

**IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE**

PERSONALIZED USER MODEL, L.L.P.,)
)
Plaintiff,)
)
v.)
)
GOOGLE INC.,)
)
Defendant.)

GOOGLE, INC.)
)
Counterclaimant,)
)
v.)
)
PERSONALIZED USER MODEL, LLP and)
YOCHAI KONIG)
)
Counterdefendants.)

C.A. No. 09-525-LPS
JURY TRIAL DEMANDED
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**MEMORANDUM IN SUPPORT OF GOOGLE'S MOTION FOR SUMMARY
JUDGMENT OF INVALIDITY**

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Unless otherwise noted, all Exhibits (denoted by “Ex.”) are Exhibits to the Declaration of Joshua L. Sohn, filed concurrently herewith.

Exhibits to the Declaration of Michael Jordan, filed concurrently herewith, are denoted by “Jordan Decl., Ex.” Dr. Jordan’s Expert Invalidity Report (“Jordan Report”) is Exhibit A to the Declaration of Michael Jordan. “Jordan Report, ¶ __” refers to the numbered paragraphs of the Jordan Report.

U.S. Patent No. 6,981,040, one of the patents-in-suit, is referred to herein as “the ‘040 Patent.” U.S. Patent No. 7,685,276, the other patent-in-suit, is referred to herein as “the ‘276 Patent.”

“Refuah” refers to U.S. Patent No. 7,631,032 to Refuah et al., which is Exhibit A to the Declaration of Joshua L. Sohn.

“Wasfi” refers to Ahmad M. Ahmad Wasfi, “Collecting User Access Patterns for Building User Profiles and Collaborative Filtering,” Proceedings of the 4th International Conference on Intelligent User Interfaces (January 1999), Exhibit B to the Declaration of Joshua L. Sohn.

“Mladenic” refers to Dunja Mladenic, “Personal WebWatcher: design and implementation” (1996), Exhibit C to the Declaration of Joshua L. Sohn.

“Montebello” refers to Matthew Montebello et al., “A Personal Evolvable Advisor for WWW Knowledge-Based Systems,” Proceedings of the 7th World-Wide Web Conference (March 1998), Exhibit D to the Declaration of Joshua L. Sohn.

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Nature and Stage of the Case

In ongoing re-examinations, every asserted claim has been rejected as anticipated or obvious on multiple grounds.¹ By this motion, Google moves for summary judgment that all asserted claims are anticipated by Refuah and rendered obvious by the overall prior art.

Summary of Argument

The shared specification for the patents-in-suit states that the "present invention, referred to as Personal Web, provides automatic, personalized information and product services to a computer network user." ('040 Patent, 7:4-6.) In the "Background of the Invention," the specification notes that "[a] variety of techniques have been developed to organize, filter, and search for information of interest to a particular user." (*Id.*, 1:22-29.) The specification also notes that machine learning was well-known. (*Id.*, 8:44-46.) Also known was the basic way in which the patents seek to provide personalized information services. The patents use Bayesian statistics to estimate parameters of a user model defining the user's interests, and compare documents against this user model to estimate a probability that such documents will interest the user. ('040 Patent, 8:29-39; 27:55-60). The patents admit that Bayesian analysis was well-known in the art. (*Id.*) Thus, the basic concepts in the patents-in-suit existed in the prior art.

The Refuah prior art reference describes the same invention as the patents. Specifically, Refuah gives each user a "personality" consisting of a "persona" and "mood," used to provide personalized web browsing and searching. Numerous other prior art references also describe the personalization elements of the asserted claims, including transparent monitoring, machine learning, user models/learning machines of user interests, estimating parameters and

¹ The asserted claims of the '040 patent are independent claims 1 and 32 and dependent claims 11, 22, and 34. The asserted claims of the '276 patent are independent claim 1 and dependent claims 3, 5, 6, 7, 21, and 22. The claim language is included in Appendix A.

probabilities, and applying that machine learning to estimate user interest in unseen documents. The patents did not invent, and were not the first to combine, any of the claim elements. Rather, the patents are obvious combinations that result from known market trends, not innovation.

Statement of Facts

As this Court previously noted, there is already a “significant likelihood” that all asserted claims will be invalidated in the re-examinations. (D.I. 407 at 2.) On April 19, 2012, the PTO issued an Action Closing Prosecution rejecting every asserted '040 claim as anticipated or obvious based on four primary references, including the Refuah, Wasfi, and Mladenic references discussed in this Motion. (PAIR Control No. 95/001,569). The next step, a Final Office Action, could issue at any time. On August 17, 2012, the PTO issued a Final Office Action rejecting every asserted '276 claim as anticipated or obvious based on seven primary references, including the Refuah, Wasfi, and Montebello references discussed in this Motion. (PAIR Control No. 95/001,699). The PTO’s rejections of the '276 claims are “final,” pending only PUM’s appeal to the Patent Trial and Appeal Board.

Argument

I. REFUAH ANTICIPATES THE ASSERTED CLAIMS OF THE '040 PATENT

The '040 and '276 patents claim priority to a provisional patent application filed December 28, 1999. Refuah claims priority to a PCT application filed on January 28, 1999 and published on August 5, 1999. PUM does not dispute that Refuah is prior art.²

² In the re-examination of the '040 patent, PUM did challenge Refuah's status as prior art under 35 U.S.C. § 102(e), on the ground that Refuah's U.S. Patent application was not filed until July 28, 2000. But the Examiner held that Refuah is still prior art under 35 U.S.C. § 102(a), because Refuah's PCT application was published in August 1999 and this PCT application “word for word covers all the subject matter disclosed in the US application.” (Control No. 95/001,569 ('040 Action Closing Prosecution) at 66 (April 19, 2012)).

A. Refuah anticipates independent claim 1

1. "[a] computer-implemented method for providing automatic, personalized information services to a user u"

Refuah meets the claim 1 preamble by disclosing "a method of aiding information search and retrieval on the Internet. In a preferred embodiment of the invention, Internet searching is personalized to a particular user's profile." (Refuah, 1:63-66.)

2. "transparently monitoring user interactions with data while the user is engaged in normal use of a computer"

Refuah discloses "tracking interactions of the user with an Internet." (*Id.*, Abstract.) Refuah also discloses that "[s]uch tracking is preferably achieved using a standalone program which monitors the browser and/or TCP/IP connection." (*Id.*, 5:59-61.) Monitoring the user's Internet browser and IP connection includes monitoring "normal" use of the computer, such as Internet browsing. (*Id.*, 19:20-22 ("a persona of a client may be automatically generated by tracking the way a client interacts with the Internet.")).

3. "updating user-specific data files, wherein the user-specific data files comprise the monitored user interactions with the data and a set of documents associated with the user"

Refuah discloses "analyzing said tracked interactions to determine at least one aspect of a user's interaction with the Internet." (*Id.*, 8:17-18.) These monitored and analyzed user interactions include a set of documents associated with the user; *e.g.*, one or more websites visited by the user. (*Id.*, 5:35-37 ("the mood is updated based on the one or more identification of sites visited by the user"); 5:57-58 ("The automatic updating may be performed at the user site, for example by tracking the activity of an Internet browser"); 22:23-27 ("a program may be loaded to the individual client to track Internet usage patterns . . . the program may store its tracking results.)) Tracking and storing website ID's - as done in Refuah - meets this element under PUM's own infringement contentions, as PUM has alleged that Google meets this element

by [REDACTED] (Ex. E, ¶¶ 152-155.)

[REDACTED], PUM cannot argue that this element is not met by Refuah. *Amazon.com, Inc. v.*

Barnesandnoble.com, Inc., 239 F.3d 1343, 1351 (Fed. Cir. 2001) ("A patent may not, like a 'nose of wax,' be twisted one way to avoid anticipation and another to find infringement.").

4. "estimating parameters of a learning machine, wherein the parameters define a User Model specific to the user and wherein the parameters are estimated in part from the user-specific data files"

Refuah meets this element by assigning users a "persona" and "mood" representing their relatively stable and transitory preferences. (*See generally* Refuah, col. 2.) "[A] mood and/or a persona may be updated by modifying continuous parameters." (*Id.*, 6:6-7.) "[A] parameter may be reflexive towards the persona, for example defining how to modify the persona and/or a mood based on user activities." (*Id.*, 6:60-62.) Thus, the parameters define the user model (persona and mood) specific to the user, and these parameters are "estimated in part from the user-specific data files" because they are "based on user activities."

Refuah's persona and mood also attempts to improve its predictive ability over time - as required by the Court's construction of "learning machine" - because its parameters are modified by monitoring and learning from the user's activities. (*Id.*, 6:60-62.) The parameters of Refuah's persona and mood also include weighting information, which indicate the degree of user interest in certain topics. (*Id.*, 6:53-55 ("a persona may include weighing information, such as relative preference of subjects of interest, for example 'baseball=5, basketball=3'.") Thus, Refuah "estimate[es] values or weights of the variables of a learning machine," as required by the Court's construction of "estimating parameters of a learning machine." (D.I. 342).

5. "analyzing a document d to identify properties of the document"

Refuah analyzes websites, made up of documents (web pages), to determine their properties. (Refuah, 21:6-10 ("an atmosphere of a site may be automatically evaluated by analyzing the content of a site . . . characteristics of a site may be automatically determined.") Refuah further discloses analyzing the "words and/or phrases used by [] the site," or analyzing books within a bookseller's website to see how well they match the user's persona and mood. (*Id.*, 21:15-16, 3:65-4:1.)

6. "estimating a probability $P(u/d)$ that an unseen document d is of interest to the user u, wherein the probability $P(u/d)$ is estimated by applying the identified properties of the document to the learning machine having the parameters defined by the User Model"

Refuah discloses that "[i]n the evaluation technique, a site is evaluated for suitability and/or qualities which are preferred and/or match a particular persona." (*Id.*, 17:44-46.) Refuah also makes a "graded" assessment of how well a site matches a user persona. (*Id.*, 7:67-8:3; 11:11-18.) The evaluation of site interestingness can be cast in numerical terms, as required by this claim element. (*Id.*, 15:24-26 ("something that is both chess and baseball may be 10 times as interesting [as] if it matches only one of the subjects.)) PUM alleges that Google meets this element by simply [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED], Refuah's

numerical grade of site interestingness is a "probability" under PUM's infringement theories.

Amazon, 239 F.3d at 1351.

Refuah's evaluation of site suitability also extends to "unseen" sites. For instance, "when a user enters a book-seller's web site, even if the user has never been at the book-seller, he may be offered books which match his persona and/or mood." (Refuah, 3:65-4:1 (emphasis added)). On a more general level, nothing in Refuah's evaluation of site suitability requires that the sites had been previously seen by the user before being compared to the user's personality.

7. "using the estimated probability to provide automatic, personalized information services to the user"

As discussed above, Refuah uses its evaluation of site suitability to provide automatic, personalized information services to the user. (See Refuah, 1:63-66 (disclosing "a method of aiding information search and retrieval on the Internet. In a preferred embodiment of the invention, Internet searching is personalized to a particular user's profile.")).

B. Refuah anticipates dependent claims 11 and 22

Claim 11 depends from claim 1, and further requires "estimating a posterior probability $P(u/d, q)$ that the document d is of interest to the user u , given a query q submitted by the user." Refuah discloses this element because its persona and mood can be used to evaluate the interestingness of search results returned in response to a query. (Refuah, 17:37-38 ("two techniques are preferably used to match a persona to a search result"); 17:29-30 ("personality and mood are designed to affect the results of substantially any query.")) Therefore, Refuah discloses posterior probabilities of site interestingness, given a query. Claim 22 depends from claim 1 and requires "wherein the monitored user interactions include a sequence of interaction times." Refuah meets this element. For instance, "a 'rush' mood [] may be identified by tracking whether a user waits until images are downloaded [or] whether a user waits for a complete site to download." (*Id.*, 5:42-45.)

C. Refuah anticipates Claims 32 and 34

Claim 32 recites “[a] program storage device accessible by a central computer, tangibly embodying a program of instructions executable by the central computer to provide method steps for providing automatic, personalized information services to a user u,” and then repeats the method steps of claim 1. As discussed above, Refuah discloses steps (a)-(f) from claim 1. Refuah also discloses that the persona and mood may be embodied as a program storage device accessible by a central computer (*see id.*, 4:7-11) and that the persona and mood may be executed by the central computer as a program of instructions. (*See id.*, 4:14-16; 18:61-63). Claim 34 depends from Claim 32, and further requires “wherein analyzing the document d provides for the analysis of documents having multiple distinct media types.” Refuah discloses the analysis of websites (*see id.*, 20:31-34), which, as was well-known in 1999, included multiple types of media.

II. REFUAH ANTICIPATES THE ASSERTED CLAIMS OF THE '276 PATENT

A. Refuah anticipates independent claim 1

1. “[a] computer-implemented method for providing automatic, personalized information services to a user”

Refuah meets the claim 1 preamble by disclosing “a method of aiding information search and retrieval on the Internet. In a preferred embodiment of the invention, Internet searching is personalized to a particular user's profile.” (Refuah, 1:63-66.)

2. “transparently monitoring user interactions with data while the user is engaged in normal use of a browser program running on the computer”

Refuah transparently monitors user interactions with data while the user is engaged in normal use of a browser program running on the computer. (*Id.*, Abstract; 5:59-61.)

3. "analyzing the monitored data to determine documents of interest to the user"

Refuah discloses "analyzing said tracked interactions to determine at least one aspect of a user's interaction with the Internet." (*Id.*, 8:17-18.) The Court construed "documents of interest to the user" as "documents for which the user has a positive response" (D.I. 342), which Refuah meets by identifying sites visited by the user. (Refuah, 5:36-37 ("the mood is updated based on the one or more identification of sites visited by the user."))

4. "estimating parameters of a user-specific learning machine based at least in part on the documents of interest to the user"

As explained in Section I(A)(4), *supra*, Refuah estimates parameters of a learning machine based at least in part on the documents of interest to the user. Refuah's persona and mood constitute the claimed "learning machine," and this learning machine is "user specific" because it is specifically tailored to the user based on monitoring the user's specific Internet activities. (*Id.*, 5:35:40; 6:60-62).

5. "receiving a search query from the user" and "retrieving a plurality of documents based on the search query."

Refuah discloses receiving a search query from the user and retrieving a plurality of documents based on the search query: "a search mechanism, such as yellow pages, white pages, indexes, search engines, intelligent agents and/or registry search, may filter and/or sort search results responsive to personality." (*Id.*, 3:12-15; *see also id.*, 17:22-30 ("personalization can affect many modes of information retrieval, including search engines . . . personality and mood are designed to affect the results of substantially any query")). In order to "filter and/or sort search results," those search results inherently must be retrieved.

6. "for each retrieved document of said plurality of retrieved documents: identifying properties of the retrieved document, and applying the identified properties of the retrieved document to the user-specific learning machine to estimate a probability that the retrieved document is of interest to the user"

As explained in Section I(A)(5), *supra*, Refuah identifies properties of each retrieved site, which include "documents". (*Id.*, 21:6-10; 21:15-16.) Refuah also applies the identified properties of the retrieved document to the user-specific learning machine to estimate a probability that the retrieved document is of interest to the user. As explained in Section I(A)(6), Refuah's comparison of site to user persona is used to estimate a probability that the site is of interest to the user.

7. "using the estimated probabilities for the respective plurality of retrieved documents to present at least a portion of the retrieved documents to the user."

Refuah discloses this element by presenting a portion of retrieved documents that best match the user's persona and mood. (*Id.*, 3:65-4:1 ("when a user enters a book-seller's web site, even if the user has never been at the book-seller, he may be offered books which match his persona and/or mood"); 17:49-50 ("In a preferred embodiment of the invention, the presentation of search results may also be parameters of the persona."))

B. Refuah anticipates claim 1's dependent claims 3, 5, 6, 7, 21 and 22

Claim 3 adds "monitoring user interactions with data during multiple different modes of user interaction with network data." Refuah likewise discloses monitoring sites visited, information downloaded, and services purchased by the user. (*Id.*, 5:35-40.) Claim 5 further requires "analyzing the monitored data to determine documents not of interest to the user, and wherein estimating parameters of a user-specific learning machine further comprises estimating parameters of a user-specific learning machine based at least in part on the documents not of interest to the user." Refuah likewise discloses that the user's persona can be modified based on

documents that "displease" the user. (*Id.*, 22:11-14 ("a client can indicate to the persona server if he is pleased with a particular site and/or displeased. Such an indication may also be used to modify the personality."))

Claim 6 adds "monitoring at least one type of data selected from the group consisting of information about the document, whether the user viewed the document, information about the user's interaction with the document, context information, the user's degree of interest in the document, time spent by the user viewing the document, whether the user followed at least one link contained in the document, and a number of links in the document followed by the user." Refuah discloses this element by monitoring whether the user viewed a site, how much time the user spent viewing the site, and information about the user's interaction with the site. (*Id.*, 5:35-39 ("the mood is updated based on the one or more of the identification of sites visited by a user, the number of sites visited, the dwell time at each site, the order in which sites are visited, the contents of the sites . . ."))

Claim 7 further requires the "plurality of retrieved documents correspond to a respective plurality of products." Refuah likewise discloses that its retrieved documents might represent products, such as books for purchase. (*Id.*, 3:64-4:1.) Claim 21 adds "presenting to the user at least said portion of the retrieved documents based on the estimated probability that the retrieved document is of interest to the user and the relevance of the retrieved document to the search query." As explained in Section I(B), *supra*, Refuah discloses this element by filtering search results based on how well they match the user's persona and mood.

Claim 22 further requires "identifying properties selected from the properties consisting of a topic associated with the retrieved document, at least one product feature extracted from the retrieved document, an author of the retrieved document, an age of the retrieved document, a list

of documents linked to the retrieved document, a number of users who have accessed the retrieved document, and a number of users who have saved the retrieved document in a favorite document list." Refuah discloses this element by identifying, *e.g.*, topics associated with a document (*id.*, 21:15-18), users who have accessed the document (*id.*, 21:24-26), and product features extracted from the document. (*Id.*, 15:15-17.)

III. THE ASSERTED PATENTS ARE INVALID FOR OBVIOUSNESS

Obviousness is a question of law, based on underlying facts. *In re Gartside*, 203 F.3d 1305, 1316 (Fed. Cir. 2000). To determine obviousness, a court must consider: (1) the scope and content of the prior art; (2) the differences between the prior art and the claims at issue; (3) the level of ordinary skill in the art; and (4) any relevant secondary considerations, such as commercial success, long felt but unsolved needs, and the failure of others. *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1, 17-18 (1966). Under these "*Graham* factors" and applicable law, the undisputed facts show that all asserted claims are obvious as a matter of law. Google also submits the Declaration of Dr. Michael Jordan, the Pehong Chen Distinguished Professor of computer science and statistics at UC Berkeley, which includes his detailed obviousness analysis required by the Supreme Court in *Graham*, as reaffirmed in *KSR Intern. Co. v. Teleflex Inc.*, 550 U.S. 398, 421 (2007).

In *KSR* the Supreme Court cautioned against granting patents, like PUM's, that are nothing more than a combination of known elements driven by non-innovative factors such as market demands. *See id.* at 417. Rather, "[c]ommon sense teaches [] that familiar items may have obvious uses beyond their primary purposes, and in many cases a person of ordinary skill will be able to fit the teachings of multiple patents together like pieces of a puzzle." *Id.* at 420. (emphasis added). As in *KSR*, the prior art "puzzle" here is nothing more than a simple combination of prior art elements that was not only predictable, but had already been done in an

identical or nearly identical way for the very same types of personalization that the asserted claims recite. As the PTO has already found, there is nothing inventive here.

A. Scope and Content of the Prior Art³

The prior art includes all the elements claimed by the patents, arranged the same way that they are in the patents. Refuah itself contains all claimed elements. But to the extent the Court finds any are not met by Refuah, any such element would be obvious to add from the wealth of available art. As PUM's infringement expert admitted: "When developing applications or uses for machine learning, a machine learning developer uses these general tools in his or her toolbox for the building of information models, estimating parameters, calculating probabilities and/or posterior probabilities, and other functions." (Ex. E, ¶ 575.) PUM's invalidity expert similarly testified that building models through machine learning, estimating parameters, and estimating probabilities were all known in the art, and indeed were all disclosed in his own textbooks from the 1983-1990 period. (Ex. G, 8:11-12:3.) And the patents themselves admit that they apply well-known Bayesian probability techniques. ('040 Patent, 8:29-39; 27:55-60.) The asserted claims do no more than combine these known tools in an obvious way to address the "personalization" problem using user models, something that had already been done repeatedly in the art. For brevity, this Section will focus on the Wasfi, Mladenic, and Montebello references - references that were found to invalidate every asserted claim in the re-examinations.

1. Transparently monitoring user interactions while engaged in normal user of a computer or browser ('040 claim 1[a], 32[a], '276 claim 1[a])

PUM and its validity expert, Dr. Carbonell, both admitted that transparently monitoring the user's behavior while the user is engaged in normal use of a computer or browser was known in the prior art. (Ex. G, 55:4-56:1; Ex. H, 8.) For example, Wasfi "proposes a new learning

³ See Jordan Report, ¶¶ 440-41 and Section VII(B).

mechanism to extract user preferences transparently for a World Wide Web recommender system." (Wasfi, Abstract.) Mladenic describes "Personal WebWatcher," a system that "watches over the user's shoulder' . . . but it avoids involving the user in its learning process (it doesn't ask the user for any keywords or opinions about pages)." (Mladenic, 3). Similarly, Montebello transparently monitors which webpages a user bookmarks. (Montebello, 3). (See Jordan Report ¶ 322 (explaining how transparent monitoring was well-known in the prior art.))

2. Updating user-specific data files/analyzing the monitored data to determine documents of interest to the user ('040 claim 1[b], 32[b], '276 claim 1[b])

As PUM has admitted, "the named inventors did not invent updating user-specific data files." (Ex. H, 9.) Mladenic and Wasfi monitor pages that a user visited and deem them to be documents of interest to the user. (Mladenic, 8 ("Hyperlinks whose documents were visited by the user are deemed to be positive examples . . . of the user interests"); Wasfi, 61 ("The context model is built progressively as users jump from one page to another")). In Montebello, documents that the user bookmarks are monitored and determined to be documents of interest to the user.⁴ (Montebello, 3 ("We assume that normally, when searching or even browsing, a user bookmarks a page of interest and proceeds with the activity he/she was performing."))

3. Estimating parameters of a [user-specific] learning machine/User Model ('040 claim 1[c], 32[c], ('276 claim 1[c])

Numerous references use machine learning to generate a user-specific profile or model of the user's interests by estimating parameters. Indeed, estimating parameters is a basic machine learning technique disclosed in Dr. Carbonell's own prior art machine learning textbook. (Ex. G, 8:11-11:21.) Several prior art references applied this technique to the same type of user models

⁴ As explained above, PUM has alleged that this element can be met by [REDACTED]

[REDACTED] (Ex. E, ¶¶ 152-155.)

and learning machines as the patents. Mladenic has a "**learner** that provides a user-model." (Mladenic, 7). "**Learner** works in two versions: learning a new model from scratch (LEARNER) or updating an existing model (UPDATER)." (*Id.*, 8.) Mladenic's Learner performs Bayesian probability calculations on the vectors of documents that the user visited, in order to generate a model of the user's interests. (*Id.*, 7 ("The current version of PWW [Personal WebWatcher] uses a naïve (Simple) Bayesian classifier on frequency vectors to generate a model of user interests, that is used for advising hyperlinks.")) Dr. Carbonell admitted that Mladenic's Personal WebWatcher system uses machine learning to create its user model. (Ex. G, 158:20-24.)

Similarly, Montebello has a "Profile Generator" that "analyze[s] each users' personal index and generate[s] a profile." (Montebello, 3). "This profile generation utilizes the term frequency/inverse document frequency machine learning technique," though users can also "select their own profile generator/prediction agent from a number of alternatives, reflecting different machine learning techniques employed." (*Id.*, 3, 5 (emphasis added)). Wasfi also discloses a "profile" which "is a description of user interests." (Wasfi, 58). A "learning module handles the task of mapping user interests to the profile and maintaining the correlation between the two." (*Id.*, 61). The profile (also called "user profile") adapts to the user's changing interests according to a specific formula that takes into account the user's pre-existing profile and the most recent webpage the user chose to visit. (Wasfi, 58).

4. Analyzing a document to identify properties of the document ('040 claim 1[d], 32[d])

As PUM admitted, "the named inventors did not invent analyzing a document to identify properties of the document." (Ex. H, 12-13.) Rather, the aforementioned references disclose analyzing a document to identify properties of the document. For example, Montebello discloses that the same term frequency/inverse document frequency method used to generate the user

profile is also used to "extract features from documents." (*See* Montebello, 4.) Similarly, Wasfi extracts keywords, anchor hypertexts, and other features from documents in order to turn these documents into vector representations of their contents. (Wasfi, 61.)

5. Receiving a search query from a user; retrieving a plurality of documents based on search query ('276 claim 1 [d-e])

There is no dispute search engines were known in the art. While Dr. Carbonell testified the alleged main innovation of the patents is "to customize or personalize the search results to an individual user" (Ex. G, 86:1-7), he further admitted that there was already a strong market desire for personalized search by the time the patents were filed. (*See id.*, 93:15-19.) Thus, the notion of providing personalized search results is not inventive at all.

Nor was the use of machine learning in connection with search or personalization anything new. PUM's infringement expert (Dr. Pazzani) stated that his own prior art system personalized search results through user models that were built by machine learning. (Ex. I, 11:18-12:4.) Dr. Carbonell admitted that machine learning was "starting to be used" in search engines by 1998, a year before the patents were invented. (Ex. G, 13:2-7.) Similarly, Montebello's personalization system is designed to work on top of conventional search engines by personalizing the search results returned by these engines. (Montebello, 2 ("The external systems utilised include some of the major search engines and also some other retrieving systems that have been developed by other research groups. They use the WWW as their source of input and we use their output as the input for PEA.⁵") Mladenic also notes that its predecessor system, WebWatcher, worked with search functionality. (Mladenic at 2 ("the user provides a few keywords describing a search goal and WebWatcher highlights related hyperlinks on the current page and/or adds new hyperlinks to the current page."))

⁵ Montebello's personalization system is called "Personal Evolvable Advisor" or "PEA."

6. Estimating probability of user interest in a document using a [user specific] learning machine ('276 claim 1[f], '040 claim 1[e], 32[e])

As the patents state, their probability estimations use Bayesian statistics and pattern-recognition techniques that were published as early as the 1970's. ('040 Patent, 27:55-60.) Bayesian calculation is a classic probability calculation, as Dr. Carbonell acknowledged. (Ex. G, 18:19-20.) Using a learning machine to estimate the probability of user interest in a document using these known techniques was hardly new. Mladenic similarly used Bayesian statistics to estimate a hyperlink's probability of interestingness to a user. (See Mladenic, 7 ("The current version of PWW uses a naïve (Simple) Bayesian classifier on frequency vectors to generate a model of user interests, that is used for advising hyperlinks.")) Dr. Pazzani's aforementioned personalized search system also estimated probabilities of user interest in documents using Bayesian statistics. (Ex. I, 13:14-14:19; 18:8-19:11.)

In a similar vein, Wasfi predicts how likely it is that the user will be interested in a given page. (Wasfi, 61) ("The Information Filtering Module: Content-based Filtering" subsection). And Montebello discloses that "documents that have been retrieved and stored within the main index by the retrieval agent will have their features extracted and compared to the profile of each individual user generated by the profile generator."⁶ (Montebello, 4.) Thus, Montebello and Wasfi estimate probabilities of user interest in a document as well.

7. Using the estimated probability to provide personalized services/present documents to the user ('040 claim 1[f], 32[f], '276 claim 1[g])

Mladenic, Wasfi, and Montebello use their evaluations of document interestingness to provide automatic, personalized information services to the user, as required by '040 claim 1[f] and 32[f]. For example, Wasfi recommends pages to the user by annotating them with "ball"

⁶ Montebello further states that this process is performed on "new" documents - *i.e.*, documents the user has not seen before. (Montebello, 4.)

icons indicating their relevance to the user. (See Wasfi, 61 ("The Graphical User Interface" subsection)). Mladenic similarly puts graphical symbols next to hyperlinks that are recommended for the user. (Mladenic, 7-8, Fig. 3.) And Montebello provides a list of documents that are "suggested" or recommended to the user. (Montebello, Fig. 2.) Notably, Montebello's suggested documents are a portion of the overall documents retrieved by the underlying search engines that Montebello's PEA system is paired with. (Montebello, 2, 4.)

8. A storage device with program executable by the central computer to perform steps (a)-(f) from claim 1] ('040 claim 32)

Independent claim 32 of the '040 Patent recites the same steps as independent claim 1, but requires the steps to be embodied as a program of instructions accessed and executable by a central computer. These new elements of claim 32 are also met by the prior art. For example, Mladenic's method is a set of instructions in the Perl and C++ programming languages (Mladenic, 7) and is stored on a central computer, namely a proxy server. (*Id.*). PUM's own expert, Dr. Carbonell, opined that a server is a "central computer" under the patents. (Ex. J, ¶ 447 ("The patents-in-suit disclose, for instance, the use of a central computer (i.e., a server)"). Wasfi's method is a set of instructions in the Java programming language (Wasfi, 60) which "inhabits a website." (*Id.*) As is well-known in the art, websites are generally stored on servers or other central computers so they can be accessed by anyone on the Internet.

9. The elements of the dependent claims are found in the prior art

The various dependent claim elements are also found in Mladenic, Wasfi, and/or Montebello. For example, Wasfi monitors a sequence of interaction times, as called for by '040 claim 22 and '276 claim 6. (Wasfi, 60 ("[t]o track user presence, a timeout mechanism is used to delete user's session information after a predetermined amount of idle time.)) Montebello monitors multiple modes of user interactions with data, as called for by '276 claim 3, by

monitoring user activity during both “searching” and “browsing” mode. (Montebello, 3).

Mladenic estimates parameters of a learning machine based on documents not of interest to the user, as called for by ‘276 claim 5. (Mladenic, 8 (“Hyperlinks whose documents were visited by the user are considered to be positive examples, and all the other to be negative examples of the user interests.”) Montebello retrieves documents corresponding to products and extracts their product features, as called for by ‘276 claims 7 and 22. (Montebello, Fig. 2). And Mladenic analyzes documents of multiple media types, as called for by ‘040 claim 34. (Mladenic, 3 (analyzing both plain text and HTML documents)).⁷

B. Differences Between the Claims and the Prior Art⁸

As detailed above, there are no differences between the claims and the prior art. The prior art discloses all elements. But even were some element somehow missing, any alleged differences would have been obvious to overcome. For example, PUM's invalidity expert states that "the main innovation [of the patents-in-suit] is to customize or personalize the search results to an individual user." (Ex. G, 86:1-7.) He further testified that there was a strong market desire for personalized search by the time of patents. (*Id.*, 93:15-19.) But as discussed above, the prior art included several references discussing personalized search. The motivation provided by these acknowledged market forces would have provided ample reason to fill in the remaining gaps, if any. *KSR*, 550 U.S. at 421 (“[w]hen there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, a person of ordinary skill has good reason to pursue the known options within his or her technical grasp.”) Indeed, Dr. Pazzani’s aforementioned personalized search system from the mid-1990’s had almost no

⁷ Dr. Jordan’s Report also explains how the prior art contains all these dependent elements. (See Jordan Report ¶¶ 148-150, 155-160, 206-208, 213-216, 229-232, 350-55, 357-65, 405-410).

⁸ See Jordan Report, ¶¶ 442-444 and Section VII(C)(1).

differences from the asserted claims. At his deposition, Dr. Pazzani could name only one independent claim element missing from his system – namely, the fact that his system monitored user behavior explicitly rather than transparently. (Ex. I, 31:2-34:12.) But as Dr. Carbonell conceded, transparent monitoring was well-known in the art. (Ex. G, 55:4-56:1.)

C. The Level of Ordinary Skill in the Art⁹

The parties' invalidity experts largely agree regarding the person of ordinary skill in the art, stating that such a person would have a B.S. in computer science or its equivalent with 2-3 years experience in information retrieval or information science. (Jordan Report, ¶ 447; Ex. J, ¶ 487). Given the extensive disclosures of the claim elements in the prior art and the fact that the claims apply common techniques found in the "toolbox" of any machine learning developer, there can be no genuine dispute that one of ordinary skill would have found the asserted claims to be obvious. The market desire for personalized search, together with the prior art references that identify ways to satisfy this desire, strongly suggests that it would have been obvious to modify the prior art personalized search methods to disclose PUM's methods - even if there were some differences between PUM's methods and the prior art. *See KSR*, 550 U.S. at 421.

There were no technical barriers to the combination of elements in the patents (and PUM has never identified any). Rather, the claims are just a combination of well-known machine learning techniques used in a predictable way. The monitoring of users, creating of models, estimating of parameters, and estimating of probabilities all are applied in the same manner as in the prior art, with each of these known tools performing the functions they were known and designed to perform, in applications (personalization and/or search) for which they had already been applied as detailed above. Thus, as explained further in Dr. Jordan's report, the use of these

⁹ See Jordan Report, ¶¶ 445-47.

tools to create the combination of elements in the patents was thoroughly predictable. (Jordan Report ¶¶ 367-393.) In response to Dr. Jordan's opinions, PUM's experts have never articulated any way in which the claimed combinations are unpredictable.

D. No Secondary Considerations Can Rebut the Obviousness Showing¹⁰

PUM cannot show any secondary considerations to rebut the obviousness of the patents. Dr. Carbonell argues that Google's commercial success shows the non-obviousness of the patented invention. (Ex. J, ¶ 493-495). But a showing of commercial success requires a nexus with the patented invention. *In re Applied Mat., Inc.*, 692 F.3d 1289, 1299 (Fed. Cir. 2012). PUM cannot show a nexus; Dr. Carbonell has not even analyzed what is accused and cannot say what success is attributable to the accused technology as opposed to non-accused technology. (Ex. G, 252:13-254:1.) PUM also alleges that the patents satisfy an unresolved, long-felt need. (Ex. J, ¶¶ 496-507.) But as explained above, numerous prior art references had already solved the problem of providing personalized information services. Moreover, [REDACTED] [REDACTED] [REDACTED] (Ex. K, 44:10-45:5; 64:9-18.)

Conclusion

For the foregoing reasons, Google respectfully requests that the Court enter summary judgment that all asserted claims of the patents are invalid for anticipation and obviousness.

¹⁰ See Jordan Report, ¶¶ 448-56.

Respectfully submitted,

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Appendix A

For the Court's convenience, the asserted claims (and claim 32 of the '040 patent) are listed below.

U.S. Patent No. 6,981,040

1. A computer-implemented method for providing automatic, personalized information services to a user u , the method comprising:
 - a) transparently monitoring user interactions with data while the user is engaged in normal use of a computer;
 - b) updating user-specific data files, wherein the user-specific data files comprise the monitored user interactions with the data and a set of documents associated with the user;
 - c) estimating parameters of a learning machine, wherein the parameters define a User Model specific to the user and wherein the parameters are estimated in part from the user-specific data files;
 - d) analyzing a document d to identify properties of the document;
 - e) estimating a probability $P(uld)$ that an unseen document d is of interest to the user u , wherein the probability $P(uld)$ is estimated by applying the identified properties of the document to the learning machine having the parameters defined by the User Model; and
 - f) using the estimated probability to provide automatic, personalized information services to the user.
11. The method of claim 1 further comprising estimating a posterior probability $P(uld,q)$ that the document d is of interest to the user u , given a query q submitted by the user.
32. A program storage device accessible by a central computer, tangibly embodying a program of instructions executable by the central computer to perform method steps for providing automatic, personalized information services to a user u , the method steps comprising:
 - a) transparently monitoring user interactions with data while the user is engaged in normal use of a client computer in communication with the central computer;
 - b) updating user-specific data files, wherein the user-specific data files comprise the monitored user interactions with the data and a set of documents associated with the user;
 - c) estimating parameters of a learning machine, wherein the parameters define a User Model specific to the user and wherein the parameters are estimated in part from the user-specific data files;
 - d) analyzing a document d to identify properties of the document;

e) estimating a probability $P(uld)$ that an unseen document d is of interest to the user u , wherein the probability $P(uld)$ is estimated by applying the identified properties of the document to the learning machine having the parameters defined by the User Model; and

f) using the estimated probability to provide automatic, personalized information services to the user.

34. The program storage device of claim 32 wherein analyzing the document d provides for the analysis of documents having multiple distinct media types.

U.S. Patent No. 7,685,276

1. A computer-implemented method for providing personalized information services to a user, the method comprising:

transparently monitoring user interactions with data while the user is engaged in normal use of a browser program running on the computer;

analyzing the monitored data to determine documents of interest to the user;

estimating parameters of a user-specific learning machine based at least in part on the documents of interest to the user;

receiving a search query from the user;

retrieving a plurality of documents based on the search query;

for each retrieved document of said plurality of retrieved documents: identifying properties of the retrieved document, and applying the identified properties of the retrieved document to the user-specific learning machine to estimate a probability that the retrieved document is of interest to the user; and

using the estimated probabilities for the respective plurality of retrieved documents to present at least a portion of the retrieved documents to the user.

3. The method of claim 1, wherein transparently monitoring user interactions with data comprises monitoring user interactions with data during multiple different modes of user interaction with network data.

5. The method of claim 1, further comprising analyzing the monitored data to determine documents not of interest to the user, and wherein estimating parameters of a user-specific learning machine further comprises estimating parameters of a user-specific learning machine based at least in part on the documents not of interest to the user.

6. The method of claim 1, wherein monitoring user interactions with data for a document comprises monitoring at least one type of data selected from the group consisting of information

about the document, whether the user viewed the document, information about the user's interaction with the document, context information, the user's degree of interest in the document, time spent by the user viewing the document, whether the user followed at least one link contained in the document, and a number of links in the document followed by the user.

7. The method of claim 1, wherein said plurality of retrieved documents correspond to a respective plurality of products.

21. The method of claim 1, wherein using the estimated probabilities for the respective plurality of retrieved documents to present at least a portion of the retrieved documents to the user comprises presenting to the user at least said portion of the retrieved documents based on the estimated probability that the retrieved document is of interest to the user and the relevance of the retrieved document to the search query.

22. The method of claim 1, wherein identifying properties of the retrieved document comprises identifying properties selected from the properties consisting of a topic associated with the retrieved document, at least one product feature extracted from the retrieved document, an author of the retrieved document, an age of the retrieved document, a list of documents linked to the retrieved document, a number of users who have accessed the retrieved document, and a number of users who have saved the retrieved document in a favorite document list.

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

CERTIFICATE OF SERVICE

I, David E. Moore, hereby certify that on December 13, 2012, the attached document was electronically filed with the Clerk of the Court using CM/ECF which will send notification to the registered attorney(s) of record that the document has been filed and is available for viewing and downloading.

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