

Electronic Acknowledgement Receipt

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| International Application Number: | |
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| Title of Invention: | Personalization of web search |
| First Named Inventor/Applicant Name: | Stephen R. Lawrence |
| Customer Number: | 24341 |
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| Payment Type | Deposit Account |
| Payment was successfully received in RAM | \$ 810 |
| RAM confirmation Number | 4261 |
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File Listing:

| Document Number | Document Description | File Name | File Size(Bytes) /Message Digest | Multi Part /.zip | Pages (if appl.) |
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| 1 | | 60963-0014_RCE-Response ToFOA.pdf | 237972 <small>e7ae209a32e275e8d3bafbb6fe137823 efd0aca1</small> | yes | 17 |
| Multipart Description/PDF files in .zip description | | | | | |
| Document Description | | Start | End | | |
| Request for Continued Examination (RCE) | | 1 | 1 | | |
| Amendment Submitted/Entered with Filing of CPA/RCE | | 2 | 2 | | |
| Claims | | 3 | 13 | | |
| Applicant Arguments/Remarks Made in an Amendment | | 14 | 17 | | |
| Warnings: | | | | | |
| Information: | | | | | |
| 2 | Fee Worksheet (PTO-06) | fee-info.pdf | 8162 <small>299f62d459b44288f66fd276bc286ff76f 7bdc3f</small> | no | 2 |
| Warnings: | | | | | |
| Information: | | | | | |
| Total Files Size (in bytes): | | | 246134 | | |
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| | | | |
|---|---|----------------------------------|---------------------------------------|
| PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875 | Application or Docket Number 10/676,711 | Filing Date 09/30/2003 | <input type="checkbox"/> To be Mailed |
|---|---|----------------------------------|---------------------------------------|

| APPLICATION AS FILED – PART I | | | OTHER THAN SMALL ENTITY | | | |
|---|---|--------------|---------------------------------------|----------|-----------|----------|
| | (Column 1) | (Column 2) | SMALL ENTITY <input type="checkbox"/> | OR | | |
| FOR | NUMBER FILED | NUMBER EXTRA | RATE (\$) | FEE (\$) | RATE (\$) | FEE (\$) |
| <input type="checkbox"/> BASIC FEE <small>(37 CFR 1.16(a), (b), or (c))</small> | N/A | N/A | N/A | | N/A | |
| <input type="checkbox"/> SEARCH FEE <small>(37 CFR 1.16(k), (l), or (m))</small> | N/A | N/A | N/A | | N/A | |
| <input type="checkbox"/> EXAMINATION FEE <small>(37 CFR 1.16(o), (p), or (q))</small> | N/A | N/A | N/A | | N/A | |
| TOTAL CLAIMS <small>(37 CFR 1.16(i))</small> | minus 20 = | * | X \$ = | | X \$ = | |
| INDEPENDENT CLAIMS <small>(37 CFR 1.16(h))</small> | minus 3 = | * | X \$ = | | X \$ = | |
| <input type="checkbox"/> APPLICATION SIZE FEE <small>(37 CFR 1.16(s))</small> | If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s). | | | | | |
| <input type="checkbox"/> MULTIPLE DEPENDENT CLAIM PRESENT <small>(37 CFR 1.16(j))</small> | | | | | | |
| * If the difference in column 1 is less than zero, enter "0" in column 2. | | | TOTAL | | TOTAL | |

| APPLICATION AS AMENDED – PART II | | | | | OTHER THAN SMALL ENTITY | | | | |
|----------------------------------|---|----------------------------------|------------------------------------|---------------|-------------------------|---------------------|-----------|---------------------|---|
| | (Column 1) | (Column 2) | (Column 3) | | SMALL ENTITY | OR | | | |
| AMENDMENT | 12/12/2007 | CLAIMS REMAINING AFTER AMENDMENT | HIGHEST NUMBER PREVIOUSLY PAID FOR | PRESENT EXTRA | RATE (\$) | ADDITIONAL FEE (\$) | RATE (\$) | ADDITIONAL FEE (\$) | |
| | Total <small>(37 CFR 1.16(i))</small> | * 56 | Minus | ** 58 | = | 0 | OR | X \$50= | 0 |
| | Independent <small>(37 CFR 1.16(h))</small> | * 4 | Minus | ***4 | = | 0 | OR | X \$210= | 0 |
| | <input type="checkbox"/> Application Size Fee <small>(37 CFR 1.16(s))</small> | | | | | | OR | | |
| | <input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <small>(37 CFR 1.16(j))</small> | | | | | | OR | | |
| | | | | | TOTAL ADD'L FEE | | OR | TOTAL ADD'L FEE | 0 |

| APPLICATION AS AMENDED – PART II | | | | | OTHER THAN SMALL ENTITY | | | |
|----------------------------------|---|------------------------------------|---------------|-----------|-------------------------|-----------|---------------------|-----------------|
| | (Column 1) | (Column 2) | (Column 3) | | SMALL ENTITY | OR | | |
| AMENDMENT | CLAIMS REMAINING AFTER AMENDMENT | HIGHEST NUMBER PREVIOUSLY PAID FOR | PRESENT EXTRA | RATE (\$) | ADDITIONAL FEE (\$) | RATE (\$) | ADDITIONAL FEE (\$) | |
| | Total <small>(37 CFR 1.16(i))</small> | * | Minus | ** | = | X \$ = | OR | X \$ = |
| | Independent <small>(37 CFR 1.16(h))</small> | * | Minus | *** | = | X \$ = | OR | X \$ = |
| | <input type="checkbox"/> Application Size Fee <small>(37 CFR 1.16(s))</small> | | | | | | OR | |
| | <input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <small>(37 CFR 1.16(j))</small> | | | | | | OR | |
| | | | | | TOTAL ADD'L FEE | | OR | TOTAL ADD'L FEE |

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
 ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
 *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
 The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner:
lamont mclaulhin

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**
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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|---------------------|------------------|
| 10/676,711 | 09/30/2003 | Stephen R. Lawrence | 060963-0014US | 8147 |
| 24341 | 7590 | 02/28/2008 | EXAMINER | |
| MORGAN, LEWIS & BOCKIUS, LLP. 2 PALO ALTO SQUARE 3000 EL CAMINO REAL PALO ALTO, CA 94306 | | | LU, CHARLES EDWARD | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2161 | |
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| | | | 02/28/2008 | PAPER |

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

DETAILED ACTION

1. This Action is in response to the Request for Continued examination dated 12/12/2007. Claims 1-4, 6-30, 32-46, and 48-58 are pending and rejected.

Response to Amendments/Response to Arguments

2. Applicant's arguments were fully considered but were not persuasive. Konig, previously made of record, teaches or suggests the amended claimed subject matter. The new grounds of rejection below are necessitated by amendment, but the same prior art and reasoning will be used in this Action.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Due to amendment, claims 1-4, 6-30, 32-46, and 48-58 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

As to claim 1 and the other independent claims, Applicant stated that support for the amendment can be found in previous claim 5 (Remarks, p. 13). However, the previous claim 5 and the specification does not appear to support the portion of the amendment "based on a document selected by a first user from the set of search result documents."

Dependent claims are rejected for inheriting the deficiencies of the independent claims.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

4. Claims 1-4, 6-7, 9-20, 22-24, 27-30, 32-33, 35-46, 48-49, and 51-58 are rejected under 35 U.S.C. 103(a) as being unpatentable over Breese et al (U.S. Patent 6,006,218), hereafter "Breese," in view of Konig et al (U.S. Patent 6,981,040), hereafter "Konig."

As to claim 1, Breese teaches the following claimed subject matter:

A method of personalizing search results of a search engine, comprising:
accessing a first user profile for a first user based on information about the first user (fig. 2B, #224, fig. 5, #500, col. 5, ll. 20-45),

The first user information including information derived from a first set of documents (col. 5, ll. 20-45),

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The first set of documents comprising a plurality of documents selected from the set consisting of documents identified by search results from the search engine, documents accessed by the first user, documents linked to the documents identified by search results from the search engine, and documents linked to the documents accessed by the first user (col. 5, ll. 20-45);

Receiving a search query from the first user (col. 6, ll. 60-65);

Identifying a set of generic search result documents that match the search query (fig. 2C, #230-231);

Assigning a generic score to each document of at least a plurality of the search result documents (col. 7, ll. 18-45);

Assigning a first personalized score to each document of the plurality of search result documents in accordance with the generic score assigned to the document and the first user profile (col. 7, ll. 18-45, details on col. 8-17);

Ranking the set of search result documents into a first order according to their first personalized scores (col. 7, ll. 18-45, details on col. 8-17).

Providing the ranked set of search result documents into a first order to the first user (e.g., fig. 2C, #236).

As to "receiving a search query from a second user that is different from the first user...accessing a second user profile...assigning a second personalized score...ranking the set of search results...and providing the ranked set of search results," Breese teaches the claimed subject matter because Breese deals with multiple users (fig. 5, #500), each with his own user profile (e.g., #224, #500). Thus, when a

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different user enters the same search query, Breese will still process a generic set of results as explained above, and then post-process using that user's profile (fig. 2C, #234) to re-rank the search results. See above.

Breese teaches a set of search result documents and a user profile, as described above, but does not expressly teach updating the user profile including analyzing links within a selected document and adding information derived from the analyzed links to the first user profile.

However, Konig teaches documents selected from the user and analyzing links within a selected document to update a user profile ("user model") because "during updating [of the user model], documents that are of interest to the user...are analyzed.... Through information extraction, links to other documents...are obtained.... Extracted information is processed to initialize or update the user representations in the User Model." (e.g., col. 17, l. 20 – col. 18, l. 9, also see the citations in the Prior Action for previous claim 5).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Breese such that documents selected from the user from the set of search results are analyzed and information from links extracted from the documents are used to update the user profile, as claimed. The motivation for maintaining a User Model would have been to enhance the system's knowledge of the user's interests, as taught by Konig (see e.g., Summary), and as known to one of ordinary skill in the art.

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As to claims 2 and 3, Breese as applied above does not expressly teach wherein the first set of documents includes a plurality of documents that have been identified by search results from the search engine and that have/have not been viewed by the first user.

However, Breese teaches that the user information includes previous search information (col. 5, ll. 30-33, col. 16, l. 40) and that the search information may include information on the entries that were presented to the user as a result of the search (i.e. search results). Furthermore, Breese states, "it may be assumed that the user is aware of these entries, or at least the highest ranked entries (col. 16, ll. 34-50)." The user information includes information on previous Internet site access operations (col. 5, ll. 30-35). Thus, Breese suggests that the user may have actually viewed the information because the information was presented to the user.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to further modify Breese/Konig, such that "wherein the set of documents include a plurality of documents that have been identified by search results from the search engine and that have/have not been viewed by the user" is implemented. The motivation would have been to enhance the effectiveness of the retrieval result adjustor, because data regarding actual document views would be used.

As to claims 4 and 14, Breese does not expressly teach updating the user profile by updating a term-based profile of the first user profile by identifying a set of terms from a document in the first set of documents, and adding information about the identified set of terms to the term-based profile; and updating a category-based profile

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of the first user profile by classifying the document into a plurality of categories, and adding information about the plurality of categories to the category-based profile.

However, Konig teaches updating a term-based, and category-based profile for a user with weights as claimed (col. fig. 4A, fig. 4C, col. 10, l. 51, col. 12, l. 55).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Breese/Konig, such that the claimed updating of the term-based and category-based profiles is implemented with appropriate weights associated with each item (see e.g., fig. 4). The motivation for maintaining this information (in a User Model) would have been to enhance the system's knowledge of the user's interests, as taught by Konig (see e.g., Summary), and as known to one of ordinary skill in the art. This would further enhance search results when combined with Breese.

As to claim 6, Konig as applied above further teaches wherein the information derived from the analyzed links that is added to the first user profile is added to a link-based profile and includes information about URLs or portions of URLs (fig. 4).

As to claim 7, Konig as applied above further teaches or suggests wherein the link-based profile of the first user profile comprises a plurality of URLs and a weight associated with each URL, wherein the weight is based on one or more factors selected from the group consisting of frequency with which the first user visits the URL, time the first user has spent viewing a document associated with the URL and quantity of the first user's scrolling activity at the document; and a plurality of hosts and a weight

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associated with each host, wherein the weight is based on frequency of the first user's visits to the host (col. 12, ll. 28-54, col. 23, ll. 1-10).

As to claim 9, Konig as applied above further teaches wherein a term in the term-based profile is an expression comprising at least one word and a weight (fig. 4A).

As to claim 10, Konig as applied above further teaches wherein the weight is a weight associated with occurrences of the term in the first set of documents (fig. 4, col. 10, l. 52 – col. 12, l. 55).

As to claim 11, Konig as applied above further teaches wherein the weight of a term depends at least partially on the term's term frequency and inverse document frequency in said first set of documents (col. 10, l. 52 – col. 11, l. 20).

As to claim 12, Konig as applied above further teaches wherein a category in the category-based profile characterizes at least one aspect of documents in the category and the category is associated with a weight indicative of the category's importance relative to other categories (fig. 4, 7, 8, col. 15, ll. 7-32).

As to claim 13, Konig as applied above further teaches wherein the at least one aspect of the documents in the category is selected from the group consisting of: document format, document type, document topic and document origin (e.g., col. 15, ll. 7-15 and see above).

As to claim 15, Breese as applied above discloses a first and second user profile and a search engine (fig. 1, 5), but does not expressly teach wherein the user profiles are stored on a server of the search engine.

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However, Konig teaches wherein user profiles are stored on a server of the search engine (fig. 1).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Breese, such that the user profiles are stored on a server of the search engine. The motivation would have been to adapt to the requirements of the user in setting up the search system, or to provide personalized services for simultaneous clients, as taught by Konig (col. 7, ll. 20-25).

As to claim 16, Breese as applied above further teaches wherein the first user profile is stored on a first client associated with the first user and the second user profile is stored on a second client associated with the second user (col. 4, l. 62, col. 5, ll. 1-2).

As to claim 17, Breese as applied above does not expressly teach wherein the first user profile corresponds to a respective a group of users.

However, Konig teaches wherein a user is a group of users (col. 20, ll. 24-28, col. 9, ll. 47-52).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Breese, such that the first user is a group of users. The motivation would have been to represent the interest level of a group of users in a document independently of any specific information need, as taught by Konig (col. 9, ll. 47-52).

As to claim 18, Breese teaches the following claimed subject matter:

A method of personalizing search results of a search engine, comprising:
creating a plurality of user profiles for a plurality of users, each user profile including at

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least a user's identification number and information derived from documents visited by the user (col. 5, ll. 20-45);

Receiving a search query from a user of the plurality of users, the search query including at least one query term (e.g., col. 8, ll. 62-66).

Retrieving a user profile that matches the user's identification number (e.g., col. 5, ll. 25-30, col. 8, ll. 29-31);

Selecting a personalized set of documents from the Internet, according to the personalized query strategy, each document having a generic ranking score based at least in part on the relevance of the document to the search query, assigning to each document in the set a personalized ranking score based at least in part on the user profile and the document's generic ranking score (discussed above);

Ranking the set of documents according to their generic and personalized ranking scores and providing the ranked set of search result documents to the user (see above).

Breese does not expressly teach the search query including the user's identification number.

However, Breese teaches that a user has a unique identification number for storing user attributes in a user database (col. 5, ll. 20-45), and that information regarding the user and the search to be performed is obtained at the input step 222 (col. 8, ll. 15-20, #224).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Breese, such that the search query includes the

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user's identification number in the input step. The motivation would have been to adapt to specific user requirements in setting up the search engine. For example, one may send the identification with the query to facilitate efficient processing.

Breese as applied above teaches a set of search result documents and a user profile, but does not expressly teach updating the user profile including analyzing links within a selected document and adding information derived from the analyzed links to the first user profile.

However, Konig teaches documents selected from the user and analyzing links within a selected document to update a user profile ("user model") because "during updating [of the user model], documents that are of interest to the user... are analyzed.... Through information extraction, links to other documents... are obtained.... Extracted information is processed to initialize or update the user representations in the User Model." (e.g., col. 17, l. 20 – col. 18, l. 9, also see the citations in the Prior Action for previous claim 5).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Breese such that documents selected from the user from the set of search results are analyzed and information from links extracted from the documents are used to update the user profile, as claimed. The motivation for maintaining a User Model would have been to enhance the system's knowledge of the user's interests, as taught by Konig (see e.g., Summary), and as known to one of ordinary skill in the art.

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Claims 19-20 are drawn to substantially the same subject matter as claims 4, 14, and 18 above, in addition to creating, which must happen in Konig in order to store the relevant data (see e.g., fig. 4).

As to claim 22, Breese as applied above further teaches wherein the documents visited by the user from which information is derived for use in a particular user's user profile is selected based on the user's activities when visiting the documents (e.g., col. 5, ll. 20-45).

As to claim 23, the "storing" limitation is addressed with respect to claim 15 above. Breese, as applied above, further teaches the retrieving including the user's user profile based on an identification number associated with the user and the user's profile (col. 5, ll. 23-30). Note that Breese must retrieve the data in order to process it.

Claims 24, 27-30, 32-33, 35-46, 48-49, and 51-58 are rejected on the same basis as the above claims.

5. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Breese, in view of Konig, further in view of Gerace (U.S. Patent 5,848,396), hereinafter "Gerace."

As to claim 21, Breese as applied above teaches wherein the user profile includes demographic information provided by the user (fig. 5), but Breese and Konig do not expressly teach geographic information.

However, Gerace teaches a user profile including both demographic and geographic information (col. 5, l. 63 – col. 6, l. 15).

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Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Breese and Konig, such that geographic information is additionally stored with the user profile. The motivation would have been to store more information about the user to facilitate better decisions by the information retrieval system.

6. Claims 8, 34, and 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Breese, in view of Konig, further in view of Gabriel et al (U.S. Patent 6,584,468), hereafter "Gabriel."

As to claim 8, Breese and Konig do not expressly teach wherein the URLs further include URLs that have not been visited by the first user, but are related to the URLs that have been visited by the first user and the weight of an unvisited URL depends on its distance to at least one related URLs that have been visited.

However, Gabriel teaches wherein URLs include URLs that have not been visited by a user but are related to URLs visited by a user, and the weight of an unvisited URL depends on its distance to at least one related URLs that have been visited (col. 7, l. 37 – col. 9, l. 10).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Breese and Konig, such that the above claimed subject matter is implemented. The motivation would have been to facilitate indexing relevant information, as taught throughout Gabriel (e.g., Abstract, col. 7, ll. 37-40, col. 2, ll. 34-46).

Claims 34 and 50 are rejected on the same basis as claim 8, discussed above.

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7. Claims 25-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Breese, in view of Konig, further in view of Dumais et al (US 2004/0267700), hereafter "Dumais."

As to claims 25-26, Breese as applied above further teaches wherein the ranked set of documents comprises a personalized subset of documents ordered by personalized scores and the other subset ordered by the generic ranking scores (col. 7, ll. 33-36, fig. 2C). Furthermore, Breese teaches a set of documents ordered by their generic scores (see above).

Breese and Konig do not expressly teach the ranked set of documents comprising the above two sets of documents, and interleaving the two sets to form the ranked set of documents.

However, Dumais teaches interleaving results from a personal search engine and other search results for presenting to the user (para. 0029).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Breese and Konig with the above, such that the ranked set of documents comprises the above two sets of documents, and the two sets are interleaved to form the ranked set of documents. The motivation would have been to create a personal browsing system to be a portal to all of a user's content, including personal information as well as more general resources, as taught by Dumais (para. 0029).

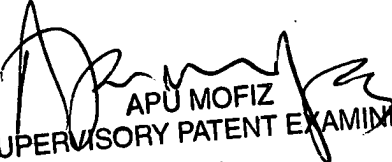
Conclusion

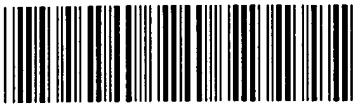
8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Charles E. Lu whose telephone number is (571) 272-8594. The examiner can normally be reached on 8:30 - 5:00; M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Apu Mofiz can be reached at (571) 272-4080. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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/Charles E Lu/
Examiner, Art Unit 2161
2/26/2008


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SUPERVISORY PATENT EXAMINER

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| Index of Claims  | Application/Control No. 10676711 | Applicant(s)/Patent Under Reexamination LAWRENCE, STEPHEN R. |
| | Examiner CHARLES E LU | Art Unit 2161 |

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| - | Cancelled |
| ÷ | Restricted |

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| N | Non-Elected |
| I | Interference |

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| A | Appeal |
| O | Objected |

Claims renumbered in the same order as presented by applicant
 CPA
 T.D.
 R.1.47

| CLAIM | | DATE | | | | | | | | | |
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| Final | Original | 02/24/2008 | | | | | | | | | |
| | 1 | ✓ | | | | | | | | | |
| | 2 | ✓ | | | | | | | | | |
| | 3 | ✓ | | | | | | | | | |
| | 4 | ✓ | | | | | | | | | |
| | 5 | - | | | | | | | | | |
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| Index of Claims  | Application/Control No. 10676711 | Applicant(s)/Patent Under Reexamination LAWRENCE, STEPHEN R. |
| | Examiner CHARLES E LU | Art Unit 2161 |

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Claims renumbered in the same order as presented by applicant
 CPA
 T.D.
 R.1.47

| CLAIM | | DATE | | | | | | | | | |
|-------|----------|------------|--|--|--|--|--|--|--|--|--|
| Final | Original | 02/24/2008 | | | | | | | | | |
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| | 38 | ✓ | | | | | | | | | |
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| | 46 | ✓ | | | | | | | | | |
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| | 48 | ✓ | | | | | | | | | |
| | 49 | ✓ | | | | | | | | | |
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| | 51 | ✓ | | | | | | | | | |
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| | 58 | ✓ | | | | | | | | | |

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| Search Notes  | Application/Control No. 10676711 | Applicant(s)/Patent Under Reexamination LAWRENCE, STEPHEN R. |
| | Examiner CHARLES E LU | Art Unit 2161 |

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| SEARCH NOTES | | | |
| Search Notes | | Date | Examiner |
| Consulted Apu Mofiz (707) | | 2/24/2008 | CL |

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| INTERFERENCE SEARCH | | | |
| Class | Subclass | Date | Examiner |
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Electronically filed May 28, 2008

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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|-----------------|---|----------------------|--------------------|
| Application of: | Stephen R. Lawrence | Confirmation No.: | 8147 |
| Serial No.: | 10/676,711 | Art Unit: | 2161 |
| Filed: | September 30, 2003 | Examiner: | Lu, Charles Edward |
| For: | <i>Personalization of Web Search Results Using Term, Category, and Link-Based User Profiles</i> | Attorney Docket No.: | 60963-0014-US |
| | | Date: | May 28, 2008 |

RESPONSE TO OFFICE ACTION

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

The enclosed Response is in response to the Office Action dated February 28, 2008 for the above identified patent application.

The Commissioner is hereby authorized to charge any required fee(s) to Morgan, Lewis & Bockius LLP Deposit Account No. 50-0310 (order no. 60963-0014-US).

IN THE CLAIMS:

Rewrite the pending claims as follows:

1. (Previously presented) A method of personalizing search results of a search engine, comprising:

accessing a first user profile for a first user based on information about the first user, the first user information including information derived from a first set of documents, the first set of documents comprising a plurality of documents selected from the set consisting of documents identified by search results from the search engine, documents accessed by the first user, documents linked to the documents identified by search results from the search engine, and documents linked to the documents accessed by the first user;

receiving a search query from the first user;

identifying a set of generic search result documents that match the search query;

assigning a generic score to each document of at least a plurality of the search result documents;

assigning a first personalized score to each document of the plurality of search result documents in accordance with the generic score assigned to the document and the first user profile;

ranking the set of search result documents into a first order according to their first personalized scores;

providing the ranked set of search result documents in the first order to the first user;

updating the first user profile based on a document selected by the first user from the set of search result documents, including analyzing links within the document and adding information derived from the analyzed links to the first user profile; and

receiving the search query from a second user that is different from the first user;

accessing a second user profile associated with the second user based on information about the second user, the second user information including information derived from a second set of documents, the second set of documents comprising a plurality of documents selected from the set consisting of documents identified by search results from the search engine, documents accessed by the second user, documents linked to the documents identified by search results from the search engine, and documents linked to the documents accessed by the second user;

assigning a second personalized score to each document of the plurality of identified search result documents in accordance with the generic score assigned to the document and the second user profile;

ranking the set of search result documents into a second order according to their second personalized scores; and

providing the ranked set of search result documents in the second order to the second user.

2. (Previously presented) The method of claim 1, wherein the first set of documents includes a plurality of documents that have been identified by search results from the search engine and that have been viewed by the first user.

3. (Previously presented) The method of claim 1, wherein the first set of documents includes a plurality of documents that have been identified by search results from the search engine and that have not been viewed by the first user.

4. (Previously presented) The method of claim 1, including updating the first user profile by:

updating a term-based profile of the first user profile by identifying a set of terms from a document in the first set of documents, and adding information about the identified set of terms to the term-based profile.

5. (Canceled)

6. (Previously presented) The method of claim 1, wherein the information derived from the analyzed links that is added to the first user profile is added to a link-based profile and includes information about URLs or portions of URLs.

7. (Previously presented) The method of claim 6, wherein the link-based profile of the first user profile comprises:

a plurality of URLs and a weight associated with each URL, wherein the weight is based on one or more factors selected from the group consisting of frequency with which the first user visits the URL, time the first user has spent viewing a document associated with the URL and quantity of the first user's scrolling activity at the document; and

a plurality of hosts and a weight associated with each host, wherein the weight is based on frequency of the first user's visits to the host.

8. (Previously presented) The method of claim 7, wherein the URLs further include URLs that have not been visited by the first user, but are related to the URLs that have been visited by the first user and the weight of an unvisited URL depends on its distance to at least one related URLs that have been visited.
9. (Previously presented) The method of claim 4, wherein a term in the term-based profile is an expression comprising at least one word and a weight.
10. (Previously presented) The method of claim 9, wherein the weight is a weight associated with occurrences of the term in the first set of documents.
11. (Previously presented) The method of claim 9, wherein the weight of a term depends at least partially on the term's term frequency and inverse document frequency in said first set of documents.
12. (Previously presented) The method of claim 14, wherein a category in the category-based profile characterizes at least one aspect of documents in the category and the category is associated with a weight indicative of the category's importance relative to other categories.
13. (Original) The method of claim 12, wherein the at least one aspect of the documents in the category is selected from the group consisting of: document format, document type, document topic and document origin.
14. (Previously presented) The method of claim 1, including updating the first user profile by:

updating a category-based profile of the first user profile by classifying a document in the first set of documents into a plurality of categories, and adding information about the plurality of categories to the category-based profile.
15. (Previously presented) The method of claim 1, wherein the first and second user profiles are stored on a server of the search engine.
16. (Previously presented) The method of claim 1, wherein the first user profile is stored on a first client associated with the first user and the second user profile is stored on a second client associated with the second user.

17. (Previously presented) The method of claim 1, wherein the first user profile corresponds to a respective group of users.
18. (Previously presented) A method of personalizing search results of a search engine, comprising:
- creating a plurality of user profiles for a plurality of users, each user profile including at least a user's identification number and information derived from documents visited by the user;
 - receiving a search query from a user of the plurality of users, the search query including at least one query term and the user's identification number;
 - retrieving a user profile that matches the user's identification number;
 - generating a personalized query strategy from the search query and the user profile;
 - selecting a personalized set of documents from the Internet according to the personalized query strategy, each document having a generic ranking score based at least in part on the relevance of the document to the search query;
 - assigning to each document in the set a personalized ranking score based at least in part on the user profile and the document's generic ranking score;
 - ranking the set of documents according to their generic and personalized ranking scores;
 - providing the ranked set of search result documents to the user; and
 - updating the first user profile based on a document selected by the first user from the set of search result documents, including analyzing links within the document and adding information derived from the analyzed links to the first user profile.
19. (Original) The method of claim 18, wherein the step of creating a user's user profile further comprises:
- creating a term-based profile by extracting a set of terms from documents visited by the user and associating a weight with each extracted term; and
 - creating a category-based profile by determining a plurality of categories associated with documents visited by the user and associating a weight with each determined category.
20. (Original) The method of claim 18, wherein the step of creating a user's user profile further comprises:

creating a link-based profile by analyzing links in documents visited by the user and associating weights with the link.

21. (Original) The method of claim 18, wherein the user profile for a particular user includes demographic and geographic information provided by the user.
22. (Original) The method of claim 18, wherein the documents visited by the user from which information is derived for use in a particular user's user profile are selected based on the user's activities when visiting the documents.
23. (Previously presented) The method of claim 18, including storing the plurality of user profiles on a server of the search engine; and
the retrieving including identifying the user's user profile based on the user identification number associated with both the user and the user's user profile.
24. (Original) The method of claim 18, including storing the plurality of user profiles on client computers associated with the plurality of users.
25. (Previously presented) The method of claim 18, wherein the ranked set of documents comprises two subsets of documents, one subset of documents ordered by their generic ranking scores and the other subset of documents ordered by personalized ranking scores.
26. (Previously presented) The method of claim 25, including interleaving or intermixing the two subsets of documents to form the ranked set of documents.
27. (Previously presented) A search engine system, comprising:
one or more central processing units for executing programs;
an interface for receiving information; and
a search engine module executable by the one or more central processing units, the module comprising:
instructions for accessing a user profile for a user, the user profile based on information about the user, the user information including information derived from a set of documents, the set of documents comprising a plurality of documents selected from the set consisting of documents identified by search results from the search engine system, documents accessed by the user, documents linked to the documents identified by search

results from the search engine system, and documents linked to the documents accessed by the user;

instructions for receiving a search query from a first user and the same search query from a second user that is different from the first user;

instructions for identifying a set of generic search result documents that match the search query;

instructions for assigning a generic score to each document of at least a plurality of the search result documents;

instructions for assigning first and second personalized scores to each document of the plurality of search result documents in accordance with the generic score assigned to the document and the first user's user profile and the second user's user profile, respectively;

instructions for ranking at least the plurality of the search result documents into first and second orders, respectively, according to their first and second personalized scores;

instructions for providing the ranked set of search result documents in the first order to the first user and the ranked set of search result documents in the second order to the second user; and

instructions for updating the first user profile based on a document selected by the first user from the set of search result documents, including analyzing links within the document and adding information derived from the analyzed links to the first user profile.

28. (Original) The system of claim 27, wherein the set of documents include a plurality of documents that have been identified by search results from the search engine and that have been viewed by the user.

29. (Original) The system of claim 27, wherein the set of documents include a plurality of documents that have been identified by search results from the search engine and that have not been viewed by the user.

30. (Original) The system of claim 27, further including:

instructions for updating a term-based profile by identifying a set of terms from a document in the set of documents, and adding information about the identified set of terms to the term-based profile; and

instructions for updating a category-based profile by classifying the document into a plurality of categories, and adding information about the plurality of categories to the category-based profile.

31. (Cancelled)

32. (Previously presented) The system of claim 27, wherein the information derived from the analyzed links that is added to the first user profile is added to a link-based profile and includes information about URLs or portions of URLs.

33. (Original) The system of claim 32, wherein the link-based profile comprises:
a plurality of URLs and a weight associated with each URL, wherein the weight is based on one or more factors selected from the group consisting of frequency with which the user visits the URL, time the user has spent viewing a document associated with the URL and quantity of the user's scrolling activity at the document; and
a plurality of hosts and a weight associated with each host, wherein the weight is based on frequency of the user's visits to the host.

34. (Original) The system of claim 33, wherein the URLs further include URLs that have not been visited by the user, but are related to the URLs that have been visited by the user and the weight of an unvisited URL depends on its distance to at least one related URLs that have been visited.

35. (Original) The system of claim 30, wherein a term in the term-based profile is an expression comprising at least one word and a weight.

36. (Original) The system of claim 35, wherein the weight is a weight associated with occurrences of the term in the set of documents.

37. (Original) The system of claim 35, wherein the weight of a term depends at least partially on the term's term frequency and inverse document frequency in said set of documents.

38. (Original) The system of claim 30, wherein a category in the category-based profile characterizes at least one aspect of documents in the category and the category is associated with a weight indicative of the category's importance relative to other categories.

39. (Original) The system of claim 38, wherein the at least one aspect of the documents in the category is selected from the group consisting of: document format, document type, document topic and document origin.

40. (Original) The system of claim 27, wherein the user profile is stored on a server of the search engine.

41. (Original) The system of claim 27, wherein the user profile is stored on a client associated with the user.

42. (Previously presented) The system of claim 27, wherein the first user's user profile corresponds to a group of users.

43. (Previously presented) A computer program product for use in conjunction with a computer system, the computer program product comprising a computer readable storage medium and a computer program mechanism embedded therein, the computer program mechanism comprising:

instructions for accessing a user profile for a user based on information about the user, the user information including information derived from a set of documents, the set of documents comprising a plurality of documents selected from the set consisting of documents identified by search results from a search engine, documents accessed by the user, documents linked to the documents identified by search results from the search engine, and documents linked to the documents accessed by the user;

instructions for receiving a search query from a first user and the same search query from a second user that is different from the first user;

instructions for identifying a set of generic search result documents that match the search query;

instructions for assigning a generic score to each document of at least a plurality of the search result documents;

instructions for assigning first and second personalized scores to each document of the plurality of search result documents in accordance with the generic score assigned to the document and the first user's user profile and the second user's user profile, respectively;

instructions for ranking at least the plurality of the search result documents into first and second orders, respectively, according to their first and second personalized scores;

instructions for providing the ranked set of search result documents in the first order to the first user and the ranked set of search result documents in the second order to the second user; and

instructions for updating the first user profile based on a document selected by the first user from the set of search result documents, including analyzing links within the document and adding information derived from the analyzed links to the first user profile.

44. (Original) The computer program product of claim 43, wherein the set of documents include a plurality of documents that have been identified by search results from the search engine and that have been viewed by the user.

45. (Original) The computer program product of claim 43, wherein the set of documents include a plurality of documents that have been identified by search results from the search engine and that have not been viewed by the user.

46. (Original) The computer program product of claim 43, further including:
instructions for updating a term-based profile by identifying a set of terms from a document in the set of documents, and adding information about the identified set of terms to the term-based profile; and
instructions for updating a category-based profile by classifying the document into a plurality of categories, and adding information about the plurality of categories to the category-based profile.

47. (Cancelled)

48. (Previously presented) The computer program product of claim 43, wherein the information derived from the analyzed links that is added to the first user profile is added to a link-based profile and includes information about URLs or portions of URLs.

49. (Original) The computer program product of claim 48, wherein the link-based profile comprises:

a plurality of URLs and a weight associated with each URL, wherein the weight is based on one or more factors selected from the group consisting of frequency with which the user visits the URL, time the user has spent viewing a document associated with the URL and quantity of the user's scrolling activity at the document; and

a plurality of hosts and a weight associated with each host, wherein the weight is based on frequency of the user's visits to the host.

50. (Original) The computer program product of claim 49, wherein the URLs further include URLs that have not been visited by the user, but are related to the URLs that have been visited by the user and the weight of an unvisited URL depends on its distance to at least one related URLs that have been visited.

51. (Original) The computer program product of claim 46, wherein a term in the term-based profile is an expression comprising at least one word and a weight.

52. (Previously presented) The computer program product of claim 51, wherein the weight is a weight associated with occurrences of the term in the set of documents.

53. (Previously presented) The computer program product of claim 51, wherein the weight of a term depends at least partially on the term's term frequency and inverse document frequency in said set of documents.

54. (Original) The computer program product of claim 46, wherein a category in the category-based profile characterizes at least one aspect of documents in the category and the category is associated with a weight indicative of the category's importance relative to other categories.

55. (Original) The computer program product of claim 54, wherein the at least one aspect of the documents in the category is selected from the group consisting of: document format, document type, document topic and document origin.

56. (Original) The computer program product of claim 43, wherein the user profile is stored on a server of the search engine.

57. (Original) The computer program product of claim 43, wherein the user profile is stored on a client associated with the user.

58. (Previously presented) The computer program product of claim 43, wherein the first user's user profile corresponds to a group of users.

REMARKS

This amendment responds to the office action mailed February 28, 2008. In the office action the Examiner:

- rejected claims 1-4, 6-30, 32-46 and 48-58 under 35 U.S.C. 112, first paragraph;
- rejected claims 1-4, 6-7, 9-20, 22-24, 27-30, 32-33, 35-46, 48-49 and 51-58 under 35 U.S.C. 103(a) as being unpatentable over Breese et al. (US 6,006,218) (hereinafter “Breese”) in view of Konig et al. (US 6,981,040) (hereinafter “Konig”);
- rejected claim 21 under 35 U.S.C. §103(a) as being unpatentable over Breese et al. (US 6,006,218) in view of Konig, further in view of Gerace (US 5,848,396) (hereinafter “Gerace”);
- rejected claims 8, 34, and 50 under 35 U.S.C. §103(a) as being unpatentable over Breese in view of Konig, further in view of Gabriel et al. (US 6,584,468) (hereinafter “Gabriel”); and
- rejected claims 25-26 under 35 U.S.C. §103(a) as being unpatentable over Breese in view of Konig, further in view of Dumais et al. (US 2004/0267700) (hereinafter “Dumais”).

In this Response, no claims have been amended, added or cancelled. The pending claims are: claims 1-4, 6-30, 32-46 and 48-58.

Claim Rejections under 35 USC 112, first paragraph

Support for the claim limitation “updating the first user profile based on a document selected by the first user from the set of search result documents, including analyzing links within the document and adding information derived from the analyzed links to the first user profile,” as recited in claim 1 can be found at least in claims 1, 4 and 5, as originally filed:

Claim 1, as originally filed, which reads as follows:

A method of personalizing search results of a search engine, comprising:

accessing a user profile for a user based on information about the user, the user information including information derived from a set of documents, *the set of documents comprising a plurality of documents selected from the set consisting of documents identified by search results from the search engine, documents accessed by the user, documents linked to the documents identified by search results from the search engine, and documents linked to the documents accessed by the user...* (Emphasis Added).

Claim 4, as originally filed, which reads as follows:

The method of claim 1, including updating the user profile by:
updating a term-based profile by identifying a set of terms from
a document in the set of documents, and adding information
about the identified set of terms to the term-based profile....
(Emphasis Added).

Claim 5, as originally filed, which reads as follows:

The method of claim 4, including updating the user profile by:
*updating a link-based profile by analyzing links in the
document*, and adding information derived from the analyzed
links to the link-based profile. (Emphasis Added).

Further, paragraph 0032 of the specification states:

*After receiving search results, the user may click on some of the
URL links, thereby downloading the documents referenced by
those links, so as to learn more details about those documents.
Certain types of general information 207 can be associated with
a set of user selected or use identified documents. For
purposes of forming a user profile, the identified documents
from which information is derived for inclusion in the user
profile may include: documents identified by search results
from the search engine, documents accessed (e.g., viewed or
downloaded, for example using a browser application) by the
user (including documents not identified in prior search
results), documents linked to the documents identified by
search results from the search engine, and documents linked to
the documents accessed by the user, or any subset of such
documents. (Emphasis added)*

Based at least on this description in the specification and the originally filed claims, Applicants respectfully submit that the afore-mentioned claim limitation of claim 1 is supported by the specification. Remaining independent claims 18, 27 and 43 recite similar limitations as those discussed with reference to claim 1. Therefore, respective claim limitations of claims 18, 27 and 43 are also supported by the specification. In light of this discussion, Applicant respectfully requests withdrawal of the rejection of claims 1, 18, 27 and 43, and associated dependent claims on these grounds.

Claim Rejections under 35 USC 103

Applicants respectfully submit that the cited references, either individually or in combination, do not teach or suggest each and every limitation of independent claims 1, 18, 27 and 43. For instance, claim 1 recites:

updating the first user profile based on a document selected by the first user from the set of search result documents, including analyzing links within the document and adding information derived from the analyzed links to the first user profile....
(emphasis added)

As acknowledged by the Examiner, Breese does not teach or suggest these limitations. (See Office Action dated 02/28/08, p. 5). The Examiner relies on Konig to teach or suggest these limitations.

However, Konig does not supply the missing limitations. Konig discloses updating a user model, using the following process:

[During] updating [of the User Model], both documents that are of interest to the user and documents that are not of interest to the user are analyzed and incorporated into the User Model. The process is as follows.... In step 84, documents 80 are parsed and separated into text, images and other non-text media 88, and formatting.... Through information extraction, links 90 to other documents ... are obtained.... Parsed portions of the documents and extracted information are processed to initialize or update the user representations in the User Model.... In step 100, the topic classifiers are applied to all extracted information and portions of documents 80 to obtain a probability distribution $P(t|d)$ for each document on each node of the topic tree. (Konig, col. 17, line 50 to col. 18, line 20); Emphasis Added.

Thus, Konig only discloses parsing a document for hyperlinks, and estimating for each of the hyperlinks a probability that the hyperlink is of interest to a user. Konig further discloses what is done with the estimated probabilities:

A variety of personalized information services are provided using the estimated probabilities. In one application, network documents are crawled and parsed for links, and probable interest of the user in the links is calculated using the learning machine. Links likely to be of interest to the user are followed. (Konig, col. 5, lines 48-53); see also Figure 20.

Thus, Konig only discloses parsing crawled documents for links, calculating probable user interest in the parsed links using the learning machine, and preferentially following links likely to be of interest to the user. Konig is silent regarding and does not teach or suggest *analyzing links within the document and adding information derived from the analyzed links to the first user profile*, as claimed.

Further, none of Gerace, Gabriel and Dumais supplies the missing limitations. None of Gerace, Gabriel and Dumais teaches or suggests “updating the first user profile based on a

document selected by the first user from the set of search result documents, including analyzing links within the document and adding information derived from the analyzed links to the first user profile,” as claimed.

As none of the cited references teach each and every limitation of claim 1, claim 1 (and associated dependent claims) are patentable over the cited references. Independent claims 18, 27 and 43 recite similar limitations as those discussed with reference to claim 1. Therefore, claims 18, 27 and 43 and associated dependent claims are also patentable over the cited references.

With respect to claim 18 and its dependent claims, (as explained in more detail below) Breese and Konig do not teach (A) “generating a personalized query strategy from the search query and the user profile;” and then (B) “selecting a personalized set of documents from the Internet according to the personalized query strategy.” In both Breese and Konig, personalized information is used only to “post process” results produced by a search engine in response to a search query. See, for example, Fig. 19 of Konig and Fig. 2C (operations 230, 231 and 234, in that order) of Breese. In Breese, the very name of the “retrieval result adjusting module” 134, as well as the explanatory text at col. 6, ln 60-66, and col. 12, lines 32-48, teaches that the retrieval result adjusting module 134 of Breese ranks or re-ranks search results. But there is no discussion in Breese whatsoever about changing the search query or search query strategy used to produce a list of search results.

It is noted that in claim 18, the personalized search query is generated prior to “selecting a personalized set of documents” because the “selecting” is performed “according to the personalized search strategy.” Also, claim 18 requires the “personalized search strategy” is generated not just from the user profile, but also “from the search query.” These aspects of claim 18, and its dependent claims, are not taught by Breese and Konig. For at least these additional reasons, claims 18 and its dependent claims are patentable over the combined teaches of the cited references.

In light of the above remarks, the Applicant respectfully requests that the Examiner reconsider this application with a view towards allowance. The Examiner is invited to call the undersigned attorney at (650) 843-4000, if a telephone call could help resolve any remaining items.

Respectfully submitted,

Date: May 28, 2008

/ Gary S. Williams /

31,066

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Electronic Acknowledgement Receipt

| | |
|---|-------------------------------------|
| EFS ID: | 3370914 |
| Application Number: | 10676711 |
| International Application Number: | |
| Confirmation Number: | 8147 |
| Title of Invention: | Personalization of web search |
| First Named Inventor/Applicant Name: | Stephen R. Lawrence |
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| Filer: | Gary Scott Williams/Beverly Gemello |
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| Document Number | Document Description | File Name | File Size(Bytes) /Message Digest | Multi Part /.zip | Pages (if appl.) |
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| 1 | | 60963-0014_ResponseToO A.pdf | 163543 <small>fa73562654dfe082ae27b02900051d13 39c04229</small> | yes | 16 |

| Multipart Description/PDF files in .zip description | | | |
|--|--|--------------|------------|
| Document Description | | Start | End |
| Amendment - After Non-Final Rejection | | 1 | 1 |
| Claims | | 2 | 11 |
| Applicant Arguments/Remarks Made in an Amendment | | 12 | 16 |

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If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

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If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

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| | | | |
|---|---|----------------------------------|---------------------------------------|
| PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875 | Application or Docket Number 10/676,711 | Filing Date 09/30/2003 | <input type="checkbox"/> To be Mailed |
|---|---|----------------------------------|---------------------------------------|

| APPLICATION AS FILED – PART I | | | OTHER THAN SMALL ENTITY | | | | |
|--|---|--------------|---------------------------------------|----------|----|-----------|----------|
| | (Column 1) | (Column 2) | SMALL ENTITY <input type="checkbox"/> | OR | | | |
| FOR | NUMBER FILED | NUMBER EXTRA | RATE (\$) | FEE (\$) | | RATE (\$) | FEE (\$) |
| <input type="checkbox"/> BASIC FEE <small>(37 CFR 1.16(a), (b), or (c))</small> | N/A | N/A | N/A | | OR | N/A | |
| <input type="checkbox"/> SEARCH FEE <small>(37 CFR 1.16(k), (l), or (m))</small> | N/A | N/A | N/A | | OR | N/A | |
| <input type="checkbox"/> EXAMINATION FEE <small>(37 CFR 1.16(o), (p), or (q))</small> | N/A | N/A | N/A | | OR | N/A | |
| TOTAL CLAIMS <small>(37 CFR 1.16(i))</small> | minus 20 = | * | X \$ = | | OR | X \$ = | |
| INDEPENDENT CLAIMS <small>(37 CFR 1.16(h))</small> | minus 3 = | * | X \$ = | | OR | X \$ = | |
| <input type="checkbox"/> APPLICATION SIZE FEE <small>(37 CFR 1.16(s))</small> | If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s). | | | | OR | | |
| <input type="checkbox"/> MULTIPLE DEPENDENT CLAIM PRESENT <small>(37 CFR 1.16(j))</small> | | | | | OR | | |
| * If the difference in column 1 is less than zero, enter "0" in column 2. | | | TOTAL | | OR | TOTAL | |

| APPLICATION AS AMENDED – PART II | | | | | OTHER THAN SMALL ENTITY | | | | |
|----------------------------------|--|----------------------------------|------------------------------------|---------------|-------------------------|---------------------|----|-----------------|---------------------|
| | (Column 1) | (Column 2) | (Column 3) | | SMALL ENTITY | OR | | | |
| AMENDMENT | 05/28/2008 | CLAIMS REMAINING AFTER AMENDMENT | HIGHEST NUMBER PREVIOUSLY PAID FOR | PRESENT EXTRA | RATE (\$) | ADDITIONAL FEE (\$) | | RATE (\$) | ADDITIONAL FEE (\$) |
| | Total (37 CFR 1.16(i)) | * 55 | Minus | ** 58 | = | 0 | OR | X \$50= | 0 |
| | Independent (37 CFR 1.16(h)) | * 4 | Minus | ***4 | = | 0 | OR | X \$210= | 0 |
| | <input type="checkbox"/> Application Size Fee (37 CFR 1.16(s)) | | | | | | OR | | |
| | <input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j)) | | | | | | OR | | |
| | | | | | TOTAL ADD'L FEE | | OR | TOTAL ADD'L FEE | 0 |

| | (Column 1) | (Column 2) | (Column 3) | | SMALL ENTITY | OR | | |
|-----------|--|------------------------------------|---------------|-----------|---------------------|----|-----------|---------------------|
| AMENDMENT | CLAIMS REMAINING AFTER AMENDMENT | HIGHEST NUMBER PREVIOUSLY PAID FOR | PRESENT EXTRA | RATE (\$) | ADDITIONAL FEE (\$) | | RATE (\$) | ADDITIONAL FEE (\$) |
| | Total (37 CFR 1.16(i)) | * | Minus | ** | = | | OR | X \$ = |
| | Independent (37 CFR 1.16(h)) | * | Minus | *** | = | | OR | X \$ = |
| | <input type="checkbox"/> Application Size Fee (37 CFR 1.16(s)) | | | | | | OR | |
| | <input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j)) | | | | | | OR | |
| | | | | | TOTAL ADD'L FEE | | OR | TOTAL ADD'L FEE |

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
 ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
 *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

Legal Instrument Examiner:
 /CATHERINE d. SMITH/

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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| MORGAN, LEWIS & BOCKIUS, LLP. 2 PALO ALTO SQUARE 3000 EL CAMINO REAL PALO ALTO, CA 94306 | | | LU, CHARLES EDWARD | |
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

DETAILED ACTION

1. This Action is in response to the Amendment dated 5/28/2008. Claims 1-4, 6-30, 32-46, and 48-58 are pending and rejected.

Response to Amendments/Response to Arguments

Applicant's remarks were fully considered.

35 USC 112, first paragraph rejection

2. The 35 USC 112, first paragraph rejection is withdrawn in view of Applicant's remarks.

35 USC 103(a) rejection

3. The 35 USC 103(a) rejection of the claims is maintained.

Applicant argues that Konig does not teach or suggest "analyzing links within the document and adding information derived from the analyzed links to the first user profile" (Remarks, p. 14, bottom). The examiner respectfully disagrees.

Konig teaches or suggests the claimed subject matter. Konig teaches that links are obtained from the document. Konig further teaches parsing the document. The parsed portions are understood to include the links at least because the links must be obtained through parsing the document (in order to obtain the link from the document). Finally, the parsed portions are processed to update the User Model ("user profile") (see Remarks, p. 14, middle). Thus, Konig teaches or suggests analyzing links from a document and adding information derived from the links to a user profile, as claimed.

Applicant further argues that Breese and Konig do not teach or suggest “generating a personalized query strategy from the search query and the user profile” and “selecting a personalized set of documents from the Internet according to the personalized query strategy” (Remarks, p. 15, middle). The examiner respectfully disagrees.

Breese and Konig teaches or suggests the claimed subject matter. Personalized information is used at least to “post process” results produced by a search engine, and to re-rank search results according to the personal information, in response to a search query (Remarks, p. 15, middle). This understanding of the prior art meets all of the argued claim limitations. Furthermore, it should be noted that “changing” the search query or search query strategy is not claimed. The broadest reasonable interpretation in light of the specification has been given to the claims, and limitations from the specification are not read into the claims.

For at least the above reasons, the prior art rejection of the claims is maintained.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

4. Claims 1-4, 6-7, 9-20, 22-24, 27-30, 32-33, 35-46, 48-49, and 51-58 are rejected under 35 U.S.C. 103(a) as being unpatentable over Breese et al (U.S. Patent 6,006,218), hereafter “Breese,” in view of Konig et al (U.S. Patent 6,981,040), hereafter “Konig.”

As to claim 1, Breese teaches the following claimed subject matter:

A method of personalizing search results of a search engine, comprising:
accessing a first user profile for a first user based on information about the first user (fig. 2B, #224, fig. 5, #500, col. 5, ll. 20-45),

The first user information including information derived from a first set of documents (col. 5, ll. 20-45),

The first set of documents comprising a plurality of documents selected from the set consisting of documents identified by search results from the search engine, documents accessed by the first user, documents linked to the documents identified by search results from the search engine, and documents linked to the documents accessed by the first user (col. 5, ll. 20-45);

Receiving a search query from the first user (col. 6, ll. 60-65);

Identifying a set of generic search result documents that match the search query (fig. 2C, #230-231);

Assigning a generic score to each document of at least a plurality of the search result documents (col. 7, ll. 18-45);

Assigning a first personalized score to each document of the plurality of search result documents in accordance with the generic score assigned to the document and the first user profile (col. 7, ll. 18-45, details on col. 8-17);

Ranking the set of search result documents into a first order according to their first personalized scores (col. 7, ll. 18-45, details on col. 8-17).

Providing the ranked set of search result documents into a first order to the first user (e.g., fig. 2C, #236).

As to “receiving a search query from a second user that is different from the first user...accessing a second user profile...assigning a second personalized score...ranking the set of search results...and providing the ranked set of search results,” Breese teaches the claimed subject matter because Breese deals with multiple users (fig. 5, #500), each with his own user profile (e.g., #224, #500). Thus, when a different user enters the same search query, Breese will still process a generic set of results as explained above, and then post-process using that user’s profile (fig. 2C, #234) to re-rank the search results. See above.

Breese teaches a set of search result documents and a user profile, as described above, but does not expressly teach updating the user profile including analyzing links within a selected document and adding information derived from the analyzed links to the first user profile.

However, Konig teaches documents selected from the user and analyzing links within a selected document to update a user profile (“user model”) because “during updating [of the user model], documents that are of interest to the user...are analyzed.... Through information extraction, links to other documents...are obtained.... Extracted information is processed to initialize or update the user representations in the User Model.” (e.g., col. 17, l. 20 – col. 18, l. 9, also see the citations in the Prior Action for previous claim 5).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Breese such that documents selected from the user from the set of search results are analyzed and information from links extracted from the documents are used to update the user profile, as claimed. The motivation for maintaining a User Model would have been to enhance the system's knowledge of the user's interests, as taught by Konig (see e.g., Summary), and as known to one of ordinary skill in the art.

As to claims 2 and 3, Breese as applied above does not expressly teach wherein the first set of documents includes a plurality of documents that have been identified by search results from the search engine and that have/have not been viewed by the first user.

However, Breese teaches that the user information includes previous search information (col. 5, ll. 30-33, col. 16, l. 40) and that the search information may include information on the entries that were presented to the user as a result of the search (i.e. search results). Furthermore, Breese states, "it may be assumed that the user is aware of these entries, or at least the highest ranked entries (col. 16, ll. 34-50)." The user information includes information on previous Internet site access operations (col. 5, ll. 30-35). Thus, Breese suggests that the user may have actually viewed the information because the information was presented to the user.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to further modify Breese/Konig, such that "wherein the set of documents include a plurality of documents that have been identified by search

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results from the search engine and that have/have not been viewed by the user” is implemented. The motivation would have been to enhance the effectiveness of the retrieval result adjustor, because data regarding actual document views would be used.

As to claims 4 and 14, Breese does not expressly teach updating the user profile by updating a term-based profile of the first user profile by identifying a set of terms from a document in the first set of documents, and adding information about the identified set of terms to the term-based profile; and updating a category-based profile of the first user profile by classifying the document into a plurality of categories, and adding information about the plurality of categories to the category-based profile.

However, Konig teaches updating a term-based, and category-based profile for a user with weights as claimed (col. fig. 4A, fig. 4C, col. 10, l. 51, col. 12, l. 55).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Breese/Konig, such that the claimed updating of the term-based and category-based profiles is implemented with appropriate weights associated with each item (see e.g., fig. 4). The motivation for maintaining this information (in a User Model) would have been to enhance the system's knowledge of the user's interests, as taught by Konig (see e.g., Summary), and as known to one of ordinary skill in the art. This would further enhance search results when combined with Breese.

As to claim 6, Konig as applied above further teaches wherein the information derived from the analyzed links that is added to the first user profile is added to a link-based profile and includes information about URLs or portions of URLs (fig. 4).

As to claim 7, König as applied above further teaches or suggests wherein the link-based profile of the first user profile comprises a plurality of URLs and a weight associated with each URL, wherein the weight is based on one or more factors selected from the group consisting of frequency with which the first user visits the URL, time the first user has spent viewing a document associated with the URL and quantity of the first user's scrolling activity at the document; and a plurality of hosts and a weight associated with each host, wherein the weight is based on frequency of the first user's visits to the host (col. 12, ll. 28-54, col. 23, ll. 1-10).

As to claim 9, König as applied above further teaches wherein a term in the term-based profile is an expression comprising at least one word and a weight (fig. 4A).

As to claim 10, König as applied above further teaches wherein the weight is a weight associated with occurrences of the term in the first set of documents (fig. 4, col. 10, l. 52 – col. 12, l. 55).

As to claim 11, König as applied above further teaches wherein the weight of a term depends at least partially on the term's term frequency and inverse document frequency in said first set of documents (col. 10, l. 52 – col. 11, l. 20).

As to claim 12, König as applied above further teaches wherein a category in the category-based profile characterizes at least one aspect of documents in the category and the category is associated with a weight indicative of the category's importance relative to other categories (fig. 4, 7, 8, col. 15, ll. 7-32).

As to claim 13, König as applied above further teaches wherein the at least one aspect of the documents in the category is selected from the group consisting of:

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document format, document type, document topic and document origin (e.g., col. 15, ll. 7-15 and see above).

As to claim 15, Breese as applied above discloses a first and second user profile and a search engine (fig. 1, 5), but does not expressly teach wherein the user profiles are stored on a server of the search engine.

However, Konig teaches wherein user profiles are stored on a server of the search engine (fig. 1).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Breese, such that the user profiles are stored on a server of the search engine. The motivation would have been to adapt to the requirements of the user in setting up the search system, or to provide personalized services for simultaneous clients, as taught by Konig (col. 7, ll. 20-25).

As to claim 16, Breese as applied above further teaches wherein the first user profile is stored on a first client associated with the first user and the second user profile is stored on a second client associated with the second user (col. 4, l. 62, col. 5, ll. 1-2).

As to claim 17, Breese as applied above does not expressly teach wherein the first user profile corresponds to a respective a group of users.

However, Konig teaches wherein a user is a group of users (col. 20, ll. 24-28, col. 9, ll. 47-52).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Breese, such that the first user is a group of users. The motivation would have been to represent the interest level of a group of

users in a document independently of any specific information need, as taught by Konig (col. 9, ll. 47-52).

As to claim 18, Breese teaches the following claimed subject matter:

A method of personalizing search results of a search engine, comprising:
creating a plurality of user profiles for a plurality of users, each user profile including at least a user's identification number and information derived from documents visited by the user (col. 5, ll. 20-45);

Receiving a search query from a user of the plurality of users, the search query including at least one query term (e.g., col. 8, ll. 62-66).

Retrieving a user profile that matches the user's identification number (e.g., col. 5, ll. 25-30, col. 8, ll. 29-31);

Selecting a personalized set of documents from the Internet, according to the personalized query strategy, each document having a generic ranking score based at least in part on the relevance of the document to the search query, assigning to each document in the set a personalized ranking score based at least in part on the user profile and the document's generic ranking score (discussed above);

Ranking the set of documents according to their generic and personalized ranking scores and providing the ranked set of search result documents to the user (see above).

Breese does not expressly teach the search query including the user's identification number.

However, Breese teaches that a user has a unique identification number for storing user attributes in a user database (col. 5, ll. 20-45), and that information regarding the user and the search to be performed is obtained at the input step 222 (col. 8, ll. 15-20, #224).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Breese, such that the search query includes the user's identification number in the input step. The motivation would have been to adapt to specific user requirements in setting up the search engine. For example, one may send the identification with the query to facilitate efficient processing.

Breese as applied above teaches a set of search result documents and a user profile, but does not expressly teach updating the user profile including analyzing links within a selected document and adding information derived from the analyzed links to the first user profile.

However, Konig teaches documents selected from the user and analyzing links within a selected document to update a user profile ("user model") because "during updating [of the user model], documents that are of interest to the user...are analyzed.... Through information extraction, links to other documents...are obtained.... Extracted information is processed to initialize or update the user representations in the User Model." (e.g., col. 17, l. 20 – col. 18, l. 9, also see the citations in the Prior Action for previous claim 5).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Breese such that documents selected from the

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user from the set of search results are analyzed and information from links extracted from the documents are used to update the user profile, as claimed. The motivation for maintaining a User Model would have been to enhance the system's knowledge of the user's interests, as taught by Konig (see e.g., Summary), and as known to one of ordinary skill in the art.

Claims 19-20 are drawn to substantially the same subject matter as claims 4, 14, and 18 above, in addition to creating, which must happen in Konig in order to store the relevant data (see e.g., fig. 4).

As to claim 22, Breese as applied above further teaches wherein the documents visited by the user from which information is derived for use in a particular user's user profile is selected based on the user's activities when visiting the documents (e.g., col. 5, ll. 20-45).

As to claim 23, the "storing" limitation is addressed with respect to claim 15 above. Breese, as applied above, further teaches the retrieving including the user's user profile based on an identification number associated with the user and the user's profile (col. 5, ll. 23-30). Note that Breese must retrieve the data in order to process it.

Claims 24, 27-30, 32-33, 35-46, 48-49, and 51-58 are rejected on the same basis as the above claims.

5. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Breese, in view of Konig, further in view of Gerace (U.S. Patent 5,848,396), hereinafter "Gerace."

As to claim 21, Breese as applied above teaches wherein the user profile includes demographic information provided by the user (fig. 5), but Breese and Konig do not expressly teach geographic information.

However, Gerace teaches a user profile including both demographic and geographic information (col. 5, l. 63 – col. 6, l. 15).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Breese and Konig, such that geographic information is additionally stored with the user profile. The motivation would have been to store more information about the user to facilitate better decisions by the information retrieval system.

6. Claims 8, 34, and 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Breese, in view of Konig, further in view of Gabriel et al (U.S. Patent 6,584,468), hereafter “Gabriel.”

As to claim 8, Breese and Konig do not expressly teach wherein the URLs further include URLs that have not been visited by the first user, but are related to the URLs that have been visited by the first user and the weight of an unvisited URL depends on its distance to at least one related URLs that have been visited.

However, Gabriel teaches wherein URLs include URLs that have not been visited by a user but are related to URLs visited by a user, and the weight of an unvisited URL depends on its distance to at least one related URLs that have been visited (col. 7, l. 37 – col. 9, l. 10).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Breese and Konig, such that the above claimed subject matter is implemented. The motivation would have been to facilitate indexing relevant information, as taught throughout Gabriel (e.g., Abstract, col. 7, ll. 37-40, col. 2, ll. 34-46).

Claims 34 and 50 are rejected on the same basis as claim 8, discussed above.

7. Claims 25-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Breese, in view of Konig, further in view of Dumais et al (US 2004/0267700), hereafter "Dumais."

As to claims 25-26, Breese as applied above further teaches wherein the ranked set of documents comprises a personalized subset of documents ordered by personalized scores and the other subset ordered by the generic ranking scores (col. 7, ll. 33-36, fig. 2C). Furthermore, Breese teaches a set of documents ordered by their generic scores (see above).

Breese and Konig do not expressly teach the ranked set of documents comprising the above two sets of documents, and interleaving the two sets to form the ranked set of documents.

However, Dumais teaches interleaving results from a personal search engine and other search results for presenting to the user (para. 0029).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Breese and Konig with the above, such that the ranked set of documents comprises the above two sets of documents, and the two sets

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are interleaved to form the ranked set of documents. The motivation would have been to create a personal browsing system to be a portal to all of a user's content, including personal information as well as more general resources, as taught by Dumais (para. 0029).

Conclusion

8. Applicant's arguments were fully considered but were not persuasive.

Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Charles E. Lu whose telephone number is (571) 272-8594. The examiner can normally be reached on 8:30 - 5:00; M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Apu Mofiz can be reached at (571) 272-4080. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2161

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Charles E Lu/
Examiner, Art Unit 2161
7/21/2008

/Apu M Mofiz/
Supervisory Patent Examiner, Art Unit 2161

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|-----------------------------------|---------------------------------------|---|-------------|
| Notice of References Cited | Application/Control No. 10/676,711 | Applicant(s)/Patent Under Reexamination LAWRENCE, STEPHEN R. | |
| | Examiner CHARLES E. LU | Art Unit 2161 | Page 1 of 1 |

U.S. PATENT DOCUMENTS

| * | Document Number Country Code-Number-Kind Code | Date MM-YYYY | Name | Classification |
|---|--|-----------------|------|----------------|
| | A US- | | | |
| | B US- | | | |
| | C US- | | | |
| | D US- | | | |
| | E US- | | | |
| | F US- | | | |
| | G US- | | | |
| | H US- | | | |
| | I US- | | | |
| | J US- | | | |
| | K US- | | | |
| | L US- | | | |
| | M US- | | | |


FOREIGN PATENT DOCUMENTS

| * | Document Number Country Code-Number-Kind Code | Date MM-YYYY | Country | Name | Classification |
|---|--|-----------------|---------|------|----------------|
| | N | | | | |
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NON-PATENT DOCUMENTS

| * | Document Number Country Code-Number-Kind Code | Date MM-YYYY | Country | Name | Classification |
|---|--|---|---------|------|----------------|
| | | Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages) | | | |
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*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

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| Index of Claims  | Application/Control No. 10676711 | Applicant(s)/Patent Under Reexamination LAWRENCE, STEPHEN R. |
| | Examiner CHARLES E LU | Art Unit 2161 |

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| - | Cancelled |
| ÷ | Restricted |

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| N | Non-Elected |
| I | Interference |

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| A | Appeal |
| O | Objected |

Claims renumbered in the same order as presented by applicant
 CPA
 T.D.
 R.1.47

| CLAIM | | DATE | | | | | | | |
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| Final | Original | 02/24/2008 | 07/11/2008 | | | | | | |
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| Index of Claims  | Application/Control No. 10676711 | Applicant(s)/Patent Under Reexamination LAWRENCE, STEPHEN R. |
| | Examiner CHARLES E LU | Art Unit 2161 |

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| I | Interference |

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| A | Appeal |
| O | Objected |

Claims renumbered in the same order as presented by applicant
 CPA
 T.D.
 R.1.47

| CLAIM | | DATE | | | | | | | |
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| Final | Original | 02/24/2008 | 07/11/2008 | | | | | | |
| | 37 | ✓ | ✓ | | | | | | |
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| | 39 | ✓ | ✓ | | | | | | |
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| | 58 | ✓ | ✓ | | | | | | |

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| Search Notes  | Application/Control No. 10676711 | Applicant(s)/Patent Under Reexamination LAWRENCE, STEPHEN R. |
| | Examiner CHARLES E LU | Art Unit 2161 |

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| SEARCHED | | | |
| Class | Subclass | Date | Examiner |
| 707 | 3 | 7/11/2008 | CL |

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| SEARCH NOTES | | |
| Search Notes | Date | Examiner |
| Consulted Apu Mofiz (707) | 2/24/2008 | CL |
| Updated EAST cls/sub + keywords | 7/11/2008 | CL |

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| INTERFERENCE SEARCH | | | |
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EAST Search History

| Ref # | Hits | Search Query | DBs | Default Operator | Plurals | Time Stamp |
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| L1 | 10275 | 707/3.ccls. | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2008/07/11 11:10 |
| L2 | 854 | l1 and user adj profile | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2008/07/11 11:10 |
| L3 | 237 | l2 and scor\$4 and rank\$4 | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2008/07/11 11:10 |
| L4 | 209 | l3 and (link hyperlink) | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2008/07/11 11:11 |
| L5 | 81 | l4 and (term same profile) | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2008/07/11 11:11 |

7/11/2008 11:12:01 AM

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Personalization of web search.wsp

REQUEST FOR CONTINUED EXAMINATION (RCE) TRANSMITTAL

Address to:
Mail Stop RCE
Commissioner of Patents
P.O. Box 1450
Alexandria, VA 22313-1450

| | |
|----------------------|---------------------|
| Electronically filed | November 21, 2008 |
| Application Number | 10/676,711 |
| Filing Date | September 30, 2003 |
| First Named Inventor | Stephen R. Lawrence |
| Art Unit | 2161 |
| Examiner Name | Lu, Charles Edward |
| Attorney Docket No. | 60963-0014-US |

This is a Request for Continued Examination (RCE) under 37 C.F.R. § 1.114 of the above-identified application. Request for Continued Examination (RCE) practice under 37 CFR 1.114 does not apply to any utility or plant application filed prior to June 8, 1995, or to any design application.

1. **Submission required under 37 C.F.R. § 1.114**

- a. Previously submitted
- i. Consider the amendment(s)/reply under 37 C.F.R. § 1.116 previously filed on ____
(Any unentered amendment(s) referred to above will be entered).
- ii. Consider the arguments in the Appeal Brief or Reply Brief previously filed ____
- iii. Other ____
- b. Enclosed
- i. Amendment/Reply
- ii. Affidavit(s)/Declaration(s)
- iii. Information Disclosure Statement (IDS)
- iv. Other ____

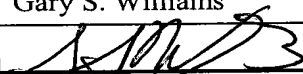
2. **Miscellaneous**

- a. Suspension of action on the above-identified application is requested under 37 C.F.R. § 1.103(c) for a period of ____ months.
(Period of suspension shall not exceed 3 months; Fee under 37 C.F.R. § 1.17(i) required)
- b. Other ____

3. **Fees** The RCE fee under 37 C.F.R. § 1.17(e) is required by 37 C.F.R. § 1.114 when the RCE is filed

- a. The Director is hereby authorized to charge the following fees, or credit any overpayments, to Morgan, Lewis & Bockius LLP Deposit Account No. 50-0310 (order no. 60963-0014-US).
- i. RCE fee required under 37 C.F.R. § 1.17(e), estimated to be \$ 810 (large entity) or \$405 (small entity)
- ii. Extension of time fee required under 37 C.F.R. §§ 1.136 and 1.17, estimated to be \$ 130 for a one (1) month(s) extension, the request for which is being made herewith
- iii. Other ____
- b. Check in the amount of \$ ____ enclosed
- c. Payment by credit card (Form PTO-2038 enclosed)

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

| | | | |
|-------------------|---|-----------------------------------|-------------------|
| Name (Print/Type) | Gary S. Williams | Registration No. (Attorney/Agent) | 31,066 |
| Signature |  | Date | November 21, 2008 |

CERTIFICATE OF MAILING OR TRANSMISSION

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Mail Stop RCE, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, or by facsimile transmitted to fax no. 1-703-____ to the U.S. Patent and Trademark Office on the date indicated below.

| | | | |
|-------------------|--|-----------------------------------|--|
| Name (Print/Type) | | Registration No. (Attorney/Agent) | |
| Signature | | Date | |

This collection of information is required by 37 CFR 1.114. This information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND Fees and Completed Forms to the following address: Mail Stop RCE, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Electronically filed November 21, 2008

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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|-----------------|---|----------------------|--------------------|
| Application of: | Stephen R. Lawrence | Confirmation No.: | 8147 |
| Serial No.: | 10/676,711 | Art Unit: | 2161 |
| Filed: | September 30, 2003 | Examiner: | Lu, Charles Edward |
| For: | <i>Personalization of Web Search Results Using Term, Category, and Link-Based User Profiles</i> | Attorney Docket No.: | 60963-0014-US |
| | | Date: | November 21, 2008 |

RESPONSE TO FINAL OFFICE ACTION

FILED WITH REQUEST FOR CONTINUED EXAMINATION

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

The enclosed Response is in response to the Final Office Action dated July 21, 2008 for the above identified patent application.

Petition for Extension of Time under 37 CFR 1.136. It is respectfully requested that the time for response to the Final Office Action dated July 21, 2008 be extended for a period of 1 month from October 21, 2008 to November 21, 2008.

The Commissioner is hereby authorized to charge any required fee(s) to Morgan, Lewis & Bockius LLP Deposit Account No. 50-0310 (order no. 60963-0014-US).

Amendments to the Claims

The following listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A computer-implemented method of personalizing search results of a search engine, comprising:

accessing a [[first]] user profile for a [[first]] user based on user information about the [[first]] user, the [[first]] user information including information derived from a first set of documents, the first set of documents comprising a plurality of documents selected from the set consisting of: documents identified by search results from the search engine, documents accessed by the [[first]] user, documents linked to the documents identified by search results from the search engine, and documents linked to the documents accessed by the [[first]] user, wherein the user information includes information derived from anchor text contained in documents that link to the documents accessed by the user;

receiving a search query from the [[first]] user;

identifying a set of generic search result documents that match the search query;

assigning a generic score to each document of at least a plurality subset of the set of search result documents;

assigning a [[first]] personalized score to each document of the plurality subset of search result documents in accordance with the generic score assigned to the document and the [[first]] user profile;

ranking the subset of search result documents ~~into a first order~~ according to their respective [[first]] personalized scores;

providing the ranked subset of search result documents ~~in the first order~~ to the [[first]] user; and

updating the [[first]] user profile based on a document selected by the [[first]] user from the ranked subset of search result documents, ~~including analyzing links within the document and adding information derived from the analyzed links to the first user profile;~~ and

~~receiving the search query from a second user that is different from the first user;~~

~~accessing a second user profile associated with the second user based on information about the second user, the second user information including information derived from a second set of documents, the second set of documents comprising a plurality of documents~~

~~selected from the set consisting of documents identified by search results from the search engine, documents accessed by the second user, documents linked to the documents identified by search results from the search engine, and documents linked to the documents accessed by the second user;~~

~~assigning a second personalized score to each document of the plurality of identified search result documents in accordance with the generic score assigned to the document and the second user profile;~~

~~ranking the set of search result documents into a second order according to their second personalized scores; and~~

~~providing the ranked set of search result documents in the second order to the second user.~~

2. (Currently Amended) The method of claim 1, wherein the first set of documents includes a plurality of documents that have been identified by search results from the search engine and that have been viewed by the [[first]] user.

3. (Currently Amended) The method of claim 1, wherein the first set of documents includes a plurality of documents that have been identified by search results from the search engine and that have not been viewed by the [[first]] user.

4. (Currently Amended) The method of claim 1, including updating the [[first]] user profile by:

updating a term-based profile of the [[first]] user profile by identifying a set of terms from a document in the first set of documents, and adding information about the identified set of terms to the term-based profile.

5. (Canceled)

6. (Currently Amended) The method of claim 59 [[1]], wherein the information derived from the analyzed links that is added to the [[first]] user profile is added to a link-based profile and includes information about URLs or portions of URLs.

7. (Currently Amended) The method of claim 6, wherein the link-based profile of the [[first]] user profile comprises:

a plurality of URLs and a weight associated with each URL, wherein the weight is based on one or more factors selected from the group consisting of frequency with which the

[[first]] user visits the URL, time the [[first]] user has spent viewing a document associated with the URL and quantity of the [[first]] user's scrolling activity at the document; and a plurality of hosts and a weight associated with each host, wherein the weight is based on frequency of the [[first]] user's visits to the host.

8. (Currently Amended) The method of claim 7, wherein the URLs further include URLs that have not been visited by the [[first]] user, but are related to the URLs that have been visited by the [[first]] user and the weight of an unvisited URL depends on its distance to at least one related URLs that have been visited.

9. (Previously presented) The method of claim 4, wherein a term in the term-based profile is an expression comprising at least one word and a weight.

10. (Previously presented) The method of claim 9, wherein the weight is a weight associated with occurrences of the term in the first set of documents.

11. (Previously presented) The method of claim 9, wherein the weight of a term depends at least partially on the term's term frequency and inverse document frequency in said first set of documents.

12. (Previously presented) The method of claim 14, wherein a category in the category-based profile characterizes at least one aspect of documents in the category and the category is associated with a weight indicative of the category's importance relative to other categories.

13. (Original) The method of claim 12, wherein the at least one aspect of the documents in the category is selected from the group consisting of: document format, document type, document topic and document origin.

14. (Currently Amended) The method of claim 1, ~~including~~ wherein the updating includes the first user profile by:

updating a category-based profile of the [[first]] user profile by classifying a document in the first set of documents into a plurality of categories, and adding information about the plurality of categories to the category-based profile.

15. (Currently Amended) The method of claim 1, wherein the ~~first and second~~ profile is stored on a server of the search engine.

16. (Currently Amended) The method of claim 1, wherein the [[first]] user profile is stored on a [[first]] client associated with the [[first]] user ~~and the second user profile is stored on a second client associated with the second user.~~

17. (Currently Amended) The method of claim 1, wherein the [[first]] user profile corresponds to a respective group of users.

18. (Currently Amended) A computer-implemented method of personalizing search results of a search engine, comprising:

creating a plurality of user profiles for a plurality of users, each user profile including at least a user's identification number and information derived from documents visited by the user, including information derived from anchor text contained in documents that link to the documents visited by the user;

receiving a search query from a user of the plurality of users, the search query including at least one query term and the user's identification number;

retrieving a user profile that matches the user's identification number;

generating a personalized query strategy from the search query and the user profile;

selecting a personalized set of documents from the Internet according to the personalized query strategy, each document having a generic ranking score based at least in part on the relevance of the document to the search query;

assigning to each document in the set a personalized ranking score based at least in part on the user profile and the document's generic ranking score;

ranking the set of documents according to their generic and personalized ranking scores;

providing the ranked set of search result documents to the user; and

updating the [[first]] user profile of the user based on a document selected by the [[first]] user from the set of search result documents, ~~including analyzing links within the document and adding information derived from the analyzed links to the first user profile.~~

19. (Currently Amended) The method of claim 18, wherein ~~the step of~~ creating a user's user profile further comprises:

creating a term-based profile by extracting a set of terms from documents visited by the user and associating a weight with each extracted term; and

creating a category-based profile by determining a plurality of categories associated with documents visited by the user and associating a weight with each determined category.

20. (Currently Amended) The method of claim 18, wherein ~~the step of~~ creating a user's user profile further comprises:

creating a link-based profile by analyzing links in documents visited by the user and associating weights with the link.

21. (Original) The method of claim 18, wherein the user profile for a particular user includes demographic and geographic information provided by the user.

22. (Original) The method of claim 18, wherein the documents visited by the user from which information is derived for use in a particular user's user profile are selected based on the user's activities when visiting the documents.

23. (Previously presented) The method of claim 18, including storing the plurality of user profiles on a server of the search engine; and

the retrieving including identifying the user's user profile based on the user identification number associated with both the user and the user's user profile.

24. (Original) The method of claim 18, including storing the plurality of user profiles on client computers associated with the plurality of users.

25. (Previously presented) The method of claim 18, wherein the ranked set of documents comprises two subsets of documents, one subset of documents ordered by their generic ranking scores and the other subset of documents ordered by personalized ranking scores.

26. (Previously presented) The method of claim 25, including interleaving or intermixing the two subsets of documents to form the ranked set of documents.

27. (Currently Amended) A search engine system, comprising:
one or more central processing units for executing programs;
an interface for receiving information; and

a search engine module executable by the one or more central processing units, the module comprising:

instructions for accessing a user profile for a user, the user profile based on information about the user, the user information including information derived from a set of

documents, the set of documents comprising a plurality of documents selected from the set consisting of documents identified by search results from the search engine system, documents accessed by the user, documents linked to the documents identified by search results from the search engine system, and documents linked to the documents accessed by the user, the user information including information derived from anchor text contained in documents that link to the documents accessed by the user;

~~instructions for receiving a search query from a [[first]] user and the same search query from a second user that is different from the first user;~~

instructions for identifying a set of generic search result documents that match the search query;

instructions for assigning a generic score to each document of at least a plurality of the search result documents;

instructions for assigning ~~first and second~~ personalized scores to each document of the plurality of search result documents in accordance with the generic score assigned to the document and the [[first]] user's user profile ~~and the second user's user profile, respectively;~~

~~instructions for ranking at least the plurality of the search result documents into first and second orders, respectively, according to their first and second personalized scores;~~

instructions for providing the ranked set of search result documents ~~in the first order to the [[first]] user and the ranked set of search result documents in the second order to the second user;~~ and

instructions for updating the [[first]] user profile based on a document selected by the [[first]] user from the set of search result documents, ~~including analyzing links within the document and adding information derived from the analyzed links to the first user profile.~~

28. (Original) The system of claim 27, wherein the set of documents include a plurality of documents that have been identified by search results from the search engine and that have been viewed by the user.

29. (Original) The system of claim 27, wherein the set of documents include a plurality of documents that have been identified by search results from the search engine and that have not been viewed by the user.

30. (Original) The system of claim 27, further including:
instructions for updating a term-based profile by identifying a set of terms from a document in the set of documents, and adding information about the identified set of terms to the term-based profile; and
instructions for updating a category-based profile by classifying the document into a plurality of categories, and adding information about the plurality of categories to the category-based profile.
31. (Cancelled)
32. (Currently Amended) The system of claim 27, wherein the information derived from the analyzed links that is added to the [[first]] user profile is added to a link-based profile and includes information about URLs or portions of URLs.
33. (Original) The system of claim 32, wherein the link-based profile comprises:
a plurality of URLs and a weight associated with each URL, wherein the weight is based on one or more factors selected from the group consisting of frequency with which the user visits the URL, time the user has spent viewing a document associated with the URL and quantity of the user's scrolling activity at the document; and
a plurality of hosts and a weight associated with each host, wherein the weight is based on frequency of the user's visits to the host.
34. (Original) The system of claim 33, wherein the URLs further include URLs that have not been visited by the user, but are related to the URLs that have been visited by the user and the weight of an unvisited URL depends on its distance to at least one related URLs that have been visited.
35. (Original) The system of claim 30, wherein a term in the term-based profile is an expression comprising at least one word and a weight.
36. (Original) The system of claim 35, wherein the weight is a weight associated with occurrences of the term in the set of documents.
37. (Original) The system of claim 35, wherein the weight of a term depends at least partially on the term's term frequency and inverse document frequency in said set of documents.

38. (Original) The system of claim 30, wherein a category in the category-based profile characterizes at least one aspect of documents in the category and the category is associated with a weight indicative of the category's importance relative to other categories.
39. (Original) The system of claim 38, wherein the at least one aspect of the documents in the category is selected from the group consisting of: document format, document type, document topic and document origin.
40. (Original) The system of claim 27, wherein the user profile is stored on a server of the search engine.
41. (Original) The system of claim 27, wherein the user profile is stored on a client associated with the user.
42. (Currently Amended) The system of claim 27, wherein the [[first]] user's user profile corresponds to a group of users.
43. (Currently Amended) ~~A computer program product for use in conjunction with a computer system, the computer program product comprising a computer readable storage medium and a computer program mechanism embedded therein, the computer program mechanism~~ storing one or more programs for execution by one or more processors, the one or more programs comprising:
instructions for accessing a user profile for a user based on information about the user, the user information including information derived from a set of documents, the set of documents comprising a plurality of documents selected from the set consisting of documents identified by search results from a search engine, documents accessed by the user, documents linked to the documents identified by search results from the search engine, and documents linked to the documents accessed by the user, the user information including information derived from anchor text contained in documents that link to the documents accessed by the user;
instructions for receiving a search query from a [[first]] user ~~and the same search query from a second user that is different from the first user;~~
instructions for identifying a set of generic search result documents that match the search query;

instructions for assigning a generic score to each document of at least a plurality of the search result documents;

instructions for assigning ~~first and second~~ personalized scores to each document of the plurality of search result documents in accordance with the generic score assigned to the document and the ~~[[first]] user's user profile and the second user's user profile, respectively;~~

instructions for ranking at least the plurality of the search result documents ~~into first and second orders, respectively,~~ according to their ~~first and second~~ personalized scores;

instructions for providing the ranked set of search result documents ~~in the first order~~ to the ~~[[first]] user and the ranked set of search result documents in the second order to the second user;~~ and

instructions for updating the ~~[[first]] user profile based on a document selected by the [[first]] user from the set of search result documents, including analyzing links within the document and adding information derived from the analyzed links to the first user profile.~~

44. (Currently amended) The computer ~~program-product~~ readable storage medium of claim 43, wherein the set of documents include a plurality of documents that have been identified by search results from the search engine and that have been viewed by the user.

45. (Currently amended) The computer ~~program-product~~ readable storage medium of claim 43, wherein the set of documents include a plurality of documents that have been identified by search results from the search engine and that have not been viewed by the user.

46. (Currently amended) The computer ~~program-product~~ readable storage medium of claim 43, further including:

instructions for updating a term-based profile by identifying a set of terms from a document in the set of documents, and adding information about the identified set of terms to the term-based profile; and

instructions for updating a category-based profile by classifying the document into a plurality of categories, and adding information about the plurality of categories to the category-based profile.

47. (Cancelled)

48. (Currently Amended) The computer ~~program-product~~ readable storage medium of claim 43, wherein the information derived from the analyzed links that is added to the ~~[[first]]~~

user profile is added to a link-based profile and includes information about URLs or portions of URLs.

49. (Currently amended) The computer ~~program-product~~ readable storage medium of claim 48, wherein the link-based profile comprises:

a plurality of URLs and a weight associated with each URL, wherein the weight is based on one or more factors selected from the group consisting of frequency with which the user visits the URL, time the user has spent viewing a document associated with the URL and quantity of the user's scrolling activity at the document; and

a plurality of hosts and a weight associated with each host, wherein the weight is based on frequency of the user's visits to the host.

50. (Currently amended) The computer ~~program-product~~ readable storage medium of claim 49, wherein the URLs further include URLs that have not been visited by the user, but are related to the URLs that have been visited by the user and the weight of an unvisited URL depends on its distance to at least one related URLs that have been visited.

51. (Currently amended) The computer ~~program-product~~ readable storage medium of claim 46, wherein a term in the term-based profile is an expression comprising at least one word and a weight.

52. (Currently amended) The computer ~~program-product~~ readable storage medium of claim 51, wherein the weight is a weight associated with occurrences of the term in the set of documents.

53. (Currently amended) The computer ~~program-product~~ readable storage medium of claim 51, wherein the weight of a term depends at least partially on the term's term frequency and inverse document frequency in said set of documents.

54. (Currently amended) The computer ~~program-product~~ readable storage medium of claim 46, wherein a category in the category-based profile characterizes at least one aspect of documents in the category and the category is associated with a weight indicative of the category's importance relative to other categories.

55. (Currently amended) The computer ~~program-product~~ readable storage medium of claim 54, wherein the at least one aspect of the documents in the category is selected from the group consisting of: document format, document type, document topic and document origin.
56. (Currently amended) The computer ~~program-product~~ readable storage medium of claim 43, wherein the user profile is stored on a server of the search engine.
57. (Currently amended) The computer ~~program-product~~ readable storage medium of claim 43, wherein the user profile is stored on a client associated with the user.
58. (Currently Amended) The computer ~~program-product~~ readable storage medium of claim 43, wherein the [[first]] user's user profile corresponds to a group of users.
59. (New) The method of claim 1, wherein the updating includes analyzing links within a document in the first set of documents and adding information derived from the analyzed links to the user profile.

REMARKS

This amendment responds to the final office action mailed February 28, 2008. In the office action the Examiner:

- rejected claims 1-4, 6-7, 9-20, 22-24, 27-30, 32-33, 35-46, 48-49 and 51-58 under 35 U.S.C. 103(a) as being unpatentable over *Breese et al.* (US 6,006,218) in view of *Konig et al.* (US 6,981,040);
- rejected claim 21 under 35 U.S.C. §103(a) as being unpatentable over *Breese* in view of *Konig*, further in view of *Gerace* (US 5,848,396);
- rejected claims 8, 34, and 50 under 35 U.S.C. §103(a) as being unpatentable over *Breese* in view of *Konig*, further in view of *Gabriel et al.* (US 6,584,468); and
- rejected claims 25-26 under 35 U.S.C. §103(a) as being unpatentable over *Breese* in view of *Konig*, further in view of *Dumais et al.* (US 2004/0267700).

Applicants have amended claims 1-4, 6-8, 14-20, 27, 32, 42, 43-46 and 48-58. Support for the amendments to claims 1, 18, 27 and 43 can be found at least in Figure 2 and corresponding discussion in the specification as originally filed, specifically in paragraph 0031. New claim 59 has been added. Support for new claim 59 can be found at least in claim 5 as originally filed. No new matter has been added.

With respect to all amendments, Applicants have not dedicated or abandoned any unclaimed subject matter. Moreover, Applicants have not acquiesced to any characterizations of the invention, nor any rejections or objections of the claims, made by the Examiner. After entry of this amendment, the pending claims are: claims 1-4, 6-30, 32-46 and 48-59.

Claim Rejections under 35 USC 103

Applicants respectfully submit that the cited references, either individually or in combination, do not teach or suggest each and every limitation of independent claims 1, 18, 27 and 43.

Claim 1, as amended, requires: “accessing a user profile for a user based on user information ... wherein the ***user information includes information derived from anchor text contained in documents that link to the documents accessed by the user...***” (Emphasis Added).

Indeed, as discussed the specification as filed, using “information derived from anchor text contained in documents that link to the documents accessed by the user” can provide useful hits about the user’s personal search preferences:

Similarly, the universal resource locators (URL) 203 associated with the search results in response to the previous search queries and their corresponding anchor texts 205, especially for search result items that have been selected or “visited” by the user (e.g., downloaded or otherwise viewed by the user), are helpful in determining the user’s preferences. (Paragraph 0031 of the specification as filed).

In contrast, *Breese* discloses estimating a probability that items included in search results are already known to the user. (*Breese*, Abstract). *Breese* uses such factors as “information on the user’s actual knowledge, and information 522 about previously conducted searches and/or previous user actions.” (*Breese*, col. 5, lines 29-33). But, *Breese* is silent about and does not teach or suggest using “information derived from anchor text contained in documents that link to the documents accessed by the user,” as required by the claim, as amended.

Konig discloses initializing and updating a user model that represents the user’s information and product interests. (*Konig*, col. 17, lines 48-51). Documents that are of interest to the user and documents that are not of interest to the user are parsed and analyzed to obtain: (i) a set of words and phrases; (ii) images, (iii) links to other documents, email addresses, monetary sums, people's names, and company names, and (iv) document locations. (*Konig*, col. 17, line 51 to col. 18, line 6; Figure 13). But, like *Breese*, *Konig* is silent about and does not teach or suggest using “information derived from anchor text contained in documents that link to the documents accessed by the user,” as required by the claim, as amended.

Further, none of *Gerace*, *Gabriel* and *Dumais* supplies the missing limitations. None of *Gerace*, *Gabriel* and *Dumais* teaches or suggests “accessing a user profile for a user based on user information, ... wherein the ***user information includes information derived from anchor text contained in documents that link to the documents accessed by the user,***” as required by claim 1.

As none of the cited references teach each and every limitation of claim 1, claim 1 (and associated dependent claims) are patentable over the cited references. Independent

claims 18, 27 and 43 (and associated dependent claims) are also patentable over the cited references for analogous reasons as those discussed with reference to claim 1.

In addition, with respect to claim 18 and its dependent claims, (as explained in more detail below) *Breeze* and *Konig* do not teach (A) “generating a personalized query strategy from the search query and the user profile;” and then (B) “selecting a personalized set of documents from the Internet according to the personalized query strategy.” In both *Breeze* and *Konig*, personalized information is used only to “post process” results produced by a search engine in response to a search query. See, for example, Fig. 19 of *Konig* and Fig. 2C (operations 230, 231 and 234, in that order) of *Breeze*. In *Breeze*, the very name of the “retrieval result adjusting module” 134, as well as the explanatory text at col. 6, ln 60-66, and col. 12, lines 32-48, teaches that the retrieval result adjusting module 134 of *Breeze* ranks or re-ranks search results. But there is no discussion in *Breeze* whatsoever about changing the search query or search query strategy used to produce a list of search results.

It is noted that in claim 18, the personalized search query is generated prior to “selecting a personalized set of documents” because the “selecting” is performed “according to the personalized search strategy.” Also, claim 18 requires the “personalized search strategy” is generated not just from the user profile, but also “from the search query.” These aspects of claim 18, and its dependent claims, are not taught by *Breeze* and *Konig*. For at least these additional reasons, claim 18 and its dependent claims are patentable over the combined teaches of the cited references.

By responding in the foregoing remarks only to particular positions asserted by the examiner, the Applicants do not necessarily acquiesce in other positions that have not been explicitly addressed. In addition, the Applicants’ arguments for the patentability of a claim should not be understood as implying that no other reasons for the patentability of that claim exist.

CONCLUSION

In light of the above amendments and remarks, the Applicants respectfully request that the Examiner reconsider this application with a view towards allowance. The Examiner is invited to call the undersigned attorney at (650) 843-4000, if a telephone call could help resolve any remaining items.

Respectfully submitted,

Date: November 21, 2008

/ Gary S. Williams /

31,066

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(Reg. No.)

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Electronic Patent Application Fee Transmittal

| | |
|---|-------------------------------------|
| Application Number: | 10676711 |
| Filing Date: | 30-Sep-2003 |
| Title of Invention: | Personalization of web search |
| First Named Inventor/Applicant Name: | Stephen R. Lawrence |
| Filer: | Gary Scott Williams/Beverly Gemello |
| Attorney Docket Number: | 060963-0014US |

Filed as Large Entity

Utility under 35 USC 111(a) Filing Fees

| Description | Fee Code | Quantity | Amount | Sub-Total in USD(\$) |
|--|----------|----------|--------|----------------------|
| Basic Filing: | | | | |
| Pages: | | | | |
| Claims: | | | | |
| Miscellaneous-Filing: | | | | |
| Petition: | | | | |
| Patent-Appeals-and-Interference: | | | | |
| Post-Allowance-and-Post-Issuance: | | | | |
| Extension-of-Time: | | | | |
| Extension - 1 month with \$0 paid | 1251 | 1 | 130 | 130 |

| Description | Fee Code | Quantity | Amount | Sub-Total in USD(\$) |
|-----------------------------------|----------|----------|--------|----------------------|
| Miscellaneous: | | | | |
| Request for continued examination | 1801 | 1 | 810 | 810 |
| Total in USD (\$) | | | | 940 |

Electronic Acknowledgement Receipt

| | |
|---|-------------------------------------|
| EFS ID: | 4338195 |
| Application Number: | 10676711 |
| International Application Number: | |
| Confirmation Number: | 8147 |
| Title of Invention: | Personalization of web search |
| First Named Inventor/Applicant Name: | Stephen R. Lawrence |
| Customer Number: | 24341 |
| Filer: | Gary Scott Williams/Beverly Gemello |
| Filer Authorized By: | Gary Scott Williams |
| Attorney Docket Number: | 060963-0014US |
| Receipt Date: | 21-NOV-2008 |
| Filing Date: | 30-SEP-2003 |
| Time Stamp: | 20:54:35 |
| Application Type: | Utility under 35 USC 111(a) |

Payment information:

| | |
|--|-----------------|
| Submitted with Payment | yes |
| Payment Type | Deposit Account |
| Payment was successfully received in RAM | \$940 |
| RAM confirmation Number | 4846 |
| Deposit Account | 500310 |
| Authorized User | |

File Listing:

| Document Number | Document Description | File Name | File Size(Bytes)/ Message Digest | Multi Part /.zip | Pages (if appl.) |
|-----------------|----------------------|-----------|----------------------------------|------------------|------------------|
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|---|------------------------|----------------------------------|--|-----|----|
| 1 | | 60963-0014_RCE-ResponseToFOA.pdf | 252458 a11ec9b668c8d59317aec8eb28a2eaa439eba9b8 | yes | 17 |
| Multipart Description/PDF files in .zip description | | | | | |
| Document Description | | Start | End | | |
| Request for Continued Examination (RCE) | | 1 | 1 | | |
| Amendment Submitted/Entered with Filing of CPA/RCE | | 2 | 2 | | |
| Claims | | 3 | 13 | | |
| Applicant Arguments/Remarks Made in an Amendment | | 14 | 17 | | |
| Warnings: | | | | | |
| Information: | | | | | |
| 2 | Fee Worksheet (PTO-06) | fee-info.pdf | 32138 9f20934f0c7470a88efdeee20d78c1ddd33ffb1 | no | 2 |
| Warnings: | | | | | |
| Information: | | | | | |
| Total Files Size (in bytes): | | | 284596 | | |
| <p>This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.</p> <p><u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.</p> <p><u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.</p> <p><u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.</p> | | | | | |

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

| | | | |
|---|---|----------------------------------|---------------------------------------|
| PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875 | Application or Docket Number 10/676,711 | Filing Date 09/30/2003 | <input type="checkbox"/> To be Mailed |
|---|---|----------------------------------|---------------------------------------|

| APPLICATION AS FILED – PART I | | | OTHER THAN SMALL ENTITY | | | |
|---|---|--------------|---------------------------------------|----------|-----------|----------|
| | (Column 1) | (Column 2) | SMALL ENTITY <input type="checkbox"/> | OR | | |
| FOR | NUMBER FILED | NUMBER EXTRA | RATE (\$) | FEE (\$) | RATE (\$) | FEE (\$) |
| <input type="checkbox"/> BASIC FEE <small>(37 CFR 1.16(a), (b), or (c))</small> | N/A | N/A | N/A | | N/A | |
| <input type="checkbox"/> SEARCH FEE <small>(37 CFR 1.16(k), (l), or (m))</small> | N/A | N/A | N/A | | N/A | |
| <input type="checkbox"/> EXAMINATION FEE <small>(37 CFR 1.16(o), (p), or (q))</small> | N/A | N/A | N/A | | N/A | |
| TOTAL CLAIMS <small>(37 CFR 1.16(i))</small> | minus 20 = | * | X \$ = | | X \$ = | |
| INDEPENDENT CLAIMS <small>(37 CFR 1.16(h))</small> | minus 3 = | * | X \$ = | | X \$ = | |
| <input type="checkbox"/> APPLICATION SIZE FEE <small>(37 CFR 1.16(s))</small> | If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s). | | | | | |
| <input type="checkbox"/> MULTIPLE DEPENDENT CLAIM PRESENT <small>(37 CFR 1.16(j))</small> | | | | | | |
| * If the difference in column 1 is less than zero, enter "0" in column 2. | | | TOTAL | | TOTAL | |

| APPLICATION AS AMENDED – PART II | | | | | OTHER THAN SMALL ENTITY | | | |
|----------------------------------|---|----------------------------------|------------------------------------|---------------|-------------------------|---------------------|-----------|---------------------|
| | (Column 1) | (Column 2) | (Column 3) | | | | | |
| AMENDMENT | 11/21/2008 | CLAIMS REMAINING AFTER AMENDMENT | HIGHEST NUMBER PREVIOUSLY PAID FOR | PRESENT EXTRA | RATE (\$) | ADDITIONAL FEE (\$) | RATE (\$) | ADDITIONAL FEE (\$) |
| | Total <small>(37 CFR 1.16(i))</small> | * 55 | Minus | ** 58 = 0 | X \$ = | | OR | X \$52= 0 |
| | Independent <small>(37 CFR 1.16(h))</small> | * 4 | Minus | ***4 = 0 | X \$ = | | OR | X \$220= 0 |
| | <input type="checkbox"/> Application Size Fee <small>(37 CFR 1.16(s))</small> | | | | | | OR | |
| | <input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <small>(37 CFR 1.16(j))</small> | | | | | | OR | |
| | | | | | TOTAL ADD'L FEE | | OR | TOTAL ADD'L FEE |
| | | | | | | | OR | 0 |

| APPLICATION AS AMENDED – PART II | | | | | OTHER THAN SMALL ENTITY | | | |
|----------------------------------|---|----------------------------------|------------------------------------|---------------|-------------------------|---------------------|-----------|---------------------|
| | (Column 1) | (Column 2) | (Column 3) | | | | | |
| AMENDMENT | | CLAIMS REMAINING AFTER AMENDMENT | HIGHEST NUMBER PREVIOUSLY PAID FOR | PRESENT EXTRA | RATE (\$) | ADDITIONAL FEE (\$) | RATE (\$) | ADDITIONAL FEE (\$) |
| | Total <small>(37 CFR 1.16(i))</small> | * | Minus | ** = | X \$ = | | OR | X \$ = |
| | Independent <small>(37 CFR 1.16(h))</small> | * | Minus | *** = | X \$ = | | OR | X \$ = |
| | <input type="checkbox"/> Application Size Fee <small>(37 CFR 1.16(s))</small> | | | | | | OR | |
| | <input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <small>(37 CFR 1.16(j))</small> | | | | | | OR | |
| | | | | | TOTAL ADD'L FEE | | OR | TOTAL ADD'L FEE |
| | | | | | | | OR | |

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
 ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
 *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
 The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner:
 /Debra R. Wyatt/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**
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Electronically filed December 8, 2008

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

| | | | |
|-----------------|---|----------------------|--------------------|
| Application of: | Stephen R. Lawrence | Confirmation No.: | 8147 |
| Serial No.: | 10/676,711 | Art Unit: | 2161 |
| Filed: | September 30, 2003 | Examiner: | Lu, Charles Edward |
| For: | <i>Personalization of Web Search Results Using Term, Category, and Link-Based User Profiles</i> | Attorney Docket No.: | 60963-0014-US |
| | | Date: | December 8, 2008 |

EXAMINER INTERVIEW SUMMARY

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

The enclosed Interview Summary is in response to a telephonic Examiner Interview conducted December 5, 2008 for the above identified patent application.

The Commissioner is hereby authorized to charge any required fee(s) to Morgan, Lewis & Bockius LLP Deposit Account No. 50-0310 (order no. 60963-0014-US).

INTERVIEW SUMMARY


Applicants' attorney Kavita Aggarwal (Reg. No.: 60,260) thanks Examiner Charles Lu for his comments during a telephone interview on December 5, 2008. In the Interview, amendments to the claims were discussed. In particular, the claim limitation that "the user information includes information derived from anchor text contained in documents that link to the documents accessed by the user" was discussed. Examiner Lu indicated that he would update his search strategy.

CONCLUSION

In light of the above remarks, the Applicants respectfully request that the Examiner reconsider this application with a view towards allowance. The Examiner is invited to call the undersigned attorney at (650) 843-4000, if a telephone call could help resolve any remaining items.

Respectfully submitted,

Date: 12/8/08



Gary S. Williams

31,066

(Reg. No.)

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3000 El Camino Real, Suite 700
Palo Alto, CA 94306
(650) 843-4000

Electronic Acknowledgement Receipt

| | |
|---|-------------------------------------|
| EFS ID: | 4417390 |
| Application Number: | 10676711 |
| International Application Number: | |
| Confirmation Number: | 8147 |
| Title of Invention: | Personalization of web search |
| First Named Inventor/Applicant Name: | Stephen R. Lawrence |
| Customer Number: | 24341 |
| Filer: | Gary Scott Williams/Beverly Gemello |
| Filer Authorized By: | Gary Scott Williams |
| Attorney Docket Number: | 060963-0014US |
| Receipt Date: | 08-DEC-2008 |
| Filing Date: | 30-SEP-2003 |
| Time Stamp: | 21:32:17 |
| Application Type: | Utility under 35 USC 111(a) |

Payment information:

| | |
|------------------------|----|
| Submitted with Payment | no |
|------------------------|----|

File Listing:

| Document Number | Document Description | File Name | File Size(Bytes)/ Message Digest | Multi Part /.zip | Pages (if appl.) |
|-----------------|--|---------------------------------|--|------------------|------------------|
| 1 | Applicant summary of interview with examiner | 60963-0014_InterviewSummary.pdf | 45615 <small>a9b441a5c9b5845270157fd0374bb04d19765b98</small> | no | 2 |

Warnings:

Information:

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New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.



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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|---------------------|------------------|
| 10/676,711 | 09/30/2003 | Stephen R. Lawrence | 060963-0014US | 8147 |
| 24341 | 7590 | 01/28/2009 | EXAMINER | |
| MORGAN, LEWIS & BOCKIUS, LLP. 2 PALO ALTO SQUARE 3000 EL CAMINO REAL PALO ALTO, CA 94306 | | | LU, CHARLES EDWARD | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2161 | |
| | | | MAIL DATE | DELIVERY MODE |
| | | | 01/28/2009 | PAPER |

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

DETAILED ACTION

1. This Action is in response to the Request for Continued Examination dated 11/21/2008. Claims 1-4, 6-30, 32-46, and 48-59 are pending and rejected.

Response to Amendments/Response to Arguments

2. Applicant argues the claims as amended. The previous grounds of prior art rejection are withdrawn. The new grounds of prior art rejection are necessitated by amendment.

3. Applicant further argues that Breese and Konig do not teach or suggest generating a personalized query strategy and selecting a personalized set of document according to the strategy (Remarks, p. 15). These arguments were treated in the prior Action on at least p. 3. It should be noted that the broadest reasonable interpretation has been applied to the claims and Applicant is arguing limitations that are not in the claim.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

4. Claims 1-4, 6-7, 9-20, 22-24, 27-30, 32-33, 35-46, 48-49, and 51-59 are rejected under 35 U.S.C. 103(a) as being unpatentable over Breese et al (U.S. Patent 6,006,218), hereafter "Breese," in view of Konig et al (U.S. Patent

Art Unit: 2161

6,981,040), hereafter “Konig,” further in view of Li et al (U.S. Patent 6,647,381), hereinafter “Li.”

As to claim 1 and claim 59, Breese teaches the following claimed subject matter:

A method of personalizing search results of a search engine, comprising:
accessing a user profile for a user based on user information about the user (e.g., fig. 2B, #224, fig. 5, #500, col. 5, ll. 20-45),

The user information including information derived from a first set of documents (e.g., col. 5, ll. 20-45),

The first set of documents comprising a plurality of documents selected from the set consisting of documents identified by search results from the search engine, documents accessed by the user, documents linked to the documents identified by search results from the search engine, and documents linked to the documents accessed by the user (e.g., col. 5, ll. 20-45; col. 8, ll. 15-30);

Receiving a search query from the user (col. 6, ll. 60-65);

Identifying a set of generic search result documents that match the search query (fig. 2C, #230-231);

Assigning a generic score to each document of at least a subset of the set of search result documents (col. 7, ll. 18-45);

Assigning a personalized score to each document of the subset of search result documents in accordance with the generic score assigned to the document and the user profile (col. 7, ll. 18-45, details on col. 8-17);

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Ranking the subset of search result documents according to their respective personalized scores (col. 7, ll. 18-45, details on col. 8-17).

Providing the ranked subset of search result documents to the user (e.g., fig. 2C, #236).

Breese teaches a set of search result documents and a user profile, as described above, but does not expressly teach updating the user profile based on a document selected by the user from the ranked subset of search result documents, and wherein updating includes analyzing links within a document in the first set of documents and adding information derived from the analyzed links to the user profile.

However, Breese teaches presenting a ranked subset of documents to the user (see above) and updating user information according to the latest user provided information, such as particular site visits (e.g., col. 8, ll. 15-40). Thus, the document selected by a user could be one that was presented to the user. Konig teaches documents selected from the user and analyzing links within a selected document to update a user profile ("user model") because "during updating [of the user model], documents that are of interest to the user...are analyzed.... Through information extraction, links to other documents...are obtained.... Extracted information is processed to initialize or update the user representations in the User Model." (e.g., col. 17, l. 20 – col. 18, l. 9, also see the citations in the Prior Action for previous claim 5).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Breese such that documents selected from user from the set of search results are analyzed and information from links extracted from the

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documents are used to update the user profile, as claimed. The motivation for maintaining a User Model would have been to enhance the system's knowledge of the user's interests, as taught by Konig (see e.g., Summary), and as known to one of ordinary skill in the art.

Breese and Konig as applied above teach user information, documents accessed by the user, and analyzing links, but do not expressly teach information derived from anchor text contained in documents that link to the documents accessed by the user.

However, Li teaches information derived from anchor text contained in documents that link to a document (e.g., col. 9, ll. 7-12, col. 7, ll. 45-65, fig. 2 "Rule 6").

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Breese and Konig, such that the user information includes information derived from anchor text in documents that link to the documents accessed by the user. The motivation would have been to facilitate recognizing a popular and/or relevant page, as taught by Li (col. 7, ll. 45-65, col. 4, ll. 42-50) and known to one of ordinary skill in the art.

As to claims 2 and 3, Breese as applied above does not expressly teach wherein the first set of documents includes a plurality of documents that have been identified by search results from the search engine and that have/have not been viewed by the user.

However, Breese teaches that the user information includes previous search information (col. 5, ll. 30-33, col. 16, l. 40) and that the search information may include information on the entries that were presented to the user as a result of the search (i.e.

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search results). Furthermore, Breese states, "it may be assumed that the user is aware of these entries, or at least the highest ranked entries (col. 16, ll. 34-50)." The user information includes information on previous Internet site access operations (col. 5, ll. 30-35). Thus, Breese suggests that the user may have actually viewed the information because the information was presented to the user.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to further modify Breese/Konig/Li, such that "wherein the set of documents include a plurality of documents that have been identified by search results from the search engine and that have/have not been viewed by the user" is implemented. The motivation as known to one of ordinary skill in the art would have been to enhance the effectiveness of the retrieval result adjustor, because data regarding actual document views would be used.

As to claims 4 and 14, Breese and Li as applied above do not expressly teach updating the user profile by updating a term-based profile of the user profile by identifying a set of terms from a document in the first set of documents, and adding information about the identified set of terms to the term-based profile; and updating a category-based profile of the first user profile by classifying the document into a plurality of categories, and adding information about the plurality of categories to the category-based profile.

However, Konig teaches updating a term-based, and category-based profile for a user with weights as claimed (col. fig. 4A, fig. 4C, col. 10, l. 51, col. 12, l. 55).

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Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Breese/Konig/Li, such that the claimed updating of the term-based and category-based profiles is implemented with appropriate weights associated with each item (see e.g., fig. 4). The motivation for maintaining this information (in a User Model) would have been to enhance the system's knowledge of the user's interests, as taught by Konig (see e.g., Summary), and as known to one of ordinary skill in the art. This would further enhance search results.

As to claim 6, Konig as applied above further teaches wherein the information derived from the analyzed links that is added to the user profile is added to a link-based profile and includes information about URLs or portions of URLs (fig. 4).

As to claim 7, Konig as applied above further teaches or suggests wherein the link-based profile of the user profile comprises a plurality of URLs and a weight associated with each URL, wherein the weight is based on one or more factors selected from the group consisting of frequency with which the first user visits the URL, time the first user has spent viewing a document associated with the URL and quantity of the first user's scrolling activity at the document; and a plurality of hosts and a weight associated with each host, wherein the weight is based on frequency of the first user's visits to the host (col. 12, ll. 28-54, col. 23, ll. 1-10).

As to claim 9, Konig as applied above further teaches wherein a term in the term-based profile is an expression comprising at least one word and a weight (fig. 4A).

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As to claim 10, Konig as applied above further teaches wherein the weight is a weight associated with occurrences of the term in the first set of documents (fig. 4, col. 10, l. 52 – col. 12, l. 55).

As to claim 11, Konig as applied above further teaches wherein the weight of a term depends at least partially on the term's term frequency and inverse document frequency in said first set of documents (col. 10, l. 52 – col. 11, l. 20).

As to claim 12, Konig as applied above further teaches wherein a category in the category-based profile characterizes at least one aspect of documents in the category and the category is associated with a weight indicative of the category's importance relative to other categories (fig. 4, 7, 8, col. 15, ll. 7-32).

As to claim 13, Konig as applied above further teaches wherein the at least one aspect of the documents in the category is selected from the group consisting of: document format, document type, document topic and document origin (e.g., col. 15, ll. 7-15 and see above).

As to claim 15, Breese and Li as applied above discloses a user profile and a search engine (e.g., Breese, fig. 1, 5), but do not expressly teach wherein the user profile is stored on a server of the search engine.

However, Konig teaches wherein user profiles are stored on a server of the search engine (fig. 1).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to further modify Breese, Konig, and Li, such that the user profiles are stored on a server of the search engine. The motivation would have been to

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adapt to the requirements of the user in setting up the search system, or to provide personalized services for simultaneous clients, as taught by Konig (col. 7, ll. 20-25).

As to claim 16, Breese as applied above further teaches wherein the user profile is stored on a client associated with the user (col. 4, l. 62, col. 5, ll. 1-2).

As to claim 17, Breese and Li as applied above do not expressly teach wherein the user profile corresponds to a respective a group of users.

However, Konig teaches wherein a user is a group of users (col. 20, ll. 24-28, col. 9, ll. 47-52).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to further modify Breese, Konig, and Li, such that the first user is a group of users. The motivation would have been to represent the interest level of a group of users in a document independently of any specific information need, as taught by Konig (col. 9, ll. 47-52).

As to claim 18, Breese teaches the following claimed subject matter:

A method of personalizing search results of a search engine, comprising:
creating a plurality of user profiles for a plurality of users, each user profile including at least a user's identification number and information derived from documents visited by the user (col. 5, ll. 20-45);

Receiving a search query from a user of the plurality of users, the search query including at least one query term (e.g., col. 8, ll. 62-66).

Retrieving a user profile that matches the user's identification number (e.g., col. 5, ll. 25-30, col. 8, ll. 29-31);

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Selecting a personalized set of documents from the Internet, according to the personalized query strategy, each document having a generic ranking score based at least in part on the relevance of the document to the search query, assigning to each document in the set a personalized ranking score based at least in part on the user profile and the document's generic ranking score (discussed above);

Ranking the set of documents according to their generic and personalized ranking scores and providing the ranked set of search result documents to the user (see above).

Breese does not expressly teach the search query including the user's identification number.

However, Breese teaches that a user has a unique identification number for storing user attributes in a user database (col. 5, ll. 20-45), and that information regarding the user and the search to be performed is obtained at the input step 222 (col. 8, ll. 15-20, #224).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Breese, such that the search query includes the user's identification number in the input step. The motivation would have been to adapt to specific user requirements in setting up the search engine. For example, one may send the identification with the query to facilitate efficient processing.

Breese teaches a set of search result documents and a user profile, as described above, but does not expressly teach updating the user profile based on a document selected by the user from the search result documents, and wherein updating includes

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analyzing links within a document in the first set of documents and adding information derived from the analyzed links to the user profile.

However, Breese teaches presenting a ranked subset of documents to the user (see above) and updating user information according to the latest user provided information, such as particular site visits (e.g., col. 8, ll. 15-40). Thus, the document selected by a user could be one that was presented to the user. Konig teaches documents selected from the user and analyzing links within a selected document to update a user profile ("user model") because "during updating [of the user model], documents that are of interest to the user...are analyzed.... Through information extraction, links to other documents...are obtained.... Extracted information is processed to initialize or update the user representations in the User Model." (e.g., col. 17, l. 20 – col. 18, l. 9, also see the citations in the Prior Action for previous claim 5).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Breese such that documents selected from the user from the set of search results are analyzed and information from links extracted from the documents are used to update the user profile, as claimed. The motivation for maintaining a User Model would have been to enhance the system's knowledge of the user's interests, as taught by Konig (see e.g., Summary), and as known to one of ordinary skill in the art.

Breese and Konig as applied above teach user information, documents visited by the user, and analyzing links, but do not expressly teach information derived from anchor text contained in documents that link to the documents visited by the user.

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However, Li teaches information derived from anchor text contained in documents that link to a document (e.g., col. 9, ll. 7-12, col. 7, ll. 45-65, fig. 2 “Rule 6”).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Breese and Konig, such that the user information includes information derived from anchor text in documents that link to the documents accessed by the user. The motivation would have been to facilitate recognizing a popular and/or relevant page, as taught by Li (col. 7, ll. 45-65, col. 4, ll. 42-50) and known to one of ordinary skill in the art.

Claims 19-20 are drawn to substantially the same subject matter as claims 4, 14, and 18 above, in addition to creating, which must happen in Konig in order to store the relevant data (see e.g., fig. 4).

As to claim 22, Breese as applied above further teaches wherein the documents visited by the user from which information is derived for use in a particular user's user profile is selected based on the user's activities when visiting the documents (e.g., col. 5, ll. 20-45).

As to claim 23, the “storing” limitation is addressed with respect to claim 15 above. Breese, as applied above, further teaches the retrieving including the user's user profile based on an identification number associated with the user and the user's profile (col. 5, ll. 23-30). Note that Breese must retrieve the data in order to process it.

Claims 24, 27-30, 32-33, 35-46, 48-49, and 51-58 are rejected based on the same reasoning as the above claims.

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5. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Breese, in view of Konig, further in view of Li and Gerace (U.S. Patent 5,848,396), hereinafter “Gerace.”

As to claim 21, Breese as applied above teaches wherein the user profile includes demographic information provided by the user (fig. 5), but Breese, Konig, and Li do not expressly teach geographic information.

However, Gerace teaches a user profile including both demographic and geographic information (col. 5, l. 63 – col. 6, l. 15).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Breese, Konig, and Li, such that geographic information is additionally stored with the user profile. The motivation would have been to store more information about the user to facilitate better decisions by the information retrieval system, as known to one of ordinary skill in the art.

6. Claims 8, 34, and 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Breese, in view of Konig, further in view of Li and Gabriel et al (U.S. Patent 6,584,468), hereafter “Gabriel.”

As to claim 8, Breese, Konig, and Li do not expressly teach wherein the URLs further include URLs that have not been visited by the first user, but are related to the URLs that have been visited by the first user and the weight of an unvisited URL depends on its distance to at least one related URLs that have been visited.

However, Gabriel teaches wherein URLs include URLs that have not been visited by a user but are related to URLs visited by a user, and the weight of an unvisited URL

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depends on its distance to at least one related URLs that have been visited (col. 7, l. 37 – col. 9, l. 10).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Breese, Konig, and Li, such that the above claimed subject matter is implemented. The motivation would have been to facilitate indexing relevant information, as taught throughout Gabriel (e.g., Abstract, col. 7, ll. 37-40, col. 2, ll. 34-46).

Claims 34 and 50 are rejected based on the same reasoning as claim 8, discussed above.

7. Claims 25-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Breese, in view of Konig, further in view of Li and Dumais et al (US 2004/0267700), hereafter “Dumais.”

As to claims 25-26, Breese as applied above further teaches wherein the ranked set of documents comprises a personalized subset of documents ordered by personalized scores and the other subset ordered by the generic ranking scores (col. 7, ll. 33-36, fig. 2C). Furthermore, Breese teaches a set of documents ordered by their generic scores (see above).

Breese, Konig, and Li do not expressly teach the ranked set of documents comprising the above two sets of documents, and interleaving the two sets to form the ranked set of documents.

However, Dumais teaches interleaving results from a personal search engine and other search results for presenting to the user (para. 0029).

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Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Breese, Konig, and Li, such that the ranked set of documents comprises the above two sets of documents, and the two sets are interleaved to form the ranked set of documents. The motivation would have been to create a personal browsing system to be a portal to all of a user's content, including personal information as well as more general resources, as taught by Dumais (para. 0029).

Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Charles E. Lu whose telephone number is (571) 272-8594. The examiner can normally be reached on 8:30 - 5:00; M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Apu Mofiz can be reached at (571) 272-4080. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Charles E Lu/
Examiner, Art Unit 2161
1/28/2009

/Apu M Mofiz/
Supervisory Patent Examiner, Art Unit 2161

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|-----------------------------------|---------------------------------------|---|-------------|
| Notice of References Cited | Application/Control No. 10/676,711 | Applicant(s)/Patent Under Reexamination LAWRENCE, STEPHEN R. | |
| | Examiner CHARLES E. LU | Art Unit 2161 | Page 1 of 1 |

U.S. PATENT DOCUMENTS

| * | Document Number Country Code-Number-Kind Code | Date MM-YYYY | Name | Classification |
|---|--|-----------------|-----------|----------------|
| * | A US-6,647,381 | 11-2003 | Li et al. | 707/3 |
| | B US- | | | |
| | C US- | | | |
| | D US- | | | |
| | E US- | | | |
| | F US- | | | |
| | G US- | | | |
| | H US- | | | |
| | I US- | | | |
| | J US- | | | |
| | K US- | | | |
| | L US- | | | |
| | M US- | | | |

FOREIGN PATENT DOCUMENTS

| * | Document Number Country Code-Number-Kind Code | Date MM-YYYY | Country | Name | Classification |
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NON-PATENT DOCUMENTS

| * | Document Number Country Code-Number-Kind Code | Date MM-YYYY | Country | Name | Classification |
|---|---|-----------------|---------|------|----------------|
| | Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages) | | | | |
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*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

EAST Search History

| Ref # | Hits | Search Query | DBs | Default Operator | Plurals | Time Stamp |
|-------|-------|--------------------------------|--------------------------------|------------------|---------|------------------|
| L1 | 11329 | 707/3.ccls. | US-PGPUB; USPAT; DERWENT | OR | ON | 2009/01/25 15:39 |
| L2 | 132 | l1 and anchor adj text | US-PGPUB; USPAT; DERWENT | OR | ON | 2009/01/25 15:39 |
| L3 | 132 | l2 and search | US-PGPUB; USPAT; DERWENT | OR | ON | 2009/01/25 15:40 |
| L4 | 117 | l3 and (scor \$4 rank\$4) | US-PGPUB; USPAT; DERWENT | OR | ON | 2009/01/25 15:40 |
| L5 | 114 | l4 and search adj engine | US-PGPUB; USPAT; DERWENT | OR | ON | 2009/01/25 15:40 |

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Personalization of web search.wsp

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| Index of Claims  | Application/Control No. 10676711 | Applicant(s)/Patent Under Reexamination LAWRENCE, STEPHEN R. |
| | Examiner CHARLES E LU | Art Unit 2161 |

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Claims renumbered in the same order as presented by applicant
 CPA
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| CLAIM | | DATE | | | | | | | |
|-------|----------|------------|------------|------------|--|--|--|--|--|
| Final | Original | 02/24/2008 | 07/11/2008 | 01/26/2009 | | | | | |
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| | 36 | ✓ | ✓ | ✓ | | | | | |

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| Index of Claims  | Application/Control No. 10676711 | Applicant(s)/Patent Under Reexamination LAWRENCE, STEPHEN R. |
| | Examiner CHARLES E LU | Art Unit 2161 |

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| N | Non-Elected |
| I | Interference |

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| A | Appeal |
| O | Objected |

Claims renumbered in the same order as presented by applicant
 CPA
 T.D.
 R.1.47

| CLAIM | | DATE | | | | | | | |
|-------|----------|------------|------------|------------|--|--|--|--|--|
| Final | Original | 02/24/2008 | 07/11/2008 | 01/26/2009 | | | | | |
| | 37 | ✓ | ✓ | ✓ | | | | | |
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| Search Notes  | Application/Control No. 10676711 | Applicant(s)/Patent Under Reexamination LAWRENCE, STEPHEN R. |
| | Examiner CHARLES E LU | Art Unit 2161 |

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| SEARCHED | | | |
| Class | Subclass | Date | Examiner |
| 707 | 3 | 7/11/2008 | CL |

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| SEARCH NOTES | | |
| Search Notes | Date | Examiner |
| Consulted Apu Mofiz (707) | 2/24/2008 | CL |
| Updated EAST cls/sub + keywords | 7/11/2008 | CL |
| " | 1/26/2009 | CL |

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of: Stephen R. Lawrence Confirmation No.: 8147
 Serial No.: 10/676,711 Art Unit: 2161
 Filed: September 30, 2003 Examiner: Lu, Charles Edward
 For: *Personalization of Web Search Results Using Term, Category, and Link-Based User Profiles* Attorney Docket No.: 60963-0014-US
 Date: April 27, 2009

AMENDMENT FEE TRANSMITTAL SHEET

Mail Stop Amendments
 Commissioner for Patents
 P.O. Box 1450
 Alexandria, VA 22313-1450

Sir:

The fee required to be filed with the accompanying amendment of even date herewith concerning the above-identified application has been estimated to be \$52.

The claim amendment fee has been estimated as shown below:

| (Col. 1) | | | (Col. 2) | (Col. 3) | <input type="checkbox"/> Small Entity | | <input checked="" type="checkbox"/> Other Than Small Entity | |
|--|----------------------------------|-------|--------------------------------|---------------|---------------------------------------|--------------|---|--------------|
| | CLAIMS REMAINING AFTER AMENDMENT | | HIGHEST NUMBER PREVIOUSLY PAID | PRESENT EXTRA | RATE (\$) | ADD'L FEE \$ | RATE (\$) | ADD'L FEE \$ |
| Total | 59 | Minus | 58 | 1 | x 26 | | x 52 | 52 |
| Indep | 4 | Minus | 4 | 0 | x 110 | | x 220 | 0 |
| <input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEP. CLAIM | | | | | 195 | | 390 | 0 |
| | | | | | TOTAL | | TOTAL | 52 |

Please charge the required fee to Morgan, Lewis & Bockius LLP Deposit Account No. 50-0310 (order no. 60963-0014-US).

Respectfully submitted,

Date: April 27, 2009


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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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| Application of: | Stephen R. Lawrence | Confirmation No.: | 8147 |
| Serial No.: | 10/676,711 | Art Unit: | 2161 |
| Filed: | September 30, 2003 | Examiner: | Lu, Charles Edward |
| For: | <i>Personalization of Web Search Results Using Term, Category, and Link-Based User Profiles</i> | Attorney Docket No.: | 60963-0014-US |
| | | Date: | April 27, 2009 |

RESPONSE TO OFFICE ACTION

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

The enclosed Response is in response to the Office Action dated January 28, 2009 for the above identified patent application.

The Commissioner is hereby authorized to charge any required fee(s) to Morgan, Lewis & Bockius LLP Deposit Account No. 50-0310 (order no. 60963-0014-US).

Listing of Claims:

1. (Currently Amended) A computer-implemented method of personalizing search results of a search engine, comprising:

at a search engine system having a one or more processors and memory storing programs executed by the one or more processors:

~~accessing a user profile for a user, wherein content of the user profile is generated from based on user information about the user, the user information including information derived from a first set of documents, the first set of documents comprising a plurality of documents selected from the set consisting of: documents identified by search results from the search engine, documents accessed by the user, documents linked to the documents identified by search results from the search engine, and documents linked to the documents accessed by the user, wherein the user information that includes information derived from anchor text contained in documents that link to [[the]] documents accessed by the user;~~

receiving a search query from the user;

identifying a set of ~~generic~~ search result documents that match the search query;

assigning a generic score to each document of at least a subset of the set of search result documents;

assigning a personalized score to each document of the subset of search result documents in accordance with the generic score assigned to the document and the user profile;

ranking the subset of search result documents according to their respective personalized scores;

providing the ranked subset of search result documents to a client system associated with the user; and

updating the user profile based on a document selected by the user from the ranked subset of search result documents.

2. (Currently Amended) The method of claim 60 [[1]], wherein the first set of documents includes a plurality of documents that have been identified by search results from the search engine and that have been viewed by the user.

3. (Currently Amended) The method of claim 60 [[1]], wherein the first set of documents includes a plurality of documents that have been identified by search results from the search engine and that have not been viewed by the user.
4. (Previously presented) The method of claim 1, including updating the user profile by: updating a term-based profile of the user profile by identifying a set of terms from a document in the first set of documents, and adding information about the identified set of terms to the term-based profile.
5. (Canceled)
6. (Previously presented) The method of claim 59, wherein the information derived from the analyzed links that is added to the user profile is added to a link-based profile and includes information about URLs or portions of URLs.
7. (Previously presented) The method of claim 6, wherein the link-based profile of the user profile comprises:
 - a plurality of URLs and a weight associated with each URL, wherein the weight is based on one or more factors selected from the group consisting of frequency with which the user visits the URL, time the user has spent viewing a document associated with the URL and quantity of the user's scrolling activity at the document; and
 - a plurality of hosts and a weight associated with each host, wherein the weight is based on frequency of the user's visits to the host.
8. (Previously presented) The method of claim 7, wherein the URLs further include URLs that have not been visited by the user, but are related to the URLs that have been visited by the user and the weight of an unvisited URL depends on its distance to at least one related URLs that have been visited.
9. (Previously presented) The method of claim 4, wherein a term in the term-based profile is an expression comprising at least one word and a weight.
10. (Previously presented) The method of claim 9, wherein the weight is a weight associated with occurrences of the term in the first set of documents.

11. (Previously presented) The method of claim 9, wherein the weight of a term depends at least partially on the term's term frequency and inverse document frequency in said first set of documents.
12. (Previously presented) The method of claim 14, wherein a category in the category-based profile characterizes at least one aspect of documents in the category and the category is associated with a weight indicative of the category's importance relative to other categories.
13. (Original) The method of claim 12, wherein the at least one aspect of the documents in the category is selected from the group consisting of: document format, document type, document topic and document origin.
14. (Previously presented) The method of claim 1, wherein the updating includes updating a category-based profile of the user profile by classifying a document in the first set of documents into a plurality of categories, and adding information about the plurality of categories to the category-based profile.
15. (Previously presented) The method of claim 1, wherein the user profile is stored on a server of the search engine.
16. (Previously presented) The method of claim 1, wherein the user profile is stored on a client associated with the user.
17. (Previously presented) The method of claim 1, wherein the user profile corresponds to a respective group of users.
18. (Currently Amended) A computer-implemented method of personalizing search results of a search engine, comprising:
 - creating a plurality of user profiles for a plurality of users, each user profile including at least a user's identification number and information derived from documents visited by the user, including information derived from anchor text contained in documents that link to the documents visited by the user;
 - receiving a search query from a user of the plurality of users, the search query including at least one query term and the user's identification number;
 - retrieving a user profile that matches the user's identification number;

generating a personalized query strategy from the search query and the user profile;
selecting a personalized set of documents from the Internet according to the
personalized query strategy, each document having a generic ranking score based at least in
part on the relevance of the document to the search query;

assigning to each document in the set a personalized ranking score based at least in
part on the user profile and the document's generic ranking score;

ranking the set of documents according to their generic and personalized ranking
scores;

providing the ranked set of search result documents to a client system associated with
the user; and

updating the user profile of the user based on a document selected by the user from
the set of search result documents.

19. (Previously presented) The method of claim 18, wherein creating a user's user profile
further comprises:

creating a term-based profile by extracting a set of terms from documents visited by
the user and associating a weight with each extracted term; and

creating a category-based profile by determining a plurality of categories associated
with documents visited by the user and associating a weight with each determined category.

20. (Previously presented) The method of claim 18, wherein creating a user's user profile
further comprises:

creating a link-based profile by analyzing links in documents visited by the user and
associating weights with the link.

21. (Original) The method of claim 18, wherein the user profile for a particular user
includes demographic and geographic information provided by the user.

22. (Original) The method of claim 18, wherein the documents visited by the user from
which information is derived for use in a particular user's user profile are selected based on
the user's activities when visiting the documents.

23. (Previously presented) The method of claim 18, including storing the plurality of user
profiles on a server of the search engine; and

the retrieving including identifying the user's user profile based on the user identification number associated with both the user and the user's user profile.

24. (Original) The method of claim 18, including storing the plurality of user profiles on client computers associated with the plurality of users.

25. (Previously presented) The method of claim 18, wherein the ranked set of documents comprises two subsets of documents, one subset of documents ordered by their generic ranking scores and the other subset of documents ordered by personalized ranking scores.

26. (Previously presented) The method of claim 25, including interleaving or intermixing the two subsets of documents to form the ranked set of documents.

27. (Currently Amended) A search engine system, comprising:
one or more central processing units for executing programs;
an interface for receiving information; and
a search engine module executable by the one or more central processing units, the module comprising:

instructions for accessing a user profile for a user, wherein content of the user profile is generated from ~~based on information about the user, the user information including information derived from a set of documents, the set of documents comprising a plurality of documents selected from the set consisting of documents identified by search results from the search engine system, documents accessed by the user, documents linked to the documents identified by search results from the search engine system, and documents linked to the documents accessed by the user,~~ the user information including that includes information derived from anchor text contained in documents that link to ~~[[the]]~~ documents accessed by the user;

instructions for receiving a search query from a user;

instructions for identifying a set of ~~generic~~ search result documents that match the search query;

instructions for assigning a generic score to each document of at least a plurality of the search result documents;

instructions for assigning personalized scores to each document of the plurality of search result documents in accordance with the generic score assigned to the document and the user's user profile;

instructions for ranking at least the plurality of the search result documents according to personalized scores;

instructions for providing the ranked set of search result documents to a client system associated with the user; and

instructions for updating the user profile based on a document selected by the user from the set of search result documents.

28. (Currently Amended) The system of claim [[27]] 61, wherein the set of documents include a plurality of documents that have been identified by search results from the search engine and that have been viewed by the user.

29. (Currently Amended) The system of claim [[27]] 61, wherein the set of documents include a plurality of documents that have been identified by search results from the search engine and that have not been viewed by the user.

30. (Original) The system of claim 27, further including:

instructions for updating a term-based profile by identifying a set of terms from a document in the set of documents, and adding information about the identified set of terms to the term-based profile; and

instructions for updating a category-based profile by classifying the document into a plurality of categories, and adding information about the plurality of categories to the category-based profile.

31. (Cancelled)

32. (Previously presented) The system of claim 27, wherein the information derived from the analyzed links that is added to the user profile is added to a link-based profile and includes information about URLs or portions of URLs.

33. (Original) The system of claim 32, wherein the link-based profile comprises:

a plurality of URLs and a weight associated with each URL, wherein the weight is based on one or more factors selected from the group consisting of frequency with which the user visits the URL, time the user has spent viewing a document associated with the URL and quantity of the user's scrolling activity at the document; and

a plurality of hosts and a weight associated with each host, wherein the weight is based on frequency of the user's visits to the host.

34. (Original) The system of claim 33, wherein the URLs further include URLs that have not been visited by the user, but are related to the URLs that have been visited by the user and the weight of an unvisited URL depends on its distance to at least one related URLs that have been visited.
35. (Original) The system of claim 30, wherein a term in the term-based profile is an expression comprising at least one word and a weight.
36. (Original) The system of claim 35, wherein the weight is a weight associated with occurrences of the term in the set of documents.
37. (Original) The system of claim 35, wherein the weight of a term depends at least partially on the term's term frequency and inverse document frequency in said set of documents.
38. (Original) The system of claim 30, wherein a category in the category-based profile characterizes at least one aspect of documents in the category and the category is associated with a weight indicative of the category's importance relative to other categories.
39. (Original) The system of claim 38, wherein the at least one aspect of the documents in the category is selected from the group consisting of: document format, document type, document topic and document origin.
40. (Original) The system of claim 27, wherein the user profile is stored on a server of the search engine.
41. (Original) The system of claim 27, wherein the user profile is stored on a client associated with the user.
42. (Previously presented) The system of claim 27, wherein the user's user profile corresponds to a group of users.
43. (Currently Amended) A computer readable storage medium storing one or more programs for execution by one or more processors, the one or more programs comprising:
instructions for accessing a user profile for a user ~~based on information about the user, the user information including information derived from a set of documents, the set of documents comprising a plurality of documents selected from the set consisting of documents~~

~~identified by search results from a search engine, documents accessed by the user, documents linked to the documents identified by search results from the search engine, and documents linked to the documents accessed by the user,~~ the, wherein content of the user profile is generated from user information including that includes information derived from anchor text contained in documents that link to [[the]] documents accessed by the user;

instructions for receiving a search query from a user;

instructions for identifying a set of ~~generic~~ search result documents that match the search query;

instructions for assigning a generic score to each document of at least a plurality of the search result documents;

instructions for assigning personalized scores to each document of the plurality of search result documents in accordance with the generic score assigned to the document and the user's user profile;

instructions for ranking at least the plurality of the search result documents according to their personalized scores;

instructions for providing the ranked set of search result documents to a client system associated with the user; and

instructions for updating the user profile based on a document selected by the user from the set of search result documents.

44. (Currently Amended) The computer readable storage medium of claim [[43]] 62, wherein the set of documents include a plurality of documents that have been identified by search results from the search engine and that have been viewed by the user.

45. (Currently Amended) The computer readable storage medium of claim [[43]] 62, wherein the set of documents include a plurality of documents that have been identified by search results from the search engine and that have not been viewed by the user.

46. (Previously presented) The computer readable storage medium of claim 43, further including:

instructions for updating a term-based profile by identifying a set of terms from a document in the set of documents, and adding information about the identified set of terms to the term-based profile; and

instructions for updating a category-based profile by classifying the document into a plurality of categories, and adding information about the plurality of categories to the category-based profile.

47. (Cancelled)

48. (Previously presented) The computer readable storage medium of claim 43, wherein the information derived from the analyzed links that is added to the user profile is added to a link-based profile and includes information about URLs or portions of URLs.

49. (Previously presented) The computer readable storage medium of claim 48, wherein the link-based profile comprises:

a plurality of URLs and a weight associated with each URL, wherein the weight is based on one or more factors selected from the group consisting of frequency with which the user visits the URL, time the user has spent viewing a document associated with the URL and quantity of the user's scrolling activity at the document; and

a plurality of hosts and a weight associated with each host, wherein the weight is based on frequency of the user's visits to the host.

50. (Previously presented) The computer readable storage medium of claim 49, wherein the URLs further include URLs that have not been visited by the user, but are related to the URLs that have been visited by the user and the weight of an unvisited URL depends on its distance to at least one related URLs that have been visited.

51. (Previously presented) The computer readable storage medium of claim 46, wherein a term in the term-based profile is an expression comprising at least one word and a weight.

52. (Previously presented) The computer readable storage medium of claim 51, wherein the weight is a weight associated with occurrences of the term in the set of documents.

53. (Previously presented) The computer readable storage medium of claim 51, wherein the weight of a term depends at least partially on the term's term frequency and inverse document frequency in said set of documents.

54. (Previously presented) The computer readable storage medium of claim 46, wherein a category in the category-based profile characterizes at least one aspect of documents in the

category and the category is associated with a weight indicative of the category's importance relative to other categories.

55. (Previously presented) The computer readable storage medium of claim 54, wherein the at least one aspect of the documents in the category is selected from the group consisting of: document format, document type, document topic and document origin.

56. (Previously presented) The computer readable storage medium of claim 43, wherein the user profile is stored on a server of the search engine.

57. (Previously presented) The computer readable storage medium of claim 43, wherein the user profile is stored on a client associated with the user.

58. (Previously presented) The computer readable storage medium of claim 43, wherein the user's user profile corresponds to a group of users.

59. (Previously presented) The method of claim 1, wherein the updating includes analyzing links within a document in the first set of documents and adding information derived from the analyzed links to the user profile.

60. (New) The method of claim 1, wherein the user information is derived from a first set of documents that includes: documents identified by search results from the search engine, documents accessed by the user, documents linked to the documents identified by search results from the search engine, and documents linked to the documents accessed by the user.

61. (New) The system of claim 27, wherein the user information is derived from a first set of documents that includes: documents identified by search results from the search engine, documents accessed by the user, documents linked to the documents identified by search results from the search engine, and documents linked to the documents accessed by the user.

62. (New) The computer readable storage medium of claim 43, wherein the user information is derived from a first set of documents that includes: documents identified by search results from the search engine, documents accessed by the user, documents linked to the documents identified by search results from the search engine, and documents linked to the documents accessed by the user.

REMARKS

This amendment responds to the office action mailed January 28, 2009. In the office action the Examiner:

- rejected claims 1-4, 6-7, 9-20, 22-24, 27-30, 32-33, 35-46, 48-49 and 51-59 under 35 U.S.C. 103(a) as being unpatentable over *Breese et al.* (US 6,006,218) in view of *Konig et al.* (US 6,981,040) further in view of *Li et al.* (US 6,647,381);
- rejected claim 21 under 35 U.S.C. §103(a) as being unpatentable over *Breese, Konig and Li*, further in view of *Gerace* (US 5,848,396);
- rejected claims 8, 34, and 50 under 35 U.S.C. §103(a) as being unpatentable over *Breese* in view of *Konig*, further in view of *Li and Gabriel et al.* (US 6,584,468); and
- rejected claims 25-26 under 35 U.S.C. §103(a) as being unpatentable over *Breese* in view of *Konig*, further in view of *Li and Dumais et al.* (US 2004/0267700).

In this response, claims 1-3, 18, 27-29, and 43-45 have been amended. Claims 1, 27 and 43 have been amended to ensure clarity of the first element (“accessing a user profile for a user, wherein content of the user profile is generated from user information...”). Support for the changes to claims 1, 27 and 43 is found in at least Figure 10 and paragraphs 0009, 0031, 0051 and 0078-0081 of the application as filed. Claims 1, 18, 27 and 43 have been amended to require that the ranked subset of search result documents are provided “to a client system associated with the user.” Support for these changes to claims 1, 18, 27 and 43 is found in at least Figure 1 and paragraphs 0029 and 0070 of the application as filed. No new matter has been added as a result of any of the amendments.

New claims 60-62 have been added. Support for the new claims 60-62 can be found at least in ¶0032 of the specification as filed and in previously pending claims 1, 27 and 43.

With respect to all amendments, Applicants have not dedicated or abandoned any unclaimed subject matter. Moreover, Applicants have not acquiesced to any characterizations of the invention, nor any rejections or objections of the claims, made by the Examiner. After entry of this amendment, the pending claims remain: claims 1-4, 6-30, 32-46 and 48-62.

Claim Rejections under 35 USC 103

To establish prima facie obviousness of a claimed invention, all the claim elements must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580

(CCPA 1974). Finding all the claim elements in the prior art is necessary, but not sufficient. *KSR Intern. Co. v. Teleflex Inc.*, 127 S.Ct. 1727, 1741 (2007) ("a patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art"). "All words in a claim must be considered in judging the patentability of that claim against the prior art." *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970). "During patent examination, the pending claims must be 'given their broadest reasonable interpretation consistent with the specification.'" MPEP § 2111 citing *Phillips v. AWH Corp.*, 415 F.3d 1303, 1316, 75 USPQ2d 1321, 1329 (Fed. Cir. 2005).

Applicants respectfully submit that the cited references, either individually or in combination, do not teach or suggest each and every limitation of independent claims 1, 18, 27 and 43.

Claim 1, as amended, requires:

"accessing a user profile for a user, wherein content of the user profile is generated from ***user information that includes information derived from anchor text contained in documents that link to documents accessed by the user....***" (Emphasis Added).

Indeed, as discussed in the specification as filed, using "information derived from anchor text contained in documents that link to documents accessed by the user" can provide useful hits about the user's personal search preferences:

Similarly, the universal resource locators (URL) 203 associated with the search results in response to the previous search queries and their corresponding anchor texts 205, especially for search result items that have been selected or "visited" by the user (e.g., downloaded or otherwise viewed by the user), are helpful in determining the user's preferences. (Paragraph 0031 of the specification as filed).

As acknowledged by the Examiner, *Breese* and *Konig* are silent about and does not teach or suggest using "information derived from anchor text contained in documents that link to documents accessed by the user," as required by the claim. (Office action dated 01-28-09, p. 5).

The Examiner relies on *Li* as teaching this limitation and cites col. 9, lines 7-12, col. 7, lines 45-65 and Figure 2, Rule 6 of *Li*. In the areas cited by the Examiner and elsewhere *Li*

discloses a method for determining if a web page is a “logical domain entry page” for navigation. (*Li*, col. 7, lines 19-24 and 48-60; col. 9, lines 9-10). *Li* discloses:

Turning now to FIG. 2, there is presented an exemplary set of rules and scoring functions for use in the method of logical domain definition of the present invention. As can be appreciated by a close examination of FIG. 2, the rules consider each page in the physical domain **and identify logical domain entry pages based upon**: available Web page metadata describing the content of the page, such as title, URL string, and **anchor text**; and link structures including popularity by citation. (*Li*, col. 7, lines 55-63; Figure 2).

Rule 6: If a page, A, contains a link pointing to another page, B, with the phrase "home," "go home," or "return home" in the anchor, there is a high probability that the page being pointed to (i.e.: page B) is a logical domain entry page. (*Li*, col. 9, lines 7-10; Figure 2).

Thus, *Li* discloses using information derived from anchor text contained in a page (Page A) that links to another page (Page B). But, *Li*'s Page B is not a “document accessed by a user,” as required by claim 1. Further, *Li* uses the anchor text information in order to determine whether or not Page B is a “logical domain entry page.” In contrast, claim 1 requires that “content of the user profile of a user is generated from user information that includes information derived from anchor text contained in documents that link to documents accessed by the user.”

Thus, like *Breese* and *Konig*, *Li* also does not teach or suggest “accessing a user profile for a user, wherein content of the user profile is generated from user information that includes information derived from anchor text contained in documents that link to documents accessed by the user,” as required by claim 1, as amended.

Further, none of *Gerace*, *Gabriel* and *Dumais* supplies the missing limitations. None of *Gerace*, *Gabriel* and *Dumais* teaches or suggests “accessing a user profile for a user, wherein content of the user profile is generated from user information that includes information derived from anchor text contained in documents that link to documents accessed by the user,” as required by claim 1, as amended.

As none of the cited references teach each and every limitation of claim 1, amended claim 1 (and associated dependent claims) are patentable over the cited references. Independent claims 18, 27 and 43, as amended, (and associated dependent claims) are also

patentable over the cited references for analogous reasons as those discussed with reference to claim 1.

Claim 18. In addition, with respect to claim 18 and its dependent claims, (as explained in more detail below) *Breeze* and *Konig* do not teach (A) “generating a personalized query strategy from the search query and the user profile;” and then (B) “selecting a personalized set of documents from the Internet according to the personalized query strategy.” In both *Breese* and *Konig*, personalized information is used only to “post process” results produced by a search engine in response to a search query. See, for example, Fig. 19 of *Konig* and Fig. 2C (operations 230, 231 and 234, in that order) of *Breese*. In *Breese*, the very name of the “retrieval result adjusting module” 134, as well as the explanatory text at col. 6, lines 60-66, and col. 12, lines 32-48, teaches that the retrieval result adjusting module 134 of *Breese* ranks or re-ranks search results. But there is no discussion in *Breese* whatsoever about changing the search query or search query strategy used to produce a list of search results.

It is noted that in claim 18, the personalized search query is generated prior to “selecting a personalized set of documents” because the “selecting” is performed “according to the personalized search strategy.” Also, claim 18 requires the “personalized search strategy” is generated not just from the user profile, but also “from the search query.” These aspects of claim 18, and its dependent claims, are not taught by *Breese* and *Konig*. For at least these additional reasons, claim 18 and its dependent claims are patentable over the combined teaches of the cited references.

By responding in the foregoing remarks only to particular positions asserted by the examiner, the Applicants do not necessarily acquiesce in other positions that have not been explicitly addressed. In addition, the Applicants’ arguments for the patentability of a claim should not be understood as implying that no other reasons for the patentability of that claim exist.

Electronic Patent Application Fee Transmittal

| | |
|---|-------------------------------------|
| Application Number: | 10676711 |
| Filing Date: | 30-Sep-2003 |
| Title of Invention: | Personalization of web search |
| First Named Inventor/Applicant Name: | Stephen R. Lawrence |
| Filer: | Gary Scott Williams/Beverly Gemello |
| Attorney Docket Number: | 060963-0014US |

Filed as Large Entity

Utility under 35 USC 111(a) Filing Fees

| Description | Fee Code | Quantity | Amount | Sub-Total in USD(\$) |
|------------------------|----------|----------|--------|----------------------|
| Basic Filing: | | | | |
| Pages: | | | | |
| Claims: | | | | |
| Claims in excess of 20 | 1202 | 1 | 52 | 52 |

Miscellaneous-Filing:

Petition:

Patent-Appeals-and-Interference:

Post-Allowance-and-Post-Issuance:

Extension-of-Time:

| Description | Fee Code | Quantity | Amount | Sub-Total in USD(\$) |
|--------------------------|----------|----------|--------|----------------------|
| Miscellaneous: | | | | |
| Total in USD (\$) | | | | 52 |

Electronic Acknowledgement Receipt

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|---|-------------------------------------|
| EFS ID: | 5229571 |
| Application Number: | 10676711 |
| International Application Number: | |
| Confirmation Number: | 8147 |
| Title of Invention: | Personalization of web search |
| First Named Inventor/Applicant Name: | Stephen R. Lawrence |
| Customer Number: | 24341 |
| Filer: | Gary Scott Williams/Beverly Gemello |
| Filer Authorized By: | Gary Scott Williams |
| Attorney Docket Number: | 060963-0014US |
| Receipt Date: | 27-APR-2009 |
| Filing Date: | 30-SEP-2003 |
| Time Stamp: | 21:08:04 |
| Application Type: | Utility under 35 USC 111(a) |

Payment information:

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| Submitted with Payment | yes |
| Payment Type | Deposit Account |
| Payment was successfully received in RAM | \$52 |
| RAM confirmation Number | 6184 |
| Deposit Account | 500310 |
| Authorized User | |

File Listing:

| Document Number | Document Description | File Name | File Size(Bytes)/ Message Digest | Multi Part /.zip | Pages (if appl.) |
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| 1 | | 60963-0014_ResponseToOA.pdf | 222629 c4eb11f2e22a17df49605ea23bbe2cd2ef6b379 | yes | 17 |
| Multipart Description/PDF files in .zip description | | | | | |
| Document Description | | Start | End | | |
| Amendment/Req. Reconsideration-After Non-Final Reject | | 1 | 2 | | |
| Claims | | 3 | 12 | | |
| Applicant Arguments/Remarks Made in an Amendment | | 13 | 17 | | |
| Warnings: | | | | | |
| Information: | | | | | |
| 2 | Fee Worksheet (PTO-875) | fee-info.pdf | 30008 399473cfa6c181e55c6eba292e99748c72823f00 | no | 2 |
| Warnings: | | | | | |
| Information: | | | | | |
| Total Files Size (in bytes): | | | 252637 | | |
| <p>This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.</p> <p><u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.</p> <p><u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.</p> <p><u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.</p> | | | | | |

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| | | | |
|---|---|----------------------------------|---------------------------------------|
| PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875 | Application or Docket Number 10/676,711 | Filing Date 09/30/2003 | <input type="checkbox"/> To be Mailed |
|---|---|----------------------------------|---------------------------------------|

| APPLICATION AS FILED – PART I | | | OTHER THAN SMALL ENTITY | | | | |
|--|---|--------------|---------------------------------------|----------|----|-----------|----------|
| | (Column 1) | (Column 2) | SMALL ENTITY <input type="checkbox"/> | OR | | | |
| FOR | NUMBER FILED | NUMBER EXTRA | RATE (\$) | FEE (\$) | | RATE (\$) | FEE (\$) |
| <input type="checkbox"/> BASIC FEE <small>(37 CFR 1.16(a), (b), or (c))</small> | N/A | N/A | N/A | | OR | N/A | |
| <input type="checkbox"/> SEARCH FEE <small>(37 CFR 1.16(k), (l), or (m))</small> | N/A | N/A | N/A | | OR | N/A | |
| <input type="checkbox"/> EXAMINATION FEE <small>(37 CFR 1.16(o), (p), or (q))</small> | N/A | N/A | N/A | | OR | N/A | |
| TOTAL CLAIMS <small>(37 CFR 1.16(i))</small> | minus 20 = | * | X \$ = | | OR | X \$ = | |
| INDEPENDENT CLAIMS <small>(37 CFR 1.16(h))</small> | minus 3 = | * | X \$ = | | OR | X \$ = | |
| <input type="checkbox"/> APPLICATION SIZE FEE <small>(37 CFR 1.16(s))</small> | If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s). | | | | OR | | |
| <input type="checkbox"/> MULTIPLE DEPENDENT CLAIM PRESENT <small>(37 CFR 1.16(j))</small> | | | | | OR | | |
| | | | TOTAL | | OR | TOTAL | |

* If the difference in column 1 is less than zero, enter "0" in column 2.

| APPLICATION AS AMENDED – PART II | | | | | OTHER THAN SMALL ENTITY | | | | | |
|----------------------------------|--|----------------------------------|------------------------------------|---------------|-------------------------|---------------------|----|-----------------|---------------------|----|
| | (Column 1) | (Column 2) | (Column 3) | | | | | | | |
| AMENDMENT | 04/27/2009 | CLAIMS REMAINING AFTER AMENDMENT | HIGHEST NUMBER PREVIOUSLY PAID FOR | PRESENT EXTRA | RATE (\$) | ADDITIONAL FEE (\$) | | RATE (\$) | ADDITIONAL FEE (\$) | |
| | Total (37 CFR 1.16(i)) | * 59 | Minus | ** 58 | = | 1 | | OR | X \$52= | 52 |
| | Independent (37 CFR 1.16(h)) | * 4 | Minus | ***4 | = | 0 | | OR | X \$220= | 0 |
| | <input type="checkbox"/> Application Size Fee (37 CFR 1.16(s)) | | | | | | | OR | | |
| | <input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j)) | | | | | | | OR | | |
| | | | | | TOTAL ADD'L FEE | | OR | TOTAL ADD'L FEE | 52 | |

| | (Column 1) | (Column 2) | (Column 3) | | | | | |
|-----------|--|------------------------------------|---------------|-----------|---------------------|--|-----------|---------------------|
| AMENDMENT | CLAIMS REMAINING AFTER AMENDMENT | HIGHEST NUMBER PREVIOUSLY PAID FOR | PRESENT EXTRA | RATE (\$) | ADDITIONAL FEE (\$) | | RATE (\$) | ADDITIONAL FEE (\$) |
| | Total (37 CFR 1.16(i)) | * | Minus | ** | = | | OR | X \$ = |
| | Independent (37 CFR 1.16(h)) | * | Minus | *** | = | | OR | X \$ = |
| | <input type="checkbox"/> Application Size Fee (37 CFR 1.16(s)) | | | | | | OR | |
| | <input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j)) | | | | | | OR | |
| | | | | | TOTAL ADD'L FEE | | OR | TOTAL ADD'L FEE |

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
 ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
 *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner:
 /VENESSA JONES/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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LU, CHARLES EDWARD

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06/01/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

DETAILED ACTION

1. This Action is in response to the Amendment dated 4/27/2009. Claims 1-4, 6-30, 32-46, and 48-62 are pending and rejected.

Response to Amendments/Response to Arguments

2. Applicant's arguments regarding the 35 USC 103 rejections were fully considered.

Applicant argues that Breese, Konig, and Li do not teach or suggest "accessing a user profile for a user, wherein content of the user profile is generated from user information that includes information derived from anchor text contained in documents that link to documents accessed by the user" (Remarks, p. 14). The examiner respectfully disagrees.

First, Breese and Konig already teach or suggest a user profile for the user generated from user information, as discussed below. As to the remaining subject matter regarding the profile "including information derived from anchor text contained in documents that link to documents accessed by the user," the combination of references would teach or suggest the claimed subject matter. Specifically, Li teaches or suggests being able to use information derived from anchor text contained in a document that links to another document, as shown below, to help identify popular or otherwise relevant pages (see below). Breese and Konig teach or suggest that a given document may be a document that was accessed by a user. The motivation for using Li to include information derived from anchor text in the user profile would have been to facilitate

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recognizing a popular or relevant page, as taught by Li and known to one of ordinary skill in the art.

Applicant further argues that Breese and Konig do not teach or suggest generating a personalized query strategy and selecting a personalized set of document according to the strategy (Remarks, p. 15). These arguments were addressed in a prior action. It should be noted that the broadest reasonable interpretation has been applied to the claims and Applicant is arguing limitations that are not in the claim.

3. For at least the above reasons, the prior art rejection of the claims is maintained.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

4. Claims 1-4, 6-7, 9-20, 22-24, 27-30, 32-33, 35-46, 48-49, and 51-62 are rejected under 35 U.S.C. 103(a) as being unpatentable over Breese et al (U.S. Patent 6,006,218), hereafter “Breese,” in view of Konig et al (U.S. Patent 6,981,040), hereafter “Konig,” further in view of Li et al (U.S. Patent 6,647,381), hereinafter “Li.”

As to claims 1, 59, and 60-62, Breese teaches the following claimed subject matter:

A method of personalizing search results of a search engine, comprising:
accessing a user profile for a user, the content of the user profile generated from

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information including user information about the user (e.g., fig. 2B, #224, fig. 5, #500, col. 5, ll. 20-45),

At a search engine system having one or more processors and memory storing programs executed by the one or more processors (fig. 1);

The user information including information derived from a first set of documents (e.g., col. 5, ll. 20-45),

The first set of documents comprising a plurality of documents selected from the set consisting of documents identified by search results from the search engine, documents accessed by the user, documents linked to the documents identified by search results from the search engine, and documents linked to the documents accessed by the user (e.g., col. 5, ll. 20-45; col. 8, ll. 15-30); (now recited in new claims 60-62).

Receiving a search query from the user (col. 6, ll. 60-65);

Identifying a set of search result documents that match the search query (fig. 2C, #230-231);

Assigning a generic score to each document of at least a subset of the set of search result documents (col. 7, ll. 18-45);

Assigning a personalized score to each document of the subset of search result documents in accordance with the generic score assigned to the document and the user profile (col. 7, ll. 18-45, details on col. 8-17);

Ranking the subset of search result documents according to their respective personalized scores (col. 7, ll. 18-45, details on col. 8-17).

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Providing the ranked subset of search result documents to a client system associated with the user (e.g., fig. 2C, #236, figs. 1-2).

Breese teaches a set of search result documents and a user profile, as described above, but does not expressly teach updating the user profile based on a document selected by the user from the ranked subset of search result documents, and wherein updating includes analyzing links within a document in the first set of documents and adding information derived from the analyzed links to the user profile.

However, Breese teaches presenting a ranked subset of documents to the user (see above) and updating user information according to the latest user provided information, such as particular site visits (e.g., col. 8, ll. 15-40). Thus, the document selected by a user could be one that was presented to the user. Konig teaches documents selected from the user and analyzing links within a selected document to update a user profile ("user model") because "during updating [of the user model], documents that are of interest to the user...are analyzed.... Through information extraction, links to other documents...are obtained.... Extracted information is processed to initialize or update the user representations in the User Model." (e.g., col. 17, l. 20 – col. 18, l. 9, also see the citations in the Prior Action for previous claim 5).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Breese such that documents selected from user from the set of search results are analyzed and information from links extracted from the documents are used to update the user profile, as claimed. The motivation for maintaining a User Model would have been to enhance the system's knowledge of the

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user's interests, as taught by Konig (see e.g., Summary), and as known to one of ordinary skill in the art.

Breese and Konig as applied above teach user information, documents accessed by the user, and analyzing links, but do not expressly teach information derived from anchor text contained in documents that link to the documents accessed by the user.

However, Li teaches being able to use information derived from anchor text contained in documents that link to a document (e.g., col. 9, ll. 7-12, col. 7, ll. 45-65, fig. 2 "Rule 6").

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Breese and Konig, such that the user information in the profile includes information derived from anchor text in documents that link to the documents accessed by the user. The motivation would have been to facilitate recognizing a popular and/or relevant page, as taught by Li (col. 7, ll. 45-65, col. 4, ll. 42-50) and known to one of ordinary skill in the art.

As to claims 2 and 3, Breese as applied above does not expressly teach wherein the first set of documents includes a plurality of documents that have been identified by search results from the search engine and that have/have not been viewed by the user.

However, Breese teaches that the user information includes previous search information (col. 5, ll. 30-33, col. 16, l. 40) and that the search information may include information on the entries that were presented to the user as a result of the search (i.e. search results). Furthermore, Breese states, "it may be assumed that the user is aware

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of these entries, or at least the highest ranked entries (col. 16, ll. 34-50).” The user information includes information on previous Internet site access operations (col. 5, ll. 30-35). Thus, Breese suggests that the user may have actually viewed the information because the information was presented to the user.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to further modify Breese/Konig/Li, such that “wherein the set of documents include a plurality of documents that have been identified by search results from the search engine and that have/have not been viewed by the user” is implemented. The motivation as known to one of ordinary skill in the art would have been to enhance the effectiveness of the retrieval result adjustor, because data regarding actual document views would be used.

As to claims 4 and 14, Breese and Li as applied above do not expressly teach updating the user profile by updating a term-based profile of the user profile by identifying a set of terms from a document in the first set of documents, and adding information about the identified set of terms to the term-based profile; and updating a category-based profile of the first user profile by classifying the document into a plurality of categories, and adding information about the plurality of categories to the category-based profile.

However, Konig teaches updating a term-based, and category-based profile for a user with weights as claimed (col. fig. 4A, fig. 4C, col. 10, l. 51, col. 12, l. 55).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Breese/Konig/Li, such that the claimed updating

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of the term-based and category-based profiles is implemented with appropriate weights associated with each item (see e.g., fig. 4). The motivation for maintaining this information (in a User Model) would have been to enhance the system's knowledge of the user's interests, as taught by Konig (see e.g., Summary), and as known to one of ordinary skill in the art. This would further enhance search results.

As to claim 6, Konig as applied above further teaches wherein the information derived from the analyzed links that is added to the user profile is added to a link-based profile and includes information about URLs or portions of URLs (fig. 4).

As to claim 7, Konig as applied above further teaches or suggests wherein the link-based profile of the user profile comprises a plurality of URLs and a weight associated with each URL, wherein the weight is based on one or more factors selected from the group consisting of frequency with which the first user visits the URL, time the first user has spent viewing a document associated with the URL and quantity of the first user's scrolling activity at the document; and a plurality of hosts and a weight associated with each host, wherein the weight is based on frequency of the first user's visits to the host (col. 12, ll. 28-54, col. 23, ll. 1-10).

As to claim 9, Konig as applied above further teaches wherein a term in the term-based profile is an expression comprising at least one word and a weight (fig. 4A).

As to claim 10, Konig as applied above further teaches wherein the weight is a weight associated with occurrences of the term in the first set of documents (fig. 4, col. 10, l. 52 – col. 12, l. 55).

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As to claim 11, Konig as applied above further teaches wherein the weight of a term depends at least partially on the term's term frequency and inverse document frequency in said first set of documents (col. 10, l. 52 – col. 11, l. 20).

As to claim 12, Konig as applied above further teaches wherein a category in the category-based profile characterizes at least one aspect of documents in the category and the category is associated with a weight indicative of the category's importance relative to other categories (fig. 4, 7, 8, col. 15, ll. 7-32).

As to claim 13, Konig as applied above further teaches wherein the at least one aspect of the documents in the category is selected from the group consisting of: document format, document type, document topic and document origin (e.g., col. 15, ll. 7-15 and see above).

As to claim 15, Breese and Li as applied above discloses a user profile and a search engine (e.g., Breese, fig. 1, 5), but do not expressly teach wherein the user profile is stored on a server of the search engine.

However, Konig teaches wherein user profiles are stored on a server of the search engine (fig. 1).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to further modify Breese, Konig, and Li, such that the user profiles are stored on a server of the search engine. The motivation would have been to adapt to the requirements of the user in setting up the search system, or to provide personalized services for simultaneous clients, as taught by Konig (col. 7, ll. 20-25).

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As to claim 16, Breese as applied above further teaches wherein the user profile is stored on a client associated with the user (col. 4, l. 62, col. 5, ll. 1-2).

As to claim 17, Breese and Li as applied above do not expressly teach wherein the user profile corresponds to a respective a group of users.

However, Konig teaches wherein a user is a group of users (col. 20, ll. 24-28, col. 9, ll. 47-52).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to further modify Breese, Konig, and Li, such that the first user is a group of users. The motivation would have been to represent the interest level of a group of users in a document independently of any specific information need, as taught by Konig (col. 9, ll. 47-52).

As to claim 18, Breese teaches the following claimed subject matter:

A method of personalizing search results of a search engine, comprising:
creating a plurality of user profiles for a plurality of users, each user profile including at least a user's identification number and information derived from documents visited by the user (col. 5, ll. 20-45);

Receiving a search query from a user of the plurality of users, the search query including at least one query term (e.g., col. 8, ll. 62-66).

Retrieving a user profile that matches the user's identification number (e.g., col. 5, ll. 25-30, col. 8, ll. 29-31);

Selecting a personalized set of documents from the Internet, according to the personalized query strategy, each document having a generic ranking score based at

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least in part on the relevance of the document to the search query, assigning to each document in the set a personalized ranking score based at least in part on the user profile and the document's generic ranking score (discussed above);

Ranking the set of documents according to their generic and personalized ranking scores and providing the ranked set of search result documents to a client system associated with the user (see above).

Breese does not expressly teach the search query including the user's identification number.

However, Breese teaches that a user has a unique identification number for storing user attributes in a user database (col. 5, ll. 20-45), and that information regarding the user and the search to be performed is obtained at the input step 222 (col. 8, ll. 15-20, #224).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Breese, such that the search query includes the user's identification number in the input step. The motivation would have been to adapt to specific user requirements in setting up the search engine. For example, one may send the identification with the query to facilitate efficient processing.

Breese teaches a set of search result documents and a user profile, as described above, but does not expressly teach updating the user profile based on a document selected by the user from the search result documents, and wherein updating includes analyzing links within a document in the first set of documents and adding information derived from the analyzed links to the user profile.

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However, Breese teaches presenting a ranked subset of documents to the user (see above) and updating user information according to the latest user provided information, such as particular site visits (e.g., col. 8, ll. 15-40). Thus, the document selected by a user could be one that was presented to the user. König teaches documents selected from the user and analyzing links within a selected document to update a user profile (“user model”) because “during updating [of the user model], documents that are of interest to the user...are analyzed.... Through information extraction, links to other documents...are obtained.... Extracted information is processed to initialize or update the user representations in the User Model.” (e.g., col. 17, l. 20 – col. 18, l. 9, also see the citations in the Prior Action for previous claim 5).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Breese such that documents selected from the user from the set of search results are analyzed and information from links extracted from the documents are used to update the user profile, as claimed. The motivation for maintaining a User Model would have been to enhance the system's knowledge of the user's interests, as taught by König (see e.g., Summary), and as known to one of ordinary skill in the art.

Breese and König as applied above teach user information, documents visited by the user, and analyzing links, but do not expressly teach information derived from anchor text contained in documents that link to the documents visited by the user.

However, Li teaches information derived from anchor text contained in documents that link to a document (e.g., col. 9, ll. 7-12, col. 7, ll. 45-65, fig. 2 “Rule 6”).

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Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Breese and Konig, such that the user information includes information derived from anchor text in documents that link to the documents accessed by the user. The motivation would have been to facilitate recognizing a popular and/or relevant page, as taught by Li (col. 7, ll. 45-65, col. 4, ll. 42-50) and known to one of ordinary skill in the art.

Claims 19-20 are drawn to substantially the same subject matter as claims 4, 14, and 18 above, in addition to creating, which must happen in Konig in order to store the relevant data (see e.g., fig. 4).

As to claim 22, Breese as applied above further teaches wherein the documents visited by the user from which information is derived for use in a particular user's user profile is selected based on the user's activities when visiting the documents (e.g., col. 5, ll. 20-45).

As to claim 23, the "storing" limitation is addressed with respect to claim 15 above. Breese, as applied above, further teaches the retrieving including the user's user profile based on an identification number associated with the user and the user's profile (col. 5, ll. 23-30). Note that Breese must retrieve the data in order to process it.

Claims 24, 27-30, 32-33, 35-46, 48-49, 51-58, and 60-62 are rejected based on the same reasoning as the above claims.

5. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Breese, in view of Konig, further in view of Li and Gerace (U.S. Patent 5,848,396), hereinafter "Gerace."

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As to claim 21, Breese as applied above teaches wherein the user profile includes demographic information provided by the user (fig. 5), but Breese, Konig, and Li do not expressly teach geographic information.

However, Gerace teaches a user profile including both demographic and geographic information (col. 5, l. 63 – col. 6, l. 15).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Breese, Konig, and Li, such that geographic information is additionally stored with the user profile. The motivation would have been to store more information about the user to facilitate better decisions by the information retrieval system, as known to one of ordinary skill in the art.

6. Claims 8, 34, and 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Breese, in view of Konig, further in view of Li and Gabriel et al (U.S. Patent 6,584,468), hereafter “Gabriel.”

As to claim 8, Breese, Konig, and Li do not expressly teach wherein the URLs further include URLs that have not been visited by the first user, but are related to the URLs that have been visited by the first user and the weight of an unvisited URL depends on its distance to at least one related URLs that have been visited.

However, Gabriel teaches wherein URLs include URLs that have not been visited by a user but are related to URLs visited by a user, and the weight of an unvisited URL depends on its distance to at least one related URLs that have been visited (col. 7, l. 37 – col. 9, l. 10).

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Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Breese, Konig, and Li, such that the above claimed subject matter is implemented. The motivation would have been to facilitate indexing relevant information, as taught throughout Gabriel (e.g., Abstract, col. 7, ll. 37-40, col. 2, ll. 34-46).

Claims 34 and 50 are rejected based on the same reasoning as claim 8, discussed above.

7. Claims 25-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Breese, in view of Konig, further in view of Li and Dumais et al (US 2004/0267700), hereafter “Dumais.”

As to claims 25-26, Breese as applied above further teaches wherein the ranked set of documents comprises a personalized subset of documents ordered by personalized scores and the other subset ordered by the generic ranking scores (col. 7, ll. 33-36, fig. 2C). Furthermore, Breese teaches a set of documents ordered by their generic scores (see above).

Breese, Konig, and Li do not expressly teach the ranked set of documents comprising the above two sets of documents, and interleaving the two sets to form the ranked set of documents.

However, Dumais teaches interleaving results from a personal search engine and other search results for presenting to the user (para. 0029).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Breese, Konig, and Li, such that the ranked set

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of documents comprises the above two sets of documents, and the two sets are interleaved to form the ranked set of documents. The motivation would have been to create a personal browsing system to be a portal to all of a user's content, including personal information as well as more general resources, as taught by Dumais (para. 0029).

Conclusion

8. Applicant's arguments were fully considered but were not persuasive.

Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Charles E. Lu whose telephone number is (571) 272-8594. The examiner can normally be reached on 8:30 - 5:00; M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Apu Mofiz can be reached at (571) 272-4080. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Charles E Lu/
Examiner, Art Unit 2161
6/1/2009


/Apu M Mofiz/
Supervisory Patent Examiner, Art Unit 2161

EAST Search History

| Ref # | Hits | Search Query | DBs | Default Operator | Plurals | Time Stamp |
|-------|-------|--------------------------------|--|------------------|---------|------------------|
| L1 | 12261 | 707/3.ccls. | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2009/05/28 14:01 |
| L2 | 1048 | I1 and user adj profile | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2009/05/28 14:01 |
| L3 | 528 | I2 and rank \$4 | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2009/05/28 14:02 |
| L4 | 59 | I3 and anchor | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2009/05/28 14:02 |
| L5 | 17 | I3 and anchor near3 text | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2009/05/28 14:02 |

5/ 28/ 2009 2:07:09 PM

C:\ Documents and Settings\ clu1\ My Documents\ EAST\ Workspaces\ 10_676711
Personalization of web search.wsp

| | | |
|---|--|--|
| Index of Claims  | Application/Control No. 10676711 | Applicant(s)/Patent Under Reexamination LAWRENCE, STEPHEN R. |
| | Examiner CHARLES E LU | Art Unit 2161 |

| | |
|---|-----------------|
| ✓ | Rejected |
| = | Allowed |


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|---|-------------------|
| - | Cancelled |
| ÷ | Restricted |

| | |
|---|---------------------|
| N | Non-Elected |
| I | Interference |

| | |
|---|-----------------|
| A | Appeal |
| O | Objected |

Claims renumbered in the same order as presented by applicant
 CPA
 T.D.
 R.1.47

| CLAIM | | DATE | | | | | | | |
|-------|----------|------------|------------|------------|------------|--|--|--|--|
| Final | Original | 02/24/2008 | 07/11/2008 | 01/26/2009 | 05/28/2009 | | | | |
| | 1 | ✓ | ✓ | ✓ | ✓ | | | | |
| | 2 | ✓ | ✓ | ✓ | ✓ | | | | |
| | 3 | ✓ | ✓ | ✓ | ✓ | | | | |
| | 4 | ✓ | ✓ | ✓ | ✓ | | | | |
| | 5 | - | - | - | - | | | | |
| | 6 | ✓ | ✓ | ✓ | ✓ | | | | |
| | 7 | ✓ | ✓ | ✓ | ✓ | | | | |
| | 8 | ✓ | ✓ | ✓ | ✓ | | | | |
| | 9 | ✓ | ✓ | ✓ | ✓ | | | | |
| | 10 | ✓ | ✓ | ✓ | ✓ | | | | |
| | 11 | ✓ | ✓ | ✓ | ✓ | | | | |
| | 12 | ✓ | ✓ | ✓ | ✓ | | | | |
| | 13 | ✓ | ✓ | ✓ | ✓ | | | | |
| | 14 | ✓ | ✓ | ✓ | ✓ | | | | |
| | 15 | ✓ | ✓ | ✓ | ✓ | | | | |
| | 16 | ✓ | ✓ | ✓ | ✓ | | | | |
| | 17 | ✓ | ✓ | ✓ | ✓ | | | | |
| | 18 | ✓ | ✓ | ✓ | ✓ | | | | |
| | 19 | ✓ | ✓ | ✓ | ✓ | | | | |
| | 20 | ✓ | ✓ | ✓ | ✓ | | | | |
| | 21 | ✓ | ✓ | ✓ | ✓ | | | | |
| | 22 | ✓ | ✓ | ✓ | ✓ | | | | |
| | 23 | ✓ | ✓ | ✓ | ✓ | | | | |
| | 24 | ✓ | ✓ | ✓ | ✓ | | | | |
| | 25 | ✓ | ✓ | ✓ | ✓ | | | | |
| | 26 | ✓ | ✓ | ✓ | ✓ | | | | |
| | 27 | ✓ | ✓ | ✓ | ✓ | | | | |
| | 28 | ✓ | ✓ | ✓ | ✓ | | | | |
| | 29 | ✓ | ✓ | ✓ | ✓ | | | | |
| | 30 | ✓ | ✓ | ✓ | ✓ | | | | |
| | 31 | - | - | - | - | | | | |
| | 32 | ✓ | ✓ | ✓ | ✓ | | | | |
| | 33 | ✓ | ✓ | ✓ | ✓ | | | | |
| | 34 | ✓ | ✓ | ✓ | ✓ | | | | |
| | 35 | ✓ | ✓ | ✓ | ✓ | | | | |
| | 36 | ✓ | ✓ | ✓ | ✓ | | | | |

| | | |
|---|--|--|
| Index of Claims  | Application/Control No. 10676711 | Applicant(s)/Patent Under Reexamination LAWRENCE, STEPHEN R. |
| | Examiner CHARLES E LU | Art Unit 2161 |

| | |
|---|-----------------|
| ✓ | Rejected |
| = | Allowed |


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|---|-------------------|
| - | Cancelled |
| ÷ | Restricted |

| | |
|---|---------------------|
| N | Non-Elected |
| I | Interference |

| | |
|---|-----------------|
| A | Appeal |
| O | Objected |

Claims renumbered in the same order as presented by applicant
 CPA
 T.D.
 R.1.47

| CLAIM | | DATE | | | | | | | |
|-------|----------|------------|------------|------------|------------|--|--|--|--|
| Final | Original | 02/24/2008 | 07/11/2008 | 01/26/2009 | 05/28/2009 | | | | |
| | 37 | ✓ | ✓ | ✓ | ✓ | | | | |
| | 38 | ✓ | ✓ | ✓ | ✓ | | | | |
| | 39 | ✓ | ✓ | ✓ | ✓ | | | | |
| | 40 | ✓ | ✓ | ✓ | ✓ | | | | |
| | 41 | ✓ | ✓ | ✓ | ✓ | | | | |
| | 42 | ✓ | ✓ | ✓ | ✓ | | | | |
| | 43 | ✓ | ✓ | ✓ | ✓ | | | | |
| | 44 | ✓ | ✓ | ✓ | ✓ | | | | |
| | 45 | ✓ | ✓ | ✓ | ✓ | | | | |
| | 46 | ✓ | ✓ | ✓ | ✓ | | | | |
| | 47 | - | - | - | - | | | | |
| | 48 | ✓ | ✓ | ✓ | ✓ | | | | |
| | 49 | ✓ | ✓ | ✓ | ✓ | | | | |
| | 50 | ✓ | ✓ | ✓ | ✓ | | | | |
| | 51 | ✓ | ✓ | ✓ | ✓ | | | | |
| | 52 | ✓ | ✓ | ✓ | ✓ | | | | |
| | 53 | ✓ | ✓ | ✓ | ✓ | | | | |
| | 54 | ✓ | ✓ | ✓ | ✓ | | | | |
| | 55 | ✓ | ✓ | ✓ | ✓ | | | | |
| | 56 | ✓ | ✓ | ✓ | ✓ | | | | |
| | 57 | ✓ | ✓ | ✓ | ✓ | | | | |
| | 58 | ✓ | ✓ | ✓ | ✓ | | | | |
| | 59 | | | ✓ | ✓ | | | | |
| | 60 | | | | ✓ | | | | |
| | 61 | | | | ✓ | | | | |
| | 62 | | | | ✓ | | | | |

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|--|--|--|
| Search Notes  | Application/Control No. 10676711 | Applicant(s)/Patent Under Reexamination LAWRENCE, STEPHEN R. |
| | Examiner CHARLES E LU | Art Unit 2161 |

| | | | |
|-----------------|-----------------|-------------|-----------------|
| SEARCHED | | | |
| Class | Subclass | Date | Examiner |
| 707 | 3 | 7/11/2008 | CL |

| | | |
|---------------------------------|-------------|-----------------|
| SEARCH NOTES | | |
| Search Notes | Date | Examiner |
| Consulted Apu Mofiz (707) | 2/24/2008 | CL |
| Updated EAST cls/sub + keywords | 7/11/2008 | CL |
| " | 1/26/2009 | CL |
| " | 5/28/2009 | CL |

| | | | |
|----------------------------|-----------------|-------------|-----------------|
| INTERFERENCE SEARCH | | | |
| Class | Subclass | Date | Examiner |
| | | | |

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|--|--|



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NUMBER | PATENT NUMBER | GROUP ART UNIT | FILE WRAPPER LOCATION |
|--------------------|---------------|----------------|-----------------------|
| 10/676,711 | | 2161 | 26M1 |



Correspondence Address/Fee Address Change

The following fields have been set to Customer Number 82750 on 07/17/2009

- Correspondence Address
- Maintenance Fee Address
- Power of Attorney Address

The address of record for Customer Number 82750 is:

82750
Morgan, Lewis & Bockius LLP/Google
2 Palo Alto Square
3000 El Camino Real
Palo Alto, CA 94306

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of: Stephen R. Lawrence Confirmation No.: 8147
Serial No.: 10/676,711 Art Unit: 2161
Filed: September 30, 2003 Examiner: Lu, Charles Edward
For: Personalization of Web Search Attorney Docket No.: 60963-0014-US
Using Term, Category, and Link-
Based User Profiles

**NOTICE OF APPEAL FROM THE EXAMINER
TO THE BOARD OF PATENT APPEALS AND INTERFERENCES**

Commissioner for Patents
P.O. Box 1450
Mail Stop AF
Alexandria, VA 22313-1450

Sir:

Applicant hereby appeals to the Board of Patent Appeals and Interferences from the last decision, dated June 1, 2009, of the Examiner rejecting claims of the above-identified application.

The item(s) checked below are appropriate:

1. An extension of time for responding to the final rejection for 3 month(s):
 was filed on
 is submitted herewith.
2. A timely response to the final rejection has been filed.
3. A fee in the amount of \$540 is:
 Required.
 Not required (Fee paid in prior appeal).
4. Applicant has qualified for the 50% reduction in fee for an independent inventor, non-profit organization or small business concern and a fee in the amount of \$270 is:
 Required.
 Not required (Fee paid in prior appeal).
5. Please charge the required fee, if any, to Morgan, Lewis & Bockius LLP Deposit Account No. 50-0310 (order no. 60963-0014-US).

Respectfully submitted,

Date: November 30, 2009



Gary S. Williams
MORGAN, LEWIS & BOCKIUS LLP
2 Palo Alto Square
3000 El Camino Real, Suite 700
Palo Alto, CA 94306
(650) 843-4000

31,066

(Reg. No.)

Electronically filed November 30, 2009

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

| | | | |
|-----------------|--|-------------------------|--------------------|
| Application of: | Stephen R. Lawrence | Confirmation No.: | 8147 |
| Serial No.: | 10/676,711 | Art Unit: | 2161 |
| Filed: | September 30, 2003 | Examiner: | Lu, Charles Edward |
| For: | Personalization of Web Search Using Term, Category, and Link-Based User Profiles | Attorney Docket No.: | 60963-0014-US |

PETITION FOR EXTENSION OF TIME UNDER 37 CFR 1.136

Commissioner for Patents
P.O. Box 1450
Mail Stop AF
Alexandria, VA 22313-1450

Sir:

It is respectfully requested that the time for response to the Final Office Action dated June 1, 2009 be extended for a period of three (3) months from September 1, 2009 to December 1, 2009.

The Commissioner is hereby authorized to charge any required fee(s) to Morgan, Lewis & Bockius LLP Deposit Account No. 50-0310 (order no. 60963-0014-US).

Respectfully submitted,

Date: November 30, 2009



Gary S. Williams
MORGAN, LEWIS & BOCKIUS LLP
2 Palo Alto Square
3000 El Camino Real, Suite 700
Palo Alto, CA 94306
(650) 843-4000

31,066
(Reg. No.)

Electronic Patent Application Fee Transmittal

| | |
|---|-------------------------------------|
| Application Number: | 10676711 |
| Filing Date: | 30-Sep-2003 |
| Title of Invention: | Personalization of web search |
| First Named Inventor/Applicant Name: | Stephen R. Lawrence |
| Filer: | Gary Scott Williams/Beverly Gemello |
| Attorney Docket Number: | 060963-0014US |

Filed as Large Entity

Utility under 35 USC 111(a) Filing Fees

| Description | Fee Code | Quantity | Amount | Sub-Total in USD(\$) |
|---|----------|----------|--------|----------------------|
| Basic Filing: | | | | |
| Pages: | | | | |
| Claims: | | | | |
| Miscellaneous-Filing: | | | | |
| Petition: | | | | |
| Patent-Appeals-and-Interference: | | | | |
| Notice of appeal | 1401 | 1 | 540 | 540 |

Post-Allowance-and-Post-Issuance:

Extension-of-Time:

| Description | Fee Code | Quantity | Amount | Sub-Total in USD(\$) |
|------------------------------------|----------|----------|--------|----------------------|
| Extension - 3 months with \$0 paid | 1253 | 1 | 1110 | 1110 |
| Miscellaneous: | | | | |
| Total in USD (\$) | | | | 1650 |

Electronic Acknowledgement Receipt

| | |
|---|-------------------------------------|
| EFS ID: | 6543713 |
| Application Number: | 10676711 |
| International Application Number: | |
| Confirmation Number: | 8147 |
| Title of Invention: | Personalization of web search |
| First Named Inventor/Applicant Name: | Stephen R. Lawrence |
| Customer Number: | 82750 |
| Filer: | Gary Scott Williams/Beverly Gemello |
| Filer Authorized By: | Gary Scott Williams |
| Attorney Docket Number: | 060963-0014US |
| Receipt Date: | 30-NOV-2009 |
| Filing Date: | 30-SEP-2003 |
| Time Stamp: | 20:34:12 |
| Application Type: | Utility under 35 USC 111(a) |

Payment information:

| | |
|--|-----------------|
| Submitted with Payment | yes |
| Payment Type | Deposit Account |
| Payment was successfully received in RAM | \$1650 |
| RAM confirmation Number | 11328 |
| Deposit Account | 500310 |
| Authorized User | |

File Listing:

| Document Number | Document Description | File Name | File Size(Bytes)/ Message Digest | Multi Part /.zip | Pages (if appl.) |
|-----------------|----------------------|-----------|-------------------------------------|------------------|------------------|
|-----------------|----------------------|-----------|-------------------------------------|------------------|------------------|

| | | | | | |
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| 1 | | 60963-0014_NoticeOfAppeal-ExtOfTime.pdf | 65803 d9535ab7c3d29ace02c582626bac86d3b85c1a5f | yes | 2 |
| Multipart Description/PDF files in .zip description | | | | | |
| Document Description | | Start | | End | |
| Notice of Appeal Filed | | 1 | | 1 | |
| Extension of Time | | 2 | | 2 | |
| Warnings: | | | | | |
| Information: | | | | | |
| 2 | Fee Worksheet (PTO-875) | fee-info.pdf | 31922 eec625fd0ceff10198f789314c781a8cce259675 | no | 2 |
| Warnings: | | | | | |
| Information: | | | | | |
| Total Files Size (in bytes): | | | 97725 | | |
| <p>This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.</p> <p><u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.</p> <p><u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.</p> <p><u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.</p> | | | | | |

Electronic Patent Application Fee Transmittal

| | |
|---|-------------------------------------|
| Application Number: | 10676711 |
| Filing Date: | 30-Sep-2003 |
| Title of Invention: | Personalization of web search |
| First Named Inventor/Applicant Name: | Stephen R. Lawrence |
| Filer: | Gary Scott Williams/Beverly Gemello |
| Attorney Docket Number: | 060963-0014US |

Filed as Large Entity

Utility under 35 USC 111(a) Filing Fees

| Description | Fee Code | Quantity | Amount | Sub-Total in USD(\$) |
|--|----------|----------|--------|----------------------|
| Basic Filing: | | | | |
| Pages: | | | | |
| Claims: | | | | |
| Miscellaneous-Filing: | | | | |
| Petition: | | | | |
| Patent-Appeals-and-Interference: | | | | |
| Post-Allowance-and-Post-Issuance: | | | | |
| Extension-of-Time: | | | | |
| Extension - 4 months with \$0 paid | 1254 | 1 | 1730 | 1730 |

| Description | Fee Code | Quantity | Amount | Sub-Total in USD(\$) |
|--------------------------|----------|----------|--------|----------------------|
| Miscellaneous: | | | | |
| Total in USD (\$) | | | | 1730 |

Electronic Acknowledgement Receipt

| | |
|---|-------------------------------------|
| EFS ID: | 7601330 |
| Application Number: | 10676711 |
| International Application Number: | |
| Confirmation Number: | 8147 |
| Title of Invention: | Personalization of web search |
| First Named Inventor/Applicant Name: | Stephen R. Lawrence |
| Customer Number: | 82750 |
| Filer: | Gary Scott Williams/Beverly Gemello |
| Filer Authorized By: | Gary Scott Williams |
| Attorney Docket Number: | 060963-0014US |
| Receipt Date: | 12-MAY-2010 |
| Filing Date: | 30-SEP-2003 |
| Time Stamp: | 18:22:58 |
| Application Type: | Utility under 35 USC 111(a) |

Payment information:

| | |
|--|-----------------|
| Submitted with Payment | yes |
| Payment Type | Deposit Account |
| Payment was successfully received in RAM | \$1730 |
| RAM confirmation Number | 6733 |
| Deposit Account | 500310 |
| Authorized User | |

File Listing:

| Document Number | Document Description | File Name | File Size(Bytes)/ Message Digest | Multi Part /.zip | Pages (if appl.) |
|-----------------|----------------------|-----------|----------------------------------|------------------|------------------|
|-----------------|----------------------|-----------|----------------------------------|------------------|------------------|

| | | | | | |
|---|-------------------|--------------------------------|--|----|---|
| 1 | Extension of Time | 60963-0014_ExtensionOfTime.pdf | 28552 | no | 1 |
| | | | d777277b6b4c01f97c93584a44608523ced6c38b | | |

Warnings:

Information:

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|---|-------------------------|--------------|--|----|---|
| 2 | Fee Worksheet (PTO-875) | fee-info.pdf | 30104 | no | 2 |
| | | | 6486a13d8a017b48f55bdfdc93d1519180f360c1 | | |

Warnings:

Information:

| | | | | | |
|-------------------------------------|--|--|-------|--|--|
| Total Files Size (in bytes): | | | 58656 | | |
|-------------------------------------|--|--|-------|--|--|

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|---------------------|------------------|
| 10/676,711 | 09/30/2003 | Stephen R. Lawrence | 060963-0014US | 8147 |
| 82750 | 7590 | 07/16/2010 | EXAMINER | |
| Morgan, Lewis & Bockius LLP/Google 2 Palo Alto Square 3000 El Camino Real, Suite 700 Palo Alto, CA 94306 | | | LU, CHARLES EDWARD | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2161 | |
| | | | NOTIFICATION DATE | DELIVERY MODE |
| | | | 07/16/2010 | ELECTRONIC |

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

padocketingdepartment@morganlewis.com
vskliba@morganlewis.com

| | | | |
|------------------------------|------------------------|----------------------|--|
| Notice of Abandonment | Application No. | Applicant(s) | |
| | 10/676,711 | LAWRENCE, STEPHEN R. | |
| | Examiner | Art Unit | |
| | CHARLES E. LU | 2161 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

This application is abandoned in view of:

1. Applicant's failure to timely file a proper reply to the Office letter mailed on 01 June 2009.
 - (a) A reply was received on _____ (with a Certificate of Mailing or Transmission dated _____), which is after the expiration of the period for reply (including a total extension of time of _____ month(s)) which expired on _____.
 - (b) A proposed reply was received on _____, but it does not constitute a proper reply under 37 CFR 1.113 (a) to the final rejection.
(A proper reply under 37 CFR 1.113 to a final rejection consists only of: (1) a timely filed amendment which places the application in condition for allowance; (2) a timely filed Notice of Appeal (with appeal fee); or (3) a timely filed Request for Continued Examination (RCE) in compliance with 37 CFR 1.114).
 - (c) A reply was received on _____ but it does not constitute a proper reply, or a bona fide attempt at a proper reply, to the non-final rejection. See 37 CFR 1.85(a) and 1.111. (See explanation in box 7 below).
 - (d) No reply has been received.

2. Applicant's failure to timely pay the required issue fee and publication fee, if applicable, within the statutory period of three months from the mailing date of the Notice of Allowance (PTOL-85).
 - (a) The issue fee and publication fee, if applicable, was received on _____ (with a Certificate of Mailing or Transmission dated _____), which is after the expiration of the statutory period for payment of the issue fee (and publication fee) set in the Notice of Allowance (PTOL-85).
 - (b) The submitted fee of \$_____ is insufficient. A balance of \$_____ is due.
The issue fee required by 37 CFR 1.18 is \$_____. The publication fee, if required by 37 CFR 1.18(d), is \$_____.
 - (c) The issue fee and publication fee, if applicable, has not been received.

3. Applicant's failure to timely file corrected drawings as required by, and within the three-month period set in, the Notice of Allowability (PTO-37).
 - (a) Proposed corrected drawings were received on _____ (with a Certificate of Mailing or Transmission dated _____), which is after the expiration of the period for reply.
 - (b) No corrected drawings have been received.

4. The letter of express abandonment which is signed by the attorney or agent of record, the assignee of the entire interest, or all of the applicants.

5. The letter of express abandonment which is signed by an attorney or agent (acting in a representative capacity under 37 CFR 1.34(a)) upon the filing of a continuing application.

6. The decision by the Board of Patent Appeals and Interference rendered on _____ and because the period for seeking court review of the decision has expired and there are no allowed claims.

7. The reason(s) below:

Applicant's representative confirmed via telephone that no response was filed.

/Charles E Lu/
Examiner, Art Unit 2161

Petitions to revive under 37 CFR 1.137(a) or (b), or requests to withdraw the holding of abandonment under 37 CFR 1.181, should be promptly filed to minimize any negative effects on patent term.

EXHIBIT 30

GOOGLE ANNOUNCES FOURTH QUARTER AND FISCAL YEAR 2010 RESULTS AND MANAGEMENT CHANGES

MOUNTAIN VIEW, Calif. – January 20, 2011 – Google Inc. (NASDAQ: GOOG) today announced financial results for the quarter and the fiscal year ended December 31, 2010.

“Q4 marked a terrific end to a stellar year,” said Eric Schmidt, CEO of Google. “Our strong performance has been driven by a rapidly growing digital economy, continuous product innovation that benefits both users and advertisers, and by the extraordinary momentum of our newer businesses, such as display and mobile. These results give us the optimism and confidence to invest heavily in future growth -- investments that will benefit our users, Google and the wider web.”

In addition, Google has also announced plans to streamline decision making and create clearer lines of responsibility and accountability at the top of the company.

- Starting from April 4, Larry Page, Google Co-Founder, will take charge of Google’s day-to-day operations as Chief Executive Officer.
- Sergey Brin, Google Co-Founder, will devote his energy to strategic projects, in particular working on new products.
- Eric Schmidt will assume the role of Executive Chairman, focusing externally on deals, partnerships, customers and broader business relationships, government outreach and technology thought leadership--all of which are increasingly important given Google’s global reach. Internally, he will continue to act as an advisor to Larry and Sergey.

Commenting on these changes, Eric said: “We’ve been talking about how best to simplify our management structure and speed up decision making for a long time. By clarifying our individual roles we’ll create clearer responsibility and accountability at the top of the company. In my clear opinion, Larry is ready to lead and I’m excited about working with both him and Sergey for a long time to come.”

Larry said: “Eric has clearly done an outstanding job leading Google for the last decade. The results speak for themselves. There is no other CEO in the world that could have kept such headstrong founders so deeply involved and still run the business so brilliantly. Eric is a tremendous leader and I have learned innumerable lessons from him. His advice and efforts will be invaluable to me as I start in this new role. Google still has such incredible opportunity--we are only at the beginning and I can't wait to get started.”

Q4 Financial Summary

Google reported revenues of \$8.44 billion for the quarter ended December 31, 2010, an increase of 26% compared to the fourth quarter of 2009. Google reports its revenues, consistent with GAAP, on a gross basis without deducting traffic acquisition costs (TAC). In the fourth quarter of 2010, TAC totaled \$2.07 billion, or 25% of advertising revenues.

Google reports operating income, operating margin, net income, and earnings per share (EPS) on a GAAP and non-GAAP basis. The non-GAAP measures, as well as free cash flow, an

alternative non-GAAP measure of liquidity, are described below and are reconciled to the corresponding GAAP measures in the accompanying financial tables.

- GAAP operating income in the fourth quarter of 2010 was \$2.98 billion, or 35% of revenues. This compares to GAAP operating income of \$2.48 billion, or 37% of revenues, in the fourth quarter of 2009. Non-GAAP operating income in the fourth quarter of 2010 was \$3.38 billion, or 40% of revenues. This compares to non-GAAP operating income of \$2.76 billion, or 41% of revenues, in the fourth quarter of 2009.
- GAAP net income in the fourth quarter of 2010 was \$2.54 billion, compared to \$1.97 billion in the fourth quarter of 2009. Non-GAAP net income in the fourth quarter of 2010 was \$2.85 billion, compared to \$2.19 billion in the fourth quarter of 2009.
- GAAP EPS in the fourth quarter of 2010 was \$7.81 on 326 million diluted shares outstanding, compared to \$6.13 in the fourth quarter of 2009 on 322 million diluted shares outstanding. Non-GAAP EPS in the fourth quarter of 2010 was \$8.75, compared to \$6.79 in the fourth quarter of 2009.
- Non-GAAP operating income and non-GAAP operating margin exclude the expenses related to stock-based compensation (SBC). Non-GAAP net income and non-GAAP EPS exclude the expenses related to SBC and the related tax benefits. In the fourth quarter of 2010, the charge related to SBC was \$396 million, compared to \$276 million in the fourth quarter of 2009. The tax benefit related to SBC was \$89 million in the fourth quarter of 2010 and \$62 million in the fourth quarter of 2009.

Q4 Financial Highlights

Revenues – Google reported revenues of \$8.44 billion in the fourth quarter of 2010, representing a 26% increase over fourth quarter 2009 revenues of \$6.67 billion. Google reports its revenues, consistent with GAAP, on a gross basis without deducting TAC.

Google Sites Revenues – Google-owned sites generated revenues of \$5.67 billion, or 67% of total revenues, in the fourth quarter of 2010. This represents a 28% increase over fourth quarter 2009 revenues of \$4.42 billion.

Google Network Revenues – Google’s partner sites generated revenues, through AdSense programs, of \$2.50 billion, or 30% of total revenues, in the fourth quarter of 2010. This represents a 22% increase from fourth quarter 2009 network revenues of \$2.04 billion.

International Revenues – Revenues from outside of the United States totaled \$4.38 billion, representing 52% of total revenues in the fourth quarter of 2010, compared to 52% in the third quarter of 2010 and 53% in the fourth quarter of 2009. Excluding gains related to our foreign exchange risk management program, had foreign exchange rates remained constant from the third quarter of 2010 through the fourth quarter of 2010, our revenues in the fourth quarter of 2010 would have been \$201 million lower. Excluding gains related to our foreign exchange risk management program, had foreign exchange rates remained constant from the fourth quarter of

2009 through the fourth quarter of 2010, our revenues in the fourth quarter of 2010 would have been \$132 million higher.

- Revenues from the United Kingdom totaled \$878 million, representing 10% of revenues in the fourth quarter of 2010, compared to 12% in the fourth quarter of 2009.
- In the fourth quarter of 2010, we recognized a benefit of \$25 million to revenues through our foreign exchange risk management program, compared to \$8 million in the fourth quarter of 2009.

Paid Clicks – Aggregate paid clicks, which include clicks related to ads served on Google sites and the sites of our AdSense partners, increased approximately 18% over the fourth quarter of 2009 and increased approximately 11% over the third quarter of 2010.

Cost-Per-Click – Average cost-per-click, which includes clicks related to ads served on Google sites and the sites of our AdSense partners, increased approximately 5% over the fourth quarter of 2009 and increased approximately 4% over the third quarter of 2010.

TAC – Traffic Acquisition Costs, the portion of revenues shared with Google’s partners, increased to \$2.07 billion in the fourth quarter of 2010, compared to TAC of \$1.72 billion in the fourth quarter of 2009. TAC as a percentage of advertising revenues was 25% in the fourth quarter of 2010, compared to 27% in the fourth quarter of 2009.

The majority of TAC is related to amounts ultimately paid to our AdSense partners, which totaled \$1.74 billion in the fourth quarter of 2010. TAC also includes amounts ultimately paid to certain distribution partners and others who direct traffic to our website, which totaled \$333 million in the fourth quarter of 2010.

Other Cost of Revenues – Other cost of revenues, which is comprised primarily of data center operational expenses, amortization of intangible assets, content acquisition costs as well as credit card processing charges, increased to \$877 million, or 10% of revenues, in the fourth quarter of 2010, compared to \$688 million, or 10% of revenues, in the fourth quarter of 2009.

Operating Expenses – Operating expenses, other than cost of revenues, were \$2.51 billion in the fourth quarter of 2010, or 30% of revenues, compared to \$1.78 billion in the fourth quarter of 2009, or 27% of revenues.

Stock-Based Compensation (SBC) – In the fourth quarter of 2010, the total charge related to SBC was \$396 million, compared to \$276 million in the fourth quarter of 2009.

We currently estimate SBC charges for grants to employees prior to January 1, 2011 to be approximately \$1.6 billion for 2011. This estimate does not include expenses to be recognized related to employee stock awards that are granted after December 31, 2010 or non-employee stock awards that have been or may be granted.

Operating Income – GAAP operating income in the fourth quarter of 2010 was \$2.98 billion, or 35% of revenues. This compares to GAAP operating income of \$2.48 billion, or 37% of revenues, in the fourth quarter of 2009. Non-GAAP operating income in the fourth quarter of 2010 was \$3.38 billion, or 40% of revenues. This compares to non-GAAP operating income of \$2.76 billion, or 41% of revenues, in the fourth quarter of 2009.

Interest and Other Income, Net – Interest and other income, net increased to \$160 million in the fourth quarter of 2010, compared to \$88 million in the fourth quarter of 2009.

Income Taxes – Our effective tax rate was 19% for the fourth quarter of 2010.

Net Income – GAAP net income in the fourth quarter of 2010 was \$2.54 billion, compared to \$1.97 billion in the fourth quarter of 2009. Non-GAAP net income was \$2.85 billion in the fourth quarter of 2010, compared to \$2.19 billion in the fourth quarter of 2009. GAAP EPS in the fourth quarter of 2010 was \$7.81 on 326 million diluted shares outstanding, compared to \$6.13 in the fourth quarter of 2009 on 322 million diluted shares outstanding. Non-GAAP EPS in the fourth quarter of 2010 was \$8.75, compared to \$6.79 in the fourth quarter of 2009.

Cash Flow and Capital Expenditures – Net cash provided by operating activities in the fourth quarter of 2010 totaled \$3.53 billion, compared to \$2.73 billion in the fourth quarter of 2009. In the fourth quarter of 2010, capital expenditures were \$2.55 billion, which was primarily related to the purchase of our office building in New York City, as well as IT infrastructure investments, including data centers, servers, and networking equipment. Free cash flow, an alternative non-GAAP measure of liquidity, is defined as net cash provided by operating activities less capital expenditures. In the fourth quarter of 2010, free cash flow was \$981 million.

We expect to continue to make significant capital expenditures.

A reconciliation of free cash flow to net cash provided by operating activities, the GAAP measure of liquidity, is included at the end of this release.

Cash – As of December 31, 2010, cash, cash equivalents, and marketable securities were \$35.0 billion.

Headcount – On a worldwide basis, Google employed 24,400 full-time employees as of December 31, 2010, up from 23,331 full-time employees as of September 30, 2010.

WEBCAST AND CONFERENCE CALL INFORMATION

A live audio webcast of Google's fourth quarter and fiscal year 2010 earnings release call will be available at <http://investor.google.com/webcast.html>. The call begins today at 1:30 PM (PT) / 4:30 PM (ET). This press release, the financial tables, as well as other supplemental information including the reconciliations of certain non-GAAP measures to their nearest comparable GAAP measures, are also available on that site.

FORWARD-LOOKING STATEMENTS

This press release contains forward-looking statements that involve risks and uncertainties. These statements include statements regarding our continued investments in our core areas of strategic focus, our expected stock-based compensation charges, and our plans to make significant capital expenditures. Actual results may differ materially from the results predicted, and reported results should not be considered as an indication of future performance. The potential risks and uncertainties that could cause actual results to differ from the results predicted include, among others, unforeseen changes in our hiring patterns and our need to expend capital to accommodate the growth of the business, as well as those risks and uncertainties included under the captions "Risk Factors" and "Management's Discussion and Analysis of Financial Condition and Results of Operations" in our Annual Report on Form 10-K for the year ended December 31, 2009, and our most recent Quarterly Report on Form 10-Q for the quarter ended September 30, 2010, which are on file with the SEC, and are available on our investor relations website at investor.google.com and on the SEC website at www.sec.gov. Additional information will also be set forth in our Annual Report on Form 10-K for the year ended December 31, 2010, which we expect to file with the SEC in February 2011. All information provided in this release and in the attachments is as of January 20, 2011, and Google undertakes no duty to update this information.

ABOUT NON-GAAP FINANCIAL MEASURES

To supplement our consolidated financial statements, which statements are prepared and presented in accordance with GAAP, we use the following non-GAAP financial measures: non-GAAP operating income, non-GAAP operating margin, non-GAAP net income, non-GAAP EPS, and free cash flow. The presentation of this financial information is not intended to be considered in isolation or as a substitute for, or superior to, the financial information prepared and presented in accordance with GAAP. For more information on these non-GAAP financial measures, please see the tables captioned "Reconciliations of non-GAAP results of operations measures to the nearest comparable GAAP measures" and "Reconciliation from net cash provided by operating activities to free cash flow" included at the end of this release.

We use these non-GAAP financial measures for financial and operational decision making and as a means to evaluate period-to-period comparisons. Our management believes that these non-GAAP financial measures provide meaningful supplemental information regarding our performance and liquidity by excluding certain expenses and expenditures that may not be indicative of our "recurring core business operating results," meaning our operating performance excluding not only non-cash charges, such as stock-based compensation, but also discrete cash charges that are infrequent in nature. We believe that both management and investors benefit from referring to these non-GAAP financial measures in assessing our performance and when planning, forecasting, and analyzing future periods. These non-GAAP financial measures also facilitate management's internal comparisons to our historical performance and liquidity as well as comparisons to our competitors' operating results. We believe these non-GAAP financial measures are useful to investors both because (1) they allow for greater transparency with respect to key metrics used by management in its financial and operational decision making and (2) they are used by our institutional investors and the analyst community to help them analyze the health

of our business.

Non-GAAP operating income and operating margin. We define non-GAAP operating income as operating income plus stock-based compensation. Non-GAAP operating margin is defined as non-GAAP operating income divided by revenues. Google considers these non-GAAP financial measures to be useful metrics for management and investors because they exclude the effect of stock-based compensation so that Google's management and investors can compare Google's recurring core business operating results over multiple periods. Because of varying available valuation methodologies, subjective assumptions and the variety of award types that companies can use under ASC Topic 718, Google's management believes that providing a non-GAAP financial measure that excludes stock-based compensation allows investors to make meaningful comparisons between Google's recurring core business operating results and those of other companies, as well as providing Google's management with an important tool for financial and operational decision making and for evaluating Google's own recurring core business operating results over different periods of time. There are a number of limitations related to the use of non-GAAP operating income versus operating income calculated in accordance with GAAP. First, non-GAAP operating income excludes some costs, namely, stock-based compensation, that are recurring. Stock-based compensation has been and will continue to be for the foreseeable future a significant recurring expense in Google's business. Second, stock-based compensation is an important part of our employees' compensation and impacts their performance. Third, the components of the costs that we exclude in our calculation of non-GAAP operating income may differ from the components that our peer companies exclude when they report their results of operations. Management compensates for these limitations by providing specific information regarding the GAAP amounts excluded from non-GAAP operating income and evaluating non-GAAP operating income together with operating income calculated in accordance with GAAP.

Non-GAAP net income and EPS. We define non-GAAP net income as net income plus stock-based compensation less the related tax effects. We define non-GAAP EPS as non-GAAP net income divided by the weighted average outstanding shares, on a fully-diluted basis. We consider these non-GAAP financial measures to be a useful metric for management and investors for the same reasons that Google uses non-GAAP operating income and non-GAAP operating margin. However, in order to provide a complete picture of our recurring core business operating results, we exclude from non-GAAP net income and non-GAAP EPS the tax effects associated with stock-based compensation. Without excluding these tax effects, investors would only see the gross effect that excluding these expenses had on our operating results. The same limitations described above regarding Google's use of non-GAAP operating income and non-GAAP operating margin apply to our use of non-GAAP net income and non-GAAP EPS. Management compensates for these limitations by providing specific information regarding the GAAP amounts excluded from non-GAAP net income and non-GAAP EPS and evaluating non-GAAP net income and non-GAAP EPS together with net income and EPS calculated in accordance with GAAP.

Free cash flow. We define free cash flow as net cash provided by operating activities minus capital expenditures. We consider free cash flow to be a liquidity measure that provides useful information to management and investors about the amount of cash generated by the business that, after the acquisition of property and equipment, including information technology

infrastructure and land and buildings, can be used for strategic opportunities, including investing in our business, making strategic acquisitions, and strengthening the balance sheet. Analysis of free cash flow also facilitates management's comparisons of our operating results to competitors' operating results. A limitation of using free cash flow versus the GAAP measure of net cash provided by operating activities as a means for evaluating Google is that free cash flow does not represent the total increase or decrease in the cash balance from operations for the period because it excludes cash used for capital expenditures during the period. Our management compensates for this limitation by providing information about our capital expenditures on the face of the cash flow statement and under the caption "Management's Discussion and Analysis of Financial Condition and Results of Operations" in our Quarterly Report on Form 10-Q and Annual Report on Form 10-K. Google has computed free cash flow using the same consistent method from quarter to quarter and year to year.

The accompanying tables have more details on the GAAP financial measures that are most directly comparable to non-GAAP financial measures and the related reconciliations between these financial measures.

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Google Inc.
CONSOLIDATED BALANCE SHEETS
(In millions)

| | As of December 31, 2009* | As of December 31, 2010 (unaudited) |
|---|---|--|
| Assets | | |
| Current assets: | | |
| Cash and cash equivalents | \$10,198 | \$13,630 |
| Marketable securities | 14,287 | 21,345 |
| Accounts receivable, net of allowance | 3,178 | 4,252 |
| Receivable under reverse repurchase agreements | - | 750 |
| Deferred income taxes, net | 644 | 259 |
| Income taxes receivable, net | 23 | - |
| Prepaid revenue share, expenses and other assets | 837 | 1,326 |
| | 29,167 | 41,562 |
| Prepaid revenue share, expenses and other assets, non-current | 415 | 442 |
| Deferred income taxes, net, non-current | 263 | 265 |
| Non-marketable equity securities | 129 | 523 |
| Property and equipment, net | 4,845 | 7,759 |
| Intangible assets, net | 775 | 1,044 |
| Goodwill | 4,903 | 6,256 |
| | \$40,497 | \$57,851 |
| Liabilities and Stockholders' Equity | | |
| Current liabilities: | | |
| Accounts payable | \$216 | \$483 |
| Short-term debt | - | 3,465 |
| Accrued compensation and benefits | 982 | 1,410 |
| Accrued expenses and other current liabilities | 570 | 961 |
| Accrued revenue share | 694 | 885 |
| Securities lending payable | - | 2,361 |
| Deferred revenue | 285 | 394 |
| Income taxes payable, net | - | 37 |
| | 2,747 | 9,996 |
| Deferred revenue, non-current | 42 | 35 |
| Income taxes payable, non-current | 1,392 | 1,200 |
| Other long-term liabilities | 312 | 379 |
| Stockholders' equity: | | |
| Common stock and additional paid-in capital | 15,817 | 18,235 |
| Accumulated other comprehensive income | 105 | 138 |
| Retained earnings | 20,082 | 27,868 |
| | 36,004 | 46,241 |
| Total liabilities and stockholders' equity | \$40,497 | \$57,851 |

* Derived from audited financial statements.

Google Inc.
CONSOLIDATED STATEMENTS OF INCOME
(In millions, except share amounts which are reflected in thousands and per share amounts)

| | Three Months Ended December 31, | | Twelve Months Ended December 31, | |
|---|------------------------------------|---------------------|-------------------------------------|---------------------|
| | 2009 (unaudited) | 2010 (unaudited) | 2009* (unaudited) | 2010 (unaudited) |
| Revenues | \$6,674 | \$8,440 | \$23,651 | \$29,321 |
| Costs and expenses: | | | | |
| Cost of revenues (including stock-based compensation expense of \$6, \$45, \$47, \$67) | 2,408 | 2,946 | 8,844 | 10,417 |
| Research and development (including stock-based compensation expense of \$179, \$224, \$725, \$861) | 736 | 1,051 | 2,843 | 3,762 |
| Sales and marketing (including stock-based compensation expense of \$52, \$76, \$231, \$261) | 583 | 902 | 1,984 | 2,799 |
| General and administrative (including stock-based compensation expense of \$39, \$51, \$161, \$187) | 466 | 559 | 1,668 | 1,962 |
| Total costs and expenses | <u>4,193</u> | <u>5,458</u> | <u>15,339</u> | <u>18,940</u> |
| Income from operations | 2,481 | 2,982 | 8,312 | 10,381 |
| Interest and other income, net | 88 | 160 | 69 | 415 |
| Income before income taxes | 2,569 | 3,142 | 8,381 | 10,796 |
| Provision for income taxes | 595 | 599 | 1,861 | 2,291 |
| Net income | <u>\$1,974</u> | <u>\$2,543</u> | <u>\$6,520</u> | <u>\$8,505</u> |
| Net income per share - basic | <u>\$6.22</u> | <u>\$7.95</u> | <u>\$20.62</u> | <u>\$26.69</u> |
| Net income per share - diluted | <u>\$6.13</u> | <u>\$7.81</u> | <u>\$20.41</u> | <u>\$26.31</u> |
| Shares used in per share calculation - basic | <u>317,237</u> | <u>319,946</u> | <u>316,221</u> | <u>318,702</u> |
| Shares used in per share calculation - diluted | <u>322,163</u> | <u>325,536</u> | <u>319,416</u> | <u>323,251</u> |

* Derived from audited financial statements.

Google Inc.
CONSOLIDATED STATEMENTS OF CASH FLOWS
(In millions)

| | Three Months Ended December 31, | | Twelve Months Ended December 31, | |
|---|------------------------------------|-----------------|-------------------------------------|-----------------|
| | 2009 | 2010 | 2009* | 2010 |
| | (unaudited) | | (unaudited) | |
| Operating activities | | | | |
| Net income | \$1,974 | \$2,543 | \$6,520 | \$8,505 |
| Adjustments: | | | | |
| Depreciation and amortization of property and equipment | 297 | 280 | 1,240 | 1,067 |
| Amortization of intangibles and other assets | 68 | 101 | 284 | 329 |
| Stock-based compensation expense | 276 | 396 | 1,164 | 1,376 |
| Excess tax benefits from stock-based award activities | (26) | (51) | (90) | (94) |
| Deferred income taxes | 20 | (14) | (268) | 9 |
| Other | 6 | (5) | (20) | (12) |
| Changes in assets and liabilities, net of effects of acquisitions: | | | | |
| Accounts receivable | (377) | (673) | (504) | (1,129) |
| Income taxes, net | 120 | 397 | 217 | 102 |
| Prepaid revenue share, expenses and other assets | (51) | (59) | 262 | (414) |
| Accounts payable | 25 | (42) | 34 | 272 |
| Accrued expenses and other liabilities | 257 | 429 | 243 | 745 |
| Accrued revenue share | 101 | 145 | 158 | 214 |
| Deferred revenue | 41 | 79 | 76 | 111 |
| Net cash provided by operating activities | <u>2,731</u> | <u>3,526</u> | <u>9,316</u> | <u>11,081</u> |
| Investing activities | | | | |
| Purchases of property and equipment | (221) | (2,545) | (810) | (4,018) |
| Purchases of marketable securities | (9,552) | (6,396) | (29,139) | (43,985) |
| Maturities and sales of marketable securities | 5,087 | 6,730 | 22,103 | 37,099 |
| Investments in non-marketable equity securities | (19) | (55) | (65) | (320) |
| Cash collateral received (returned) related to securities lending | - | (500) | - | 2,361 |
| Investments in reverse repurchase agreements | - | 125 | - | (750) |
| Acquisitions, net of cash acquired, and purchases of intangibles and other assets | (68) | (208) | (108) | (1,067) |
| Net cash used in investing activities | <u>(4,773)</u> | <u>(2,849)</u> | <u>(8,019)</u> | <u>(10,680)</u> |
| Financing activities | | | | |
| Net proceeds related to stock-based award activities | 132 | 359 | 143 | 294 |
| Excess tax benefits from stock-based award activities | 26 | 51 | 90 | 94 |
| Repurchase of common stock in connection with acquisitions | - | - | - | (801) |
| Proceeds from issuance of short-term debt | - | 2,702 | - | 5,246 |
| Repayments of short-term debt | - | (1,360) | - | (1,783) |
| Net cash provided by financing activities | <u>158</u> | <u>1,752</u> | <u>233</u> | <u>3,050</u> |
| Effect of exchange rate changes on cash and cash equivalents | (5) | (56) | 11 | (19) |
| Net increase (decrease) in cash and cash equivalents | (1,889) | 2,373 | 1,541 | 3,432 |
| Cash and cash equivalents at beginning of period | 12,087 | 11,257 | 8,657 | 10,198 |
| Cash and cash equivalents at end of period | <u>\$10,198</u> | <u>\$13,630</u> | <u>\$10,198</u> | <u>\$13,630</u> |

* Derived from audited financial statements.

Reconciliations of non-GAAP results of operations measures to the nearest comparable GAAP measures

The following table presents certain non-GAAP results before certain material items (in millions, except share amounts which are reflected in thousands and per share amounts, unaudited):

| | Three Months Ended December 31, 2009 | | | | Three Months Ended December 31, 2010 | | | | | |
|--|--------------------------------------|----------------------|------------------------|------------------|--------------------------------------|---------|----------------------|-------------------------|------------------|-------------------------------|
| | GAAP | Operating Margin (a) | Adjustments | Non-GAAP Results | Non-GAAP Operating Margin (b) | GAAP | Operating Margin (a) | Adjustments | Non-GAAP Results | Non-GAAP Operating Margin (b) |
| Income from operations | \$2,481 | 37.2% | \$276 (c) | \$2,757 | 41.3% | \$2,982 | 35.3% | \$396 (d) | \$3,378 | 40.0% |
| Net income | \$1,974 | | \$276 (c) (\$2) (e) | \$2,188 | | \$2,543 | | \$396 (d) (\$89) (e) | \$2,850 | |
| Net income per share - diluted | \$6.13 | | | \$6.79 | | \$7.81 | | | \$8.75 | |
| Shares used in per share calculation - diluted | 322,163 | | | 322,163 | | 325,536 | | | 325,536 | |

(a) Operating margin is defined as income from operations divided by revenues.

(b) Non-GAAP operating margin is defined as non-GAAP income from operations divided by revenues.

(c) To eliminate \$276 million of stock-based compensation expense recorded in the fourth quarter of 2009.

(d) To eliminate \$396 million of stock-based compensation expense recorded in the fourth quarter of 2010.

(e) To eliminate income tax effects related to expenses noted in (c) and (d).

Reconciliation from net cash provided by operating activities to free cash flow (in millions, unaudited):

| | <u>Three Months Ended</u> <u>December 31, 2010</u> |
|--|---|
| Net cash provided by operating activities | \$3,526 |
| Less purchases of property and equipment | <u>(2,545)</u> |
| Free cash flow | <u>\$981</u> |
| | |
| Net cash used in investing activities* | <u>\$(2,849)</u> |
| | |
| Net cash provided by financing activities | <u>\$1,752</u> |

*includes purchases of property and equipment.

The following table presents our revenues by revenue source (in millions, unaudited):

| | Three Months Ended December 31, | | Twelve Months Ended December 31, | |
|----------------------------|------------------------------------|----------------|-------------------------------------|-----------------|
| | 2009 | 2010 | 2009 | 2010 |
| Advertising revenues: | | | | |
| Google web sites | \$4,421 | \$5,672 | \$15,723 | \$19,444 |
| Google Network web sites | 2,044 | 2,495 | 7,166 | 8,792 |
| Total advertising revenues | 6,465 | 8,167 | 22,889 | 28,236 |
| Other revenues | 209 | 273 | 762 | 1,085 |
| Revenues | <u>\$6,674</u> | <u>\$8,440</u> | <u>\$23,651</u> | <u>\$29,321</u> |

The following table presents our revenues, by revenue source, as a percentage of total revenues (unaudited):

| | Three Months Ended December 31, | | Twelve Months Ended December 31, | |
|----------------------------|------------------------------------|-------------|-------------------------------------|-------------|
| | 2009 | 2010 | 2009 | 2010 |
| Advertising revenues: | | | | |
| Google web sites | 66% | 67% | 67% | 66% |
| Google Network web sites | 31% | 30% | 30% | 30% |
| Total advertising revenues | 97% | 97% | 97% | 96% |
| Other revenues | 3% | 3% | 3% | 4% |
| Revenues | <u>100%</u> | <u>100%</u> | <u>100%</u> | <u>100%</u> |

Exhibit 31



US007693825B2

(12) **United States Patent**
Wang et al.

(10) **Patent No.:** **US 7,693,825 B2**
(45) **Date of Patent:** **Apr. 6, 2010**

(54) **SYSTEMS AND METHODS FOR RANKING
IMPLICIT SEARCH RESULTS**

(75) Inventors: **Niniane Wang**, Santa Clara, CA (US);
Stephen R. Lawrence, Mountain View,
CA (US)

(73) Assignee: **Google Inc.**, Mountain View, CA (US)

(*) Notice: Subject to any disclaimer, the term of this
patent is extended or adjusted under 35
U.S.C. 154(b) by 559 days.

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(21) Appl. No.: **10/813,875**

(Continued)

(22) Filed: **Mar. 31, 2004**

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(65) **Prior Publication Data**

U.S. Appl. No. 10/749,440, filed Dec. 31, 2003, Badros et al.

US 2007/0276829 A1 Nov. 29, 2007

(Continued)

(51) **Int. Cl.**
G06F 17/30 (2006.01)

Primary Examiner—Don Wong
Assistant Examiner—Thanh-Ha Dang

(52) **U.S. Cl.** **707/3**; 707/713; 707/723;
707/728; 707/731; 707/748

(74) *Attorney, Agent, or Firm*—Fenwick & West LLP

(58) **Field of Classification Search** 707/100,
707/3, 7, 5

(57) **ABSTRACT**

See application file for complete search history.

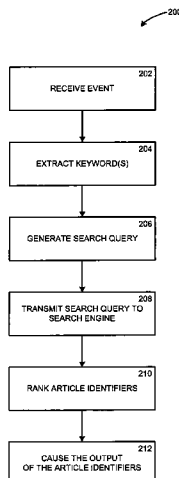
Systems and methods for ranking implicit search queries are described. In one embodiment a method comprising receiving an event, the event comprising user interaction with an article on a client device, wherein the article is capable of being associated with at least one of a plurality of client applications, extracting at least one keyword from the event, generating a query based at least in part on the at least one keyword, performing a search based at least in part on the query to determine a result set, wherein the result set comprises one or more article identifiers associated with articles comprising the at least one keyword, and determining a ranking for each of the one or more article identifiers comprising the result set is described.

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56 Claims, 2 Drawing Sheets



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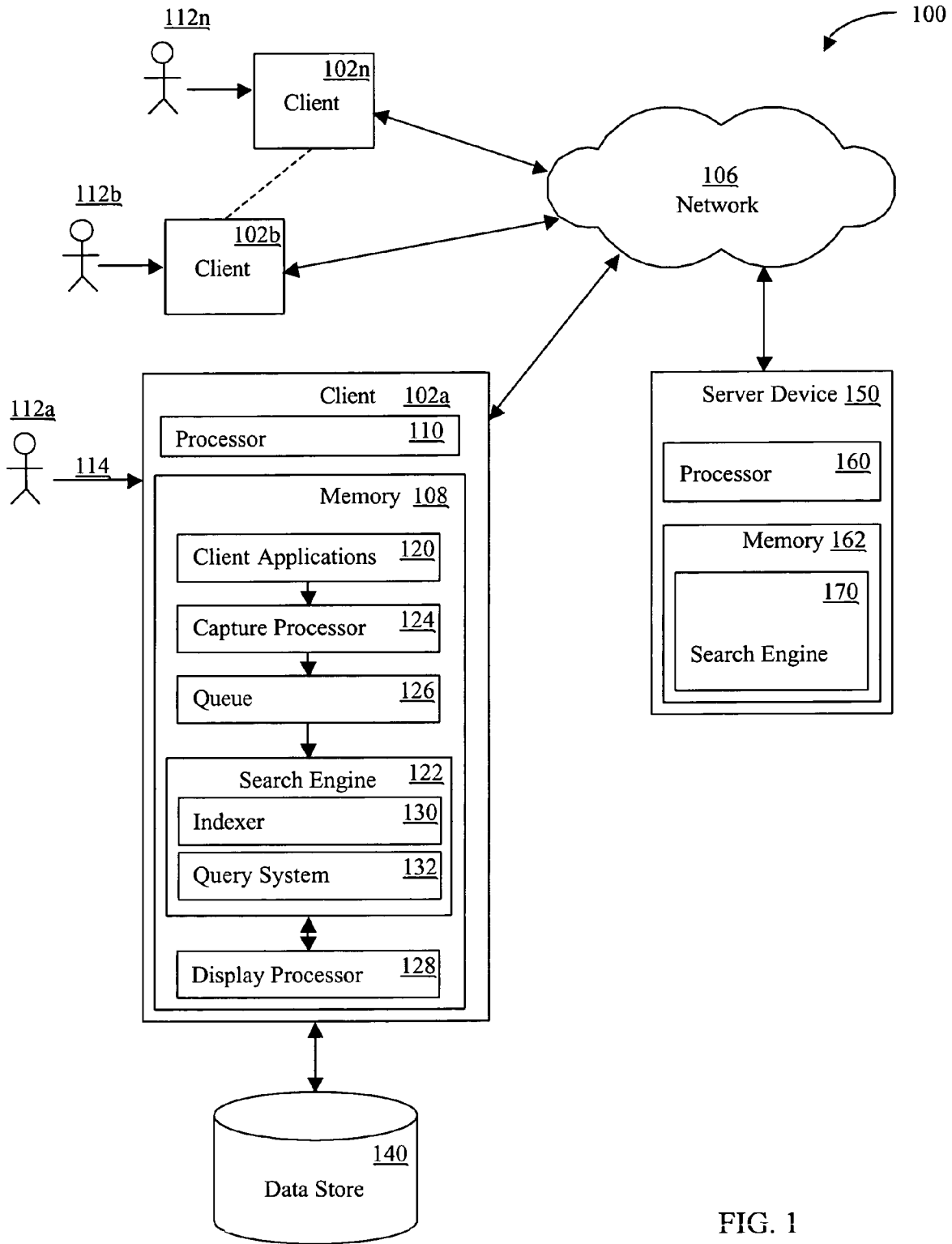


FIG. 1

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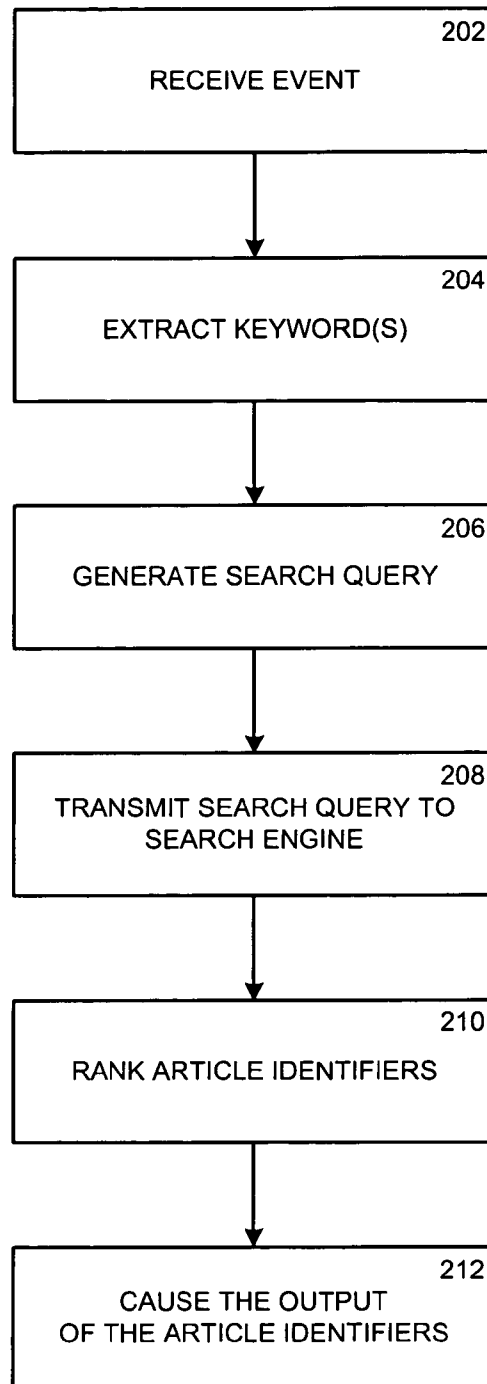


FIG. 2

SYSTEMS AND METHODS FOR RANKING IMPLICIT SEARCH RESULTS

FIELD OF THE INVENTION

The present invention relates generally to methods and systems for information retrieval. The present invention relates particularly to methods and systems for ranking implicit search results.

BACKGROUND

Conventional search engines receive a search query from a user and execute a search against a global index. Such conventional search engines typically use one or more conventional methods for performing a search. For example, one known method, described in an article entitled "The Anatomy of a Large-Scale Hypertextual Search Engine," by Sergey Brin and Lawrence Page, assigns a degree of importance to a document, such as a web page, based on the link structure of the web. The search results are often presented in a list format, comprising article identifiers and brief snippets about the documents in a web page that can be resized.

Often, the user has access to other information stored on the user's local machine or on other storage media accessible via a network that is relevant to the user's current contextual state. For example, if a user is working on a document regarding a particular subject, information about the subject may be stored on the user's hard drive or in a global index accessible to the user. In order to access this information, the user issues an explicit search query in an application, such as a web search page. The information is provided to the user as a result set. Thus, the user shifts focus from the document that the user is working on to perform the search.

In many cases, the user may be unaware or may not remember that information is available regarding a particular subject. In such a case, the user may not perform an explicit search and thus, will not have access to the potentially relevant information.

SUMMARY

Embodiments of the present invention provide systems and methods for ranking implicit search results. In one embodiment, a method comprising receiving an event, the event comprising user interaction with an article on a client device, wherein the article is capable of being associated with at least one of a plurality of client applications, extracting at least one keyword from the event, generating a query based at least in part on at least that one keyword, performing a search based at least in part on the query to determine a result set, wherein the result set comprises one or more article identifiers associated with articles comprising the at least one keyword, and determining a ranking for each of the one or more article identifiers comprising the result set is described.

Another embodiment of the present invention comprises receiving an event, the event comprising user interaction with an article on a client device, wherein the article is capable of being associated with at least one of a plurality of client applications, extracting at least one keyword from the event, generating a query based at least in part on the at least one keyword, performing a search based at least in part on the query to determine a result set, wherein the result set comprises one or more article identifiers associated with articles comprising the at least one keyword, filtering the article identifiers in the result set based on a threshold, and causing the display of the result set.

These exemplary embodiments are mentioned not to limit or define the invention, but to provide examples of embodiments of the invention to aid understanding thereof. Exemplary embodiments are discussed in the Detailed Description, and further description of the invention is provided there. Advantages offered by the various embodiments of the present invention may be further understood by examining this specification.

BRIEF DESCRIPTION OF THE FIGURES

These and other features, aspects, and advantages of the present invention are better understood when the following Detailed Description is read with reference to the accompanying drawings, wherein:

FIG. 1 is a block diagram illustrating an exemplary environment in which one embodiment of the present invention may operate;

FIG. 2 is a flowchart illustrating a method in accordance with one embodiment of the present invention.

DETAILED DESCRIPTION

Embodiments of the present invention provide systems and methods for ranking implicit search results.

System Architecture

Referring now to the drawings in which like numerals indicate like elements throughout the several figures, FIG. 1 is a block diagram illustrating an exemplary environment for implementation of an embodiment of the present invention. While the environment shown reflects a client-side search engine architecture embodiment, other embodiments are possible.

The system **100** shown in FIG. 1 includes multiple client devices **102a-n** in communication with a server device **150** over a wired or wireless network **106**. The network **106** shown comprises the Internet. In other embodiments, other networks, such as an intranet, may be used instead. Moreover, methods according to the present invention may operate within a single client device.

The client devices **102a-n** shown each includes a computer-readable medium **108**. The embodiment shown includes a random access memory (RAM) **108** coupled to a processor **110**. The processor **110** executes computer-executable program instructions stored in memory **108**. Such processors may include a microprocessor, an ASIC, a state machine, or other processor, and can be any of a number of computer processors, such as processors from Intel Corporation of Santa Clara, Calif. and Motorola Corporation of Schaumburg, Ill. Such processors include, or may be in communication with, media, for example computer-readable media, which stores instructions that, when executed by the processor, cause the processor to perform the steps described herein.

Embodiments of computer-readable media include, but are not limited to, an electronic, optical, magnetic, or other storage or transmission device capable of providing a processor, such as the processor **110** of client **102a**, with computer-readable instructions. Other examples of suitable media include, but are not limited to, a floppy disk, CD-ROM, DVD, magnetic disk, memory chip, ROM, RAM, an ASIC, a configured processor, all optical media, all magnetic tape or other magnetic media, or any other medium from which a computer processor can read instructions. Also, various other forms of computer-readable media may transmit or carry instructions

to a computer, including a router, private or public network, or other transmission device or channel, both wired and wireless. The instructions may comprise code from any suitable computer-programming language, including, for example, C, C++, C#, Visual Basic, Java, Python, Perl, and JavaScript.

Client devices **102a-n** can be connected to a network **106** as shown, or can be stand-alone machines. Client devices **102a-n** may also include a number of external or internal devices such as a mouse, a CD-ROM, DVD, a keyboard, a display, or other input or output devices. Examples of client devices **102a-n** are personal computers, digital assistants, personal digital assistants, cellular phones, mobile phones, smart phones, pagers, digital tablets, laptop computers, Internet appliances, and other processor-based devices. In general, the client devices **102a-n** may be any type of processor-based platform that operates on any operating system, such as Microsoft® Windows® or Linux, capable of supporting one or more client application programs. For example, the client device **102a** shown comprises a personal computer executing client application programs, also known as client applications **120**. The client applications **120** can be contained in memory **108** and can include, for example, a word processing application, a spreadsheet application, an e-mail application, an instant messenger application, a presentation application, an Internet browser application, a calendar/organizer application, and any other application capable of being executed by a client device.

The user **112a** can interact with the various client applications **120** and articles associated with the client applications **120** via various input and output devices of the client device **102a**. Articles include, for example, word processor, spreadsheet, presentation, e-mail, instant messenger, database, and other client application program content files or groups of files, web pages of various formats, such as HTML, XML, XHTML, Portable Document Format (PDF) files, and audio files, video files, or any other documents or groups of documents or information of any type whatsoever.

The memory **108** of the client device **102a** shown also contains a capture processor **124**, a queue **126**, and a search engine **122**. The client device **102a** shown also contains or is in communication with a data store **140**. The search engine **122** can receive an explicit query from the user **112a** or generate an implicit query and retrieve information from the data store **140** in response to the query.

The search engine **122** shown contains an indexer **130**, a query system **132**, and a formatter **134**. Events, real-time and historical, contextual and indexable, and performance data can be sent by the queue **126** to the query system **132** to provide the query system **132** with information concerning current user context. The query system **132** can use this information to generate an implicit query. The query system **132** can also receive and process explicit queries from the user **112a**.

The user context attribute may comprise, for example, the current word in a buffer, the last *n* words received from the user (e.g., the last 10 words the user typed), the text nearby the cursor (e.g., the text up to *x* words before and *y* words after), the current sentence, the current paragraph, an entire buffer (e.g., an entire word-processing document), the selected or highlighted buffer, the buffer currently in the clipboard, a term measure, such as a term frequency or inverse document frequency measure, an identified term, such as an e-mail address, the name of a person, or an instant messaging buddy name, a previously copied term, a prior implicit or explicit search term, a user identifier, or a word determined by rules specific to the application that generated the event, such as a web page URL for a web browser application.

The data store **140** can be any type of computer-readable media and can be integrated with the client device **102a**, such as a hard drive, or external to the client device **102a**, such as an external hard drive or on another data storage device accessed through the network **106**. The data store **140** may include any one or combination of methods for storing data, including without limitation, arrays, hash tables, lists, and pairs.

In the embodiment shown in FIG. 1, a user **112a** can input an explicit query into a search engine interface displayed on the client device **102a**, which is received by the search engine **122**. The search engine **122** can also generate an implicit query based on a current user context or state, which can be determined by the query system **132** from contextual real time events. Based on the query, the query system **132** can locate relevant information in the data store **140** and provide a result set. In one embodiment, the result set comprises article identifiers identifying articles associated with the client applications **120** or client articles. Client articles stored in the data store **140** include articles associated with the user **112a** or client device **102a**, such as the word processing documents, previously viewed web pages and any other article associated with the client device **102a** or user **112a**. In another embodiment, the result set also comprises identifiers identifying articles located on the network **106** or network articles located by a search engine on a server device. Network articles include articles located on the network **106** not previously viewed or otherwise referenced by the user **112a**, such as web pages not previously viewed by the user **112a**.

The result sets comprise one or more article identifiers. An article identifier may be, for example, a Uniform Resource Locator (URL), a file name, a link, an icon, a path for a local file, or any other suitable item that identifies an article. In the embodiment shown, an article identifier comprises a URL associated with an article.

Messaging articles stored in the data store **140** include user's e-mails, chat messages, and instant messaging messages. Each time a message is received, sent, modified, printed, or otherwise accessed, a record is stored in the data store **140**. This information can later be searched to identify messages that should be displayed in a user interface element.

An embodiment of the present invention may also store message threads in the data store **140**. In such an embodiment, messages are related together by various attributes, including, for example, the sender, recipient, date/time sent and received, the subject, the content, a window identifier of the display window in which the messages were displayed, or any other attribute of the message. The related messages can then be retrieved as a thread, which may be treated as a document by the display processor **128**.

The formatter **134** can receive the search result set from the query system **132** of the search engine **122** and can format the results for output to a display processor **128**. In one embodiment, the formatter **134** formats the results in XML or HTML. In another embodiment, the formatter **134** displays the results as strings on user interface components such as, for example, labels. The display processor **128** can be contained in memory **108** and can control the display of the result set on a display device associated with the client device **102a**. The display processor **128** may comprise various components. For example, in one embodiment, the display processor **128** comprises a Hypertext Transfer Protocol (HTTP) server that receives requests for information and responds by constructing and transmitting Hypertext Markup Language (HTML) pages. In one such embodiment, the HTTP server comprises a scaled-down version of the Apache Web server. In various

embodiments, the functions described herein may be performed by various other components and devices.

Through the client devices **102a-n**, users **112a-n** can communicate over the network **106**, with each other and with other systems and devices coupled to the network **106**. As shown in FIG. 1, a server device **150** is also coupled to the network **106**. In the embodiment shown, the search engine **122** can transmit a search query comprised of an explicit or implicit query or both to the server device **150**. The user **112a** can also enter a search query in a search engine interface, which can be transmitted to the server device **150**. In another embodiment, the query signal may instead be sent to a proxy server (not shown), which then transmits the query signal to server device **150**. Other configurations are also possible.

The server device **150** shown includes a server executing a search engine application program, such as the Google™ search engine. Similar to the client devices **102a-n**, the server device **150** shown includes a processor **160** coupled to a computer-readable memory **162**. Server device **150**, depicted as a single computer system, may be implemented as a network of computer processors. Examples of a server device **150** are servers, mainframe computers, networked computers, a processor-based device, and similar types of systems and devices. The server processor **160** can be any of a number of computer processors, such as processors from Intel Corporation of Santa Clara, Calif. and Motorola Corporation of Schaumburg, Ill.

Memory **162** contains the search engine application program, also known as a search engine **170**. The search engine **170** locates relevant information in response to a search query from a client device **102a**. The search engine **122** then provides the result set to the client device **102a** via the network **106**. The result set **134** comprises one or more article identifiers. An article identifier may be, for example, a uniform resource locator (URL), a file name, a link, an icon, a path for a local file, or anything else that identifies an article. In the embodiment shown, an article identifier comprises a URL associated with an article.

In the embodiment shown, the server device **150**, or related device, has previously performed a crawl of the network **106** to locate articles, such as web pages, stored at other devices or systems connected to the network **106**, and indexed the articles in memory **162** or on another data storage device.

It should be noted that the present invention may comprise systems having different architecture than that which is shown in FIG. 1. For example, in some systems according to the present invention, server device **104** may comprise a single physical or logical server. The system **100** shown in FIG. 1 is merely exemplary, and is used to explain the exemplary methods shown in FIG. 2.

Various methods may be implemented in the environment shown in FIG. 1 and other environments, according to the present invention. Methods according to the present invention may be implemented by, for example, a processor-executable program code stored on a computer-readable medium.

Embodiments of the present invention are capable of generating implicit queries based on a user's contextual state. The results of an implicit query are displayed to the user in a content display window. The results may be updated periodically as the user's contextual state changes. For example, in one embodiment, the user is working on a word document concerning budgeting. A query implicit builder ("QUIB"), one component of the query system **132** shown in FIG. 1, requests and receives events related to the document. The QUIB generates queries from the events and presents the results of the queries to the user.

Events comprise historical, contextual, and real-time events. In one embodiment, contextual events are time sensitive and may be of higher significance even after an elapsed period of time. Contextual events relate to actions that are occurring now or have occurred within a short time frame, e.g., the last ten words that the user typed. In contrast, real-time events are less time-sensitive, e.g., the user printed or opened a file.

Events may be tracked over multiple sessions. For example, in one embodiment, if a user has opened a web page repeatedly during the last several times the user has used a client machine, the query system **132** tracks the usage for each of those sessions by tracking the events associated with the usage. In one such embodiment, access during a particular session is down-weighted or promoted based on the period of time that has elapsed since the session. In other words, events associated with more recent accesses of a specific article are weighted more heavily than those occurring less recently.

The events may include information, such as the last twenty words the user typed, the last sentence the user typed, the text nearby the cursor (e.g. the text up to x words before and y words after), the currently active buffer (e.g., the entire active document), the selected or highlighted buffer, the buffer in the clipboard, or other information relevant to the user's context. The query system **132** extracts keywords from the information and generates a search query to be submitted to a search engine. The query system **132** creates and executes the query as if the user had explicitly typed the keywords in a search interface.

In one embodiment, the query system **132** learns from a user's behavior whether or not certain data streams or keywords are particularly relevant. The query system **132** may rely on click-throughs within the content display window to determine results in which the user exhibits particular interest. For example, if the content display includes a link that has been shown to a user multiple times but has not been clicked, the link may be eliminated from the content display. The data streams, query types, or keywords that resulted in the link being displayed may be down-weighted in subsequent analysis. In contrast, if the user clicks the link, this typically indicates that the user is interested in the article, and can result in promoting the data streams, query types, or keywords that resulted in the link being displayed. These data streams, query types, or keywords can be used with increased weight in subsequent analysis. Additionally, click-through data can be used to identify a type preference for the user **112a**. A type preference can comprise, for example, a file format preferred by the user **112a**. For example, if the user **112a** typically selects results that are in HTML format and ignores results that are in PDF format, the query system **132** can promote future identifiers associated with articles in HTML format and down-weight articles in PDF format. Click-through data can also be used to identify a preference for a particular method of generating keywords. For example, if the user **112a** typically selects results that were generated based on the most recently typed 10 words and ignores results generated based on text on the clipboard, the query system **132** can promote future identifiers associated with articles generated from the most recently typed 10 words, and down-weight articles associated with text from the clipboard.

The query system **132** shown in FIG. 1 utilizes multiple data streams as sources for generating search queries. For example, if the user is editing a document, the query system **132** may use the last 20 words that were typed, as well as the entire document to extract keywords and generate search queries. The query system **132** generates a search query for

each data stream and combines the result sets corresponding to each search query for display to the user.

Processes

Various methods in accordance with the present invention may be carried out. For example, one embodiment comprises receiving an event, the event comprising user interaction with an article on a client device, wherein the article is capable of being associated with at least one of a plurality of client applications, extracting at least one keyword from the event generating a query based at least in part on the at least one keyword performing a search based at least in part on the query to determine a result set, wherein the result set comprises one or more article identifiers associated with articles comprising the at least one keyword, and determining a ranking for each of the one or more article identifiers comprising the result set. According to some embodiments, ranking the article identifiers can be based at least in part on a user preference. The user preference can be based at least in part on click-through data or file type.

According to other embodiments, ranking the article identifiers can be based at least in part on meta-data. The meta-data can comprise at least one of bolding, highlighting, italicizing, font color, or heading data. According to other embodiments, ranking the article identifiers is based at least in part on a term frequency and a document frequency. The ranking can be proportional to the log of the sum of a first constant plus the term frequency and inversely proportional to the log of the sum of a second constant plus the document frequency. In one embodiment, both the first and second constants have the value one. In another embodiment, they have different values. In yet another embodiment, the document frequency is not used directly but is hashed into a pre-defined table which maps ranges of document frequency into constants used for ranking article identifiers. According to other embodiments, the ranking is based at least in part on a number data. The number data can comprise a number of letters in the keyword or whether a keyword comprises numbers. According to other embodiments, the ranking is based at least in part on capitalization data. According to other embodiments, the ranking is based at least in part on source data. According to other embodiments, the keywords can be associated with keyword ranking scores. According to some embodiments, the ranking of article identifiers can be based at least in part on the keyword ranking scores. According to some embodiments, ranking the article identifiers can comprise assigning a higher ranking to article identifiers associated with articles containing higher ranked keywords.

According to other embodiments, extracting at least one keyword from an event comprises extracting a keyword from at least one of recently typed words, an entire document, a selected portion of a document, or words surrounding a cursor. According to other embodiments, extracting at least one keyword from an event comprises determining names. Determining names can comprise crawling at least one article.

According to other embodiments, a method comprises receiving an event, the event comprising user interaction with an article on a client device, wherein the article is capable of being associated with at least one of a plurality of client applications, extracting at least one keyword from the event, generating a query based at least in part on the at least one keyword, performing a search based at least in part on the query to determine a result set, wherein the result set comprises one or more article identifiers associated with articles comprising the at least one keyword, filtering the article identifiers in the result set based on a threshold, and causing the

display of the result set. The threshold can comprise a number of keywords or a minimum weighting score. The minimum weighting score can be based at least in part on a number of keywords multiplier, a source multiplier, and a time multiplier.

FIG. 2 is a flowchart illustrating a method 200 for processing an implicit query. The method 200 begins in block 202, wherein the query system 132 receives a contextual event 202. The contextual event is an occurrence that is captured by the capture processor 124 and can be used to update the user's contextual state and can be indexed and stored in the event database in data store 140 to provide information for future queries.

Once the query system 132 receives a contextual event, the method 200 proceeds to block 204, wherein the query system 132 extracts keywords from the event in order to generate one or more search queries. The keywords may comprise, for example, words that the user has recently typed, words that occur in a document or buffer, words that are highlighted or selected, words placed into the clipboard, words that are identified as proper names, words that are typed as explicit queries by the user, or may comprise any other type of keyword that the system is able to identify. The keywords may comprise all of the words in the event. The query system 132 may extract keywords from any of a number of data streams. Data streams can comprise, for example, sources of implicit query keywords including one or more of the following: the most recently typed n words where n is on the order of ten; the n words around the user's cursor where n is around ten; words in the current selection; words from the current document (e.g., one such method selects the most frequently occurring words); previous explicit queries executed by the user or submitted by the user; clipboard content; and a list of all the names of people with which the user has communicated; a list of e-mail addresses and/or instant messenger "buddy names"; and a list of important terms or phrases for the user.

Words from a current document can comprise, for example, words from an entire buffer, e.g., an entire Microsoft Word document. In one embodiment, to facilitate performance or, for other benefits, only the first portion of the document may be considered for extracting keywords, e.g., the first 100 kilobytes of data. In another embodiment of the present invention, the query system extracts keywords from explicit queries that are captured by an application on the client 102a, such as a Winsock Layered Service Provider ("LSP"). When the user submits a query to a global index, such as the Google™ search engine, the Winsock LSP captures the query as an event and provides a query, either the original or a modified version, to another search engine application, such as search engine 122 on the client 102a. The local search engine 122 processes the query substantially simultaneously with the global search engine.

Other methods for extracting keywords from data streams may be utilized by an embodiment of the present invention. For example, the query system 132 may use identified terms to generate search queries. An identified term is a term which the user uses in a manner that has been noted as being particularly relevant to the user's contextual state. For instance, an identified term may comprise the name of a person to which the user recently directed an e-mail. The names need not be recent or popular; for example, the names may include all e-mail addresses, etc. captured for a user. Even old, rare names may be useful to identify. For example, if a user has only sent or received a single message to a particular person several years ago, it may still be desirable to recall the message when the sender/recipient e-mail address is recognized. In one embodiment, the names are limited to recent and/or

popular names to limit the amount of data required to store the names. To extract the name, the query system 132 can examine the user's e-mail system and determine the names of users to which the user recently or often sends e-mail messages. The query system can extract all names associated with the user's e-mail system, or can extract names based on recipients of an e-mail or names appearing in the e-mail, for example. In another embodiment, the query system also correlates this information with the subject and/or text of e-mail or other correspondence. For example, if a user frequently sends e-mail to a person, and the user also frequently refers to the name of an organization with which the person is affiliated (e.g., the company field of the person's contact information), the query system can identify the organization and content of interest to the person. According to one embodiment, the query system 132 can extract names from a list of contacts comprising, for example, a set of names and associated telephone numbers and e-mails.

In another embodiment, the query system 132 can extract keywords based on identified proper names. The query system 132 can identify proper names, for example, by identifying capitalized words not at the beginning of a sentence. The query system can also search for proper names by crawling articles located on the client device 102a or on the network 106. After determining proper names by crawling articles, the query system 132 can store a list of proper names in the data store 140 or other suitable location. The names can then be used by the query system 132 to identify keywords to extract from an article.

The query system 132 may also extract keywords from a selection or from a clipboard buffer. A selection can comprise, for example, the text or objects that are highlighted in the currently active application. For example, the user 112a can select a portion of text to modify and the query system 132 can extract keywords from the selected or highlighted portion of text. The clipboard buffer can comprise, for example, information that was previously selected and copied or cut by the user 112a.

The query system 132 can also extract keywords based on a list of common words. For example, the query system 132 can extract the following sentence from a text document: "What is the budget for the second quarter of 2003?" Not all the words that appear in this sentence are necessary for a search query. For example, many of the words in the sentence are filler words. Filler words include words such as "the" which are determiners and are not necessarily relevant to any particular query. These words are filtered out before the search query is submitted to the search engine 122. The original sentence may be maintained to compare to future content extracts. According to some embodiments, filtering words can comprise, for example, comparing words to a list of common words. The list of common words can comprise, for example, a list of words determined to appear frequently and be of little value in ranking search results. For example, a list of common words can comprise the words "is," "of," "to," "it," and other common words. The query system 132 can compare words extracted from a string or document to the list of common words and filter out words that appear in the list. In another embodiment, a list can contain common words which are not to be excluded as keywords, but which are down-weighted. For example, such words can be made less likely to appear as keywords, but may still be selected as keywords if they appear frequently within an article. Additionally, keywords can be associated with keyword ranking scores. Keyword ranking scores can reflect, for example, the relative importance or lack of importance of keywords. For example, common keywords can have low keyword ranking scores

associated with them while proper name keywords can have high keyword ranking scores associated with them. The keyword ranking scores can be used in ranking an article containing the keyword ranking scores. For example, articles containing keywords associated with high keyword ranking scores can receive high ranking scores themselves. Likewise, articles containing keywords associated with low keyword ranking scores can receive low ranking scores themselves.

Once the query system 132 has extracted keywords from a data stream, the method 200 proceeds to block 206, wherein the query system 132 generates a search query 206. The search query that the query system 132 generates may comprise keywords extracted from a single data stream or may comprise keywords extracted from multiple streams. For example, the query system 132 can extract keywords from a selected portion of text within a document and from the entire contents of the document. Whether a word extracted from more than one source continues to be used in an implicit query may be determined in various ways. For example, if the word "budget" occurs with some frequency (e.g. fifty times) in a document but the user has not recently typed the word budget, budget may continue to be included in a query generated by the query system 132.

Following block 206, the method 200 proceeds to block 208, wherein the query system 132 transmits the search query to a search engine, for example, search engine 122. In other embodiments, the query system 132 transmits the query to other search engines, for example, a search engine running on a server device 150, such as the Google™ search engine. The search engine 122 performs a search of one or more indices, either local or global, and provides at least one article identifier associated with a relevant article as a result set.

Once the query system 132 transmits the query to a search engine, the method 200 proceeds to block 210, wherein the query system 132 ranks the article identifiers in the result set based on ranking scores. The ranking scores may be related to previous events that were recorded by the query system 132 or another component or may be based on other criteria. For example, the query system 132 can determine ranking scores based at least in part on meta-data associated with articles in the result set. Meta-data can include, for example, bolding, highlighting, underlining, italicizing, font color, heading data, or any other formatting or meta-data associated with a portion of an article. Heading data can comprise, for example, whether a portion of an article is designated as a heading in a text document. The query system 132 can determine the meta-data associated with an article in the result set by determining the meta-data associated with the keywords in the search query. For example, if the search query comprises the terms "budgeting meeting" the query system can identify a result set containing articles comprising the words "budgeting meeting." One such article can be, for example, a spreadsheet with a title "budgeting meeting" appearing in bold. A second such article can be an e-mail with the words "budgeting meeting" appearing in the text. The query system 132 can determine meta-data associated with the keywords "budgeting meeting" in the spreadsheet indicating that the words are bolded. The query system can then boost a ranking score associated with the spreadsheet to reflect the likelihood that the spreadsheet titled "budgeting meeting" is more responsive to the search query than the e-mail simply containing these words in the body of the e-mail.

The query system 132 can further rank the article identifiers based at least in part on capitalization data associated with the articles in the result set. Capitalization data can comprise, for example, data indicating whether one or more letters in a word are capitalized. For example, if the words "budgeting

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meeting” in the spreadsheet from the example above are capitalized, this is a further indication that they are of greater significance in the article and thus that the article is more closely related to the search query “budgeting meeting.” Additionally, capitalized letters can indicate the proper names of people and places. Keywords associated with names and places can be a better indicator that an article containing such keywords is responsive to a search query. For example, if the user types a sentence “meet with Bob Jones for lunch” into an e-mail, the query system 132 can determine key words “meet,” “with,” “Bob,” “Jones,” and “lunch” from the sentence. The query system 132 can then identify an article containing the keywords “lunch” and “with” and an article containing the keywords “Bob” and “Jones.” The article containing the keywords “Bob” and “Jones” can be more likely to interest the user 112a, and so the query system 132 can rank the identifier associated with the article containing the capitalized words “Bob” and “Jones” higher based at least in part on the capitalization. According to some embodiments, the query system can assign a higher ranking to capitalized keywords that do not begin a sentence as these more likely reflect proper names or places.

Additionally, the query system 132 can determine a ranking score based at least in part on term frequency (TF) and a document frequency (DF) or an inverse document frequency (IDF) associated with a key word. A TF can comprise, for example, the frequency with which a keyword appears in a single article. A DF can comprise, for example, the frequency with which a keyword appears in all documents, and an IDF can comprise, for example, the inverse of the frequency with which the keyword appears in all documents. For example, a common keyword can appear frequently within any one particular document and thus have a high TF. The same common keyword can also appear frequently in all documents and thus have a high DF and consequently a low IDF. By determining a ranking score based on a composite of the TF and IDF, the query system can compensate for keywords appearing frequently in one document when the keywords also appear frequently in all documents. On the other hand a unique keyword that appears a few times in one particular document may have a relatively low TF but can have a very high IDF and thus the composite for such a keyword can be high. According to some embodiments, the query system can determine a ranking score for an identifier in the result set proportional to:

$$\text{Log}(\text{TF}+\text{A})/\text{log}(\text{DF}+\text{B})$$

Where TF denotes the term frequency of a term, DF denotes the document frequency of a term, A denotes a first constant, and B denotes a second constant.

In one embodiment, A can have the value of 1, and B can have the value of 1. In another embodiment, A can have the value of 0.5, and B can have the value of 0. In yet another embodiment, the logarithm of the DF may not be used, and the DF may be hashed into a lookup table which maps ranges of DF values into constants. Thus the ranking score can be proportional to:

$$\text{Log}(\text{TF}+\text{A})/\text{mapping function}(\text{DF})$$

The query system 132 can further determine a ranking score based at least in part on number data associated with articles in the result set. Number data can comprise, for example, whether a keyword comprises numbers. For example if the user 112a types a date into a document, a keyword “2004” can be determined by the query processor 132. The query processor can further determine number data indicating that the keyword “2004” comprises numbers and

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determine a ranking score for the article containing the keyword “2004” based at least in part on the number data. For example, keywords containing numbers can be less likely to indicate important portions of an article and thus less likely to be associated with search results of interest to the user 112a. Additionally number data can comprise, for example, a number of letters comprising a keyword. For example the query system 132 can determine that a keyword “the” comprises three letters and that a keyword “antidisestablishmentarianism” contains 28 letters. A keyword containing a high number of letters can be more likely to be unique and thus more likely to indicate unique results interesting to the user 112a.

The query system 132 can further determine a ranking score based at least in part on preference data. Preference data can comprise, for example, data indicating the user’s 112a preference for a particular article or for a particular file type. In one embodiment, the query system 132 can receive click-through data indicating the user 112a has selected an article identifier displayed in a content display window. The query system 132 evaluates the article identifier to determine a content type associated with the article identifier. The file type may be a web page, e-mail, text file, image, or any other content type. For example, the user 112a can be presented with multiple article identifiers of different types as the result of an implicit query. For example, the user can be presented with e-mails, web pages, and text documents. The user can demonstrate a preference by selecting a particular article type more frequently than any other. For example, the user 112a can select e-mails when presented and ignore results associated with text documents. In this example, the query system 132 can rank subsequent e-mail articles higher to reflect the user’s 112a preference for e-mail documents.

In another embodiment, the query system 132 can use the click-through data to adjust the ranking scores both within and across result sets before displaying the combined result set to the user. In another embodiment, the present invention utilizes content type, source, keyword, and other data related to items that the user did not click on. The query system 132 of one such embodiment reduces the relevancy score of article identifiers corresponding to content types and sources that the user has not clicked as frequently as other types of content.

Additionally, the query system 132 can rank article identifiers based on the number of results sets in which the articles are located. For example, the user 112a can view a web page and edit a text document. Four queries are generated from the user context. The first query comprises information from the web page. The second query comprises the last ten words that the user types. The third query comprises the sentence that the user just pasted in the document. And the fourth query comprises the words that the user is currently selecting with the mouse. The query system 132 can submit the queries to one or more search engines and receive four result sets in response. The query system 132 can merge the results and can present the first five article identifiers from the merged result set to the user 112a in a contextual display window for example. The first query can produce a results set comprising articles A, B and C. The second query can produce a result set comprising articles C, D, and E. Because article C appears in both result sets, it can receive a higher ranking score when displayed in the merged results set.

The query system 132 can further determine a ranking score based at least in part on source data. Source data can comprise, for example, data indicating the source of keywords contained in an article. For example, in one embodiment, query results based on keywords extracted from recently typed words receive a higher ranking score than results based on keywords extracted from an entire document.

Source data may further include data indicating the relevancy of a source of keywords. For example, a ranking score can be based on a how frequently the keywords appear in a document, the document frequency of the keywords, or how long an application from which the keywords are extracted has been in the foreground. 5

Once the query system 132 has received the result set and ranked the results or performed any other operations, the method 200 proceeds to block 212, wherein the query system 132 transmits the result set to the display processor 128 and the display processor 128 causes the output of the article identifiers. The display processor 128 may output the result set in a format similar to a format used for global result sets such as those provided by a search engine utilizing a global index, e.g., Google™ search engine. The display processor 128 may alternatively output the result sets in a small window superimposed over another application that the user is currently using. In one embodiment of the present invention, the display processor 128 creates a window based on the amount of available screen space on the user's 112a display and outputs the result sets from the query system 132 in the window that it created. In another embodiment, the window of an active application may be modified to include the result set. 10

In one embodiment, once the desired number of results has been retrieved in a result set, the results can be stored in memory and the query system informs the display processor 128. In another embodiment, if the number of results in a result set is less than a pre-determined minimum number, the query system 132 can execute additional queries to retrieve results until the minimum threshold of results has been exceeded. The query system 132 may execute a single query or may execute multiple queries based on multiple data streams in order to return result sets that are relevant to the current user context. 20

Additionally article identifiers can be presented to the user 112a based on a threshold determined for occurrences of keywords in an article associated with the article identifier. For example, a threshold can be determined to exclude articles from the result set that contain fewer than three occurrences of one or more keywords. Additionally, the display processor 128 can present only those results above a weighted score threshold. For example, the query system 132 can determine a weighted score for each article in a result set. The weighted score can comprise, for example, number of keywords multiplier, a source multiplier, and a time multiplier. The number of keywords multiplier can comprise, for example, a weighting factor based on the number of keywords within a result and a normalizing factor based on a total number of keywords. The normalizing factor can be used to compare results associated with different numbers of keywords. The source multiplier can comprise, for example, a weighting factor based on the source of a keyword. 30

For example, if a keyword appearing in a first article is highlighted and the same keyword appearing in a second article is not highlighted, the source multiplier can boost a ranking score for the first article. Once a weighted score is determined for an article, the query system 132 can compare the weighted score to a threshold and the display processor 128 can receive this data and present only results exceeding the threshold. For example, the query system can determine two articles associated with a search query and can further determine a weighted score for each article. If the weighted score for the first article is above a threshold value and the weighted score for the second article is below the threshold value, the query system 132 can transmit this data to the display processor 128 and the display processor 128 can 40

present to the user 112a an article identifier associated with the first article and not present an article identifier associated with the second article. Once the article identifiers are presented to the user 112a, the method 200 ends.

General

The foregoing description of embodiments of the invention has been presented only for the purpose of illustration and description and is not intended to be exhaustive or to limit the invention to the precise forms disclosed. Numerous modifications and adaptations thereof will be apparent to those skilled in the art without departing from the spirit and scope of the present invention.

That which is claimed:

1. A method of ranking article identifiers of a result set from an implicit query implied from a user's current context, the method comprising:

receiving an event concerning the user's current context, wherein the event comprises a user interaction with an article having content stored on a local client device, wherein the article is associated with at least one of a plurality of client applications;

analyzing the content of the article associated with the event concerning the user's current context to extract at least one keyword and to identify one or more characteristics of the content of the article, a characteristic comprising highlighting of the content of the article;

generating the implicit query based at least in part on the at least one keyword;

performing a search based at least in part on the implicit query to determine the result set, wherein the result set comprises one or more article identifiers associated with articles relevant to the implicit query; and

ranking the article identifiers based at least in part on the one or more characteristics of the content of the article associated with the event concerning the user's current context, wherein the one or more characteristics comprise the identified highlighting of the content of the article associated with the event. 35

2. The method of claim 1, wherein ranking the article identifiers is based at least in part on a preference of a current user.

3. The method of claim 2, wherein the preference of the current user is based at least in part on click-through data associated with the article identifiers.

4. The method of claim 2, wherein the preference of the current user is based at least in part on file type associated with the article identifiers.

5. The method of claim 1, wherein the one or more characteristics comprise bolding of content within the article.

6. The method of claim 1, wherein ranking the article identifiers is based at least in part on a term frequency and a document frequency.

7. The method of claim 6, wherein ranking the article identifiers comprises determining a rank that is proportional to the log of a sum of a first constant plus the term frequency and inversely proportional to the log of a sum of a second constant plus the document frequency.

8. The method of claim 1, wherein ranking the article identifiers comprises determining a rank that is proportional to the log of a sum of a constant plus a term frequency and inversely proportional to an output of a mapping function that maps ranges of document frequency into constants.

9. The method of claim 1, wherein the one or more characteristics comprise number data associated with the keyword within the article. 65

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10. The method of claim 9, wherein the number data comprises a number of letters in the keyword.

11. The method of claim 9, wherein the number data comprises whether the keyword comprises numbers.

12. The method of claim 1, wherein the one or more characteristics comprise capitalization data associated with content within the article.

13. The method of claim 1, wherein ranking the article identifiers is based at least in part on a number of sources from which the keyword was located.

14. The method of claim 1, wherein ranking the article identifiers is based at least in part on a number of result sets in which the result set appears.

15. The method of claim 1, further comprising:

analyzing the content of the article associated with the event concerning the user's current context to extract a plurality of keywords; and

determining keyword ranking scores for the plurality of keywords.

16. The method of claim 15, wherein ranking the article identifiers is based at least in part on the keyword ranking scores.

17. The method of claim 16, wherein ranking the article identifiers comprises assigning a higher ranking to article identifiers associated with articles containing higher ranked keywords.

18. The method of claim 1, wherein analyzing the content of the article associated with the event concerning the user's current context to extract at least one keyword comprises extracting a keyword from at least one of recently typed words, an entire document, a selected portion of a document, or words surrounding a cursor.

19. The method of claim 1, wherein analyzing the content of the article associated with the event concerning the user's current context to extract at least one keyword from an event comprises determining proper names.

20. The method of claim 19, wherein determining proper names comprises crawling at least one article.

21. The method of claim 1, further comprising:

filtering the result set based on a threshold; and

outputting the article identifiers associated with the filtered result set.

22. The method of claim 21, wherein the threshold comprises a number of keywords.

23. The method of claim 21, wherein the threshold comprises a minimum weighting score based at least in part on one or more of a number of keywords multiplier, a source multiplier, and a time multiplier.

24. The method of claim 1, wherein the article is a document on the client device, and wherein the event comprises an addition of words to the document.

25. The method of claim 1, wherein the article is a document on the client device, and wherein the event comprises a placement of a cursor near words in the document.

26. The method of claim 1, wherein the article is associated with one client application selected from a group consisting of a word processing program, a spreadsheet program, a presentation program, an e-mail program, an instant messenger program, and a database program.

27. The method of claim 1, wherein the one or more characteristics comprise italicizing of content within the article associated with the event.

28. The method of claim 1, wherein the one or more characteristics comprise font color of content within the article associated with the event.

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29. The method of claim 1, wherein the one or more characteristics comprise heading data of content within the article associated with the event.

30. The method of claim 1, wherein the at least one keyword is extracted from recently typed words within the article associated with the event.

31. The method of claim 1, wherein the at least one keyword is extracted from a user selected portion within the article associated with the event.

32. The method of claim 1, wherein the at least one keyword is extracted from words surrounding a cursor within the article associated with the event.

33. A computer-readable storage medium containing program code for ranking article identifiers of a result set from an implicit query implied from a user's current context, the program code comprising:

program code for receiving an event concerning the user's current context, wherein the event comprises a user interaction with an article having content stored on a local client device, wherein the article is associated with at least one of a plurality of client applications;

program code for analyzing the content of the article associated with the event concerning the user's current context to extract at least one keyword and to identify one or more characteristics of the content of the article, a characteristic comprising highlighting of the content of the article;

program code for generating the implicit query based at least in part on the at least one keyword;

program code for performing a search based at least in part on the implicit query to determine the result set, wherein the result set comprises one or more article identifiers associated with articles relevant to the implicit query; and

program code for ranking the article identifiers based at least in part on the one or more characteristics of the content of the article associated with the event concerning the user's current context, wherein the one or more characteristics comprise the identified highlighting of the content of the article associated with the event.

34. The computer-readable storage medium of claim 33, wherein ranking the article identifiers is based at least in part on a preference of a current user.

35. The computer-readable storage medium of claim 34, wherein the preference of the current user is based at least in part on click-through data associated with the article identifiers.

36. The computer-readable storage medium of claim 34, wherein the preference of the current user is based at least in part on file type associated with the article identifiers.

37. The computer-readable storage medium of claim 33, wherein the one or more characteristics comprise bolding of content of the article.

38. The computer-readable storage medium of claim 33, wherein ranking the article identifiers is based at least in part on a term frequency and a document frequency.

39. The computer-readable storage medium of claim 38, wherein ranking the article identifiers comprises determining a rank that is proportional to the log of the sum of a first constant plus the term frequency and inversely proportional to the log of the sum of a second constant plus the document frequency.

40. The computer-readable storage medium of claim 33, wherein ranking the article identifiers comprises determining a rank that is proportional to the log of the sum of a constant

plus a term frequency and inversely proportional to the output of a mapping function that maps ranges of document frequency into constants.

41. The computer-readable storage medium of claim 33, wherein the one or more characteristics comprise number data associated with the keyword within the article.

42. The computer-readable storage medium of claim 41, wherein the number data comprises a number of letters in the keyword.

43. The computer-readable storage medium of claim 41, wherein the number data comprises whether the keyword comprises numbers.

44. The computer-readable storage medium of claim 33, wherein the one or more characteristics comprise capitalization data associated with content within the article.

45. The computer-readable storage medium of claim 33, wherein ranking the article identifiers is based at least in part on a number of sources from which the keyword was located.

46. The computer-readable storage medium of claim 33, wherein ranking the article identifiers is based at least in part on a number of result sets in which the result set appears.

47. The computer-readable storage medium of claim 33, further comprising program code for:

analyzing the content of the article associated with the event concerning the user's current context to extract a plurality of keywords; and

determining keyword ranking scores for the plurality of keywords.

48. The computer-readable storage medium of claim 47, wherein ranking the article identifiers is based at least in part on the keyword ranking scores.

49. The computer-readable storage medium of claim 48, wherein ranking the article identifiers comprises assigning a higher ranking to article identifiers associated with articles containing higher ranked keywords.

50. The computer-readable storage medium of claim 33, wherein analyzing the content of the article associated with the event concerning the user's current context to extract at least one keyword comprises extracting a keyword from at least one of recently typed words, an entire document, a selected portion of a document, or words surrounding a cursor.

51. The computer-readable storage medium of claim 33, wherein analyzing the content of the article associated with

the event concerning the user's current context to extract at least one keyword comprises determining proper names.

52. The computer-readable storage medium of claim 51, wherein determining proper names comprises crawling at least one article.

53. The computer-readable storage medium of claim 33, the program code further comprising:

program code for filtering the result set based on a threshold; and

program code for outputting the article identifiers associated with the filtered result set.

54. The computer-readable storage medium of claim 53, wherein the threshold comprises a number of keywords.

55. The computer-readable storage medium of claim 53, wherein the threshold comprises a minimum weighting score based at least in part on one or more of a number of keywords multiplier, a source multiplier, and a time multiplier.

56. A method of ranking article identifiers of a result set from an implicit query implied from a user's current context, the method comprising:

receiving a contextual event concerning the user's current context, the contextual event comprising a user's modification of a file having content stored on a local client device;

analyzing the content of the file stored on the local client device to extract at least one keyword and to identify one or more characteristics of the content of the file, a characteristic comprising highlighting of the content of the file;

generating the implicit query based at least in part on the at least one keyword extracted from the file;

performing a search based at least in part on the implicit query to determine the result set, wherein the result set comprises one or more article identifiers associated with articles comprising the at least one keyword;

determining a ranking score for the one or more article identifiers based at least in part on the one or more characteristics of the content of the file associated with the contextual event concerning the user's current context, wherein the one or more characteristics comprise the identified highlighting of the content of the file associated with the contextual event; and

ranking the one or more article identifiers in the result set based on the ranking score.

* * * * *

Exhibit 32



US007693827B2

(12) **United States Patent**
Zamir et al.

(10) **Patent No.:** **US 7,693,827 B2**

(45) **Date of Patent:** **Apr. 6, 2010**

(54) **PERSONALIZATION OF PLACED CONTENT ORDERING IN SEARCH RESULTS**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 492 days.

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(22) Filed: **Jul. 13, 2004**

(65) **Prior Publication Data**

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Related U.S. Application Data

(63) Continuation-in-part of application No. 10/676,711, filed on Sep. 30, 2003.

(51) **Int. Cl.**
G06F 17/30 (2006.01)

(52) **U.S. Cl.** **707/3; 707/4; 707/5; 707/7**

(58) **Field of Classification Search** None
See application file for complete search history.

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Primary Examiner—John E Breene

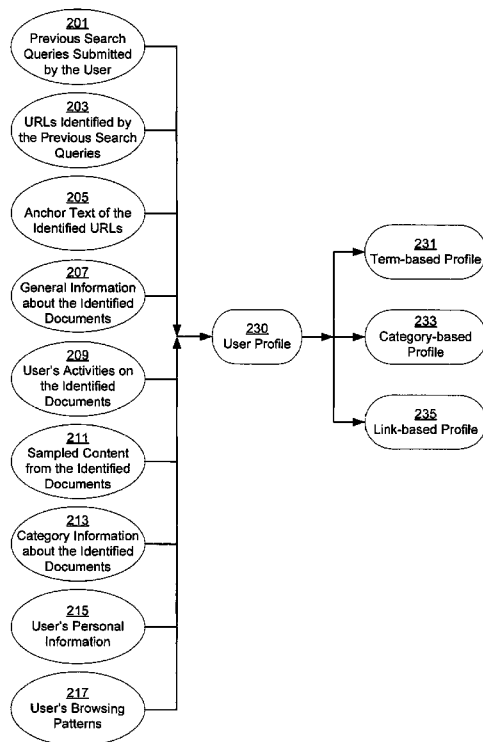
Assistant Examiner—Thu-Nguyet Le

(74) *Attorney, Agent, or Firm*—Morgan, Lewis & Bockius LLP

(57) **ABSTRACT**

A system and method for using a user profile to order placed content in search results returned by a search engine. The user profile is based on search queries submitted by a user, the user's specific interaction with the documents identified by the search engine and personal information provided by the user. Placed content is ranked by a score based at least in part on a similarity of a particular placed content to the user's profile. User profiles can be created and/or stored on the client side or server side of a client-server network environment.

29 Claims, 13 Drawing Sheets



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Client-Server Network Environment 100

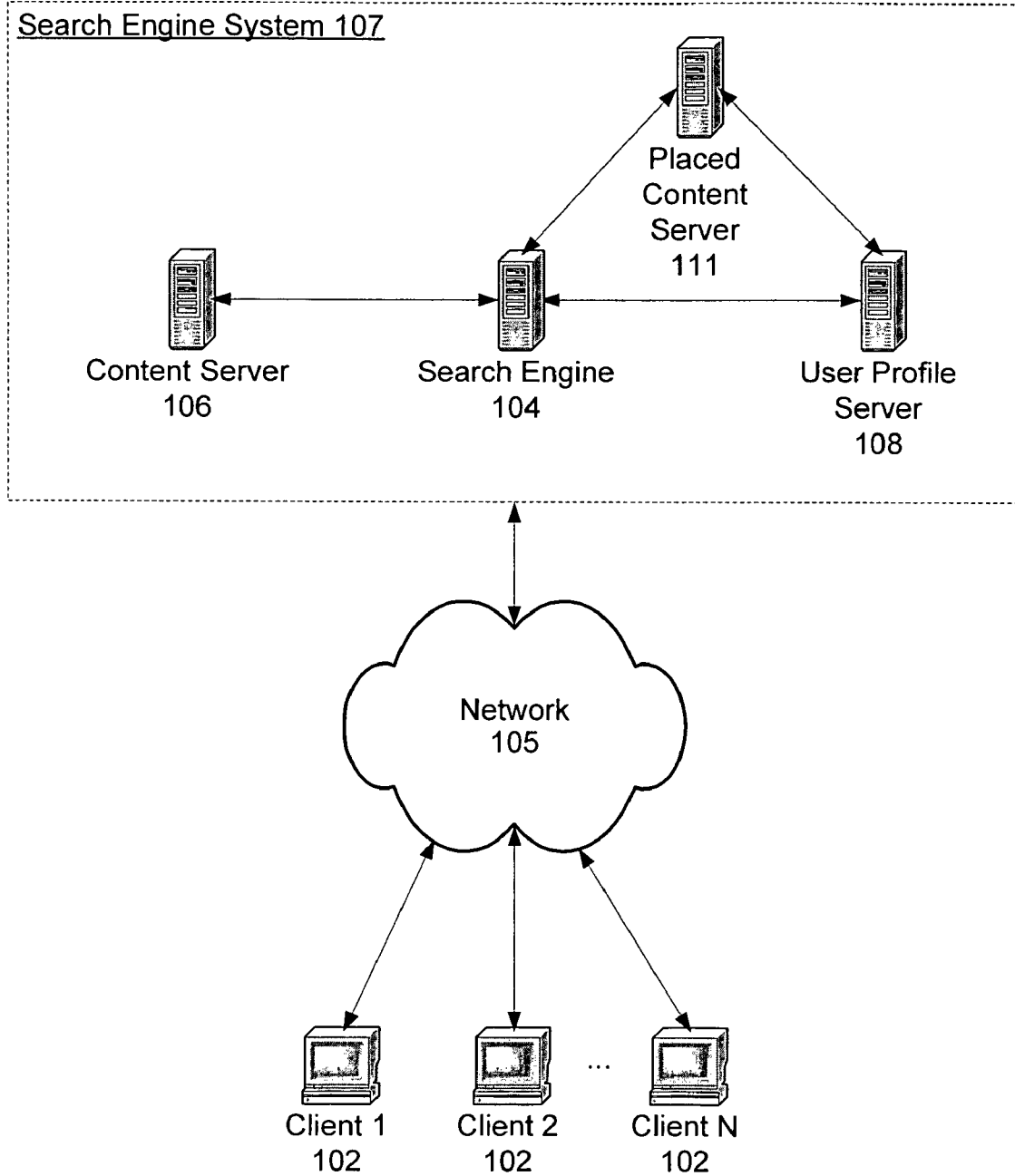


Fig. 1

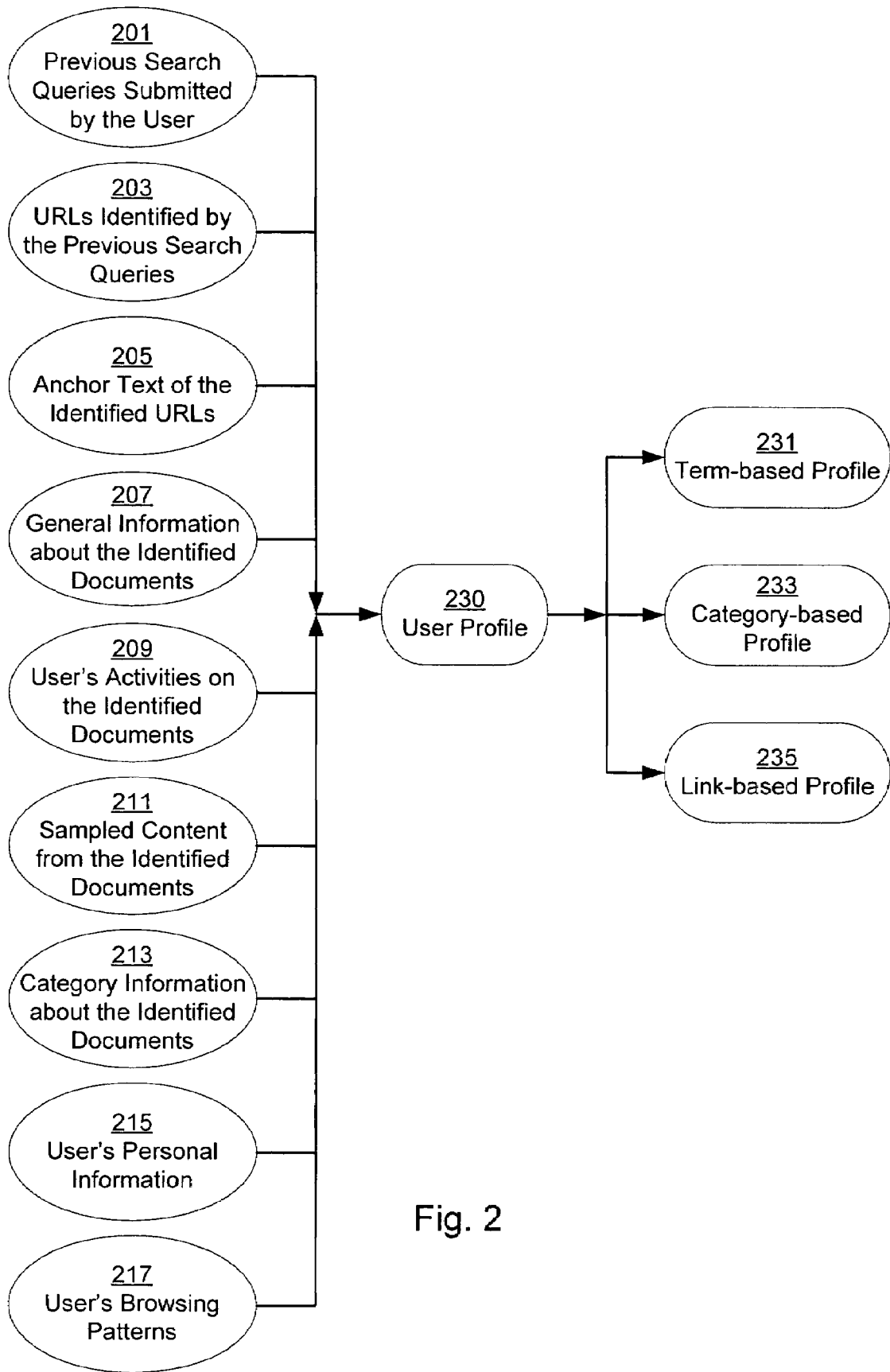


Fig. 2

Term-based Profile Table 300

| | | | | | |
|---------|--------------------|--------------------|-------|--------------------|--|
| 320 | | 340 | | | |
| USER_ID | (TERM_1, WEIGHT_1) | (TERM_2, WEIGHT_2) | . . . | (TERM_N, WEIGHT_N) | |
| 310 | . | . | . | . | |
| | . | . | . | . | |
| | . | . | . | . | |

Fig. 3

Link-based Profile Table 500

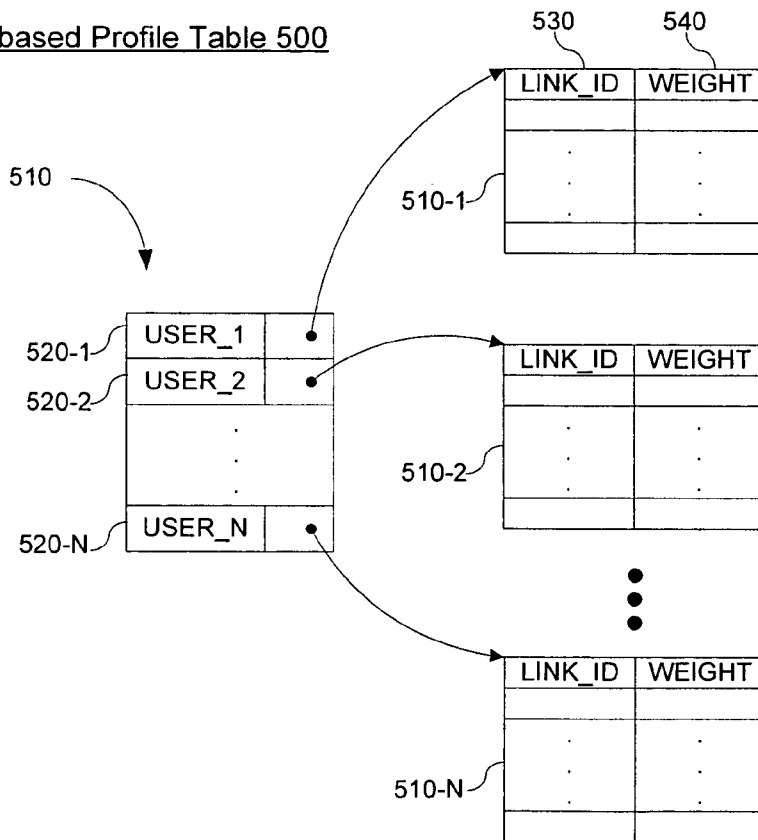


Fig. 5

Category Map 400

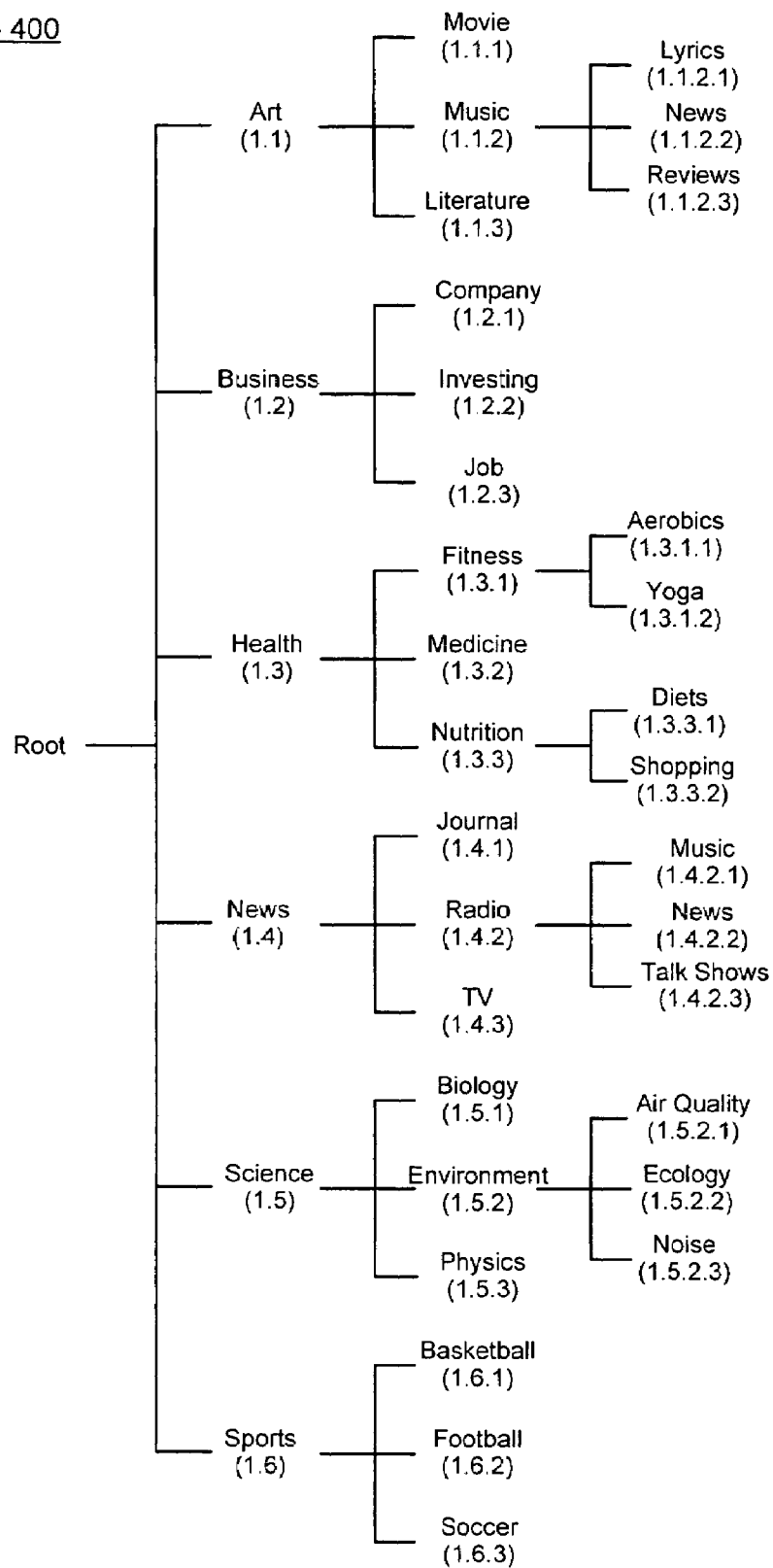


Fig. 4A

Category-based Profile Table 450

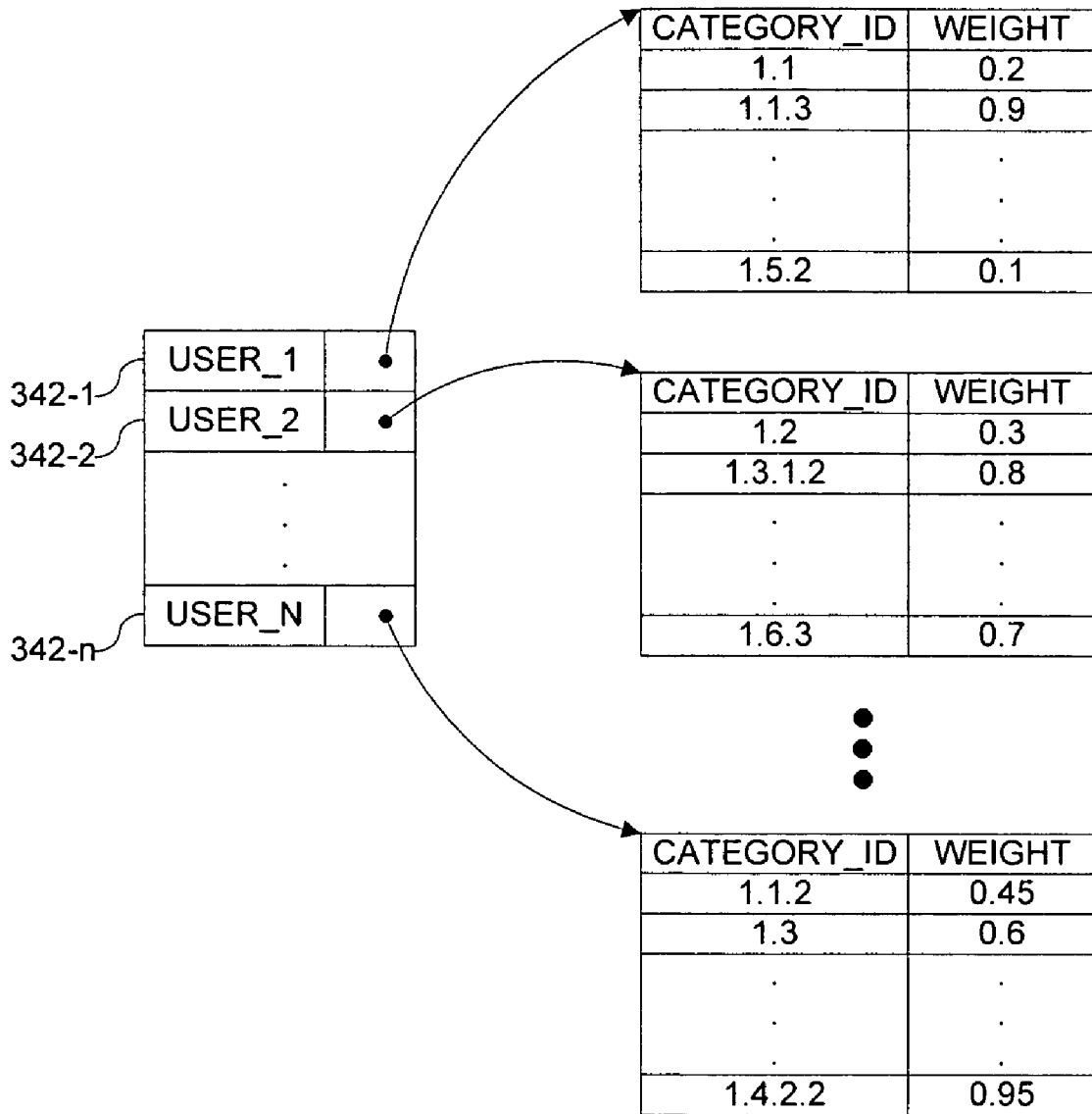


Fig. 4B

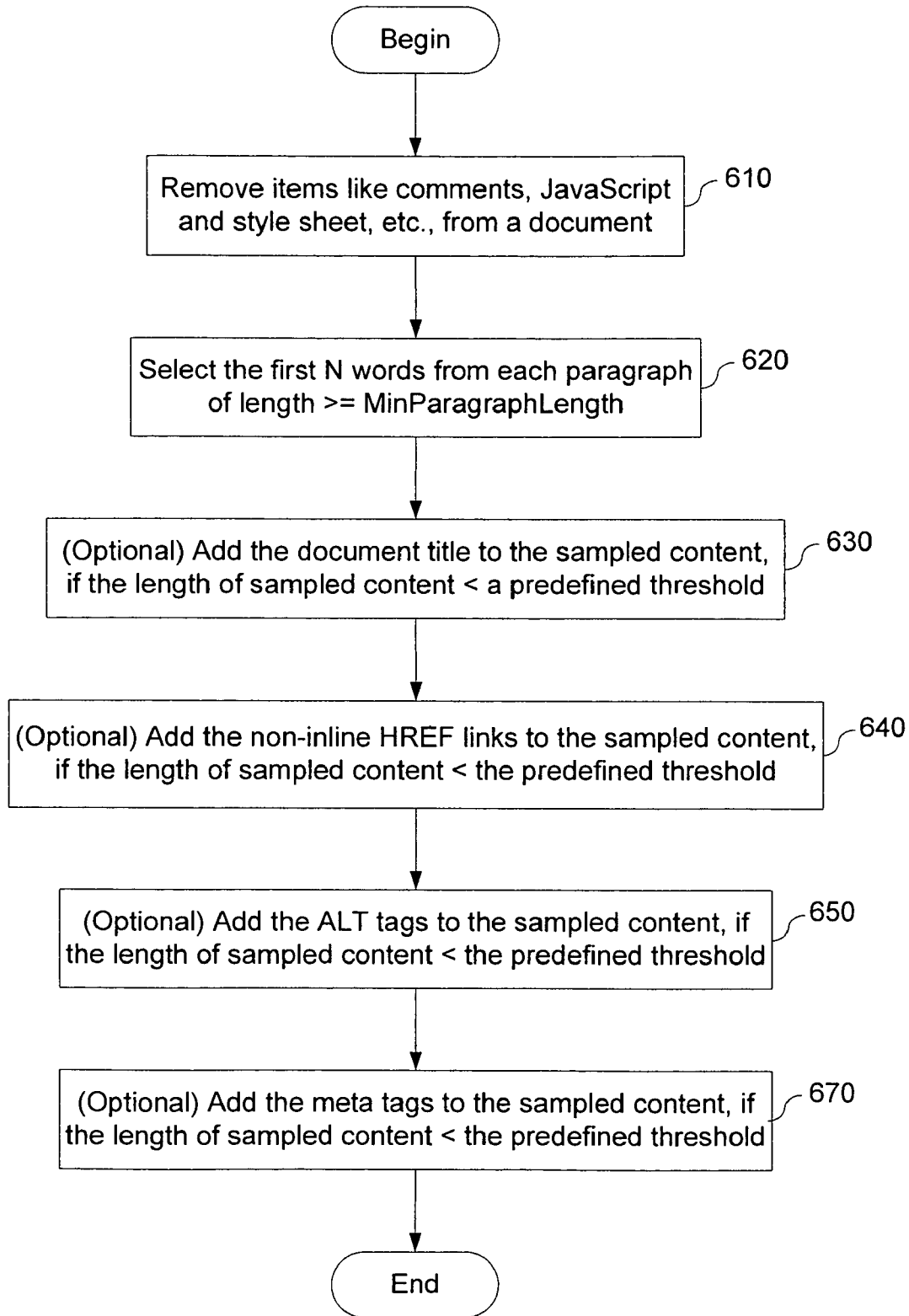


Fig. 6

Context Analysis

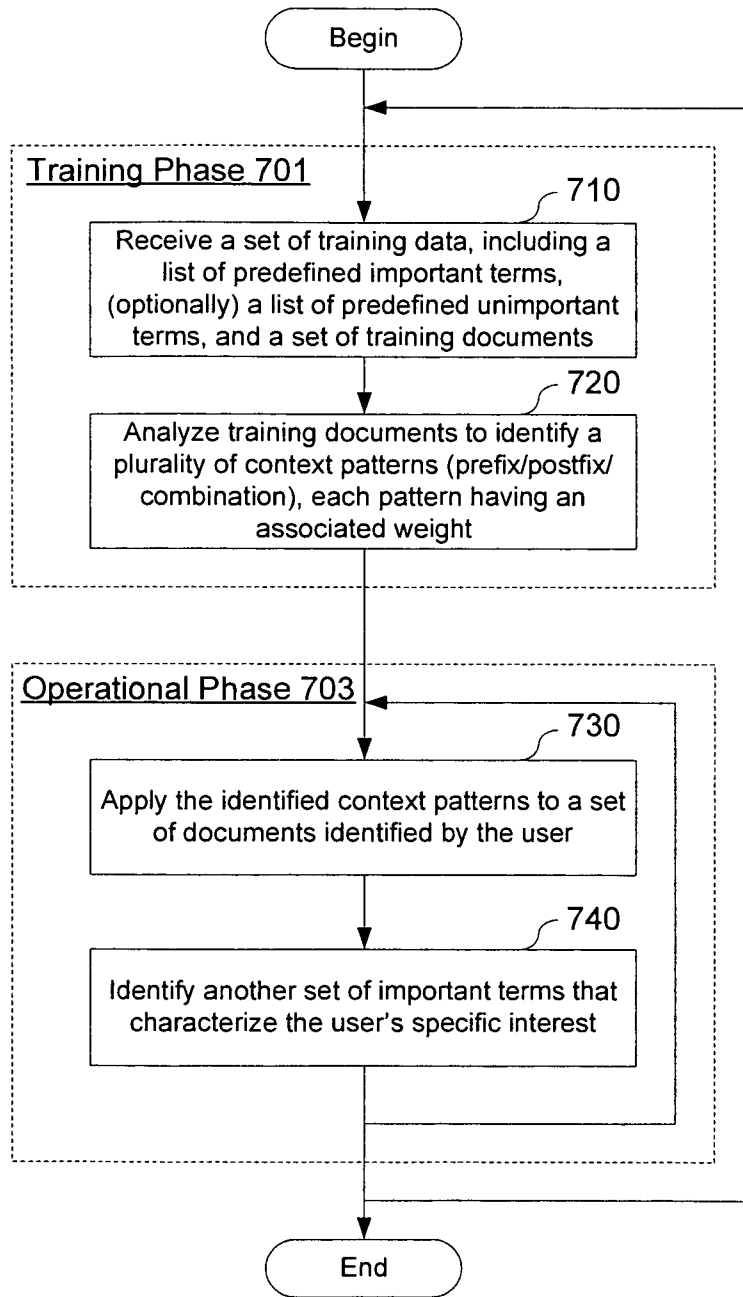
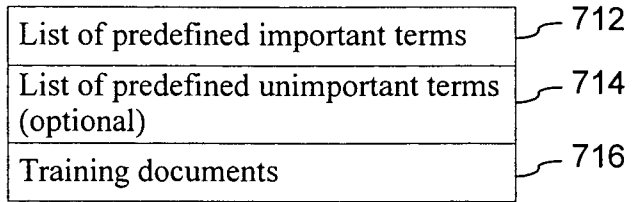


Fig. 7A

Context Analysis

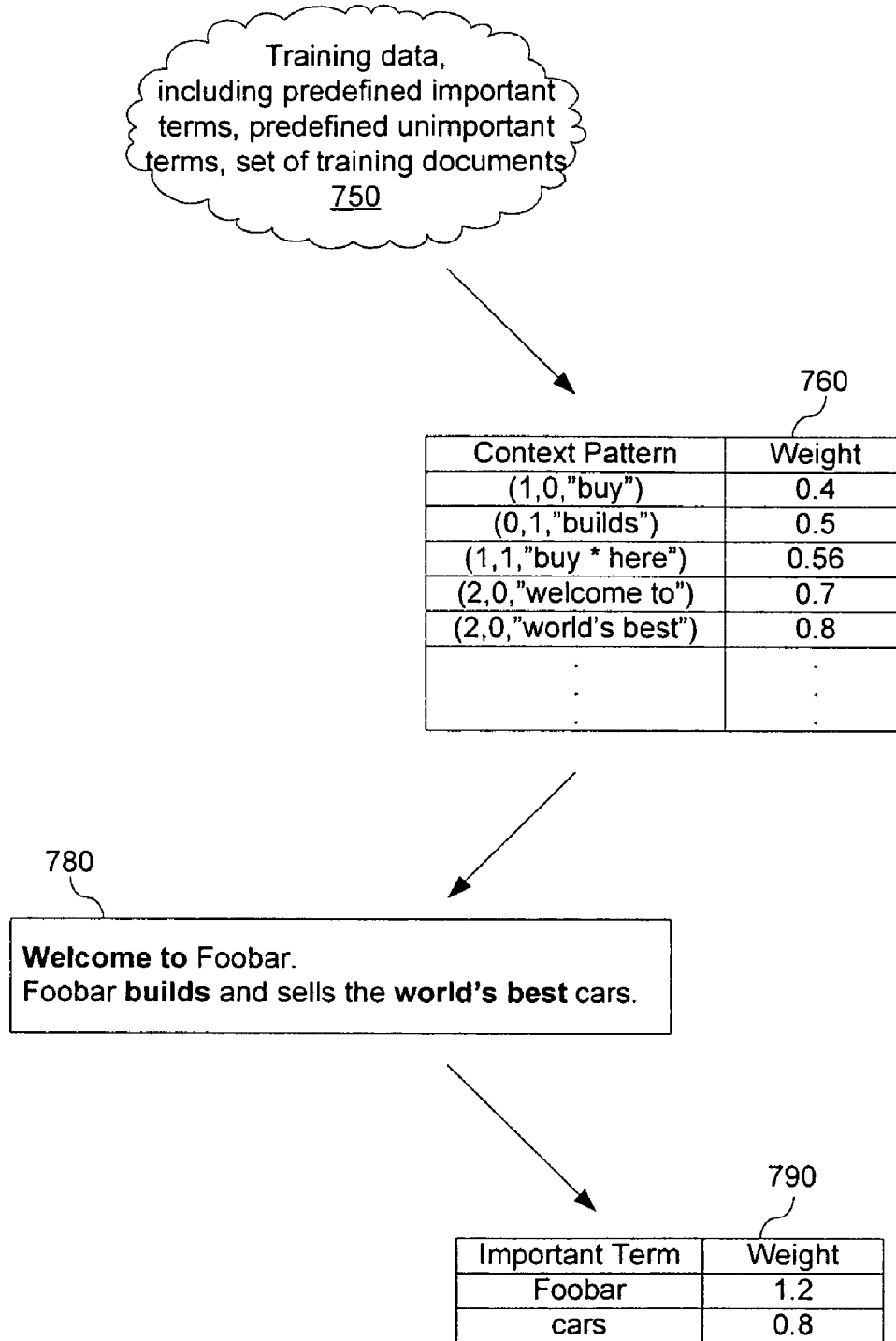


Fig. 7B

Term-based Document Information Table 810

| DOC_ID | (TERM_1, WEIGHT_1) | (TERM_2, WEIGHT_2) | · · · | (TERM_X, WEIGHT_X) | Term-based Ranking Score |
|--------|-----------------------|-----------------------|-------|-----------------------|-----------------------------|
| | | | | | |
| · | · | · | · | · | · |
| · | · | · | · | · | · |
| · | · | · | · | · | · |
| | | | · · · | | |

Category-based Document Information Table 830

| DOC_ID | (CATEGORY_1, WEIGHT_1) | (CATEGORY_2, WEIGHT_2) | · · · | (CATEGORY_Y, WEIGHT_Y) | Category-based Ranking Score |
|--------|---------------------------|---------------------------|-------|---------------------------|---------------------------------|
| | | | | | |
| · | · | · | · | · | · |
| · | · | · | · | · | · |
| · | · | · | · | · | · |
| | | | · · · | | |

Link-based Document Information Table 850

| DOC_ID | (LINK_1, WEIGHT_1) | (LINK_2, WEIGHT_2) | · · · | (LINK_Z, WEIGHT_Z) | Link-based Ranking Score |
|--------|-----------------------|-----------------------|-------|-----------------------|-----------------------------|
| | | | | | |
| · | · | · | · | · | · |
| · | · | · | · | · | · |
| · | · | · | · | · | · |
| | | | · · · | | |

Fig. 8

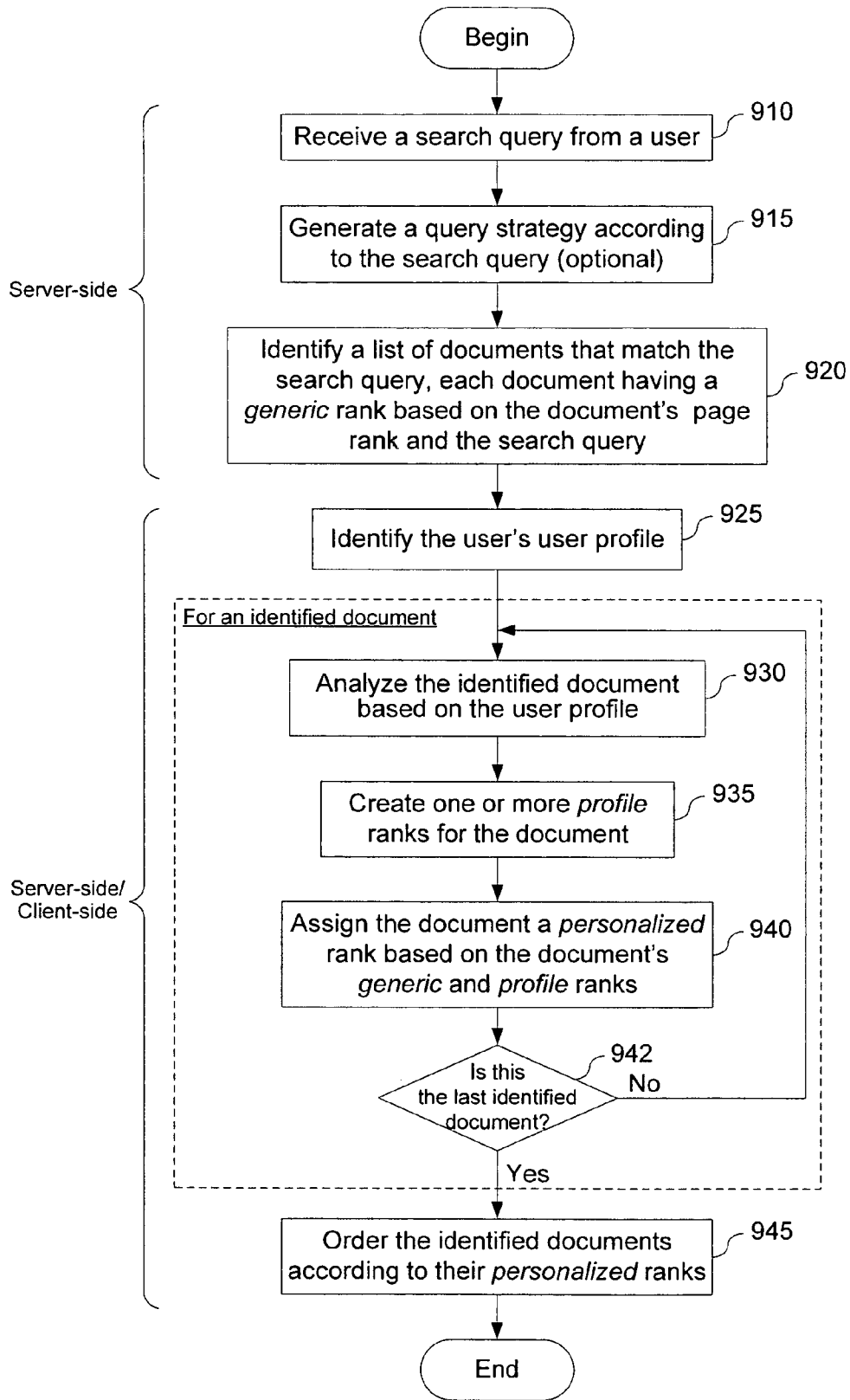


Fig. 9A

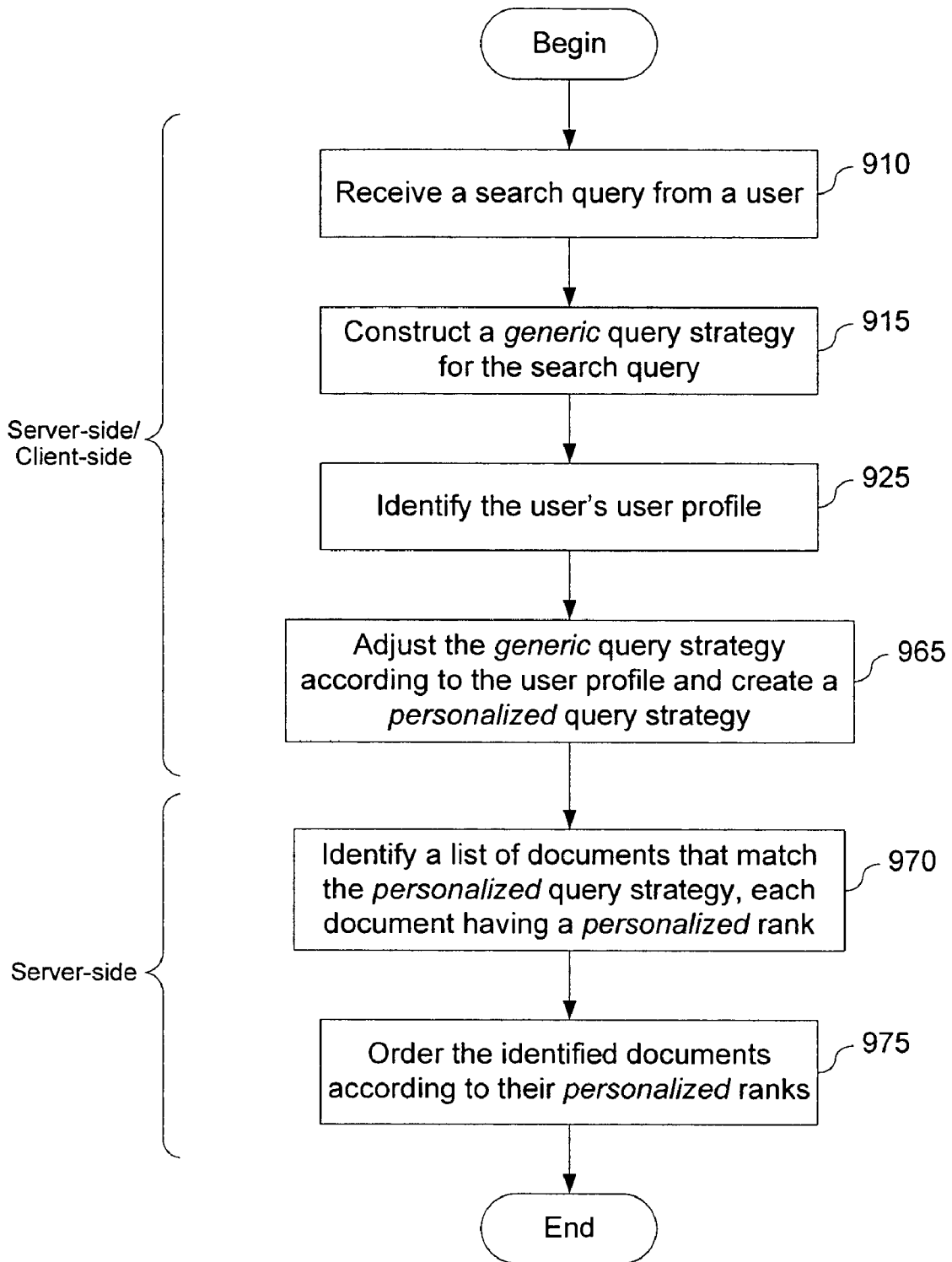


Fig. 9B

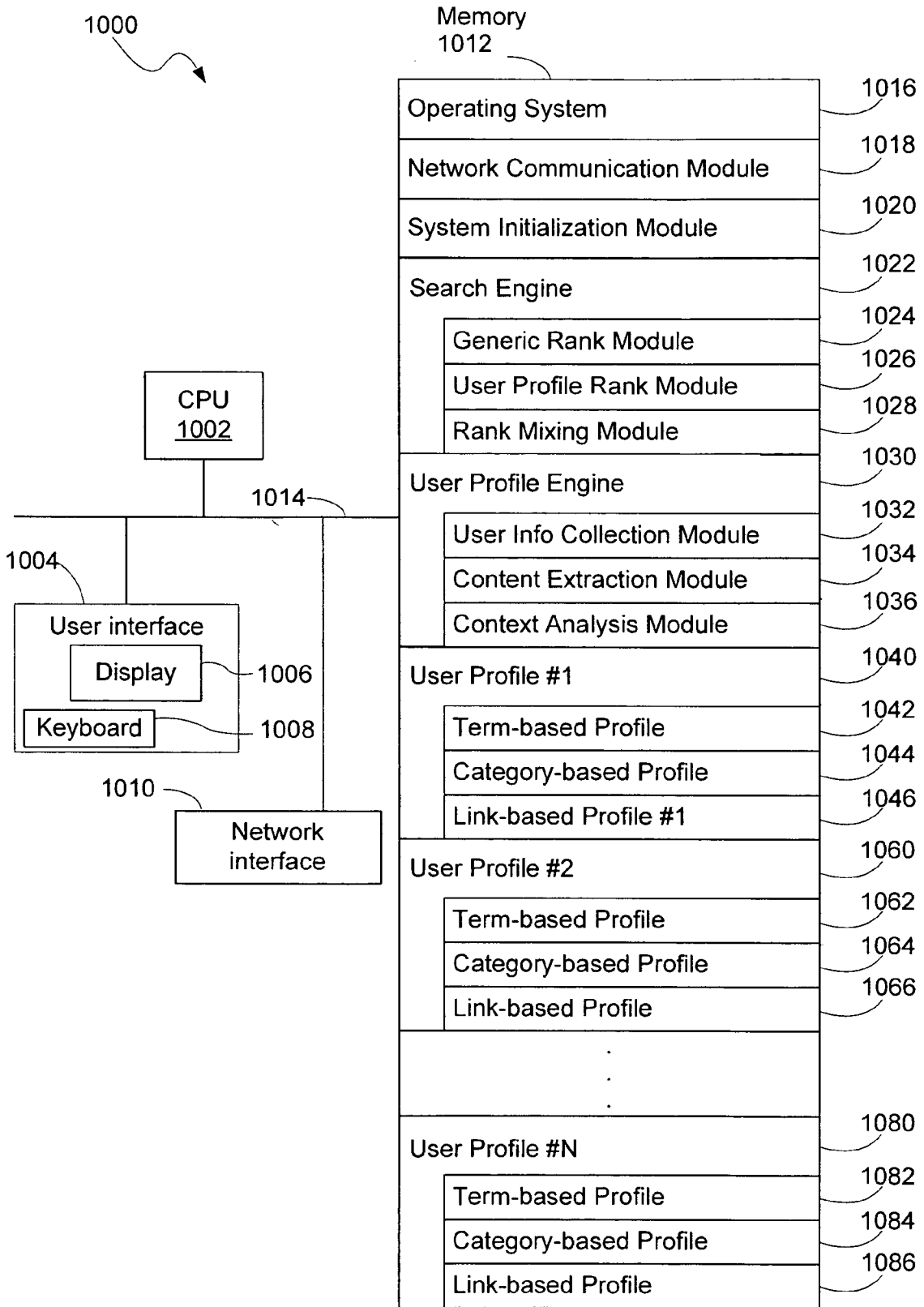


Fig. 10

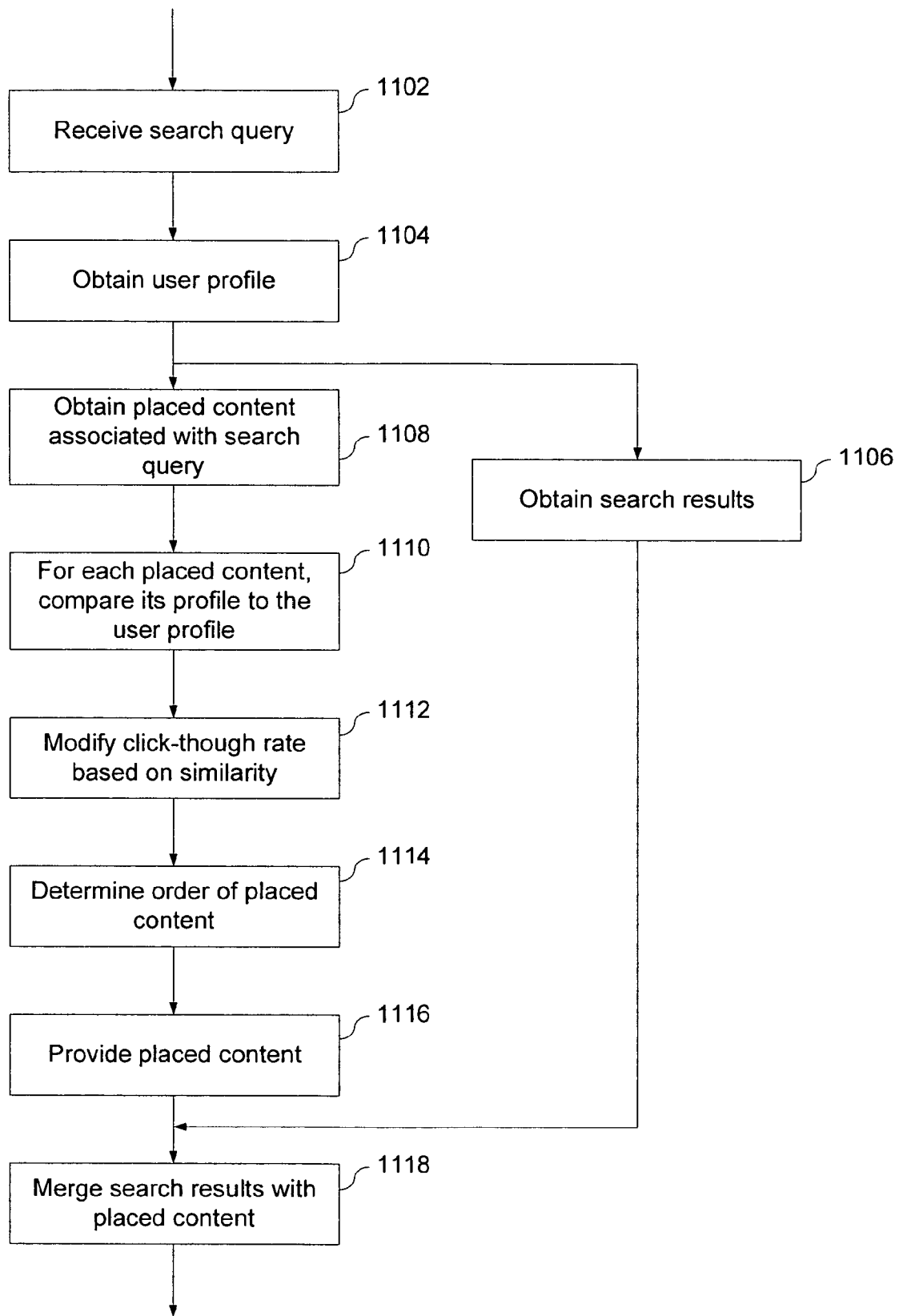


Fig. 11

PERSONALIZATION OF PLACED CONTENT ORDERING IN SEARCH RESULTS

RELATED APPLICATIONS

This application is a continuation-in-part of U.S. patent application Ser. No. 10/676,711, filed Sep. 30, 2003, which application is incorporated by reference herein in its entirety.

FIELD OF THE INVENTION

The present invention relates generally to the field of a search engine in a computer network system, in particular to system and method of creating and using a user profile to customize ordering of placed content in response to search queries submitted by the user.

BACKGROUND OF THE INVENTION

Search engines provide a powerful source of indexed documents from the Internet (or an intranet) that can be rapidly scanned in response to a search query submitted by a user. Such a query is usually very short (on average about two to three words). As the number of documents accessible via the Internet grows, the number of documents that match the query may also increase. However, not every document matching the query is equally important from the user's perspective. As a result, a user is easily overwhelmed by an enormous number of documents returned by a search engine, if the engine does not order the search results based on their relevance to the user's query.

One approach to improving the relevance of search results to a search query is to use the link structure of different web pages to compute global "importance" scores that can be used to influence the ranking of search results. This is sometimes referred to as the PageRank algorithm. A more detailed description of the PageRank algorithm can be found in the article "The Anatomy of a Large-Scale Hypertextual Search Engine" by S. Brin and L. Page, 7th International World Wide Web Conference, Brisbane, Australia and U.S. Pat. No. 6,285,999, both of which are hereby incorporated by reference as background information.

An important assumption in the PageRank algorithm is that there is a "random surfer" who starts his web surfing journey at a randomly picked web page and keeps clicking on the links embedded in the web pages, never hitting the "back" button. Eventually, when this random surfer gets bored of the journey, he may re-start a new journey by randomly picking another web page. The probability that the random surfer visits (i.e., views or downloads) a web page depends on the web page's page rank.

From an end user's perspective, a search engine using the PageRank algorithm treats a search query the same way no matter who submits the query, because the search engine does not ask the user to provide any information that can uniquely identify the user. The only factor that affects the search results is the search query itself, e.g., how many terms are in the query and in what order. The search results are a best fit for the interest of an abstract user, the "random surfer", and they are not be adjusted to fit a specific user's preferences or interests.

In reality, a user like the random surfer never exists. Every user has his own preferences when he submits a query to a search engine. The quality of the search results returned by the engine has to be evaluated by its users' satisfaction. When a user's preferences can be well defined by the query itself, or when the user's preference is similar to the random surfer's preference with respect to a specific query, the user is more

likely to be satisfied with the search results. However, if the user's preference is significantly biased by some personal factors that are not clearly reflected in a search query itself, or if the user's preference is quite different from the random user's preference, the search results from the same search engine may be less useful to the user, if not useless.

As suggested above, the journey of the random surfer tends to be random and neutral, without any obvious inclination towards a particular direction. When a search engine returns only a handful of search results that match a query, the order of the returned results is less significant because the requesting user may be able to afford the time to browse each of them to discover the items most relevant to himself. However, with billions of web pages connected to the Internet, a search engine often returns hundreds or even thousands of documents that match a search query. In this case, the ordering of the search results is very important. A user who has a preference different from that of the random surfer may not find what he is looking for in the first five to ten documents listed in the search results. When that happens, the user is usually left with two options: (1) either spending the time required to review more of the listed documents so as to locate the relevant documents; or (2) refining the search query so as to reduce the number of documents that match the query. Query refinement is often a non-trivial task, sometimes requiring more knowledge of the subject or more expertise with search engines than the user possesses, and sometimes requiring more time and effort than the user is willing to expend.

For example, assume that a user submits to a search engine a search query having only one term "blackberry". Without any other context, on the top of a list of documents returned by a PageRank-based search engine may be a link to www.blackberry.net, because this web page has the highest page rank. However, if the query requester is a person with interests in foods and cooking, it would be more useful to order the search results so as to include at the top of the returned results web pages with recipes or other food related text, pictures or the like. It would be desirable to have a search engine that is able to reorder its search results, or to otherwise customize the search results, so as to emphasize web pages that are most likely to be of interest to the person submitting the search query. Further, it would be desirable for such a system to require minimal input from individual users, operating largely or completely without explicit input from the user with regard to the user's preferences and interests. Finally, it would be desirable for such a system to meet users' requirements with respect to security and privacy.

SUMMARY

In a method of personalizing placed content, an interest of a user is determined, and a user profile associated with the user is accessed. A set of placed content that matches the interest of the user is identified, and the set of placed content is ordered in accordance with the user profile.

In one aspect of the invention, a search engine utilizes user profiles to customize search results, which may include placed content as well as other or general content. A user profile comprises multiple items that characterize a user's interests or preferences. These items are extracted from various information sources, including previous search queries submitted by the user, links from or to the documents identified by the previous queries, sampled content from the identified documents as well as personal information implicitly or explicitly provided by the user.

When the search engine receives a search query from a user, it identifies a set of placed content that matches the

search query. Each placed content is associated with a rank based at least in part a similarity of the placed content to the user profile. The placed content items are then ordered according to their ranks.

The present invention, including user profile construction and search results re-ordering and/or scoring, can be implemented on either the client side or the server side of a client-server network environment.

BRIEF DESCRIPTION OF THE DRAWINGS

The aforementioned features and advantages of the invention as well as additional features and advantages thereof will be more clearly understood hereinafter as a result of a detailed description of preferred embodiments of the invention when taken in conjunction with the drawings.

FIG. 1 illustrates a client-server network environment.

FIG. 2 illustrates multiple sources of user information and their relationship to a user profile.

FIG. 3 is an exemplary data structure that may be used for storing term-based profiles for a plurality of users.

FIG. 4A is an exemplary category map that may be used for classifying a user's past search experience.

FIG. 4B is an exemplary data structure that may be used for storing category-based profiles for a plurality of users.

FIG. 5 is an exemplary data structure that may be used for storing link-based profiles for a plurality of users.

FIG. 6 is a flowchart illustrating paragraph sampling.

FIG. 7A is a flowchart illustrating context analysis.

FIG. 7B depicts a process of identifying important terms using context analysis.

FIG. 8 illustrates a plurality of exemplary data structures that may be used for storing information about documents after term-based, category-based and/or link-based analyses, respectively.

FIG. 9A is a flowchart illustrating a personalized web search process according to one embodiment.

FIG. 9B is a flowchart illustrating a personalized web search process according to another embodiment.

FIG. 10 is a block diagram of a personalized search engine.

FIG. 11 is a flowchart illustrating a personalized placed content process according to an embodiment of the invention.

Like reference numerals refer to corresponding parts throughout the several views of the drawings.

DESCRIPTION OF EMBODIMENTS

The embodiments discussed below include systems and methods that create a user profile based a user's past experience with a search engine and then use the user profile to rank search results in response to search queries provided by the user.

FIG. 1 provides an overview of a typical client-server network environment 100 in which the present invention may be implemented. A plurality of clients 102 are connected to a search engine system 107 through a network 105, e.g., the Internet. Search engine system 107 comprises one or more search engines 104. A search engine 104 is responsible for processing a search query submitted by a client 102, generating search results in accordance with the search query and returning the results to the client. Search engine system 107 may also comprise one or more content servers 106, one or more user profile servers 108, and one or more placed content servers 111. A content server 106 stores a large number of indexed documents retrieved from different websites. Alternately, or in addition, the content server 106 stores an index of documents stored on various websites. In one embodiment,

each indexed document is assigned a page rank according to the document's link structure. The page rank serves as a query independent measure of the document's importance. A search engine 104 communicates with one or more content servers 106 to select a plurality of documents in response to a specific search query. The search engine assigns a score to each document based on the document's page rank, the text associated with the document, and the search query. A search engine 104 may communicate with one or more placed content servers 111 to provide advertisements, or other types of placed content, in conjunction with the search results. Placed content servers 111 may communicate with the one or more user profile servers 108. Placed content is described more fully below.

A user profile server 108 stores a plurality of user profiles. Each profile includes information that uniquely identifies a user as well as his previous search experience and personal information, which can be used to refine search results in response to the search queries submitted by this user. Different approaches are available for user profile construction. For example, a user profile can be created by requiring a first-time user to fill in a form or answer a survey. This approach may be useful in certain applications such as opening a bank account. But it is hardly a favorable one in the context of a search engine. First, a user's interaction with a search engine is usually a dynamic process. As time goes on, the user's interests may change. This change may be reflected by the search queries submitted by the user, or by the user's handling of the search results, or both. The user's answers to questions on a form tend to become less useful over time, unless the user chooses to update his answers periodically. Unlike an occasional update of phone number in the case of an on-line bank account, frequent updates of a user profile in the case of a search engine significantly affect its user friendliness, which is an important consideration when a user chooses among the search engines currently available. Further, it is known that users are reluctant to provide explicit feedback, such as filling out of a form, as many users find it too burdensome. Thus, while some users may provide explicit feedback on their interests, it is desirable to have a procedure for implicitly obtaining information about the user's interests without requiring any explicit or new actions by the user.

It has been observed that a search engine user's past search activities provide useful hints about the user's personal search preferences. FIG. 2 provides a list of sources of user information that are beneficial for user profile construction. For example, previously submitted search queries 201 are very helpful in profiling a user's interests. If a user has submitted multiple search queries related to diabetes, it is more likely than not that this is a topic of interest to the user. If the user subsequently submits a query including the term "organic food", it can be reasonably inferred that he may be more interested in those organic foods that are helpful in fighting diabetes. Similarly, the universal resource locators (URL) 203 associated with the search results in response to the previous search queries and their corresponding anchor texts 205, especially for search result items that have been selected or "visited" by the user (e.g., downloaded or otherwise viewed by the user), are helpful in determining the user's preferences. When a first page contains a link to a second page, and the link has text associated with it (e.g., text neighboring the link), the text associated with the link is called "anchor text" with respect to the second page. Anchor text establishes a relationship between the text associated with a URL link in a document and another document to which the URL link points. The advantages of anchor text include that it often provides an accurate description of the document to

which the URL link points, and it can be used to index documents that cannot be indexed by a text-based search engine, such as images or databases.

After receiving search results, the user may click on some of the URL links, thereby downloading the documents referenced by those links, so as to learn more details about those documents. Certain types of general information **207** can be associated with a set of user selected or use identified documents. For purposes of forming a user profile, the identified documents from which information is derived for inclusion in the user profile may include: documents identified by search results from the search engine, documents accessed (e.g., viewed or downloaded, for example using a browser application) by the user (including documents not identified in prior search results), documents linked to the documents identified by search results from the search engine, and documents linked to the documents accessed by the user, or any subset of such documents.

The general information **207** about the identified documents may answer questions such as, what is the format of the document? Is it in hypertext markup language (HTML), plain text, portable document format (PDF), or Microsoft Word? What is the topic of the document? Is it about science, health or business? This information is also helpful in profiling the user's interests. In addition, information about a user's activities **209** with respect to the user selected documents (sometimes herein call the identified documents), such as how long the user spent viewing the document, the amount of scrolling activity on the document, and whether the user has printed, saved or bookmarked the document, also suggests the importance of the document to the user as well as the user's preferences. In some embodiments, information about user activities **209** is used both when weighting the importance of information extracted or derived from the user identified documents. In some embodiments, information about user activities **209** is used to determine which of the user identified documents to use as the basis for deriving the user profile. For example, information **209** may be used to select only documents that received significant user activity (in accordance with predefined criteria) for generating the user profile, or information **209** may be used to exclude from the profiling process documents that the user viewed for less than a predefined threshold amount of time.

The content of the identified documents from previous search activities is a rich source of information about a user's interests and preferences. Key terms appearing in the identified documents and their frequencies with which they appear in the identified documents are not only useful for indexing the document, but are also a strong indication of the user's personal interests, especially when they are combined with other types of user information discussed above. In one embodiment, instead of the whole documents, sampled content **211** from the identified documents is extracted for the purpose of user profile construction, to save storage space and computational cost. In another embodiment, various information related to the identified documents may be classified to constitute category information **213** about the identified documents. The various information could include the types of individuals who have visited the page previously or other meta-data which could describe the document. More discussion about content sampling, the process of identifying key terms in an identified document and the usage of the category information is provided below.

Another potential source of information for a user profile is the user's browsing patterns **217**. The user's browsing patterns may be represented by the URLs visited by the user over a period of time, such as the preceding N days (e.g., 60 days).

In some embodiments, user profile information is weighted in accordance with its age, with more recent information being given larger weight and less recent information being given smaller weight. This helps the user profile to better track changes in the user's interests, and to reduce the impact of passing interests or subjects of dwindling interest to the user. A variety of data structures can be used to support a time weighted user profile, typically including a number of bins or tiers for holding user information associated with a sequence of time periods.

Optionally, a user may choose to offer personal information **215**, including demographic and geographic information associated with the user, such as the user's age or age range, educational level or range, income level or range, language preferences, marital status, geographic location (e.g., the city, state and country in which the user resides, and possibly also including additional information such as street address, zip code, and telephone area code), cultural background or preferences, or any subset of these. Compared with other types of personal information such as a user's favorite sports or movies that are often time varying, this personal information is more static and more difficult to infer from the user's search queries and search results, but may be crucial in correctly interpreting certain queries submitted by the user. For example, if a user submits a query containing "Japanese restaurant", it is very likely that he may be searching for a local Japanese restaurant for dinner. Without knowing the user's geographical location, it is hard to order the search results so as to bring to the top those items that are most relevant to the user's true intention. In certain cases, however, it is possible to infer this information. For example, users often select results associated with a specific region corresponding to where they live.

Creating a user profile **230** from the various sources of user information is a dynamic and complex process. In some embodiments, the process is divided into sub-processes. Each sub-process produces one type of user profile characterizing a user's interests or preferences from a particular perspective. They are:

- a term-based profile **231**—this profile represents a user's search preferences with a plurality of terms, where each term is given a weight indicating the importance of the term to the user;
- a category-based profile **233**—this profile correlates a user's search preferences with a set of categories, which may be organized in a hierarchal fashion, with each category being given a weight indicating the extent of correlation between the user's search preferences and the category; and
- a link-based profile **235**—this profile identifies a plurality of links that are directly or indirectly related to the user's search preferences, with each link being given a weight indicating the relevance between the user's search preferences and the link.

In some embodiments, the user profile **230** includes only a subset of these profiles **231**, **233**, **235**, for example just one or two of these profiles. In one embodiment, the user profile **230** includes a term-based profile **231** and a category-based profile **233**, but not a link-based profile **235**.

A category-based profile **233** may be constructed, for instance, by mapping sets of search terms (e.g., from each individual query) or identified content terms (from a particular identified document) to categories, and then aggregating the resulting sets of categories, weighting the categories both in terms of their frequency of occurrence and the relevance of the search terms or identified content terms to the categories. Alternately, all the search terms or identified content terms

accumulated over a period of time may be treated as a group, for mapping into weighted categories. Furthermore, user provided personal information **215** may be mapped into weighted categories and those categories may be combined or aggregated with the weighted categories generated using any of the techniques discussed above. Other suitable ways of mapping user related information into categories may also be used.

In some embodiments, the user profile **230** is an aggregated profile based on information associated with multiple users. The users whose profile information is aggregated may be selected or identified in a number of ways. For instance, all the users who are members of a club or other organization, or employees of a particular company, may have their profile information aggregated. In another example, users having similar pre-aggregation user profiles may have their profile information aggregated. Alternately, an organization or web site may have a "user profile" associated with it, which may be automatically generated based on activities of the organization's members or which may be customized by or for the organization. A search engine or other service may utilize the organization's user profile when executing a search query or when providing placed content or other content in conjunction with any other suitable information service to help select content that is of interest to the requester or subscriber.

In one embodiment, a user profile is created and stored on a server (e.g., user profile server **108**) associated with a search engine. The advantage of such deployment is that the user profile can be easily accessed by multiple computers, and that since the profile is stored on a server associated with (or part of) the search engine **104**, it can be easily used by the search engine **104** to personalize the search results. In another embodiment, the user profile can be created and stored on the user's computer, sometimes called the client in a network environment. Creating and storing a user profile on a user's computer (e.g., in a cookie) not only reduces the computational and storage cost for the search engine's servers, but also satisfies some users' privacy requirements. In yet another embodiment, the user profile may be created and updated on the client, but stored on a server. Such embodiment combines some of the benefits illustrated in the other two embodiments. A disadvantage of this arrangement is that it may increase the network traffic between clients and the servers. It is understood by a person of ordinary skill in the art that the user profiles of the present invention can be implemented using client computers, server computers, or both.

FIG. 3 illustrates an exemplary data structure, a term-based profile table **300**, that may be used for storing term-based profiles for a plurality of users. Table **300** includes a plurality of records **310**, each record corresponding to a user's term-based profile. A term-based profile record **310** includes a plurality of columns including a USER_ID column **320** and multiple columns of (TERM, WEIGHT) pairs **340**. The USER_ID column stores a value that uniquely identifies a user or a group of users sharing the same set of (TERM, WEIGHT) pairs, and each (TERM, WEIGHT) pair **340** includes a term, typically 1-3 words long, that is usually important to the user or the group of users and a weight associated with the term that quantifies the importance of the term. In one embodiment, the term may be represented as one or more n-grams. An n-gram is defined as a sequence of n tokens, where the tokens may be words. For example, the phrase "search engine" is an n-gram of length 2, and the word "search" is an n-gram of length 1.

N-grams can be used to represent textual objects as vectors. This makes it possible to apply geometric, statistical and other mathematical techniques, which are well defined for

vectors, but not for objects in general. In the present invention, n-grams can be used to define a similarity measure between two terms based on the application of a mathematical function to the vector representations of the terms.

The weight of a term is not necessarily a positive value. If a term has a negative weight, it may suggest that the user prefers that his search results should not include this term and the magnitude of the negative weight indicates the strength of the user's preference for avoiding this term in the search results. By way of example, for a group of surfing fans at Santa Cruz, Calif., the term-based profile may include terms like "surfing club", "surfing event" and "Santa Cruz" with positive weights. The terms like "Internet surfing" or "web surfing" may also be included in the profile. However, these terms are more likely to receive a negative weight since they are irrelevant and confusing with the authentic preference of the users sharing this term-based profile.

A term-based profile itemizes a user's preference using specific terms, each term having certain weight. If a document matches a term in a user's term-based profile, i.e., its content includes exactly this term, the term's weight will be assigned to the document; however, if a document does not match a term exactly, it will not receive any weight associated with this term. Such a requirement of relevance between a document and a user profile sometimes may be less flexible when dealing with various scenarios in which a fuzzy relevance between a user's preference and a document exists. For example, if a user's term-based profile includes terms like "Mozilla" and "browser", a document containing no such terms, but other terms like "Galeon" or "Opera" will not receive any weight because they do not match any existing term in the profile, even though they are actually Internet browsers. To address the need for matching a user's interests without exact term matching, a user's profile may include a category-based profile.

FIG. 4A illustrates a hierarchal category map **400** according to the Open Directory Project (<http://dmoz.org/>). Starting from the root level of map **400**, documents are organized under several major topics, such as "Art", "News", "Sports", etc. These major topics are often too broad to delineate a user's specific interest. Therefore, they are further divided into sub-topics that are more specific. For example, topic "Art" may comprise sub-topics like "Movie", "Music" and "Literature" and the sub-topic "Music" may further comprise sub-sub-topics like "Lyrics", "News" and "Reviews". Note that each topic is associated with a unique CATEGORY_ID like 1.1 for "Art", 1.4.2.3 for "Talk Show" and 1.6.1 for "Basketball".

Although FIG. 4A illustrates exemplary categories using the Open Directory Project, other types of categories could also be used. For example, categories could be determined by analyzing the various contents of documents or other information to produce categories of relevant information organized around concepts. In other terms, words or phrases can be mapped to clusters that relate to various concepts. One of ordinary skill in the art would recognize many different ways to categorize information into clusters that could aid in determining a document's relation to different concepts.

A user's specific interests may be associated with multiple categories at various levels, each of which may have a weight indicating the degree of relevance between the category and the user's interest. The categories and weights could be determined by analyzing any or all of the information previously discussed relating to the user. In some embodiments, the categories are determined by analyzing any one or more of the following sets of information: previous search queries submitted by the user **201**, URLs identified by the previous

search queries **203**, general information **207** about the identified documents **207** (e.g., meta-data embedded in or otherwise associated with the identified documents), the user's activities with respect to the identified documents **209** (e.g., user clicks on general content and/or placed content), sampled content from the identified documents **211**, category information about the identified documents **213**, the user's personal information **215**, or any combination thereof. In one embodiment, a category-based profile may be implemented using a Hash table data structure as shown in FIG. 4B. A category-based profile table **450** includes a table **455** that comprises a plurality of records **460**, each record including a USER_ID and a pointer pointing to another data structure, such as table **460-1**. Table **460-1** may include two columns, CATEGORY_ID column **470** and WEIGHT column **480**. CATEGORY_ID column **470** contains a category's identification number as shown in FIG. 4A, suggesting that this category is relevant to the user's interests and the value in the WEIGHT column **480** indicates the degree of relevance of the category to the user's interests.

A user profile based upon the category map **400** is a topic-oriented implementation. The items in a category-based profile can also be organized in other ways. In one embodiment, a user's preference can be categorized based on the formats of the documents identified by the user, such as HTML, plain text, PDF, Microsoft Word, etc. Different formats may have different weights. In another embodiment, a user's preference can be categorized according to the types of the identified documents, e.g., an organization's homepage, a person's homepage, a research paper, or a news group posting, each type having an associated weight. Another type category that can be used to characterize a user's search preferences is document origin, for instance the country associated with each document's host. In yet another embodiment, the above-identified category-based profiles may co-exist, with each one reflecting one aspect of a user's preferences.

Besides term-based and category-based profiles, another type of user profile is referred to as a link-based profile. As discussed above, the PageRank algorithm is based on the link structure that connects various documents over the Internet. A document that has more links pointing to it is often assigned a higher page rank and therefore attracts more attention from a search engine. Link information related to a document identified by a user can also be used to infer the user's preferences. In one embodiment, a list of preferred URLs are identified for a user by analyzing the frequency of his access to those URLs. Each preferred URL may be further weighted according to the time spent by the user and the user's scrolling activity at the URL, and/or other user activities (**209**, FIG. 2) when visiting the document at the URL. In another embodiment, a list of preferred hosts are identified for a user by analyzing the user's frequency of accessing web pages of different hosts. When two preferred URLs are related to the same host the weights of the two URLs may be combined to determine a weight for the host. In another embodiment, a list of preferred domains are identified for a user by analyzing the user's frequency of accessing web pages of different domains. For example, for finance.yahoo.com, the host is "finance.yahoo.com" while the domain is "yahoo.com".

FIG. 5 illustrates a link-based profile using a Hash table data structure. A link-based profile table **500** includes a table **510** that includes a plurality of records **520**, each record including a USER_ID and a pointer pointing to another data structure, such as table **510-1**. Table **510-1** may include two columns, LINK_ID column **530** and WEIGHT column **540**. The identification number stored in the LINK_ID column **530** may be associated with a preferred URL or host. The actual

URL/host/domain may be stored in the table instead of the LINK_ID, however it is preferable to store the LINK_ID to save storage space.

A preferred list of URLs and/or hosts includes URLs and/or hosts that have been directly identified by the user. The preferred list of URLs and/or host may furthermore extend to URLs and/or hosts indirectly identified by using methods such as collaborative filtering or bibliometric analysis, which are known to persons of ordinary skill in the art. In one embodiment, the indirectly identified URLs and/or host include URLs or hosts that have links to/from the directly identified URLs and/or hosts. These indirectly identified URLs and/or hosts are weighted by the distance between them and the associated URLs or hosts that are directly identified by the user. For example, when a directly identified URL or host has a weight of 1, URLs or hosts that are one link away may have a weight of 0.5, URLs or hosts that are two links away may have a weight of 0.25, etc. This procedure can be further refined by reducing the weight of links that are not related to the topic of the original URL or host, e.g., links to copyright pages or web browser software that can be used to view the documents associated with the user selected URL or host. Irrelevant Links can be identified based on their context or their distribution. For example, copyright links often use specific terms (e.g., copyright or "All rights reserved" are commonly used terms in the anchor text of a copyright link); and links to a website from many unrelated websites may suggest that this website is not topically related (e.g., links to the Internet Explorer website are often included in unrelated websites). The indirect links can also be classified according to a set of topics and links with very different topics may be excluded or be assigned a low weight.

The three types of user profiles discussed above are generally complimentary to one another since different profiles delineate a user's interests and preferences from different vantage points. However, this does not mean that one type of user profile, e.g., category-based profile, is incapable of playing a role that is typically played by another type of user profile. By way of example, a preferred URL or host in a link-based profile is often associated with a specific topic, e.g., finance.yahoo.com is a URL focusing on financial news. Therefore, what is achieved by a link-based profile that comprises a list of preferred URLs or hosts to characterize a user's preference may also be achievable, at least in part, by a category-based profile that has a set of categories that cover the same topics covered by preferred URLs or hosts.

It is a non-trivial operation to construct various types of user profiles that can be stored in the data structures shown in FIGS. 3-5 based on the user information listed in FIG. 2. Given a document identified (e.g., viewed) by a user, different terms in the document may have different importance in revealing the topic of the document. Some terms, e.g., the document's title, may be extremely important, while other terms may have little importance. For example, many documents contain navigational links, copyright statements, disclaimers and other text that may not be related to the topic of the document. How to efficiently select appropriate documents, content from those documents and terms from within the content is a challenging topic in computational linguistics. Additionally, it is preferred to minimize the volume of user information processed, so as to make the process of user profile construction computationally efficient. Skipping less important terms in a document helps in accurately matching a document with a user's interest.

Paragraph sampling (described below with reference to FIG. 6) is a procedure for automatically extracting content from a document that may be relevant to a user. An important

observation behind this procedure is that less relevant content in a document, such as navigational links, copyright statements, disclaimer, etc., tend to be relatively short segments of text. In one embodiment, paragraph sampling looks for the paragraphs of greatest length in a document, processing the paragraphs in order of decreasing length until the length of a paragraph is below a predefined threshold. The paragraph sampling procedure optionally selects up to a certain maximum amount of content from each processed paragraph. If few paragraphs of suitable length are found in a document, the procedure falls back to extracting text from other parts of the document, such as anchor text and ALT tags.

FIG. 6 is a flowchart illustrating the major steps of paragraph sampling. Paragraph sampling begins with the step 610 of removing predefined items, such as comments, JavaScript and style sheets, etc., from a document. These items are removed because they are usually related to visual aspects of the document when rendered on a browser and are unlikely to be relevant to the document's topic. Following that, the procedure may select the first N words (or M sentences) at step 620 from each paragraph whose length is greater than a threshold value, MinParagraphLength, as sampled content. In one embodiment, the values of N and M are chosen to be 100 and 5, respectively. Other values may be used in other embodiments.

In order to reduce the computational and storage load associated with the paragraph sampling procedure, the procedure may impose a maximum limit, e.g., 1000 words, on the sampled content from each document. In one embodiment, the paragraph sampling procedure first organizes all the paragraphs in a document in length decreasing order, and then starts the sampling process with a paragraph of maximum length. It is noted that the beginning and end of a paragraph depend on the appearance of the paragraph in a browser, not on the presence of uninterrupted a text string in the HTML representation of the paragraph. For this reason, certain HTML commands, such as commands for inline links and for bold text, are ignored when determining paragraph boundaries. In some embodiments, the paragraph sampling procedure screens the first N words (or M sentences) so as to filter out those sentences including boilerplate terms like "Terms of Service" or "Best viewed", because such sentences are usually deemed irrelevant to the document's topic.

Before sampling a paragraph whose length is above the threshold value, the procedure may stop sampling content from the document if the number of words in the sampled content has reached the maximum word limit. If the maximum word limit has not been reached after processing all paragraphs of length greater than the threshold, optional steps 630, 640, 650 and 670 are performed. In particular, the procedure adds the document title (630), the non-inline HREF links (640), the ALT tags (650) and the meta tags (670) to the sampled content until it reaches the maximum word limit.

Once the documents identified by a user have been scanned, the sampled content can be used for identifying a list of most important (or unimportant) terms through context analysis. Context analysis attempts to learn context terms that predict the most important (or unimportant) terms in a set of identified documents. Specifically, it looks for prefix patterns, postfix patterns, and a combination of both. For example, an expression "x's home page" may identify the term "x" as an important term for a user and therefore the postfix pattern "*"home page" can be used to predict the location of an important term in a document, where the asterisk "*" represents any term that fits this postfix pattern. In general, the patterns identified by context analysis usually consist of m terms before an important (or unimportant) term and n terms after

the important (or unimportant) term, where both m and n are greater than or equal to 0 and at least one of them is greater than 0. Typically, m and n are less than 5, and when non-zero are preferably between 1 and 3. Depending on its appearance frequency, a pattern may have an associated weight that indicates how important (or unimportant) the term recognized by the pattern is expected to be.

According to one embodiment of the present invention (FIG. 7A), context analysis has two distinct phases, a training phase 701 and an operational phase 703. The training phase 701 receives and utilizes a list of predefined important terms 712, an optional list of predefined unimportant terms 714, and a set of training documents (step 710). In some embodiments, the list of predefined unimportant terms is not used. The source of the lists 712, 714 is not critical. In some embodiments, these lists 712, 714 are generated by extracting words or terms from a set of documents (e.g., a set of several thousand web pages of high page rank) in accordance with a set of rules, and then editing them to remove terms that in the opinion of the editor do not belong in the lists. The source of the training documents is also not critical. In some embodiments, the training documents comprise a randomly or pseudo-randomly selected set of documents already known to the search engine. In other embodiments, the training documents are selected from a database of documents in the search engine in accordance with predefined criteria.

During the training phase 701, the training documents are processed (step 720), using the lists of predefined important and unimportant terms, so as to identify a plurality of context patterns (e.g., prefix patterns, postfix patterns, and prefix-postfix patterns) and to associate a weight with each identified context pattern. During the operational phase 703, the context patterns are applied to documents identified by the user (step 730) to identify a set of important terms (step 740) that characterize the user's specific interests and preferences. Learning and delineating a user's interests and preferences is usually an ongoing process. Therefore, the operational phase 703 may be repeated to update the set of important terms that have been captured previously. This may be done each time a user accesses a document, according to a predetermined schedule, at times determined in accordance with specified criteria, or otherwise from time to time. Similarly, the training phase 701 may also be repeated to discover new sets of context patterns and to recalibrate the weights associated with the identified context patterns.

Below is a segment of pseudo code that exemplifies the training phase:

```

For each document in the set {
  For each important term in the document {
    For m = 0 to MaxPrefix {
      For n = 0 to MaxPostfix {
        Extract the m words before the important
        term and the n words after the important
        term as s;
        Add 1 to ImportantContext(m,n,s);
      }
    }
  }
  For each unimportant term in the document {
    For m = 0 to MaxPrefix {
      For n = 0 to MaxPostfix {
        Extract the m words before the
        unimportant term and the n words after
        the unimportant term as s;
        Add 1 to UnimportantContext(m,n,s);
      }
    }
  }
}

```

-continued

```

    }
  }
  For m = 0 to MaxPrefix {
    For n = 0 to MaxPostfix {
      For each value of s {
        Set the weight for s to a function of
          ImportantContext(m,n,s), and
          UnimportantContext(m,n,s);
      }
    }
  }
}

```

In the pseudo code above, the expressions refers to a prefix pattern (n=0), a postfix pattern (m=0) or a combination of both (m>0 & n>0). Each occurrence of a specific pattern is registered at one of the two multi-dimensional arrays, ImportantContext(m,n,s) or UnimportantContext(m,n,s). The weight of a prefix, postfix or combination pattern is set higher if this pattern identifies more important terms and fewer unimportant terms and vice versa. Note that it is possible that a same pattern may be associated with both important and unimportant terms. For example, the postfix expression “* operating system” may be used in the training documents 716 in conjunction with terms in the list of predefined important terms 712 and also used in conjunction with terms in the list of predefined unimportant terms 714. In this situation, the weight associated with the postfix pattern “* operating system” (represented by the expression Weight(1,0, “operating system”)) will take into account the number of times the postfix expression is used in conjunction with terms in the list of predefined important terms as well as the number of times the postfix expression is used in conjunction with terms in the list of predefined unimportant terms. One possible formula to determine the weight of a context patterns is:

$$\text{Weight}(m,n,s) = \text{Log}(\text{ImportantContext}(m,n,s)+1) - \text{Log}(\text{UnimportantContext}(m,n,s)+1).$$

Other weight determination formulas may be used in other embodiments.

In the second phase of the context analysis process, the weighted context patterns are used to identify important terms in one or more documents identified by the user. Referring to FIG. 7B, in the first phase a computer system receives training data 750 and creates a set of context patterns 760, each context pattern having an associated weight. The computer system then applies the set of context patterns 760 to a document 780. In FIG. 7B, previously identified context patterns found within the document 780 are highlighted. Terms 790 associated with the context patterns are identified and each such term receives a weight based on the weights associated with the context patterns. For example, the term “Foobar” appears in the document twice, in association with two different patterns, the prefix pattern “Welcome to *” and the postfix pattern “* builds”, and the weight 1.2 assigned to “Foobar” is the sum of the two patterns’ weights, 0.7 and 0.5. The other identified term “cars” has a weight of 0.8 because the matching prefix pattern “world’s best *” has a weight of 0.8. In some embodiments the weight for each term is computed using a log transform, where the final weight is equal to $\log(\text{initial weight}+1)$. It is possible that the two terms “Foobar” and “cars” may not be in the training data 750 and may have never been encountered by the user before. Nevertheless, the context analysis method described above identifies these terms and adds them to the user’s term-based profile. Thus, context analysis can be used to discover terms

associated with a user’s interests and preferences even when those terms are not included in a predefined database of terms.

As noted, the output of context analysis can be used directly in constructing a user’s term-based profile. Additionally, it may be useful in building other types of user profiles, such as a user’s category-based profile. For example, a set of weighted terms can be analyzed and classified into a plurality of categories covering different topics, and those categories can be added to a user’s category-based profile.

After executing the context analysis on a set of documents identified by or for a user, the resulting set of terms and weights may occupy a larger amount of storage than allocated for each user’s term-based profile. Also, the set of terms and corresponding weights may include some terms with weights much, much smaller than other terms within the set. Therefore, in some embodiments, at the conclusion of the context analysis, the set of terms and weights is pruned by removing terms having the lowest weights (A) so that the total amount of storage occupied by the term-based profile meets predefined limits, and/or (B) so as to remove terms whose weights are so low, or terms that correspond to older items, as defined by predefined criteria, that the terms are deemed to be not indicative of the user’s search preferences and interests. In some embodiments, similar pruning criteria and techniques are also applied to the category-based profile and/or the link-based profile.

As discussed above, a category-based profile can be created based on the information described in reference to FIG. 2. For example, the query terms previously submitted can be associated with particular categories of information. A user profile engine could analyze the previous search queries submitted by a user to determine particular categories of information that the user might be interested in and their respective weights. Such a user profile engine could analyze any of the sources of information described in reference to FIG. 2.

In some embodiments, a user’s profile is updated each time the user performs a search and selects at least one document from the search results to download or view. In some embodiments, the search engine builds a list of documents identified by the user (e.g., by selecting the documents from search results) over time, and at predefined times (e.g., when the list reaches a predefined length, or a predefined amount of time has elapsed), performs a profile update. When performing an update, new profile data is generated, and the new profile data is merged with the previously generated profile data for the user. In some embodiments, the new profile data is assigned higher importance than the previously generated profile data, thereby enabling the system to quickly adjust a user’s profile in accordance with changes in the user’s search preferences and interests. For example, the weights of items in the previously generated profile data may be automatically scaled downward prior to merging with the new profile data. In one embodiment, there is a date associated with each item in the profile, and the information in the profile is weighted based on its age, with older items receiving a lower weight than when they were new. In other embodiments, the new profile data is not assigned high importance than the previously generated profile data.

The paragraph sampling and context analysis methods may be used independently or in combination. When used in combination, the output of the paragraph sampling is used as input to the context analysis method.

It is further noted that the above-described methods used for creating user profiles, e.g., paragraph sampling and context analysis, may be also leveraged for determining the relevance of a candidate document to a user’s preference. Indeed, the primary mission of a search engine is to identify

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a series of documents that are most relevant to a user's preference based on the search queries submitted by the user as well as the user's user profile. FIG. 8 illustrates several exemplary data structures that can be used to store information about a document's relevance to a user profile from multiple perspectives. For each candidate document, each identified by a respective DOC_ID, term-based document information table 810 includes multiple pairs of terms and their weights, category-based document information table 830 includes a plurality of categories and associated weights, and link-based document information table 850 includes a set of links and corresponding weights.

The rightmost column of each of the three tables (810, 830 and 850) stores the rank (i.e., a computed score) of a document when the document is evaluated using one specific type of user profile. A user profile rank can be determined by combining the weights of the items associated with a document. For instance, a category-based or topic-based profile rank may be computed as follows. A user may prefer documents about science with a weight of 0.6, while he dislikes documents about business with a weight of -0.2. Thus, when a science document matches a search query, it will be weighted higher than a business document. In general, the document topic classification may not be exclusive. A candidate document may be classified as being a science document with probability of 0.8 and a business document with probability of 0.4. A link-based profile rank may be computed based on the relative weights allocated to a user's URL, host, domain, etc., preferences in the link-based profile. In one embodiment, term-based profile rank can be determined using known techniques, such as the term frequency-inverse document frequency (TF-IDF). The term frequency of a term is a function of the number of times the term appears in a document. The inverse document frequency is an inverse function of the number of documents in which the term appears within a collection of documents. For example, very common terms like "the" occur in many documents and consequently as assigned a relatively low inverse document frequency.

When a search engine generates search results in response to a search query, a candidate document D that satisfies the query is assigned a query score, QueryScore, in accordance with the search query. This query score is then modulated by document D's page rank, PageRank, to generate a generic score, GenericScore, that is expressed as

$$\text{GenericScore} = \text{QueryScore} * \text{PageRank}.$$

This generic score may not appropriately reflect document D's importance to a particular user U if the user's interests or preferences are dramatically different from that of the random surfer. The relevance of document D to user U can be accurately characterized by a set of profile ranks, based on the correlation between document D's content and user U's term-based profile, herein called the TermScore, the correlation between one or more categories associated with document D and user U's category-based profile, herein called the CategoryScore, and the correlation between the URL and/or host of document D and user U's link-based profile, herein called the LinkScore. Therefore, document D may be assigned a personalized rank that is a function of both the document's generic score and the user profile scores. In one embodiment, this personalized score can be expressed as:

$$\text{PersonalizedScore} = \text{GenericScore} * (\text{TermScore} + \text{CategoryScore} + \text{LinkScore}).$$

FIGS. 9A and 9B represent two embodiments, both implemented in a client-server network environment such as the

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network environment 100 shown in FIG. 1. In the embodiment shown in FIG. 9A, the search engine 104 receives a search query from a client 102 at step 910 that is submitted by a particular user. In response, the search engine 104 may optionally generate a query strategy at step 915 (e.g., the search query is normalized so as to be in proper form for further processing, and/or the search query may be modified in accordance with predefined criteria so as to automatically broaden or narrow the scope of the search query). At step 920, the search engine 104 submits the search query (or the query strategy, if one is generated) to the content server 106. The content server identifies a list of documents that match the search query at step 920, each document having a generic score that depends on the document's page rank and the search query. In general, all the three operations (steps 910, 915 and 920) are conducted by the search engine system 107, which is on the server side of the network environment 100. There are two options on where to implement the operations following these first three steps.

In some embodiments that employ a server-side implementation, the user's identification number is embedded in the search query. Based on the user's identification number, the user profile server 108 identifies the user's user profile at step 925. Starting from step 930, the user profile server 108 or the search engine 104 analyzes each document identified at step 920 to determine its relevance to the user's profile, creates a profile score for the identified document at step 935 and then assigns the document a personalized score that is a function of the document's generic and profile scores at step 940. At step 942, the user profile server 108 or the search engine 104 checks whether this the last one in the list of identified documents. If no, the system processes the next document in the list. Otherwise, the list of documents are re-ordered according to their personalized scores and then sent to the corresponding client from which the user submitted the search query.

Embodiments using a client-side implementation are similar to the server-side implementation, except that after step 920, the identified documents are sent to the corresponding client from which the user submitted the query. This client stores the user's user profile and it is responsible for re-ordering the documents based upon the user profile. Therefore, this client-side implementation may reduce the server's workload. Further, since there is no privacy concern with the client-side implementation, a user may be more willing to provide private information to customize the search results. However, a significant limitation to the client-side implementation is that only a limited number of documents, e.g., the top 50 documents (as determined using the generic rank), may be sent to a client for re-ordering due to limited network bandwidth. In contrast, the server-side implementation may be able to apply a user's profile to a much larger number of documents, e.g., 1000, that match the search query. Therefore, the client-side implementation may deprive a user access to those documents having relatively low generic ranks, but significantly high personalized ranks.

FIG. 9B illustrates another embodiment. Unlike the embodiment depicted in FIG. 9A, where the search query is not personalized before submitting the search query to the search engine 104, a generic query strategy is adjusted (step 965) according to the user's user profile to create a personalized query strategy. For example, relevant terms from the user profile may be added to the search query with associated weights. The creation of the personalized query strategy can be performed either on the client side or on the server side of the system. This embodiment avoids the network bandwidth restriction facing the previous embodiment. Finally, the search engine 104 submits the personalized query strategy to

the content server **106** (step **970**), and therefore the search results returned by the content server have already been ordered by the documents' personalized ranks (step **975**).

The profiles of a group of users with related interests may be combined together to form a group profile, or a single profile may be formed based on the documents identified by the users in the group. For instance, several family members may use the same computer to submit search queries to a search engine. If the computer is tagged with a single user identifier by the search engine, the "user" will be the entire family of users, and the user profile will be represent a combination or mixture of the search preferences of the various family members. An individual user in the group may optionally have a separate user profile that differentiates this user from other group members. In operation, the search results for a user in the group are ranked according to the group profile, or according to the group profile and the user's user profile when the user also has a separate user profile.

It is possible that a user may switch his interests so dramatically that his new interests and preferences bear little resemblance to his user profile, or a user may be temporarily interested in a new topic. In this case, personalized search results produced according to the embodiments depicted in FIGS. **9A** and **9B** may be less favorable than search results ranked in accordance with the generic ranks of the documents in the search results. Additionally, the search results provided to a user may not include new websites among the top listed documents because the user's profile tends to increase the weight of older websites which the user has visited (i.e., older websites from which the user has viewed or downloaded web pages) in the past.

To reduce the impact caused by a change in a user's preferences and interests, the personalized search results may be merged with the generic search results. In one embodiment, the generic search results and personalized search results are interleaved, with the odd positions (e.g., 1, 3, 5, etc.) of a search results list reserved for generic search results and the even positions (e.g., 2, 4, 6, etc.) reserved for personalized search results, or vice versa. Preferably, the items in the generic search results will not duplicate the items listed in the personalized search results, and vice versa. More generally, generic search results are intermixed or interleaved with personalized search results, so that the items in the search results presented to the user include both generic and personalized search results.

In another embodiment, the personalized ranks and generic ranks are further weighted by a user profile's confidence level. The confidence level takes into account factors such as how much information has been acquired about the user, how close the current search query matches the user's profile, how old the user profile is, etc. If only a very short history of the user is available, the user's profile may be assigned a correspondingly low confidence value. The final score of an identified document can be determined as:

$$\text{FinalScore} = \text{ProfileScore} * \text{ProfileConfidence} + \text{GenericScore} * (1 - \text{ProfileConfidence}).$$

When intermixing generic and personalized results, the fraction of personalized results may be adjusted based on the profile confidence, for example using only one personalized result when the confidence is low.

Sometimes, multiple users may share a machine, e.g., in a public library. These users may have different interests and preferences. In one embodiment, a user may explicitly login to the service so the system knows his identity. Alternatively, different users can be automatically recognized based on the

items they access or other characteristics of their access patterns. For example, different users may move the mouse in different ways, type differently, and use different applications and features of those applications. Based on a corpus of events on a client and/or server, it is possible to create a model for identifying users, and for then using that identification to select an appropriate "user" profile. In such circumstances, the "user" may actually be a group of people having somewhat similar computer usage patterns, interests and the like.

Referring to FIG. **10**, a personalized search engine system **1000** typically includes one or more processing units (CPU's) **1002**, one or more network or other communications interfaces **1010**, memory **1012**, and one or more communication buses **1014** for interconnecting these components. The system **1000** may optionally include a user interface **1004**, for instance a display **1006** and a keyboard **1008**. Memory **1012** may include high speed random access memory and may also include non-volatile memory, such as one or more magnetic disk storage devices. Memory **1012** may include mass storage that is remotely located from the central processing unit(s) **1002**. The memory **1012** preferably stores:

- an operating system **1016** that includes procedures for handling various basic system services and for performing hardware dependent tasks;

- a network communication module **1018** that is used for connecting the system **1000** to other servers or computers via one or more communication networks (wired or wireless), such as the Internet, other wide area networks, local area networks, metropolitan area networks, and so on;

- a system initialization module **1020** that initializes other modules and data structures stored in memory **1012** required for the appropriate operation of system **1000**;

- a search engine **1022** for processing a search query, identifying and ordering search results according to the search query and a user's profile;

- a user profile engine **1030** for gathering and processing user information, such as the user information identified in FIG. **2**, and creating and updating a user's user profile that characterizes the user's search preferences and interests; and

- data structures **1040**, **1060** and **1080** for storing a plurality of user profiles.

The search engine **1022** may further comprise:

- a generic rank module (or instructions) **1024** for processing a search query submitted by a user, identifying a list of documents matching the query and assigning each identified document a generic rank without reference to user specific information;

- a user profile rank module (or instructions) **1026** for correlating each of a plurality of documents identified by the generic rank module **1024** with the user's user profile and assigning the document a profile rank indicating the relevance of the document to the user's search preferences and interests; and

- a rank mixing module (or instructions) **1028** for combining the generic rank and the profile rank of an identified document into a personalized rank and re-ordering the list of documents according to their personalized ranks.

In some embodiments, these modules **1024**, **1026**, **1028** may be implemented within a single procedure or in a set of procedures that reside within a single software module.

The user profile engine **1030** may further comprise:

- a user information collection module **1032** for collecting and assorting various user information listed in FIG. **2**;

a document content extraction module **1034** for selecting and extracting content from the documents identified by the user, to identify content relevant to the user's interests, using techniques such as paragraph sampling (as discussed above); and

a context analysis module **1036** for analyzing the content extracted by the document extraction module **1034** so as to identify terms that characterize a user's search preferences.

Each data structure hosting a user profile may further comprise:

a data structure **1042**, **1062** or **1082** for storing a term-based user profile;

a data structure **1044**, **1064** or **1084** for storing a category-based user profile; and

a data structure **1046**, **1066** or **1086** for storing a link-based user profile.

Ordering Placed Content in Accordance with a User Profile

Placed content may be displayed to users of search services, email services, and a variety of other services provided via the Internet or other wide area networks. The following is a description of a system and method for ordering the placed content (e.g., within a browser window or other application window viewed by a user) so as to (A) maximize or at least improve the chances that the user will be interested in viewing the placed content, or (B) maximize or at least improve the revenue stream to a provider of the placed content, or (C) optimize or at least improve a metric associated with the delivery and ordering of the placed content. The system and method will first be described with respect to delivering placed content to users of a search engine, after which applications of the system and method to other internet services will be described.

When search results are returned to a user in response to a search query, often times certain placed content is returned as well. Placed content is usually in the form of advertising, but could be any type of content related to the search query or to a document being sent to the user. Although the following description uses advertising content for the sake of illustration, any type of content where content providers compete or pay for placement is contemplated by some embodiments of the invention. The user's search query can be run against a repository of advertisements (ads) at the same time the search query is being run against a document repository. The ads returned from the search against the repository of ads (e.g., ads whose keywords match at least one term of the search query) are typically ordered by a score for each ad. The score is based on a click through rate (CTR) multiplied by a bid (e.g., a bid price). The ads having the highest scores are presented to the user. In some embodiments, a content provider may provide multiple, similar ads associated with the same bid. In this case, the various ads may be presented to users in a random fashion, or any other order. For instance, if a content provider provides a group of three ads to which a single bid on the term "hat" applies, whenever the group of ads has a high enough score to be included in a set of search results, one of the three ads in the group is selected (e.g., randomly, or in round robin order) and presented to the user.

Advertisers may bid on different keywords or concepts through, for example, an auction in which advertisers place bids on certain search terms or phrases. For example, a maker of sails for sailboats may bid on the keyword "spinnaker" such that when that term appears in a search query, the advertiser's ad will appear in the list of potential ads to be presented

to the user. The ad will be presented to the user if the ad's score is high enough. As mentioned above, the score is based on the CTR times the bid. An advertiser then pays for the ad based on its bid and based on the number of click throughs for the ad for a particular accounting period (e.g., the bid times the number of click throughs). In some embodiments, the auction may have characteristics of a "Dutch auction," in which case the amount paid by the advertiser for a particular ad may be a modified or reduced bid multiplied by the number of click throughs for the particular accounting period.

Improving an ad's CTR is one way to raise the score of the ad. Improving the CTR could be achieved, for example, by presenting an ad which appeals to users more than other ads. Alternatively, the advertiser may choose to increase his or her bid for a keyword or phrase associated with the ad in order to raise the ad's score. And, of course, the advertiser could both improve the CTR of the ad and increase its bid for a keyword associated with the ad. In some embodiments, the CTR for an ad is equal to the number of clicks on the ad divided by the number of impressions, that is, the number of times the ad is presented to users. Ads which are new do not typically have useful CTRs, because the number of impressions of the ad is too low for the value of the CTR to be a reliable indication of the ad's attractiveness to users. In such instances (e.g., when an ad has less than one thousand impressions) an initial CTR is provided by the system. The initial CTR for an ad may be a default value, such as an average CTR value. Alternately, the initial CTR may be selected based on the CTRs of other ads by the same advertiser, or may be based on the CTRs of some other set of ads having a defined relationship to the ad in question.

It would be desirable to increase the likelihood that the user is presented with ads that are of interest to the user. Accordingly, ads which are in some way related to the user's profile are better candidates for presentation. One way to do this is to modify the ad's score based on the similarity of the ad to the user's profile. Referring back the broader term, "placed content," FIG. 11 illustrates one embodiment for providing placed content with search results.

Initially a search query is received (**1102**) at a search engine, for example. The search query may identify the user submitting the search query, for instance by including an identifier of the client computer or client process submitting the search query. Alternately, the identity of the user may be known due to a prior login to a service, or a cookie or other suitable method. The user's profile is obtained (**1104**) from a database or repository of user profiles. In one embodiment, the user's profile is a category profile. While the following description uses the category profile, one of ordinary skill in the art will readily recognize that the concepts herein can be applied to other types of profiles. While the search engine processes the search query so as to obtain search results (**1106**), a placed content server identifies one or more placed content items (herein called potential placed content) that match or are relevant to the search query (**1108**). In other embodiments, the placed content server may provide the placed content based on what document is being provided to the user, be it as a result of a search or a specifically requested document. In that embodiment the placed content server determines which of the placed content is relevant to the document being presented to the user. In other embodiments, the placed content server may provide the placed content based on the contents of the one or more documents being presented as the search results.

Each potential placed content has a profile associated with it. In one embodiment, the profile is in the form of a category profile containing pairs of categories and weights. The profile

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could be created by, for example, extracting key terms from the placed content and associating them with various categories and assigning respective weights.

For each potential placed content, a profile of the potential placed content is compared to the user's profile (1110). The user's profile is compared to the placed content profile to obtain a similarity score. The similarity score is then used to modify the placed content's ranking. If one considers each of the profiles as a vector, then one of ordinary skill in the art will recognize various mathematical ways to compare the profiles. For example, the similarity score could be determined by taking each category in the user's profile and determining a mathematical distance between it and each category of the placed content's profile and then multiplying by the respective weights. One way to represent this calculation is by the following formula:

similarity score =

$$\sum_{i=0}^{n-1} \sum_{j=0}^{m-1} \text{distance}(\text{category}(i), \text{category}(j)) * \text{weight}(i) * \text{weight}(j)$$

where n represents the number of categories in the user's profile and m represents the number of categories in the placed content's profile; distance(category(i), category(j)) represents a mathematical distance between category(i) and category(j); and weight(i) and weights(j) represent the weights associating with category(i) and category(j), respectively.

Another, more general, way to represent computation of the similarity score is:

$$\text{similarity score} = \text{function}(\text{user profile}, \text{content profile})$$

where "function" is any suitable function of the user profile and the content profile of a particular placed content item. When the user and content profiles are category profiles, the computation of the similarity score may be represented as:

$$\text{similarity score} = \text{function}(\text{user profile categories}, \text{user profile weights}, \text{content profile categories}, \text{content profile weights})$$

where "function" is any suitable function of the vector of user profile categories and weights and the vector of content profile categories and weights. A somewhat more specific example of a computation of the similarity score, which differs from the double sum computation shown above, is:

similarity score =

$$\sum_i \text{Max}_j(\text{function}(\text{category}(i), \text{category}(j), \text{weight}(i), \text{weight}(j)))$$

where "Max_j" represents the maximum value of the function for all valid values of j, and the "function" is any suitable function of the user and content profile categories and weights.

In some embodiments the similarity score is normalized to a particular range to create a scaling factor. For example, the similarity score may be normalized so as to fall in the inclusive range of 0 to 1, or 0 to 2. Higher similarity scores indicate

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that the profiles are more closely related than profiles whose comparisons result in lower similarity scores. In some embodiments, the normalized similarity score is used as the scaling factor. In other embodiments, the scaling factor is determined by mapping either the similarity score or the normalized similarity score to a corresponding scaling factor in accordance with either a scaling factor mapping function or a scaling factor lookup table.

In one embodiment, a set of N predefined scaling factors (sometimes called subfactors) are stored in a scaling factor lookup table, with each scaling factor corresponding to a respective range of similarity score values. In this exemplary embodiment, N is an integer greater than one, and preferably greater than three. The similarity score for a particular placed content is mapped to a "bin," for example by multiplying or dividing the similarity score by a predefined number, rounding the result up or down to the closest integer to produce a bin number, and then mapping the resulting bin number to a scaling factor by using the bin number as an index into the scaling factor lookup table. The range of scaling factors can vary from one implementation to another.

The use of either a scaling factor mapping function or a scaling factor lookup table permits a great deal of flexibility in relating the similarity score to the scaling factor. For example, one could create a scaling factor mapping function or a scaling factor lookup table that adjusts downward the CTRs of placed content having very low similarity scores as well as placed content having very high similarity scores. In some embodiments, the scaling factor associated with the maximum similarity score is less than the scaling factor associated with a mid-point similarity score, where the mid-point could be either the mean or median of the similarity scores. Alternately, the mid-point can be any identified point between the minimum and maximum similarity scores. In some embodiments, the scaling factor associated with the maximum similarity score is greater than the scaling factor associated with a mid-point similarity score, but is less than the maximum scaling factor associated with a scaling factor mapping function or a scaling factor lookup table. When viewing the scaling factor mapping function for values of the similarity score going from a minimum score to a maximum score, the scaling factor will typically initially increase from a low value associated with the minimum score until it reaches a peak scaling factor value, and will then decrease until the similarity score reaches a maximum value.

In some embodiments, the scaling factor corresponding to a similarity score is determined in accordance with statistical information relating similarity scores to click through rates. In particular, click through rates by users can be statistically correlated to similarity scores for the users and the placed content items. For instance, separate click through rates can be determined for each range in a set of N ranges of similarity scores by collecting data on impressions, click throughs and the similarity scores associated with each impression and click through. Based on those click through rates, a set of N scaling factors can be generated for storing in a scaling factor lookup table. Alternately, the collected statistical information can be used to generate a scaling factor mapping function, for instance by using curve fitting techniques.

In some embodiments, the respective scaling factor for each identified placed content is multiplied by the CTR of the placed content to provide a modified CTR, to reflect the increased likelihood that the user would be interested in the placed content (1112 of FIG. 11). More specifically, the score for each placed content that matches the search query (e.g., by

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having at least one keyword that matches a term of the search query) is computed as:

$$\text{score} = \text{scaling factor} \times \text{CTR} \times \text{bid}.$$

The placed content items are then ranked or ordered based on their respective scores (1114) and the placed content items having the highest scores are provided to the user (1116), for example by being sent to a browser application on the user's computer. In some embodiments, the placed content items having the H highest scores (where H is an integer greater one) may be merged (1118) with search results (sometimes called the primary search results) obtained from execution of the search query against a database. For instance, when the placed content comprises ads, one or more of the ads having the highest scores may be displayed above, below and/or to the side of the primary search results.

In some embodiments, the scores for placed content items are based on the similarity scores produced using a user profile and a bid, but are not based on a click through rate. For instance, in some embodiments click through rates for the placed content items may not be available. As a result, in such embodiments action 1112 either does not occur, or is replaced by a different scoring adjustment or scoring computation action.

In some other embodiments, the scores for placed content items are based on the similarity scores produced using a user profile and a click through rate, but not a bid. And in yet other embodiments, the scores for placed content items are based on the similarity scores produced using a user profile, but those scores are not based on either the bid or a click through rate. When the placed content scores take into account a user profile, but not a bid, the ordering of the placed content is optimized or improved with respect to placed content that is likely to be of interest to the user, without regard to potential economic benefits of other orderings of the placed content items.

The system and method described above can also be used in systems other than search engine systems. For instance, in an email system or in virtually any other system for providing services via the Internet or other wide area network that displays a document or other content to a user or subscriber, placed content may be also be selected and displayed to the user. The placed content may be selected based on the keywords associated with the placed content matching the content of a displayed document or set of documents, or it may be based on the other selection criteria. The selected placed content items are then ordered based on similarity of the user profile and profiles of the selected placed content items, as described above.

The foregoing description, for purpose of explanation, has been described with reference to specific embodiments. However, the illustrative discussions above are not intended to be exhaustive or to limit the invention to the precise forms disclosed. Many modifications and variations are possible in view of the above teachings. The embodiments were chosen and described in order to best explain the principles of the invention and its practical applications, to thereby enable others skilled in the art to best utilize the invention and various embodiments with various modifications as are suited to the particular use contemplated.

What is claimed is:

1. A computer-implemented method of personalizing placed content associated with a search query, comprising:
 - at a server system having one or more processors and memory storing programs executed by the one or more processors:

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- receiving a search query from a user;
- accessing a user profile associated with the user, wherein the user profile is based, at least in part, on query terms in a plurality of previously submitted search queries;
- identifying a set of placed content that matches the search query;
- assigning a popularity score to each of the set of placed content in accordance with the user profile, a respective bid value for the placed content, and a respective click through rate for the placed content based on multiple user activities, wherein the assigning the popularity score includes:
 - determining a similarity score between the user profile and a placed content profile associated with the placed content, wherein the similarity score is indicative of a level of similarity between the user profile and the associated placed content profile, and
 - combining the similarity score with the respective click through rate and the respective bid value to determine the popularity score assigned to the placed content; and
- ranking the set of placed content according to their respective popularity scores; and
- preparing for display to the user at least a subset of the set of placed content in an order determined by their respective popularity scores.

2. The method of claim 1, wherein the user profile is based, at least in part, on information about the user, including information derived from a set of documents, the set of documents comprising a plurality of documents selected from the set consisting of documents identified by search results from a search engine, documents linked to the documents identified by search results from the search engine, documents linked to the documents accessed by the user, and documents browsed by the user.

3. The method of claim 1, wherein the determining of the similarity score includes

- determining a mathematical distance between a user profile vector of the user profile, the user profile vector including first pairs of categories and respective weights, and a placed content profile vector of the placed content, the placed content profile vector including second pairs of categories and respective weights.

4. The method of claim 1, further including associating the similarity score with a scaling factor.

5. The method of claim 1, further including normalizing the similarity score to a particular range to create a scaling factor.

6. The method of claim 4, wherein the assigning the popularity score to each of the set of placed content includes multiplying the scaling factor, the respective click through rate and the respective bid value.

7. The method of claim 6, wherein the scaling factor associated with a maximum similarity score is less than the scaling factor associated with a mid-point similarity score.

8. The method of claim 4, wherein the scaling factor is determined in accordance with statistical information relating similarity scores to click through rates.

9. The method of claim 1, further including providing the placed content as an advertisement.

10. A computer system for personalizing placed content associated with a search query, comprising:

- a user profile, based, at least in part, on query terms in a plurality of previously submitted search queries; and
- a placed content server, including a plurality of placed content, for identifying a subset of the plurality of placed content that matches a search query and that assigns a popularity score to each of the plurality of placed con-

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tent in the subset in accordance with the user profile, a respective bid value for the placed content, and a respective click through rate for the placed content based on multiple user activities, and that ranks the subset based on the respective popularity scores of the subset of placed content, and that prepares for display of the subset of the plurality of placed content in an order determined by their respective popularity scores, wherein the popularity score of each piece of placed content is based on a similarity score between the user profile and a placed content profile associated with the placed content, wherein the similarity score is indicative of a level of similarity between the user profile and the associated placed content profile, and wherein the similarity score is combined with the respective click through rate and the respective bid value to determine the popularity score assigned to the placed content.

11. The system of claim 10, wherein the user profile is based, at least in part, on information about the user, including information derived from a set of documents, the set of documents comprising a plurality of documents selected from the set consisting of documents identified by search results from a search engine, documents linked to the documents identified by search results from the search engine, documents linked to the documents accessed by the user, and documents browsed by the user.

12. The system of claim 10, wherein the similarity score is based on a mathematical distance between a user profile vector of the user profile, the user profile vector including first pairs of categories and respective weights, and a placed content profile vector of the placed content, the placed content profile vector including second pairs of categories and respective weights.

13. The system of claim 10, further including a scaling factor associated with the similarity score.

14. The system of claim 13, wherein the scaling factor is determined by normalizing the similarity score to a particular range.

15. The system of claim 13, wherein the popularity score of each piece of placed content in the set of placed content corresponds to the multiplicative product of the respective scaling factor, the respective click through rate and the respective bid value for the placed content.

16. The system of claim 15, wherein the scaling factor associated with a maximum similarity score is less than the scaling factor associated with a mid-point similarity score.

17. The system of claim 13, wherein the scaling factor is based on statistical information relating similarity scores to click through rates.

18. The system of claim 10, wherein the placed content is an advertisement.

19. A computer program product embodied on a computer readable medium, the computer program product comprising one or more programs that are stored on the computer readable medium and that are executable by a computer so as to perform a process, the one or more computer programs of the computer program product comprising:

instructions for receiving a search query from a user;
instructions for accessing a user profile associated with the user, wherein the user profile is based, at least in part, on query terms in a plurality of previously submitted search queries;
instructions for identifying a set of placed content that matches the search query;
instructions for assigning a popularity score to each of the set of placed content in accordance with the user profile,

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a respective bid value for the placed content, and a respective click through rate for the placed content based on multiple user activities, wherein the instructions for assigning the popularity score include:

instructions for determining a similarity score between the user profile and a placed content profile associated with the placed content, wherein the similarity score is indicative of a level of similarity between the user profile and the associated placed content profile, and instructions for combining the similarity score with the respective click through rate and the respective bid value to determine the popularity score assigned to the placed content;

instructions for ranking the set of placed content according to their respective popularity scores; and

instructions for preparing for display to the user at least a subset of the set of placed content in an order determined by their respective popularity scores.

20. The computer program product of claim 19, wherein the user profile is based, at least in part, on information about the user, including information derived from a set of documents, the set of documents comprising a plurality of documents selected from the set consisting of documents identified by search results from a search engine, documents linked to the documents identified by search results from the search engine, documents linked to the documents accessed by the user, and documents browsed by the user.

21. The computer program product of claim 19, wherein the instructions for determining the similarity score include determining a mathematical distance between a user profile vector of the user profile, the user profile vector including first pairs of categories and respective weights, and a placed content profile vector of the placed content, the placed content profile vector including second pairs of categories and respective weights.

22. The computer program product of claim 19, further including instructions for associating the similarity score with a scaling factor.

23. The computer program product of claim 21, further including instructions for normalizing the similarity score to a particular range to create a scaling factor.

24. The computer program product of claim 22, wherein the instructions for assigning the popularity score to each of the set of placed content includes instructions for multiplying the scaling factor, the respective click through rate and the respective bid value.

25. The computer program product of claim 24, wherein the scaling factor associated with a maximum similarity score is less than the scaling factor associated with a mid-point similarity score.

26. The computer program product of claim 22, wherein the scaling factor is determined in accordance with statistical information relating similarity scores to click through rates.

27. The computer program product of claim 19, wherein the placed content is an advertisement.

28. A computer-implemented method of personalizing placed content associated with a search query, comprising: receiving a search query from a user;
accessing a user profile associated with the user, wherein the user profile is based, at least in part, on query terms in a plurality of previously submitted search queries;
identifying a set of placed content based on contents of one or more documents being presented as search results to the search query;
assigning a popularity score to each of the set of placed content in accordance with the user profile, a respective bid value for the placed content, and a respective click

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through rate for the placed content based on multiple user activities, wherein the assigning the popularity score includes:

determining a similarity score between the user profile and a placed content profile associated with the placed content, wherein the similarity score is indicative of a level of similarity between the user profile and the associated placed content profile, and

combining the similarity score with the respective click through rate and the respective bid value to determine the popularity score assigned to the placed content; and

ranking the set of placed content according to their respective popularity scores; and

preparing for display to the user at least a subset of the set of placed content in an order determined by their respective popularity scores.

29. A computer-implemented method of personalizing placed content associated with a search query, comprising:

receiving a request from a user for a document;

accessing a user profile associated with the user, wherein the user profile is based, at least in part, on query terms in a plurality of previously submitted search queries;

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identifying a set of placed content based on contents of the document being requested by the user;

assigning a popularity score to each of the set of placed content in accordance with the user profile, a respective bid value for the placed content, and a respective click through rate for the placed content based on multiple user activities, wherein the assigning the popularity score includes:

determining a similarity score between the user profile and a placed content profile associated with the placed content, wherein the similarity score is indicative of a level of similarity between the user profile and the associated placed content profile, and

combining the similarity score with the respective click through rate and the respective bid value to determine the popularity score assigned to the placed content; and

ranking the set of placed content according to their respective popularity scores; and

preparing for display to the user at least a subset of the set of placed content in an order determined by their respective popularity scores.

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Exhibit 33

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Exhibit 34

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