Exhibit 3

IN THE UNITED STATES DISTRICT COURT

FOR THE EASTERN DISTRICT OF VIRGINIA

I/P ENGINE, INC.,	)	
Plaintiff,	)	
v.	)	C.A. No. 2:11-cv-512-RAJ
AOL, INC., GOOGLE INC., IAC SEARCH & MEDIA, INC., TARGET CORP., and GANNETT CO., INC.	)	**JURY TRIAL DEMANDED**
Defendants.	)	

REPORT OF DEFENDANTS' EXPERT
LYLE H. UNGAR, PH.D., CONCERNING INVALIDITY OF

CLAIMS 10, 14, 15, 25, 27, AND 28
OF U.S. PATENT NO. 6,314,420

AND

CLAIMS 1, 5, 6, 21, 22, 26, 28, AND 38
OF U.S. PATENT NO. 6,775,664

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I. INTRODUCTION

1. My name is Lyle H. Ungar. I have been retained by Defendants AOL, Inc., Google Inc., IAC Search & Media, Inc., Target Corp., and Gannett Co., Inc. (collectively "Defendants") to give my expert opinion as to the validity of the patent claims asserted by I/P Engine, Inc. ("I/P Engine") in the above-captioned matter. Below, I set forth the reasons that I believe the asserted patent claims to be invalid.

2. My analysis covers claims 10, 14, 15, 25, 27, and 28 of U.S. Patent No. 6,314,420 (hereinafter "the '420 Patent") and claims 1, 5, 6, 21, 22, 26, 28, and 38 of U.S. Patent No. 6,775,664 (hereinafter "the '664 Patent"). It is my opinion that each of the asserted claims are invalid at least for anticipation and/or obviousness in light of the prior art.

3. I receive $600 per hour for my work. My compensation is not dependent upon the outcome of this case.

4. The matters referenced in this Report are based upon my personal knowledge, and if called upon as a witness I could testify completely as to these matters.

II. QUALIFICATIONS

5. I am an Associate Professor of Computer and Information Science at the University of Pennsylvania. I obtained my Ph.D. in 1984 from MIT and my B.S. in 1979 from Stanford University. I have been on the faculty of the University of Pennsylvania since 1984.

6. I won the National Science Foundation Presidential Young Investigator Award and I currently serve as an editor of the Journal of Machine Learning Research, the premier publication in its area. I also regularly present papers and tutorials at a number of top conferences in the fields of data mining, machine learning, and text mining, and I review submissions for such conferences.

7. I have published over 100 peer-reviewed articles on my research, in venues such as the *Journal of Machine Learning Research* (JMLR), ACM Transactions on Knowledge Discovery from Data (TKDD), IEEE Knowledge and Information Systems, the Proceedings of the ACM Conference on Electronic Commerce, and the Proceedings of the ACM Conference on Information and Knowledge Management (CIKM). I also am a named co-inventor on eight patents in the field of computer and/or information science.

8. I have extensive experience teaching the subjects of Internet search, information filtering, and collaborative filtering, which I cover in my courses at the University of Pennsylvania at both the undergraduate and graduate levels, in executive education courses I teach to working executives at Penn's Engineering and Business schools, and in tutorials that I give at technical conferences around the world.

9. My work in collaborative filtering, dating back to the time of the asserted patents, is widely cited. For example, "Clustering Methods for Collaborative Filtering" (Ungar and Foster; 1998) and "Methods and Metrics for Cold-Start Recommendations" (Schein, Popescul, Ungar and Pennock; 2002) each has over 400 citations in the scientific literature. Three of my patents in the area of information recommender systems (U.S. Patent Nos. 5,754,939; 5,835,087; and 5,758,257) each has over 500 citations listed on Google Scholar.

10. I have consulted for a number of start-ups in the area of collaborative filtering, including CDNow (music recommendations), Alkindi (movie recommendations), and MutualArt (art recommendations). I also have worked with a wide range of companies in the area of information filtering, including Digital Trowel and Dow Jones.

11. A full list of my qualifications and experience is contained in my CV, which I attached as Exhibit C to this Report.

12. As a result of my qualifications and experience, I consider myself to be an expert in the field of the asserted patents. I also have mentored and supervised numerous students whom I consider to be persons of ordinary skill in the field of the asserted patents.

13. I have reviewed extensive materials relating to this case, including the asserted patents, the patent histories, the claim construction briefs and order, and numerous technical papers and articles discussing the scope and content of the prior art in the timeframe relevant for the asserted patent. In all cases, I have applied the claim constructions propounded by the Court in its Order and Opinion dated June 15, 2012 or constructions agreed by the parties for terms not expressly construed by the Court. The materials relied upon are listed in Exhibit B.

14. In this Report, where I have cited a reference as prior art, either the reference predates the priority date of the Patents or I have been informed by counsel for Defendants that Defendants will be able to prove at trial that the reference is prior art as to the Patents.

15. I may present my opinions in the form of a tutorial or otherwise and reserve the right to respond to any evidence I/P Engine may present concerning the subject matter of this report.

16. It may be necessary for me to supplement this Report based on material that subsequently comes to light in this case, and I reserve the right to do so. I may be asked to present demonstrative evidence at trial, and I reserve the right to do so.

17. It may be necessary for me to revise or supplement this Report, or submit a supplemental or responsive report, based on any supplemental or responsive report of I/P Engine, and I reserve the right to do so.

III. LEGAL PRINCIPLES

18. As an expert assisting the Court in determining invalidity, I am obliged to follow existing law. I have therefore been asked to apply the following legal principles to my analysis, and I have done so:

a. For a claim to be anticipated, every limitation of the claimed invention must be found in a single prior art reference, either expressly or inherently, arranged as in the claim.

b. When a claim covers several alternative structures or compositions of elements, either generically or as alternatives, the claim is deemed anticipated if any of the structures or compositions within the scope of the claim is disclosed or practiced in a single prior art reference.

c. For a claim element to be inherently present in a prior art reference, the element must be "necessarily present" in the disclosed apparatus, system or method, not merely probably or possibly present.

d. A claim is invalid for obviousness if differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. To be properly applied as an obviousness or anticipation reference, the reference must predate the invention of the subject matter of the claim, unless a statutory bar applies.

e. In determining whether a claimed invention is obvious, one should consider the scope and content of the prior art, the level of ordinary skill in the relevant art, the differences between the claimed invention and the prior art, and whether the claimed invention would have been obvious to one of ordinary skill in the art in light of those differences.

f. If one of ordinary skill in the art can implement a predictable variation prompted by market forces or design incentives, such a variation is obvious. If a technique has been used to improve one device, and one of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond ordinary skill. Stated differently, the proper question is whether one of ordinary skill, facing the wide range of needs created by developments in the field of endeavor, would have seen a benefit to combining the teachings of the prior art.

g. Where there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, it is obvious to pursue the known options within the grasp of one of ordinary skill.

h. Contemporaneous development of similar variations of a device or method by other parties is indicative of obviousness.

i. In establishing obviousness, one must avoid the " temptation to read into the prior art the teachings of the invention in issue" and "guard against slipping into the use of hindsight." The prior art itself, and not the applicant's alleged achievement, must establish the obviousness of the combination.

j. I understand that certain objective factors, sometimes known as "secondary considerations" may also be taken into account in determining whether a claimed invention would have been obvious. Such secondary considerations as "commercial success, long felt but unsolved needs, [and] failures of others" may be evidence of non-obviousness. If such factors are present, they must be considered in determining obviousness.

k. The person of ordinary skill is a hypothetical person who is presumed to be aware of all of the pertinent art. The person of ordinary skill is not an automaton, and may be able to fit together the teachings of multiple prior art references employing ordinary creativity and the common sense that familiar items may have obvious uses beyond their primary purposes. It is not necessary to demonstrate precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ. A patent which merely claims predictable uses of old elements according to their established functions to achieve predicable results may be found invalid as obvious.

l. Art that is analogous to the subject matter of the patent may properly be used as an obviousness reference. I understand that a reference is reasonably pertinent if, even though it may be in a different field from that of the inventor's endeavor, it is one which, because of the matter with which it deals, logically would have commended itself to an inventor's attention in considering his problem.

m. An invention is obvious if one of ordinary skill in the art, faced with the wide range of needs created by developments in the field, would have found it obvious to employ the solution tried by the applicant to meet such needs.

n. I understand that 35 U.S.C. § 112 governs the "definiteness" requirement for patent claims. I understand that a patent claim is invalid as indefinite if a person of ordinary skill in the art could not determine the bounds of the claim. I understand that one of ordinary skill in the art must take the claim as written to determine if it is definite.

IV. OVERVIEW OF THE ASSERTED PATENTS

19. The patents-in-suit are U.S. Patent No. 6,314,420, entitled "Collaborative/ Adaptive Search Engine," and U.S. Patent No. 6,775,664, titled "Information Filter System and Method for Integrated Content-Based and Collaborative/Adaptive Feedback Queries." The '420 Patent was filed on December 3, 1998 and issued on November 6, 2001. The '664 Patent was

filed on October 22, 2001 and issued on August 10, 2004. The ‘664 Patent claims priority to the ‘420 Patent.[1] There are no substantive differences in the content of the patents’ specifications.

20. I understand that I/P Engine has asserted infringement of claims 10, 14, 15, 25, 27, and 28 of the ‘420 Patent. Claim 10 is an independent claim, claim 14 depends directly from claim 10, and claim 15 depends directly from claim 14. Claim 25 is an independent claim, claim 27 depends directly from claim 25, and claim 28 depends directly from claim 27. Claims 10, 14, and 15 are system claims, and claims 25, 27, and 28 are essentially method versions of claims 10, 14, and 15, respectively.

21. I further understand that I/P Engine has asserted infringement of claims 1, 5, 6, 21, 22, 26, 28, and 38 of the ‘664 Patent. Claim 1 is an independent claim, claims 5, 6, and 21 depend directly from claim 1, and claim 22 depends directly from claim 21. Claim 26 is an independent claim and claims 28 and 38 depend directly from claim 26. Claim 1 and its dependants are system claims, while claim 26 and its dependants are method claims.

22. Broadly speaking, the asserted patents describe systems and methods for using a combination of content-based and collaborative filtering to filter search results. The Abstract[2] reads:

> A search engine system is provided for a portal site on the internet. The search engine system employs a regular search engine to make one-shot or demand searches for information entities which provide at least threshold matches to user queries. The search engine system also employs a collaborative/content-based filter to make continuing searches for information entities which match existing wire queries and are ranked and stored over time in user-accessible, system wires

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[1] The ‘420 Patent and the ‘664 Patent also purport to be continuations-in-part of U.S. Patent 5,867,799 (“the ‘799 Patent”), filed on April 4, 1996. However, I understand I/P Engine does not claim that the ‘420 Patent or ‘664 Patent are entitled to the ‘799 Patent’s priority date. Furthermore, in the ongoing re-examination of the ‘420 Patent, the Patent Office explicitly held that the ‘420 Patent is not entitled to the ‘799 Patent’s priority date. *See* Section VIII, *infra*.

[2] As noted above, the ‘420 and ‘664 Patents have substantially identical specifications. Unless otherwise noted, all quotations and citations to the specification in this Report refer to the ‘420 Patent.

> corresponding to the respective queries. A user feedback system provides collaborative feedback data for integration with content profile data in the operation of the collaborative/content-based filter. A query processor determines whether a demand search or a wire search is made for an input query.

23. As noted in the Abstract, the concept of a "wire" features prominently in the patent specifications and many of the claims. The patents define a "wire" as a "query [that] is profiled in storage on a content basis and adaptively updated over time, and informons[3] obtained from the network are compared to the profile for relevancy and ranking." (1:57-60.) As discussed below, the Patent Office relied on the "wire" as the alleged point of novelty that rendered the patents patentable. However, the "wire" element is absent from all the asserted claims in this litigation. Thus, the claims in this litigation lack the feature that the Patent Office considered key to the patents' novelty and patentability.

A. <u>Technology Claimed in the Asserted Patents</u>

24. The asserted patents "relate[] to information processing systems for large or massive information networks, such as the Internet." (1:10-12). More specifically, the asserted patents relate to "information systems . . . wherein a search engine operates with collaborative and content-based filtering to provide better search responses to user queries." (1:12-16). The patents use a combination of content-based and collaborative filtering to filter "informons." (Abstract; 3:19-20). "Informon" is a coined term from the Patents that simply means "an information entity of potential or actual interest to a particular user." (3:31-33).[4]

25. As the specification explains, "[c]ontent-based filtering is a process of filtering by extracting features from the informon, e.g., the text of a document, to determine the informon's relevance." (4:23-26). For example, if a user entered the search query "Paris," a content-based

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[3] The parties agree that an "informon" is "information entity of potential or actual interest to the [individual/first] user." The Court adopted the parties' agreed construction. (Markman Order at 8.)

[4] *See also* fn. 3.

filter might filter documents according to how often their text included the word "Paris," with documents that mentioned "Paris" numerous times more likely to pass the filter than documents that mentioned "Paris" just once or twice. Alternatively, if a user entered the query "Paris museum vacations," a content-based filter might filter documents according how many of these words were included in the documents' text, with documents that mentioned "Paris," "museum" and "vacations" more likely to pass the filter than documents that only mentioned "Paris" and "vacations" or documents that only mentioned "Paris" and "museum."

26. In contrast to content-based filtering, the specification states that "[c]ollaborative filtering . . . is the process of filtering informons, e.g., documents, by determining what informons other users with similar interests or needs found to be relevant." (4:26-29). The exemplar query mentioned above, "Paris," illustrates the potential utility of collaborative filtering. The word "Paris" can refer to many different concepts – for example, the large city in France, the smaller town in Texas, the celebrity Paris Hilton, etc. Without collaborative filtering, a search engine user who enters the query "Paris" might receive a jumble of documents related to France, Texas, or celebrity gossip, since all these documents might contain the word "Paris." Collaborative filtering could filter these documents according to which documents other users *with similar interests or needs* found to be relevant. For example, suppose the user's prior browsing history showed that she was a Francophile. In that case, a collaborative filter would look at which Paris-containing documents other Francophiles (as determined by *their* prior browsing history) found to be relevant. Other Francophiles would presumably have browsed documents about Paris, France far more than documents about Paris, Texas or Paris Hilton, even if all these documents mentioned the term "Paris" an equal number of times. Thus, the collaborative filter would present our hypothetical Francophile with documents about Paris,

France rather than documents about Paris, Texas or Paris Hilton, based on the fact that other Francophiles had found documents about Paris, France to be the most relevant.

27. As for how a collaborative filtering system groups users into communities of similar interests or needs (Francophiles, celebrity watchers, etc.) in the first place, this is also conventionally done by monitoring what documents the users clicked on, bookmarked, or otherwise selected. If the system sees that Users A, B, and C have each selected a high proportion of documents about France, then it may group these users together as Francophiles. If the system sees that users D, E, and F have each selected a high proportion of documents about celebrities, then it may group these users together as celebrity watchers.

28. While the above example illustrates the conventional understanding of collaborative filtering, I understand that I/P Engine has taken a broad and unconventional view of what collaborative filtering entails. According to I/P Engine, users are deemed to have "similar interests or needs" for purpose of collaborative filtering as long as these users entered the same search *query* – even if there is no similarity in the type of search *results* or other documents that they choose to view. Indeed, I/P Engine made this precise argument at the *Markman* hearing in this case. (*See* Markman Tr. at 35:14-18 ("when we look to see who has similar needs or interests, what we are looking at is who else made that same search? Who else made that same query? Who asked for grills? Who asked for Jaguar?")

29. Thus, sticking with the example of a "Paris" query, I/P Engine takes the view that collaborative filtering would simply require filtering search results according to which search results other users who entered the query "Paris" found to be relevant – regardless of whether these other users were Francophiles looking for information on the Paris in France, Texans looking for information on the Paris in Texas, or celebrity watchers looking for information on Paris Hilton. Under I/P Engine's interpretation, there is no need to record users' search history

over time to determine their interests/needs and group them into communities of interest. Instead, a user's interests or needs can be discerned instantaneously by looking at a single query that he entered – and any users who entered a single query in common are deemed to have the same interests or needs simply by virtue of having entered the same query.

30. Notably, the "Background of the Invention" section of the asserted patents tacitly acknowledges that using a combination of content-based and collaborative filtering to filter search queries was known in the prior art. Specifically, the Background of the Invention section states that "[i]n the operation of the Internet. . . A user typically connects to a portal or other web site having a search capability, and thereafter enters a particular query . . . Thereafter, the search site typically employs a 'spider' scanning system and a content-based filter in a search engine to search the internet and find information which match the query." (1:17-26). It goes on to state that "[c]ollaborative data can be made available to assist in informon rating when a user actually downloads an informon, considers and evaluates it, and returns data to the search site as a representation of the value of the considered informon to the user." (1:41-45).

31. Having explained that prior search engines used content-based and collaborative filtering, the Background of the Invention section then states that "[i]n the patent application which is parent to this continuation-in-part application[5] . . . an *advanced* collaborative/content-based information filter system is employed to provide superior filtering in the process of finding and rating informons which match a user's query." (1:46-52) (emphasis added). The alleged advancement of this patent was to employ a "wire" that stores the user's query on a continuing basis. *See* 1:56-64:

[5] This "parent" application referred to in this section is the application that matured into the '799 Patent. As previously noted, both asserted patents are continuations-in-part of the '799 Patent, but I/P Engine does not allege that the asserted patents can claim priority to the '799 Patent's priority date.

> In operation, a user enters a query *and a corresponding 'wire' is established, i.e., the query is profiled in storage on a content basis and adaptively updated over time*, and informons obtained from the network are compared to the profile for relevancy and ranking. A continuously operating 'spider' scans the network to find informons which are received and processed to determine relevancy to the individual user's wire or to wires established by numerous other users. (emphasis added).

32. Finally, when the patents first describe "the present invention," they repeat the "adaptive" updating that is the hallmark of the recited wire. *See* 2:20-26 ("The present invention is directed to an information processing system especially adapted for use at internet portal or other websites to make network searches for information entities relevant to user queries, with collaborative feedback data and content-based data *and adaptive filter structuring*, being used in filtering operations to produce significantly improved search results.")

B. <u>The Prosecution Histories</u>

1. <u>The '420 Patent</u>

33. The Applicants filed the application that would become the '420 Patent on December 3, 1998. On December 6, 2000, all asserted claims were rejected for non-statutory double-patenting over the parent '799 Patent. The Examiner reasoned that the only difference between the pending claims and the '799 claims was that the pending claims applied the '799 claims' content-based and collaborative filtering to a search engine environment. Further, the Examiner stated that "it would have been obvious to one of skill in the art at the time of the invention to have implemented the information filtering system of Lang et al. (U.S. Patent no. 5,867,799) wherein the computer network provided thereof (See Lang et al. Figure 1) would have incorporated a search engine." (December 6, 2000 Office Action at 3).

34. On May 7, 2001, the applicants submitted a terminal disclaimer to overcome the double-patenting rejection.

35. On May 21, 2001, the Examiner allowed the pending claims. In so doing, the Examiner made clear that a search engine that employed a combination of content-based and collaborative filtering was not novel. Nonetheless, the Examiner found that the claims were patentable because of the "wire" element:

> 2. The following is an examiner's statement of reasons for allowance: The present invention is directed to a search engine operated with collaborative and content-based filtering. The closest prior art [Michael Persin, Document Filtering for Fast Ranking, ACM, July, 6, 1994, pages 339-348] discloses a similar filtering method. However, Michael Persin fails to show *"storing a linked list of relevant informons as a wire and providing a system for returning a wire to an individual user"*. These limitations, in conjunction with all other limitations of the base claims were not shown by, would not have been obvious over, nor would have been fairly suggested by the prior art of record.

(May 21, 2001 Notice of Allowability at 2 (emphasis in original)). At no point did the applicants alert the Examiner that not all of the claims actually contained the "wire" element that was key to the Examiner's conclusion of patentability.

2. The '664 Patent

36. The application that would become the '664 Patent was filed on October 22, 2001. The Examiner allowed the patent, without prior rejection, on March 31, 2004.

C. The Relevant Claims

37. The relevant claims of the asserted patents are reproduced below:[6]

1. The '420 Patent

10. A search engine system comprising:

a) a system for scanning a network to make a demand search for informons relevant to a query from an individual user;

[6] The letter designations in each of these reproduced claims are added for clarity.

b) a content-based filter system for receiving the informons from the scanning system and for filtering the informons on the basis of applicable content profile data for relevance to the query; and

c) a feedback system for receiving collaborative feedback data from system users relative to informons considered by such users;

d) the filter system combining pertaining feedback data from the feedback system with the content profile data in filtering each informon for relevance to the query.

14. The system of claim **10** wherein the collaborative feedback data comprises passive feedback data.

15. The system of claim **14** wherein the passive feedback data is obtained by passively monitoring the actual response to a proposed informon.

25. A method for operating a search engine system comprising:

a) scanning a network to make a demand search for informons relevant to a query from an individual user;

b) receiving the informons in a content-based filter system from the scanning system and filtering the informons on the basis of applicable content profile data for relevance to the query;

c) receiving collaborative feedback data from system users relative to informons considered by such users; and

d) combining pertaining feedback data with the content profile data in filtering each informon for relevance to the query.

27. The method of claim **25** wherein the collaborative feedback data provides passive feedback data.

28. The method of claim **27** wherein the passive feedback data is obtained by monitoring the actual response to a proposed informon.

2. <u>The ‘664 Patent</u>

1. A search system comprising:

a) a scanning system for searching for information relevant to a query associated with a first user in a plurality or users;

b) a feedback system for receiving information found to be relevant to the query by other users; and

c) a content-based filter system for combining the information from the feedback system with the information from the scanning system and for filtering the combined information for relevance to at least one of the query and the first user.

5. The search system of claim **1** wherein the filtered information is an advertisement.

6. The search system of claim **1** further comprising an information delivery system for delivering the filtered information to the first user.

21. The search system of claim **1** wherein the content-based filter system filters by extracting features from the information.

22. The search system of claim **21** wherein the extracted features comprise content data indicative of the relevance to the at least one of the query and the user.

26. A method for obtaining information relevant to a first user comprising:

a) searching for information relevant to a query associated with a first user in a plurality of users;

b) receiving information found to be relevant to the query by other users;

c) combining the information found to be relevant to the query by other users with the searched information; and

d) content-based filtering the combined information for relevance to at least one of the query and the first user.

28. The method of claim **26** further comprising the step of delivering the filtered information to the first user.

38. The method of claim **26** wherein the searching step comprises scanning a network in response to a demand search for the information relevant to the query associated with the first user.

D. The Court's Claim Constructions

38. On June 15, 2012,[7] the Court issued a *Markman* Order construing several terms in the asserted claims. (*See* Docket Entry 171 ("Markman Order")). The Court's constructions are as follows:

informon: information entity of potential or actual interest to the [individual/first] user

user: an individual in communication with the network (in the '420 claims); an individual in communication with a network (in the '664 claims)

relevance to the query: how well an informon satisfies the individual user's information need in the query

query: request for search results

collaborative feedback data: data from system users regarding what informons such users found to be relevant

scanning a network: looking for or examining items in a network

a scanning system: a system used to search for information

demand search: a single search engine query performed upon a user request

order of steps: Step [a] must be performed before Step [b] in '420 claim 25; Steps [a] and [b] must be performed before Step [c] in '664 claim 26

V. THE SCOPE AND CONTENT OF THE PRIOR ART

A. The Prior Art Generally

39. This section contains a brief history of search and collaborative filtering, focusing on the years shortly before the applications for the asserted patents were filed. In this section, I explain some of the key ideas discussed in the patents and describe the state of the art at the time of the patents.

[7] While the Order was filed on June 15, 2012, I understand that it was not distributed to the parties until June 18, 2012.

40. The 1990's was a period with much research on, and application of, search and collaborative filtering. Two parallel threads came together in the 1990's: search engines such as AltaVista allowed people to type queries and retrieve documents, while recommender systems such as GroupLens used collaborative filtering to recommend items such as movies or news articles to people. These collaborative filtering algorithms took advantage of the fact that if you liked the last ten movies that I liked, you will probably like the eleventh movie that I like as well.

41. As the number of documents on the Internet grew, a key question for search engines became determining which documents were "best" for a given user making a given query. As will be described below, it was clear to many people that collaborative filtering could provide one part of the answer to that question. This is the context in which the '420 and '664 Patents were written.

a. Recommender systems

42. Recommender systems have long been used to select which of a large set of items a user might be interested in. For example, Netflix determined which of its movies to suggest to a subscriber and Amazon determined which of a set of products to present to a shopper. Note that the items have often been web pages, containing general information or descriptions of specific products such as movies or books.

43. Recommendations can be based on many attributes of the web pages, the products they describe, and the users to whom the recommendation is offered. Most simply, the popularity of the page or product can be used: how many people bought a book, clicked on an ad, or linked to a web page. More popular items are ranked higher in the list to be presented to the user. More sophisticated approaches for selecting recommendations include *content-based* and *collaborative* filtering.

44. *Content-based filtering* uses attributes of the items being considered for recommendation in order to better select recommendations for a given user. In movie recommendations, for example, content-based filtering could use the movie's director and lead actors, genre information (is it a comedy or not?), and words that appear in the synopsis of the movie. These might be matched against the user's profile (*e.g.*, based on movies previously viewed by the user) or against the words the user typed in a query to a search engine. Thus, if a user's profile showed that he liked romantic comedies starring Steve Martin, the movie recommendation system might present him with movies that have been labeled as romantic comedies and had Steve Martin as one of the actors. Alternatively, if the user typed "romantic comedies Steve Martin" as a search query, the movie recommendation system might also present him with romantic comedies that had Steve Martin as one of the actors.

45. *Collaborative filtering* works on the principle that if you and I like many of the same items, then it is a good idea to recommend to you additional items that I have liked.[8] Many different algorithms are used for this task. A simple one is *k-nearest neighbors-based collaborative filtering*, which works as follows:

a) Represent each person in a database by a list of products that they have purchased.

b) For a 'target' user, for whom one wants to make a recommendation, find the set of people who have the most similar list of purchased products. The number of products that occur on both lists is a simple measure of how similar they are. In practice, much more sophisticated algorithms are used that take into account how many items each user has purchased and how popular the different items are.

c) Select the k (where k is a number, such as 5) most similar users to the target user.

[8] Typically, one does not know if a user actually likes a product or page; one only knows if they purchased it or clicked on it. Thus, in the example that appears later in this paragraph, I speak of "purchased" instead of "liked."

d) Rank potential products to recommend based on how many of the k similar users have purchased those products. Products that more similar people have purchased are ranked more highly.

e) Optionally, return only the most highly-ranked items on the list.

46. Some recommender systems use a different variant, *item-based collaborative filtering*, where instead of finding similar users based on their purchase history, similar items are found based on the items being purchased by the same people. In this case, each item is a list of the people that have purchased it, and similarity between a pair of items is computed based on how "similar" their lists of purchasers are.

47. Early collaborative filtering systems, and some current systems, worked by having users explicitly rate items (*e.g.*, "On a scale of 1 to 5, where 1 is 'I hate it' and 5 is 'I love it,' how do you rate this movie?"). However, researchers soon found that it is often sufficient to monitor users' actions to infer what they like. Such *passive monitoring* includes noting what items a user has viewed, clicked or purchased, or how long the user has spent viewing a given web page or listening to a given song.

48. By the mid 1990's, content-based and collaborative filtering were both well established in academia and in industry and attention was paid to how to improve these filtering methods in various ways, including by combining them. This is important, among other reasons, because when one first starts an information system, one only has data for content-based recommendations. In other words, when a system first starts, no user selections are generally available on which to do collaborative filtering. Moreover, if a system has relatively few users compared to the number of selectable items, some items might be selected infrequently or not at all, making it hard or impossible to recommend these items using collaborative filtering alone.

49. “Collaborative filtering” as a term in the literature dates back at last to the 1992 Goldberg et al. article on their *Tapestry* system, and was receiving significant press by 1995 with the WEBHOUND system and the founding of what became Firefly Network, Inc. Several of the key academic collaborative filtering systems, including GroupLens, Fab, Referralweb, PHOAKS and Siteseer were described in 1997 in a widely read Communications of the ACM Special Issue on collaborative filtering. Workshops on recommender systems soon followed, sponsored by the American Association for Artificial Intelligence (AAAI 1998) and the ACM *Special Interest Group on Information Retrieval* (SIGIR 1999), among others. An overview of the applications of collaborative filtering covering the 1990’s is given the 2002 book *Word of Mouse*.[9]

b. Search engines

50. By the time of the asserted patents, search engines had been popular for many years. The first wave of modern search engines, including AltaVista, InfoSeek, and Lycos, were launched in 1994. By 1998, Google and MSN Search had also launched search engines. These ‘modern’ search engines all share the same core technology: they first collect a database of web pages (originally entered manually, and later collected using automatic web-crawling software called “spiders”), which are then indexed by the words that they contain.[10] Users type in a query, which is then matched against the index to retrieve documents that contain the query words (or some subset of them). The resulting retrieved documents are then ranked based on some metric of quality (*e.g.*, popularity as described above) and links to the highest-ranked documents are presented to the user, along with short summaries of the documents called “snippets” or “squibs”.

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[9] Detailed bibliographic citations for the references discussed in this paragraph are contained in Exhibit B of this report.

[10] Formally, this list of documents containing each word is called an “inverted index”: each word has a list of documents that it occurs in, inverting the normal document collection where each document has a list of words that occur in it.

51. Current systems are actually much more sophisticated, using not only the words of the query but also related words including variant spellings and synonyms, and the set of documents returned are selected for diversity as well as for quality. However, the basic idea remains the same as in the 1990's.

52. *Search*, where a user enters a query a single time ("one shot" or "demand" queries) and immediately looks at the results, is closely related to *filtering* ('wires" in the asserted patents) where a user provides a standing query and documents are collected for the user to read. Search is widely used, of course, by modern search engines. Filtering was widely studied in the mid-1990's, but has proved less popular than demand search, although it remains common among, for example, news-clipping services that send subscribers daily collections of articles that match their interest profiles.

53. For example, in a search system, a user might enter the query "Paris museum vacations" and the system would immediately present him (within seconds) with dozens or hundreds of documents matching these terms. After presenting the user with these documents, the search for and presentation of documents would cease. By contrast, in a filtering system, a user might have a standing request for documents about Paris museum vacations. Every day, the system would look for newly-published documents matching these terms and would deliver them to the user's folder.

54. As previously noted, search systems and filtering systems are conceptually very similar. In the example from the preceding paragraph, for instance, a search system and a filtering system might use the same algorithm(s) to find candidate documents. The difference would simply be that the search system conducts a one-time search and delivers responsive documents to the user almost instantaneously, while a filtering system conducts the same search

every day and delivers new documents to the user whenever one of its daily searches uncovers a new and non-duplicative responsive document.

B. Exemplary Prior Art References

1. U.S. Patent No. 6,185,558 to Bowman et al. ("Bowman")

55. U.S. Patent No. 6,185,558 to Bowman et al., entitled "Identifying the Items Most Relevant to a Current Query Based on Items Selected in Connection with Similar Queries," was filed on March 10, 1998 and claims priority to a provisional application filed one week earlier. The Bowman patent issued on February 6, 2001. I understand that Bowman is accordingly a prior art patent with respect to the asserted patents, which claim priority to a December 3, 1998 patent application.[11]

56. As detailed in the specification, Bowman functions similarly to a traditional search engine in that it accepts a query from a user and generates a body of search results in response to the query. (*See id.* at Abstract; 5:31-32; claim 28). However, Bowman also gives each search result a ranking score according to how often prior users who had entered the same query had selected that particular result. (*See id.* at Abstract; 2:30-35; 5:32-35; claim 28). Items that were selected more often get higher ranking scores.

57. Bowman then adjusts the ranking score of each search result according to how *many* of the terms in the query are matched by the search result. (*See id.* at 8:50-53; claim 29). Search results whose content contains all the terms in the query get higher ranking scores, while

[11] I understand I/P Engine has specifically disclaimed any knowledge or belief that the asserted patents may claim a priority date earlier than December 3, 1998. (*See* I/P Engine's Third Supplemental Response to Interrogatory No. 1 (July 2, 2012) ("After a reasonable investigation of available information including a review of the documents identified in Plaintiff's First Supplemental Response to Interrogatory No. 1 and discussions with named inventors Andrew K. Lang and Donald Kosak, Plaintiff is not aware of evidence sufficient to form a contention as to the conception of, or any reduction to practice activities related to, the patents-in-suit prior to December 3, 1998.")

search results get progressively lower ranking scores as their content contains fewer and fewer of the terms in the query. (*See id.*)

58. The search results are finally presented to the user in ranked order. (*Id.* at Abstract). Additionally, the system may present only a subset of the search results whose ranking scores exceed a certain threshold, or a predetermined number of search results that have the highest ranking scores. (*See id.* at 9:60-64).

59. For example, if a user enters the search query "Paris museum vacations," Bowman generates a body of search result items that contain the words "Paris," "museum," or "vacations." Bowman then gives each of these items a ranking score based on how often they were selected by other users who had entered the query "Paris museum vacations." Bowman then adjusts the ranking scores by giving higher scores to items that contain "Paris," "museum," *and* "vacations," while giving lower scores to items that contain only two of these terms (and giving even *lower* scores to items that only contain one of these terms.) Bowman finally presents these items (or some subset of these items) to the user.

60. Thus, in Bowman, the final ranking score for each item is generated through a combination of what I/P Engine asserts to be collaborative filtering (determining how often other users who entered the same query selected the item) and content-based filtering (analyzing the item's content to see how many of the words from the query appear in the item).

2. <u>U.S. Patent No. 6,006,222 to Culliss ("Culliss")</u>

61. U.S. Patent No. 6,006,222 to Culliss, entitled "Method for Organizing Information," was filed on August 1, 1997 and issued on December 21, 1999. I understand that Culliss is accordingly a prior art patent with respect to the asserted patents, which claim priority to a December 3, 1998 patent application.

62. Culliss, like Bowman, is directed to a search engine system that ranks search results based on a combination of the content of the search results and feedback from prior users who had entered the same query and viewed these search results.

63. In Culliss, Internet articles are associated with key terms that they contain. (*Id.* at 3:60-64). For example, two articles about museum-viewing vacations in Paris ("Article 1" and "Article 2") might both be associated with the key terms "Paris," "museum," and "vacations" if they both contained all three of these words.

64. These articles are given a "key term score" for each of the key terms that they contain. (*Id.* at 3:65-66). Culliss discloses that each key term score might initially be set at 1. (*Id.* at 3:10-4:9). Thus, in the above example, Article 1 would have a key term score of 1 for each of "Paris," "museum," and "vacations," and so would Article 2. Alternatively, Culliss discloses that the key term scores might be set to reflect how many times each of the key terms appeared in the document's content. (*See id.* at 14:32-36 ("Although the scores in the index are initially shown at 1, they can be initially set to any desired score. For example, the scores can be initially set to correspond with the frequency of the term occurrence in the article.") Thus, if the term "Paris" appeared five times in Article 1, then Article 1 would have a key term score of 5 for "Paris." If the term "museum" appeared three times in Article 1, then Article 1 would have a key term score of 3 for "museum."

65. A user of Culliss's system enters a search query, and the system returns squibs of the documents that match the key terms in the query. (*Id.* at 4:10-26). Each squib shows a truncated portion of the corresponding document's content, so the user can evaluate whether he wants to select and view the full document. (*Id.* at 4:26-36). Sticking with the above example, a user who enters the query "Paris museum vacations" would be presented with squibs of Article 1 and Article 2.

66. Culliss discloses that the articles are presented to the user in the order dictated by their combined key term scores. (*Id.* at 5:2-10). For example, if Article 1 had a key term score of 5 for "Paris," 3 for "museum," and 2 for "vacations," its aggregate score for the query "Paris museum vacations" would be 10 (5 + 3 +2). If Article 2 had a key term score of 4 for "Paris," 2 for museum," and 3 for "vacations," its aggregate score for the query "Paris museum vacations" would be 9 (4 + 2 +3). Thus, Article 1 would be presented above Article 2 because it had a higher aggregate score.

67. When a user selects an article whose squib is presented to him, the key term scores for that article which correspond to the terms in the user's query are increased. (*Id.* at 4:37-49). This is because the user, by selecting the article in response to his query, has implicitly endorsed the idea that these key terms from the query are appropriately matched to the article. (*See id.*)

68. For example, if our hypothetical first user who queried "Paris museum vacations" selected Article 2, then Article 2's key term scores for "Paris," "museum," and "vacations" might each rise by +1. (*See id.* at 4:43-45 ("To alter the key term scores, a positive score such as (+1) can be added to the key term scores, for example . . .") The next user who enters the same query would thus see a different rank of articles, based on the new key term scores that reflect the input of the prior user. (*See id.* at 4:66-5:1). Sticking with our example, Article 2 would have a new aggregate score of 12 (instead of 9) after the first user selected it, because its key term scores for "Paris," "museum," and "vacations" each increased by +1 when the first user selected it. Thus, a later user who queries "Paris museum vacations" would see Article 2 (which has a new aggregate score of 12) presented above Article 1 (which still has its old aggregate score of 10).

69. In short, the article ranking in Culliss is based on a combination of the articles' content and feedback given by previous users who entered the same query. This is because both factors (article content and user feedback) are used to calculate the key term scores that determine the article ranking.

3. U.S. Patent No. 6,202,058 to Rose et al. ("Rose")

70. U.S. Patent No. 6,202,058 to Rose et al., entitled "System for Ranking the Relevance of Information Objects Accessed by Computer Users," was filed on April 25, 1994 and issued on March 13, 2001. I understand that Rose is accordingly a prior art patent with respect to the asserted patents, which claim priority to a December 3, 1998 patent application.

71. Rose describes a system that predicts how relevant various items in an information database will be to users of the database. "The prediction of relevance is carried out by combining data pertaining to the content of each item of information with other data regarding correlations of interests between users." (*Id.* at Abstract).

72. Rose makes its content-based analysis by comparing a vector representing a document's content to a vector representing the user's preferences. (*Id.* at 6:11-58). The closer the vectors are to each other, the more relevant the document is judged to be for the user. (*Id.* at 6:56-58).

73. Rose makes its correlation-based analysis by recording feedback from system users about how much they liked documents that they viewed. (*Id.* at 5-26-30). Based on this user feedback, the system determines the degree of correlation in various users' interests. (*Id.* at 6:59-66). This correlation of interests is used to help predict whether a given document will be deemed relevant to a given user. Specifically, a document will be deemed relevant to a user if other users, whose preferences correlate with the user at issue, had given a high rating to the document. (*Id.* at 7:6-19). As noted above, Rose combines the content-based scores and

correlation scores to generate an overall score for the document, which indicates the document's relevance to the user. (*See id.* at Abstract, 7:34-36).

74. Rose also discloses that this content-based/correlation-based filtering can be used to filter documents from a wide variety of information systems, including “search results obtained through an online text retrieval service.” (2:54-55; *see also* claim 26).

4. Feature Guided Automated Collaborative Filtering by Yezdezard Zerxes Lashkari (“Lashkari”)

75. *Feature Guided Automated Collaborative Filtering* was a thesis submitted by Yezdezard Lashkari as part of his Master of Science in Media Arts and Sciences at the Massachusetts Institute of Technology in 1995. I understand that Lashkari is accordingly a prior art reference with respect to the asserted patents, which claim priority to a December 3, 1998 patent application.

76. Lashkari disclosed a filtering framework entitled “Feature Guided Automated Collaborative Filtering” (FGACF), which he described as “A formal framework for combining content-based and automated collaborative filtering techniques to leverage off of the complementary strengths of both techniques.” (Lashkari at 20-21).

77. Lashkari's FGACF algorithm implements content-based filtering by extracting features from documents in order to increase the accuracy of the collaborative filtering component of the disclosed algorithm. (*Id.* at 33-35). Lashkari recognized that blindly applying collaborative filtering without any content-based filtering would have poor results as users might strongly agree about some categories of documents but strongly disagree about other categories of documents (they may have similar tastes in technical articles, but radically different tastes when it comes to purchasing automobiles). (*Id.* at 30).

78. Lashkari disclosed a WWW-specific implementation of feature extraction through his implementation of the WEBHOUND server interface. (*Id.* at 62-63). Specifically, Lashkari

disclosed extraction of “Title Keywords”, “Body Keywords”, “Anchor Keywords”, “Server Domain”, “Number of Inline Images”, and “Number of Hypertext Links.” (*Id.* at 63).

79. Lashkari's FGACF algorithm also implements collaborative filtering through the automated collaborative filtering algorithm (ACF). (*Id.* at 33-34). The ACF algorithm utilized by FGACF implements collaborative filtering as asserted by I/P Engine because it compares the activity of a first user to the activity of other users, and then uses the most similar users' prior rankings to calculate a predicted rating for the first user. (*Id.* at 25).

80. Lashkari's FGACF combines content-based filtering and collaborative filtering to ultimately generate predicted rankings. (*Id.* at 39). Specifically, Lashkari's prediction equation incorporates content-based filtering by using “Feature Weights” and “Cluster Weights” before ultimately calculating a final ranking score based on ACF. (*Id.*) “Feature Weight” reflects the importance of a given feature relative to the other features for a particular user. (*Id.* at 38). “Cluster Weight” is an indication of “how important a particular user seems to find a particular feature value cluster.” (*Id.* at 37). The algorithm calculates both of these factors by extracting features from documents that the user has already rated in order to ascertain how important the user finds those specific features. In an implementation where the only feature under consideration is “Body Keywords” and the keywords are not clustered whatsoever, “Feature Weight” would be irrelevant because there is only one feature and “Cluster Weight” would reduce to the importance the user attaches to each query keyword.

81. For example, suppose a user enters the search query “Paris museum vacations” in a Lashkari system where “Body Keywords” are the only extracted feature given any weight in the algorithm and there is no keyword clustering. The system will first determine the “Cluster Weight” for each keyword by analyzing the user's historical rankings for pages that have that keyword. If a user has historically ranked content highly when the content contained the

keyword, that keyword will have a higher "Cluster Weight" score (for example, the user might have ranked pages higher that contained "Paris" than those that contained "vacations.") (*Id.* at 37). The system will then find the neighbors of the user by finding other users with similar historical rankings, assigning more weight to the neighbors that are more similar with respect to ranking the query keywords (for example, a second user that also highly ranked pages with "Paris" is a closer neighbor than a third user that did not highly rank pages with "Paris"). (*Id.* at 38). Finally, the system will make a final ranking score for each item based on the neighbors' ratings of that item (for example, if a neighbor viewed the webpage under consideration and gave it a poor rating, the webpage would have a lower final ranking score). Thus, the final ranking predictions of the Lashkari FGACF algorithm incorporate both content-based filtering through the extraction and weighing of features for each web page and collaborative filtering through the ACF algorithm.

82. Finally, Lashkari discloses that the WEBHOUND filtering system can be paired with a traditional search engine, such as Lycos or Yahoo!, to filter search results returned by the search engine in response to a user query. (*Id.* at 78).

5. <u>U.S. Patent No. 6,421,675 to Ryan et al. ("Ryan")</u>

83. U.S. Patent No. 6,421,675 to Ryan et al., entitled "Search Engine," was filed on July 15, 1998 and issued on July 16, 2002. Ryan claims priority to a provisional application filed on March 16, 1998. I understand that Ryan is accordingly a prior art patent with respect to the asserted patents, which claim priority to a December 3, 1998 patent application.

84. Ryan describes a search engine system wherein a user can request several different types of search, including "Popular Search," "Conventional Search," and "Content Only Search." (*See* Ryan at 20:30-66.) The Popular Search functionality combines content-based and collaborative filtering, as those limitations have been interpreted by I/P Engine. More

specifically, after a user enters the desired keyword,[12] "Popular Search" lists "the most popular URLs for that keyword." (*Id*. at 20:34-35.)

85. Among various other data tables, Ryan maintains a table that pairs URLs and keywords. Web site owners may submit new URLs and associated keywords to the search engine. (*Id.* at 18:38-67.) Alternately, specialist crawlers may be sent out to locate web site addresses and keyword. (*Id.* at 19:31-33.) The initial pairing of keywords with URLs is "content based filtering" under I/P Engine's infringement theories. *See, e.g.*, 7/2/12 Infringement Contentions for Google at 9: "Google AdWords receives and filters advertisements on the basis of content data (e.g., ad text, *keyword*, and landing page attributes) for relevance to the query." (emphasis added.)

86. For each keyword-URL pair entered into the system, Ryan tracks "the cumulative number of significant visits (hits) to each URL addresses corresponding to each key-word," "the previous cumulative number of significant visits measured at an earlier predetermined instant," and "the date time in which a web-page developer submitted a web-page to the search engine." (Ryan at 12:23-39.) These three values are termed X, Y, and Z respectively, and are stored in a data structure corresponding to Table 3 of the Ryan patent. Tracking visits to search results is collaborative feedback data under I/P Engines infringement theories. *See, e.g.*, 7/2/12 Infringement Contentions for Google at 13: "The CTR [clickthrough rate] is collaborative feedback data."

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[12] As Ryan explains, a key-word is "[t]he word or phrase that is entered in the search engine." (Ryan at 6:10-11.)

TABLE 3

Links between information suppliers (web-pages) and information requests (key-words)					
	Key-word	Key-word	Key-word	Key-word	Key-word
URL address 1	X, Y, Z				
URL address 2					X, Y, Z
URL address 3			X, Y, Z		
URL address 4	X, Y, Z				
URL address 5		X, Y, Z		X, Y, Z	
URL address 6					
URL address 7					

87. A more technical description of Ryan's operation follows. Initially, Ryan tracks the user's interactions with various URLs. That tracking can be as simple as merely recording that the user visited the URL given a keyword search (Ryan at 16:31-34), or it can involve only recording the visit if the user spends a specified amount of time at the URL. (*Id.* at 16:34-39.) Tracked visits are fed into a "cumulative surfer hit table," which counts the number of valid visits within a specified time period.[13]

TABLE 8

cumulative surfer hit table created from accumulated surfer traces				
	Key-word	Key-word	Key-word	Key-word
URL address 1				
URL address 2	α		α	
URL address 3		α		α
URL address 4		α		
URL address 5				
URL address 6			α	
URL address 7				α

88. At regular times, the cumulative surfer hit table in Table 8 is used to update Table 3. Ryan essentially adds the new number of "hits" to the previous number of "hits" for each

[13] Ryan only counts a subsequent visit from a user if it does not occur immediately after a prior visit. (Ryan at 17:2-9.) This is meant to prevent users from artificially inflating the popularity of the keyword/URL pair by clicking on that result repeatedly.

keyword-URL pair. (Ryan at 17:23-26.) Previous hits may be "aged" so that older visits do not matter as much as newer visits. (*Id.*) Ryan also keeps track of the prior number of visits. (*Id.* at 18:21-27.) For example, if CNN.com previously had 120 visits from users who requested a search on "news" and got 25 more visits in the last reporting period, Ryan may record both the current number of visits (145) as well as the previous number of visits (120). This allows Ryan to track "hot" URLs that are rapidly increasing in popularity. (*Id.*)

89. When a user requests a popular search, Ryan "produces a list of web pages based on the values of X taken from Table 3 (172, FIG. 5) for the keyword 270 entered," *i.e.* based on the number of previous visits made by other users who entered the same query. (*Id.* at 21:16-19.) "[T]he resulting list of web pages is then tagged… and sent to the user for them to make their selections." (*Id.* at 21:24-26.)

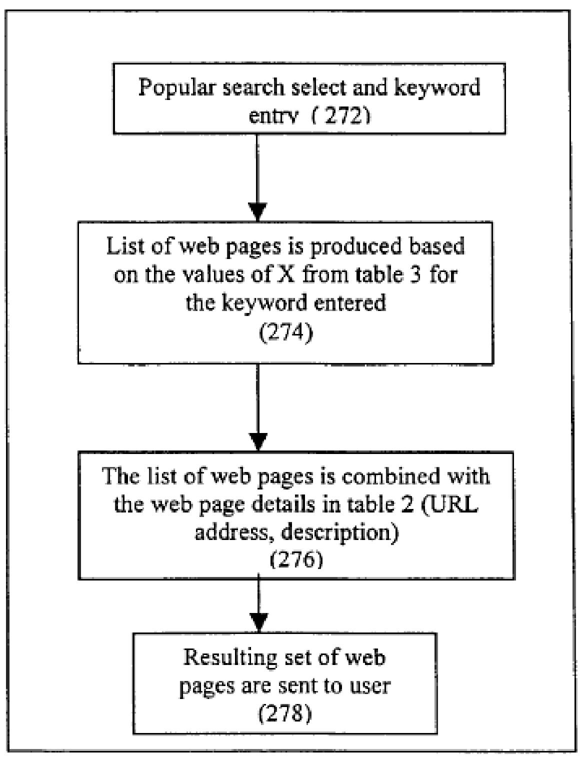

Figure 6

6. Marko Balabanovic et al., "Fab: Content-Based, Collaborative Recommendation," Comm'ns of the ACM (March 1997) ("Balabanovic")

90. "Fab: Content-Based, Collaborative Recommendation" by Balabanovic et al. was published in March 1997. I understand that Balabanovic is accordingly a prior art reference with respect to the asserted patents, which claim priority to a December 3, 1998 patent application.

91. Balabanovic describes the "Fab" system as an information recommender system that combines content-based and collaborative filtering. (Balabanovic at 66 ("By combining both collaborative and content-based filtering systems, Fab may eliminate many of the weaknesses found in each approach."))

92. Fab stores a profile for each user that represents the user's interests. (*Id.* at 69). It presents each user with documents whose content matches the user's profile. (*Id.*) The user rates these documents on a 7-point scale, and documents that the user rates highly are presented to other users who have similar user profiles to the first user. (*Id.*)

93. Thus, a given document might go through both content-based filtering and collaborative filtering before being presented to a user. Consider: if Document X's content matches User #1's profile, then Document X will be presented to User #1. This is an example of content-based filtering. If User #1 gives Document X a high rating, then Document X will be passed to User #2 (a user who has a similar profile to User #1). This is an example of collaborative filtering. Thus, Document X was ultimately presented to User #2 via a combination of content-based filtering and collaborative filtering.

7. Shoshana Loeb, "Architecting Personalized Delivery of Multimedia Information," Comm'ns of the ACM (December 1992) ("Loeb")

94. "Architecting Personalized Delivery of Multimedia Information" by Loeb was published in December 1992. I understand that Loeb is accordingly a prior art reference with respect to the asserted patents, which claim priority to a December 3, 1998 patent application.

95. Loeb describes the "LyricTime" music system, which selects and presents songs to system users. "[T]o select songs from the database, it users the information filter which implements the model . . . using descriptions of the songs, a listener profile, and feedback from the listener." (Loeb at 45).

96. The system derives "descriptors" for each candidate song. For example, the song *True Love Ways* by Buddy Holly might have the following descriptors: "Buddy Holly *True Love Ways* quiet fifties artistic male vocal American music . . ." (*Id.* at 46). Using these descriptors, the system presents to a listener songs that best match the listener profile. (*Id.*)

97. The listener profile is not static, but adapts based on active ("explicit") and passive ("implicit") feedback from the listener. (*See id.* ("The adaptor uses listener-explicit and listener-implicit feedback information to update the listener profiles")). To receive active feedback, the LyricTime user interface has a row of buttons that users can select to indicate how much they liked a given song. (*See id.* at 46, Fig. 3). To receive passive feedback, the system monitors whether the user chose to skip a song (which constitutes negative passive feedback toward that song) or replay the song (which constitutes positive passive feedback). (*See id.* at 47).

VI. <u>THE ASSERTED CLAIMS ARE INVALID AS ANTICIPATED</u>

98. Exhibits A-1 through A-7 of this Report contain element-by-element claim charts of each of the asserted claims in this case with references to the prior art, and are fully incorporated in their entirety into this Report. The charts also list additional references that would render each claim obvious should a finder-of-fact determine that the corresponding element is not present in the prior art reference. Further narrative discussion of these references is below.

A. **<u>Bowman anticipates claims 10, 14, 15, 25, 27, and 28 of the '420 Patent and claims 1, 5, 6, 21, 22, 26, 28, and 38 of the '664 Patent</u>**

1. **<u>Background on Bowman</u>**

99. As discussed above, Bowman functions similarly to a traditional search engine in that it accepts a search query from a user and generates a body of search results that match the query. (*See* Bowman at Abstract, 5:31-32, claim 28). However, Bowman also gives each search result a ranking score based on how often prior users who had entered the same query had selected that particular result. (*See id.* at Abstract, 2:30-35, 5:32-35, claim 28). Bowman further adjusts the ranking score of the search results according to how *many* of the search terms in the query are matched by each search result. (*See id.* at 8:50-53, claim 29). For example, if the user enters the query "Paris museum vacations," Bowman will adjust the ranking score for the various search results by giving a relatively higher score to search results that contain all three words in the query, a lower score to search results that only contain two of the words in the query, and an even lower score to items that only contain one of the words in the query.

100. Claims 28 and 29 of Bowman, viewed together, illustrate how Bowman meets each of the elements from the asserted claims of the '420 and '664 Patents. Claim 28 of Bowman recites:

> A computer-readable medium whose contents cause a computer system to rank items in a search result by:
>
> [a][14] receiving a query specifying one or more terms;
>
> [b] generating a query result identifying a plurality of items satisfying the query; and
>
> [c] for each item identified in the query result, combining the relative frequencies with which users selected the item in earlier queries specifying each of the terms in the query to producing [sic] a ranking value for the item.

Claim 29 of Bowman recites:

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[14] These letter indicators are added for clarity and convenience.

> The computer-readable medium of claim **28** wherein the contents of the computer-readable medium further cause the computer system to perform the step of adjusting the ranking value produced for each item identified in the query result to reflect the number of terms specified by the query that are matched by the item.

2. Bowman anticipates claim 10 of the '420 Patent

101. I understand that the preamble of a claim is not always considered a limitation. Further, I/P Engine's infringement contentions assert that the preamble of claim 10 is not a limitation. *See, e.g.,* 7/2/12 Infringement Contentions for Google at 1 ("no comparison needs to be made between the accused system, Google AdWords, and the preamble"). To the extent the preamble is considered a limitation here, Bowman teaches a "search engine system" as recited in the preamble to claim 10. Specifically, Bowman's disclosed computer system accepts a search query from a user and returns a set of search results, which one of ordinary skill in the art would understand is the hallmark of a search engine. (*See* Bowman at 5:31-32 (stating that Bowman's system includes "a query server for generating query results from queries."))

(a) A system for scanning a network to make a demand search for informons relevant to a query from an individual user

102. The Court construed "scanning a network" as "looking for or examining items in a network," and construed "demand search" as "a single search engine query performed upon a user request." The Court construed "query" as a "request for search results." Thus, the element of "scanning a network to make a demand search" requires looking for or examining items to make a request for search results.

103. If the "request for search results" is understood to be the literal search terms that a user enters to trigger a search, then this claim element would be incomprehensible to one of skill in the art (and the claim would be indefinite). One cannot look for or examine items to enter search terms.

104. However, I understand I/P Engine takes the position that the "request for search results" is the search that is run in *response* to the search terms that a user enters. *See* 7/2/12 Infringement Contentions for Google at 6 ("the search bar on Google's website (www.google.com) and other 'search network' sites allows a user to enter a search query and run a single search engine query"). Under I/P Engine's interpretation of this claim element, Bowman meets this element because Bowman conducts a search for information in response to a user query. *See* Bowman at Claim 28[a-b] ("A computer-readable medium whose contents cause a computer system to rank items in a search result by: receiving a query specifying one or more terms; generating a query result identifying a plurality of items satisfying the query").[15]

(b) <u>a content-based filter system for receiving the informons from the scanning system and for filtering the informons on the basis of applicable content profile data for relevance to the query</u>

105. Bowman discloses this element. Specifically, Bowman examines each search result's content profile to see how many of the query terms are contained therein, and adjusts the search results' ranking scores by giving higher scores to search results that contain every term in the query and progressively lower scores to search results that contain fewer and fewer of the terms in the query. (*See* Bowman at 9:28-53 ("The facility uses rating tables that it has generated to generate ranking values for items in new query results . . . scores may be adjusted to more directly reflect the number of query terms that are matched to the item, so that items that match more query terms than others are favored in the rankings.") Indeed, claim 29 of Bowman is devoted exclusively to this concept of adjusting search results' ranking scores based on how many terms from the query are found in each search result's content. (*See id.* at claim 29 ("The

[15] Furthermore, I/P Engine has taken the position that virtually any retrieval of information items from any location where they are stored meets the "scanning a network" limitation. For example, I/P Engine's infringement allegations assert that retrieving a set of ads from a distributed database meets this limitation. *See, e.g.*, 7/2/12 Infringement Contentions to Google at 6-9.

computer-readable medium of claim **28** wherein the contents of the computer-readable medium further cause the computer system to perform the step of *adjusting the ranking value produced for each item identified in the query result to reflect the number of terms specified by the query that are matched by the item*.") (emphasis added). Bowman then filters out (*i.e.*, excludes) search results whose ranking scores fall below a certain threshold, or presents a predetermined number of search results that have the highest ranking scores and filters out all the rest. (*See* Bowman at 9:60-64). Accordingly, Bowman discloses this element.[16]

(c) <u>a feedback system for receiving collaborative feedback data from system users relative to informons considered by such users</u>

106. Bowman discloses a feedback system for receiving collaborative feedback data from system users relative to informons considered by such users. The Court construed "collaborative feedback data" as data from system users regarding what informons such users found to be relevant. Bowman receives such data by recording how often users who entered the same search query selected various search results. Bowman then uses this selection frequency data to help determine the search results' ranking scores. For example, claim 28[c] of Bowman recites "for each item identified in the query result, combining the relative frequencies with which users selected the item in earlier queries specifying each of the terms in the query to producing [sic] a ranking value for the item." (*Id.* at 13:42-46; *see also id.* at Abstract: "the

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[16] Alternatively, if "content profile data" were understood to require a more elaborate or thorough mapping of the informon's content, then this element would be obvious over Bowman in view of Rose. Rose creates a vector representing each informon's content profile and uses this vector to filter the informons for relevance. (*See* Rose at 6:11-58). It would be obvious to apply Rose's vector methods to Bowman, if one desired to make a more detailed analysis of the content profile for each search result in Bowman. Nonetheless, I believe that Bowman meets this claim element without reliance on Rose. I also note I/P Engine's apparent position that the "content-based filter" and "content profile data" limitations are met by any filtering that takes into account the content of the informons. *See, e.g.*, 7/2/2012 Infringement Contentions for Google at 9 ("Google AdWords receives and filters advertisements on the basis of content data (e.g., ad text, keyword, and landing page attributes) for relevance to the query.")

facility generates a query result identifying a plurality of items that satisfy the query. The facility then produces a ranking value for at least a portion of the items identified in the query result by combining the relative frequencies with which users selected that item from the query results generated from queries specifying each of the terms specified by the query.")

(d) <u>The filter system combining pertaining feedback data from the feedback system with the content profile data in filtering each informon for relevance to the query</u>

107. The Court determined that "combining" has its plain and ordinary meaning. (Markman Order at 2 n. 1.) Bowman discloses this element. Specifically, each search result item's ultimate ranking score in Bowman is determined by combining feedback data (showing how often other users who entered the same query selected that item) with content profile data (showing how many of the query terms appear in that item's content). (*See id.* at claim 29). Bowman's specification explicitly states that an item's feedback score is "combined" with its content-based score to produce a final ranking score for the item. (*See id.* at 9:49-53: "These [feedback] scores may be combined in other ways, however. In particular, scores may be adjusted to more directly reflect the number of query terms that are matched by the item, so that items that match more query terms than others are favored in the ranking.") The final ranking score is used to determine the item's relevance to the query. (*See id.* at 2:23-24 ("The facility preferably generates ranking values for items indicating their level of relevance to the current query")). As noted above, Bowman then filters out items whose ranking scores fall below a certain threshold, or presents a predetermined number of items that have the highest scores and filters out all the rest. (*See id.* at 9:60-64). Accordingly, Bowman discloses this element.

3. <u>Bowman anticipates claims 14 and 15 of the '420 Patent</u>

108. Claim 14 depends from claim 10 and further requires "wherein the collaborative feedback data comprises passive feedback data." Claim 15 depends from claim 14 and further

requires "wherein the passive feedback data is obtained by passively monitoring the actual response to a proposed informon." Bowman meets both these limitations, because Bowman's feedback data is derived from passively monitoring users' actual response to search results – namely, monitoring how frequently users who had entered the same query selected each of those search results. (*See id.* at 2:31-35 ("The scores in the rating table preferably reflect, for a particular item and term, how often users have selected the item when the item has been identified in query results produced for queries containing particular term.") These user selections can comprise user requests to see more information about one or more of the search results presented to them. (*See id.* at 7:31-33). User selections can also comprise a request to purchase the item(s) corresponding to the search result(s). (*Id.* at 9:2-3).

4. <u>Bowman anticipates claims 25, 27, and 28 of the '420 Patent</u>

109. Claims 25, 27, and 28 contain the same substance as claims 10, 14, and 15, respectively, but are simply recast as method rather than system claims. Thus, Bowman anticipates claims 25, 27, and 28 for the same reasons that it anticipates claims 10, 14, and 15.[17] I incorporate by reference my prior discussion about how Bowman anticipates claims 10, 14, and 15. I also incorporate by reference the claim chart, attached as Exhibit A-5 to this Report, showing how Bowman anticipates these claims.

5. <u>Bowman anticipates claim 1 of the '664 Patent</u>

110. I understand that the preamble of a claim is not always considered a limitation. Further, I/P Engine's infringement contentions assert that the preamble of claim 1 is not a limitation. *See, e.g.*, 7/2/12 Infringement Contentions for Google at 30. To the extent the

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[17] Notably, claims 28 and 29 of Bowman – which, as discussed above, contain the elements of '420 claims 10, 14, and 15 – contain the preamble "A computer-readable medium whose contents cause a computer system to rank items in a search result by . . .," followed by method steps. Thus, the disclosures in claims 28 and 29 of Bowman can be equally characterized as a computer system performing a method or as the method itself.

preamble is considered a limitation here, Bowman recites "a search system" as required by the preamble to '664 claim 1. Specifically, Bowman's disclosed computer system accepts a search query from a user and returns a set of search results, which qualifies this system as a search system. (*See* Bowman at 5:31-32 (stating that Bowman's system includes "a query server for generating query results from queries."))

(a) <u>a scanning system for searching for information relevant to a query associated with a first user in a plurality of users</u>

111. The Court has construed "a scanning system" as "a system used to search for information." Thus construed, Bowman's disclosed system meets this claim element because it searches for information relevant to a query associated with a first user. *See* Bowman at Claim 28[a-b] ("A computer-readable medium whose contents cause a computer system to rank items in a search result by: receiving a query specifying one or more terms; generating a query result identifying a plurality of items satisfying the query"). Furthermore, Bowman's system is intended for use by a plurality of users, as evidenced by the fact that the system records the collective preferences of multiple users. (*See id.* at 5:33-34). However, because Bowman searches for results to a query submitted by a particular user, it meets the "first user in a plurality of users" aspect of this claim element.

(b) <u>a feedback system for receiving information found to be relevant to the query by other users</u>

112. Bowman discloses a feedback system for receiving information found to be relevant to the query by other users. As previously noted, claim 28[c] of Bowman recites a computer readable medium that causes a computer system to perform the step of "for each item identified in the query result, combining the relative frequencies with which users selected the item in earlier queries specifying each of the terms in the query to producing a ranking value for the item." The Abstract of Bowman further explains that a "software facility . . . produces a

ranking value for at least a portion of the items identified in the query result by combining the relative frequencies with which users selected that item from the query results specifying each of the terms specified by the query." Thus, Bowman contains a feedback system that receives information found to be relevant to the query by other users – *i.e.*, it receives feedback about which search results were selected most often by other users who had entered the same query.

(c) <u>a content-based filter system for combining the information from the feedback system with the information from the scanning system and for filtering the combined information for relevance to at least one of the query and the first user</u>

113. Bowman discloses this element. As for combining the information from the feedback system with the information from the scanning system, Bowman discloses that the search results are combined with feedback information showing how often prior users who entered the same query had selected those results. *See id.* at claim 28[b-c] (disclosing that the computer system performs the steps of "generating a query result identifying a plurality of items satisfying the query; and for each item identified in the query result, combining the relative frequencies with which users selected the item in earlier queries specifying each of the terms of the query to producing [sic] a ranking value for the item.")

114. Bowman also discloses the "content-based" aspect of this claim element. As described above, Bowman does not filter search results based solely on feedback from other users who had entered the same query. Rather, Bowman also adjusts the ranking score for each search result based on how many terms in the query appear in the search result's content. (*See id.* at claim 29; 9:50-53). Finally, this combination of content-based data and feedback data is used to filter the search results for relevance to the query. (*See* Bowman at Abstract ("The facility identifies as most relevant those items having the highest ranking values"); 2:23-24 ("The facility preferably generates ranking values for items indicating their level of relevance to the current query").

6. **Bowman anticipates claim 5 of the '664 Patent**

115. Claim 5 depends from claim 1 and further requires "wherein the filtered information is an advertisement." Bowman meets this element. Specifically, Bowman discloses that system users can purchase the items represented by the search results. (*See id.* at 5:4; 9:2-3; claim 7). Thus, each search result is essentially an advertisement for the purchasable item that it represents. To the extent an advertisement is not explicitly disclosed, it would be obvious as explained in Section VII.C.1, *infra*.

7. **Bowman anticipates claim 6 of the '664 Patent**

116. Claim 6 depends from claim 1 and further requires "an information delivery system for delivering the filtered information to the first user." Bowman discloses this element, as it recites that the software facility displays the filtered search results to the user. (*See id.* at 9:56-58) ("In step **808**, the facility displays the items identified in the query result in accordance with the ranking values generated for the items in step **806**"); *see also id.* at 10:34-37).

8. **Bowman anticipates claim 21 of the '664 Patent**

117. Claim 21 depends from claim 1 and further recites "wherein the content-based filter system filters by extracting features from the information." Bowman discloses this element. As discussed above, Bowman extracts words from the content of each search result in order to determine how many of the words from the query are found in the search result. (*See id.* at 9:50-53; claim 29).

9. **Bowman anticipates claim 22 of the '664 Patent**

118. Claim 22 depends from claim 21 and further recites "wherein the extracted features comprise content data indicative of the relevance to the at least one of the query and the user." Bowman discloses this element, because the words that Bowman extracts from a search

result's content indicate how relevant the search result is to the query. (*See id.* at 9:50-53; claim 29).

10. Bowman anticipates claim 26 of the '664 Patent

119. Claim 26 contains essentially the same elements as claim 1, but is recast as a method rather than system claim. For example, where claim 1 requires "a scanning system for searching for information relevant to a query associated with a first user in a plurality of users," claim 26 simply requires "searching for information relevant to a query associated with a first user in a plurality of users." Where claim 1 requires "a feedback system for receiving information found to be relevant to the query by other users," claim 26 simply requires "receiving information found to be relevant to the query by other users." Thus, Bowman anticipates claim 26 for the same reasons that it anticipates claim 1.[18] I incorporate by reference my prior discussion about how Bowman anticipates claim 1, as well as the claim chart attached hereto as Exhibit A-5.

11. Bowman anticipates claim 28 of the '664 Patent

120. Claim 28 depends from claim 26 and further recites "the step of delivering the filtered information to the first user." As discussed with respect to claim 6, *supra*, Bowman discloses this element. (*See id.* at 9:56-58) ("In step **808**, the facility displays the items identified in the query result in accordance with the ranking values generated for the items in step **806**"); *see also id.* at 10:34-37).

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[18] Notably, claims 28 and 29 of Bowman – which, as discussed above, contain the elements of '664 claim 1 – contain the preamble "A computer-readable medium whose contents cause a computer system to rank items in a search result by . . .," followed by method steps. Thus, the disclosures in claims 28 and 29 of Bowman can be equally characterized as a computer system performing a method or as the method itself.

12. <u>Bowman anticipates claim 38 of the '664 Patent</u>

121. Claim 38 depends from claim 26 and further recites "wherein the searching step comprises scanning a network in response to a demand search for the information relevant to the query associated with the first user." As noted above, "scanning a network" has been construed simply as looking for or examining items in a network, and "demand search" has been construed as a single search engine query performed upon a user request. Furthermore, I/P Engine has taken the position that "scanning a network" is satisfied by looking for advertisements stored on a distributed database. (*See, e.g.*, 7/2/2012 Infringement Contentions for Google at 6-7). Under I/P Engine's interpretation, Bowman meets this element because Bowman conducts a search for information in response to a user query. *See* Bowman at Claim 28[a-b] ("A computer-readable medium whose contents cause a computer system to rank items in a search result by: receiving a query specifying one or more terms; generating a query result identifying a plurality of items satisfying the query").

B. <u>Culliss anticipates claims 10, 14, 15, 25, 27, and 28 of the '420 Patent and claims 1, 5, 6, 21, 22, 26, 28, and 38 of the '664 Patent</u>

1. <u>Background on Culliss</u>

122. As discussed above, Culliss describes a search engine system that ranks search results based on a combination of the content of the search results and feedback from prior users who had entered the same query and viewed these search results.

123. In Culliss, Internet articles are given "key term scores" for each key term that they contain. (*Id.* at 3:60-66). The key term scores can be initially set to reflect how many times each of the key terms appeared in the article's content. (*See id.* at 14:32-36).

124. A user of Culliss's system enters a query, and the system returns squibs of the articles that contain key terms matching the terms in the query. (*Id.* at 4:10-26). Each squib

shows a truncated portion of the corresponding article's content, so the user can evaluate whether he wants to select and view the full article. (*Id.* at 4:26-36). These articles are presented to the user in the order dictated by their combined key term scores. (*Id.* at 5:2-10).

125. When a user selects an article whose squib is presented to him, the key term scores for that article corresponding to terms in the user's query are increased. (*Id.* at 4:37-49). This is because the user, by selecting the article in response to his query, has implicitly endorsed the idea that these key terms from the query are appropriately matched to the article. (*See id.*)

126. The next user who enters the same query would thus see a different rank of articles, based on the new key term scores that reflect the input of the prior user. (*See id.* at 4:66-5:1) Accordingly, the article ranking in Culliss is based on a combination of article content and feedback from prior users who entered the same query, because both factors (article content and user feedback) are used to calculate the key term scores that determine the article ranking.

2. <u>Culliss anticipates claim 10 of the '420 Patent</u>

127. As noted above, I/P Engine's infringement contentions assert that the preamble of claim 10 is not a limitation. To the extent that the preamble is considered a limitation here, Culliss recites a "search engine system" as recited by the preamble to claim 10. Specifically, Culliss's disclosed computer system accepts a search query from a user and returns a set of search results, which is the hallmark of a search engine. (*See* Culliss at 4:10-26 (explaining that Culliss' system accepts a search query from a user and returns squibs of articles that match the query.))

(a) <u>A system for scanning a network to make a demand search for informons relevant to a query from an individual user</u>

128. As noted with respect to the Bowman reference, I/P Engine takes the position that '420 claim 10(a) is satisfied if a system conducts a search for information in response to a user query, including looking for advertisements stored in a distributed database. Culliss meets this

element under I/P Engine's interpretation because Culliss' system accepts a search query from a user and returns a set of search results in response. (*See* Culliss at 4:10-26).

(b) <u>a content-based filter system for receiving the informons from the scanning system and for filtering the informons on the basis of applicable content profile data for relevance to the query</u>

129. Culliss discloses this element. Specifically, Culliss uses search results' aggregate key term scores to rank these search results for relevance to the query. (*id.* at 5:2-10). The key term scores are calculated in part by analyzing each search result's content profile to determine how many times each of the key terms from the query appear in the search result. (*See id.* at 14:35-36 ("the [key term] scores can be initially set to correspond with the frequency of the term occurrence in the article.")[19] I also note that, under I/P Engine's infringement allegations, ranking a set of search results is sufficient to meet the "filter" limitation even if no candidate search results are excluded altogether. *See, e.g.,* 7/2/12 Infringement Contentions for Google at 11 (asserting that "mixer-disabling" and "Promotion" meet the claim limitations). Accordingly, Culliss discloses this element.

(c) <u>a feedback system for receiving collaborative feedback data from system users relative to informons considered by such users</u>

130. Culliss discloses a feedback system for receiving collaborative feedback data from system users relative to informons considered by such users. Specifically, Culliss's feedback system records which search results were selected by users who entered a given query. Culliss then raises the key term scores for terms in the selected search results that match terms in the query. (*See id.* at 4:37-49).

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[19] Alternatively, if "content profile data" were understood to require a more elaborate or thorough mapping of the informon's content, then this element would be obvious over Culliss in view of Rose. *See* fn. 16, *supra.*

(d) <u>The filter system combining pertaining feedback data from the feedback system with the content profile data in filtering each informon for relevance to the query</u>

131. Culliss discloses this element. Specifically, Culliss ranks search results for relevance to a query by calculating their aggregate key term scores for the terms in that query (*id.* at 5:2-10), and each key term score is based on a combination of feedback data and content data. For example, a key term score for a search result may be initially determined by the content of the search result – namely, how many times the key term appears in the search result's content. (*See id.* at 14:34-36). This key term score may then be altered based on feedback from other users. If users who had entered the same query had selected that search result, then the key term scores would rise for each of the key terms in that search result that match terms from the query. (*See id.* at 4:37-49).

132. The example cited in Section V.B.2, *supra*, provides a concrete illustration of how Culliss combines content data with feedback data to rank search results for relevance to a query. Namely, two articles about museum-viewing Paris vacations ("Article 1" and "Article 2") might be given different key term scores for the terms "Paris," "museum," and "vacations" based on how often each of these terms appeared in Article 1's and Article 2's content. Thus, if "Paris" appeared five times in Article 1, then Article 1 would have a key term score of 5 for "Paris;" if "museum" appeared three times in Article 1, then Article 1 would have a key term score of 3 for "museum," etc.

133. A user who enters the query "Paris museum vacations" would be presented with squibs of Article 1 and Article 2, and could select one or both of them. If the user selects Article 1, then Article 1's key term scores for "Paris," "museum," and "vacations" would rise. The next user who enters the same query might see Article 1 listed in a higher ranked position because Article 1's key term scores had risen based on feedback from the first user.

134. In this way, the key term scores that determine Article 1's relevance ranking for the query "Paris museum vacations" are determined by combination of content profile data (how often these terms appeared in Article 1's content) and feedback data (how often other users who entered the same search query had selected Article 1).

3. Culliss anticipates claims 14 and 15 of the '420 Patent

135. Claim 14 depends from claim 10 and further requires "wherein the collaborative feedback data comprises passive feedback data." Claim 15 depends from claim 14 and further requires "wherein the passive feedback data is obtained by passively monitoring the actual response to a proposed informon." Culliss meets both these limitations because Culliss's feedback data is derived from passively monitoring users' actual response to search results – namely, monitoring how frequently users who had entered the same query selected each of those search results. (*See id.* at Abstract ("As users enter search queries and select articles, the scores are altered"); 3:3-4 (same)). Specifically, the system passively monitors whether the user performs such selection actions as "opening, retrieving, reading, viewing, listening to or otherwise closely inspecting the article." (*Id.* at 4:32-34).

4. Culliss anticipates claims 25, 27, and 28 of the '420 Patent

136. Claims 25, 27, and 28 contain the same substance as claims 10, 14, and 15, respectively, but are simply recast as method rather than system claims. Thus, Culliss anticipates claims 25, 27, and 28 for the same reasons that it anticipates claims 10, 14, and 15. I incorporate by reference my prior discussion about how Culliss anticipates claims 10, 14, and 15. I also incorporate by reference the claim chart, attached as Exhibit A-6 to this Report, showing how Culliss anticipates these claims.

5. **Culliss anticipates claim 1 of the ‘664 Patent**

137. As noted above, I/P Engine’s infringement contentions assert that the preamble of claim 1 is not a limitation. To the extent that the preamble is considered a limitation here, Culliss recites “a search system” as required by the preamble to ‘664 claim 1. Specifically, Culliss’s disclosed computer system accepts a search query from a user and returns a set of search results, which qualifies this system as a search system. (*See* Culliss at 4:10-26).

(a) **a scanning system for searching for information relevant to a query associated with a first user in a plurality of users**

138. The Court has construed “a scanning system” as “a system used to search for information.” Thus construed, Culliss’s disclosed system meets this claim element because it searches for information relevant to a query associated with a first user. (*See id.*). Furthermore, Culliss is intended for use by a plurality of users, as evidenced by the fact that the system records the collective preferences of multiple users. (*See id.* at Abstract, 4:37-49). However, because Culliss searches for results to a query submitted by a particular user, it meets the “first user in a plurality of users” aspect of this claim element.

(b) **a feedback system for receiving information found to be relevant to the query by other users**

139. Culliss discloses a feedback system for receiving information found to be relevant to the query by other users. As previously noted, Culliss records which search results were selected by users who entered a given query and raises the key term scores for terms in the selected search results that match terms in the query. (*See id.* at 4:37-49). Thus, Culliss contains a feedback system that receives information found to be relevant to the query by other users – *i.e.*, it receives feedback about which search results were selected most often by other users who had entered the same query (or a query containing some of the same terms).

(c) **a content-based filter system for combining the information from the feedback system with the information from the**

scanning system and for filtering the combined information for relevance to at least one of the query and the first user

140. Culliss discloses this element. Culliss discloses a content-based filter system because Culliss' system ranks search results for relevance to the query in part by examining the search results' content – *i.e.*, examining how often the terms from the query appear as key terms in each search result's content. (*Id.* at 14:34-36). I also note that, under I/P Engine's infringement allegations, ranking a set of search results is sufficient to meet the "filter" limitation even if no candidate search results are excluded altogether. *See, e.g.*, 7/2/12 Infringement Contentions for Google at 11.

141. Culliss' content-based filter system also operates by combining the search results from the scanning system with the feedback information from the feedback system. This is because Culliss' content-based key term scores – which, of course, are associated with the search results from the scanning system – are adjusted based on the feedback information from other users. If users who had entered the same query had selected a given search result, then the key term scores will rise for each of the key terms in that search result that match terms from the query. (*See id.* at 4:37-49).

6. Culliss anticipates claim 5 of the '664 Patent

142. Claim 5 depends from claim 1 and further requires "wherein the filtered information is an advertisement." Culliss meets this element, because Culliss explicitly states that the articles which are filtered may be advertisements. (*See id.* at 9:56-62 ("The invention may allow a user to enter one or more category key terms in formulating a search. For example, the user may enter the category key terms 'Apartments' and 'Los Angeles' or the category key terms 'Romantic' and 'Comedy' to find articles (*i.e., advertisements or movies*) which fall under two or more category key terms.") (emphasis added).

7. Culliss anticipates claim 6 of the '664 Patent

143. Claim 6 depends from claim 1 and further requires "an information delivery system for delivering the filtered information to the first user." Culliss discloses this element, as it recites that the search engine displays squibs of the search results to the user. (*See id.* at 4:25-31 ("As shown in FIG. 1 at **20**, the search engine will then display a squib of each of the matched articles . . . the user can then scroll through the squibs of the articles and select a desired one")).

8. Culliss anticipates claim 21 of the '664 Patent

144. Claim 21 depends from claim 1 and further recites "wherein the content-based filter system filters by extracting features from the information." Culliss discloses this element. As discussed above, Culliss extracts words from the content of each search result in order to determine how often the words from the query are found in these search results. (*See id.* at 14:34-36).

9. Culliss anticipates claim 22 of the '664 Patent

145. Claim 22 depends from claim 21 and further recites "wherein the extracted features comprise content data indicative of the relevance to the at least one of the query and the user." Culliss discloses this element, because the words that Culliss extracts from a search result's content indicate how relevant the search result is to the query. (*See id.* at 14:34-36).

10. Culliss anticipates claim 26 of the '664 Patent

146. Claim 26 contains essentially the same elements as claim 1, but is recast as a method rather than system claim. For example, where claim 1 requires "a scanning system for searching for information relevant to a query associated with a first user in a plurality of users," claim 26 simply requires "searching for information relevant to a query associated with a first user in a plurality of users." Where claim 1 requires "a feedback system for receiving information found to be relevant to the query by other users," claim 26 simply requires

"receiving information found to be relevant to the query by other users." Thus, Culliss anticipates claim 26 for the same reasons that it anticipates claim 1. I incorporate by reference my prior discussion about how Culliss anticipates claim 1, as well as the claim chart attached hereto as Exhibit A-6.

11. **Culliss anticipates claim 28 of the '664 Patent**

147. Claim 28 depends from claim 26 and further recites "the step of delivering the filtered information to the first user." As discussed with respect to claim 6, *supra*, Culliss discloses this element. (*See id.* at 4:25-31 ("As shown in FIG. 1 at **20**, the search engine will then display a squib of each of the matched articles . . . the user can then scroll through the squibs of the articles and select a desired one")).

12. **Culliss anticipates claim 38 of the '664 Patent**

148. Claim 38 depends from claim 26 and further recites "wherein the searching step comprises scanning a network in response to a demand search for the information relevant to the query associated with the first user." As noted above, "scanning a network" has been construed simply as looking for or examining items in a network, and "demand search" has been construed as a single search engine query performed upon a user request. Furthermore, I/P Engine has taken the position that "scanning a network" is satisfied by looking for advertisements stored on a distributed database. (*See, e.g.*, 7/2/2012 Infringement Contentions for Google at 6-7). Under I/P Engine's interpretation, Culliss meets this element because Culliss conducts a search for information in response to a user query. (*See* Culliss at 4:10-26).

C. **Lashkari anticipates claims 10 and 25 of the '420 Patent and claims 1, 6, 21, 22, 26, 28, and 38 of the '664 Patent**

1. **Background on Lashkari**

149. Lashkari discloses a general search engine system that utilizes both feature extraction and automated collaborative filtering in order to predict webpage ratings. (Lashkari at

20-21). Lashkari implemented the search engine system on the world wide web as WEBHOUND, a Personalized WWW Document Filtering System. (*Id.* at 56). WEBHOUND can be paired with a traditional search engine, such as Lycos or Yahoo!, to filter search results returned by the search engine in response to a user query. (*Id.* at 78).

2. <u>Lashkari anticipates claim 10 of the '420 Patent</u>

150. As noted above, I/P Engine's infringement contentions assert that the preamble of claim 10 is not a limitation. To the extent that the preamble is considered a limitation here, Lashkari discloses a "search engine system" as recited by the preamble to claim 10. Specifically, Lashkari discloses that its WEBHOUND filtering system can be paired with a traditional search engine system such as Lycos or Yahoo! (*Id.* at 78).

(a) <u>A system for scanning a network to make a demand search for informons relevant to a query from an individual user</u>

151. The Court has construed "scanning a network" to mean "looking for or examining items in a network." Lashkari discloses "scanning a network" in its implementation of the WEBHOUND information filtering system. WEBHOUND has "code to retrieve WWW documents and parse them for features" and thus examines items on a network. (*Id.* at 62). WEBHOUND implements "WWW Document Retrieval and Parsing" as shown in the following figure:

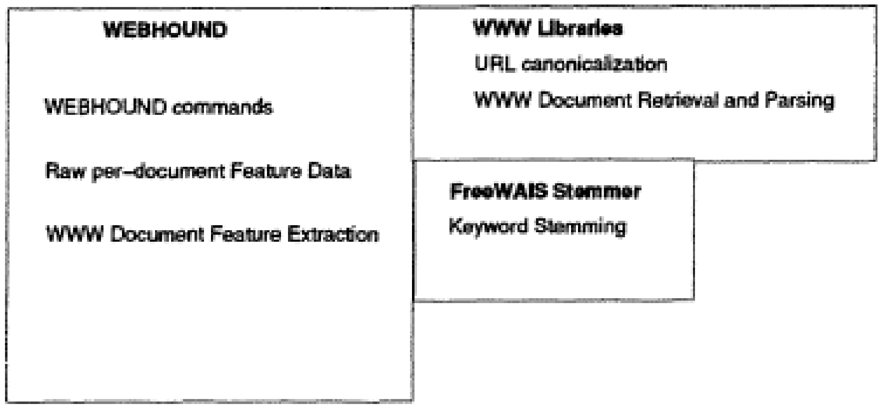

Figure 5.3: Structure of the WWW Domain Specific Module

Furthermore, I/P Engine has taken the position that "scanning a network" is satisfied by looking for advertisements stored on a distributed database. (*See*, *e.g.*, 7/2/2012 Infringement Contentions for Google at 6-7). Under I/P Engine's interpretation, the traditional search engines that WEBHOUND is paired with (such as Lycos and Yahoo!) meet this element when they look for candidate search results that match a user's query. (*Id.* at 78).

152. Lashkari also discloses a "demand search." The Court has construed demand search to mean "a single search engine query performed upon a user request." The traditional search engines paired with WEBHOUND perform such a query. (*See id.*: "As a concrete example, let's say a user is searching for documents on **Indian Cooking**. He types the keywords **Indian Cooking** into the Lycos search form . . .").

(b) <u>a content-based filter system for receiving the informons from the scanning system and for filtering the informons on the basis of applicable content profile data for relevance to the query</u>

153. Lashkari's Feature Guided Automated Collaborative Filtering (FGACF) algorithm discloses a content-based filter system for filtering informons on the basis of applicable content profile data. Lashkari implements such a content-based filter system because it extracts "features" from items in the database and then uses the values of those features to

compute a predicted rating (relevance score) for each item. (*Id.* at 39). The WEBHOUND implementation of the FGACF algorithm extracts such content profile items as Title Keywords, Body Keywords, Anchor Keywords, Server Domain, Number of Inline Images, and Number of Hypertext Links. (*Id.* at 63).[20] Finally, WEBHOUND filters these information items "for relevance to the query" because WEBHOUND may be employed to filter query results returned from a traditional search engine such as Lycos. (*See id.* at 78 ("let's say a user is searching for documents on **Indian Cooking**. He types the keywords **Indian Cooking** into the Lycos search form . . . the resulting matches could be filtered through WEBHOUND and only the top ranked ones (in terms of predicted rating) need be returned.")

(c) a feedback system for receiving collaborative feedback data from system users relative to informons considered by such users

154. The Court has construed "collaborative feedback data" to mean "data from system users regarding what informons such users found to be relevant." Lashkari implements a feedback system that uses collaborative feedback data through WEBHOUND's Automated Collaborative Filtering (ACF) algorithm. Users of the FGACF system give feedback by rating pages. The FGACF algorithm uses those ratings to find similar users, or "nearest neighbors", that have similar rating histories. Finally, the predicted rating scores generated by the system are based on the ratings given by those nearest neighbors. (*Id.* at 24-25).

(d) The filter system combining pertaining feedback data from the feedback system with the content profile data in filtering each informon for relevance to the query

155. Lashkari discloses this element. Lashkari combines automated collaborative filtering (the feedback system) with feature extraction (content-based filtering) in the rating

[20] Alternatively, if "content profile data" were understood to require a more elaborate or thorough mapping of the informon's content, then this element would be obvious over Lashkari in view of Rose. *See* fn. 16, *supra*.

prediction equation, as detailed below. *See id.* at 39:

1. **Calculate a per item distance between Users I and J**

   The distance between users I and J for item p is:

$$d_{p,I,J} = \sum_{\alpha=1}^{\|FeaturesDefined\|} F\vec{W}_I^{\alpha} \times \left(\sum_{\alpha_x=1}^{\|\alpha\|} \vec{D}_{I,J}^{\alpha_x} \times C\vec{W}_I^{\alpha_x} \times \tau^{\alpha_x}(\vec{D}_{I,J}) \times \gamma_p^{\alpha_x}\right) \quad (3.5)$$

2. **Calculate a per item weight for Neighbor J**

   The neighbor weight for neighbor J of user I for item p is:

$$Wt_{p,I,J} = \begin{cases} \frac{\mathcal{L} - d_{p,I,J}}{\mathcal{L}} & \text{iff } d_{p,I,J} \leq \mathcal{L} \\ 0.0 & \text{otherwise} \end{cases} \quad (3.6)$$

3. **Calculate Predicted Rating for Item p**

   The predicted rating for item p is calculated as:

$$P_{I,p} = \frac{\sum_{J=1}^{\|Neighbors_I\|} Wt_{p,I,J} \times R_{J,p} \times c_{J,p}}{\sum_{J=1}^{\|Neighbors_I\|} Wt_{p,I,J} \times c_{J,p}} \quad (3.7)$$

156. In the above rating equations, "FW" and "CW" represent the feature weight and cluster weight, respectively. Feature weights represent how important certain features are for a given user. Cluster weight is an "indication of how important a particular user seems to find a particular feature value." (*Id.* at 37). For example, if a user has historically rated highly pages that contain the keyword "vacations", this indicates that the user particularly values the keyword feature, and within that feature, the "vacations" keyword value. Feature extraction, and thus content-based filtering, is inherent in the computation of these factors. It is only possible to compute them after scanning various items and extracting the features from each item.

157. In the above rating equations, "D" represents the distance between two users. Distance here is a measure of how similar two users are. "R" represents a rating value. $R_{J,p}$ is the rating given by user J to item P. The rating equation thus incorporates a feedback system because the new predicted rating is based on the ratings previously given to an item by the pool of users.

158. Finally, as discussed above, WEBHOUND's content- and feedback-based filtering is used to filter documents for relevance to the query when WEBHOUND is paired with a traditional search engine to filter query results from that search engine. (*See id.* at 78 ("let's say a user is searching for documents on **Indian Cooking**. He types the keywords **Indian Cooking** into the Lycos search form . . . the resulting matches could be filtered through WEBHOUND and only the top ranked ones (in terms of predicted rating) need be returned.")

3. Lashkari anticipates claims 25 of the '420 Patent

159. Claim 25 contains the same substance as claim 10, but is simply recast as a method rather than system claim. Thus, Lashkari anticipates claim 25 for the same reasons that it anticipates claim 10. I incorporate by reference my prior discussion about how Lashkari anticipates claim 10. I also incorporate by reference the claim chart, attached as Exhibit A-3 to this Report, showing how Lashkari anticipates these claims.

4. Lashkari anticipates claim 1 of the '664 Patent

160. As noted above, I/P Engine's infringement contentions assert that the preamble of claim 1 is not a limitation. To the extent that the preamble is considered a limitation here, Lashkari discloses a "search system" as recited by the preamble to claim 1. Specifically, Lashkari discloses that its WEBHOUND filtering system can be paired with a traditional search system such as Lycos or Yahoo! (*Id.* at 78).

(a) a scanning system for searching for information relevant to a query associated with a first user in a plurality of users

161. The Court has construed "a scanning system" to mean "a system used to search for information." The parties have agreed that "query" means a "request for search results." The traditional search engines paired with WEBHOUND search for information relevant to a request for search results, thus meeting this limitation. (*See id.*: "As a concrete example, let's say a user

is searching for documents on **Indian Cooking**. He types the keywords **Indian Cooking** into the Lycos search form . . .").

(b) <u>a feedback system for receiving information found to be relevant to the query by other users</u>

162. Lashkari implements a feedback system for receiving information from other users through the Automated Collaborative Filtering (ACF) algorithm. Users of the FGACF system give feedback by rating pages. The ACF algorithm uses those ratings to find similar users, or "nearest neighbors", that have similar rating histories. Finally, the predicted rating scores generated by the system are based on the ratings given by those nearest neighbors. (*Id.* at 24-25). Since the rating scores indicate the relevance of the page to other users, Lashkari thus implements a feedback system for receiving information found to be relevant by other users.

163. Moreover, I note that Plaintiff's infringement allegations allege that that the sub-element of "receiving information found to be relevant *to the query* by other users" is met by receiving information globally from system users, not just information from users who had entered a common query. (*See* 7/2/2012 Infringement Contentions for Google at 33-35). Thus, under Plaintiff's Infringement Contentions, Lashkari thus meets the "to the query" sub-element by receiving information found to be relevant by nearest-neighbors, even if these nearest neighbors had not entered a common query.[21]

[21] Alternatively, it would be obvious in light of Bowman and Culliss to modify Lashkari's WEBHOUND system such that WEBHOUND received information that other users found relevant to a particular query. As discussed above, Bowman and Culliss both disclose "receiving information found to be relevant *to the query* by other users." *See* Sections VI.A.5(b) and VI.B.5(b), *supra*. Moreover, Lashkari itself recognizes the utility of pairing WEBHOUND with a traditional, query-based search engine. (*See id.* at 78). Thus, instead of having WEBHOUND just receive feedback from nearest neighbors, it would be obvious to have WEBHOUND receive feedback from the subset of nearest-neighbors who entered the same query into the search engine that WEBHOUND is paired with. By receiving feedback from the subset of nearest-neighbors who had entered the same query, WEBHOUND's feedback data would be even more tightly focused and higher-quality for a nearest-neighbor who entered that particular query.

(c) a content-based filter system for combining the information from the feedback system with the information from the scanning system and for filtering the combined information for relevance to at least one of the query and the first user

164. Lashkari discloses this element. As for combining the information from the feedback system with the information from the scanning system, Lashkari loops over the results of the scanning system (all of the items) as part of its rating equation and incorporates the ratings given by other users. In the following equation, which calculates the similarity (distance) between users I and J, the summation symbol loops over all items and incorporates user feedback scores as "R". *See id.* at 37:

$$\vec{D}^{\alpha_x}_{I,J} = \begin{cases} \frac{\sum_{p=1}^{||Items||}(R_{I,p}-R_{J,p})^2 \times c_{I,p}\times c_{J,p}\times \gamma_p^{\alpha_x}}{\sum_{p=1}^{||Items||} c_{I,p}\times c_{J,p}\times\gamma_p^{\alpha_x}} & \text{iff } \sum_{p=1}^{||Items||} c_{I,p}\times c_{J,p}\times \gamma_p^{\alpha_x} \geq 1 \\ Undefined & \text{otherwise}\end{cases} \qquad (3.1)$$

165. Lashkari also discloses the "content-based" aspect of this claim element. Lashkari does not solely filter search results based on feedback from other users. Rather, feature weights represent how important certain features are for a given user. Cluster weight is an "indication of how important a particular user seems to find a particular feature value." (*Id.* at 37). For example, if a user has historically rated highly pages that contain the keyword "vacations," this indicates that the user particularly values the keyword feature, and within that feature, the "vacations" keyword value. Feature extraction, and thus content-based filtering, is inherent in the computation of these factors. It is only possible to compute them after scanning various items and extracting the features from each item.

166. The cluster weights and feature weights ultimately tie into the final rating predictions, as shown in the following set of equations ("FW" and "CW"). *See id.* at 39:

$$d_{p,I,J} = \sum_{\alpha=1}^{||FeaturesDefined||} \vec{FW}_I^{\alpha} \times (\sum_{\alpha_x=1}^{||\alpha||} \vec{D}_{I,J}^{\alpha_x} \times \vec{CW}_I^{\alpha_x} \times \tau^{\alpha_x}(\vec{D}_{I,J}) \times \gamma_p^{\alpha_x}) \quad (3.5)$$

2. **Calculate a per item weight for Neighbor J**
   The neighbor weight for neighbor J of user I for item p is:

$$Wt_{p,I,J} = \begin{cases} \frac{\mathcal{L} - d_{p,I,J}}{\mathcal{L}} & \text{iff } d_{p,I,J} \leq \mathcal{L} \\ 0.0 & \text{otherwise} \end{cases} \quad (3.6)$$

3. **Calculate Predicted Rating for Item p**
   The predicted rating for item p is calculated as:

$$P_{I,p} = \frac{\sum_{J=1}^{||Neighbors_I||} Wt_{p,I,J} \times R_{J,p} \times c_{J,p}}{\sum_{J=1}^{||Neighbors_I||} Wt_{p,I,J} \times c_{J,p}} \quad (3.7)$$

167. Since feature weights and cluster weights ultimately affect the predicted ratings, and they are computed through a process of content-based filtering, Lashkari thus utilizes a "content-based filter system."

5. <u>Lashkari anticipates claim 6 of the '664 Patent</u>

168. Claim 6 depends from claim 1 and further requires "an information delivery system for delivering the filtered information to the first user." Lashkari discloses this element, as it discloses that search results filtered by WEBHOUND are delivered to the user. (*Id.* at 78 ("the resulting matches could be filtered through WEBHOUND and only the top ranked ones (in terms of predicted rating) need be returned."))

6. <u>Lashkari anticipates claim 21 of the '664 Patent</u>

169. Claim 21 depends from claim 1 and further recites "wherein the content-based filter system filters by extracting features from the information." Lashkari discloses this element. As discussed above, Lashkari extracts features from all items in the database in order to compute "feature weights" and "cluster weights" as part of its rating prediction algorithm. (*Id.* at 35-38).

7. **Lashkari anticipates claim 22 of the '664 Patent**

170. Claim 22 depends from claim 21 and further recites "wherein the extracted features comprise content data indicative of the relevance to the at least one of the query and the user." Lashkari discloses this element because the rating prediction algorithm awards a higher score to extracted features that closely match the features and feature values the user has indicated he found relevant through his prior rating behavior. (*Id.* at 39-40).

8. **Lashkari anticipates claim 26 of the '664 Patent**

171. Claim 26 contains essentially the same elements as claim 1, but is recast as a method rather than system claim. For example, where claim 1 requires "a scanning system for searching for information relevant to a query associated with a first user in a plurality of users," claim 26 simply requires "searching for information relevant to a query associated with a first user in a plurality of users." Where claim 1 requires "a feedback system for receiving information found to be relevant to the query by other users," claim 26 simply requires "receiving information found to be relevant to the query by other users." Thus, Lashkari anticipates claim 26 for the same reasons that it anticipates claim 1. I incorporate by reference my prior discussion about how Lashkari anticipates claim 1, as well as the chart attached as Exhibit A-3 which shows how Lashkari anticipates these claims.

9. **Lashkari anticipates claim 28 of the '664 Patent**

172. Claim 28 depends from claim 26 and further recites "the step of delivering the filtered information to the first user." As discussed with respect to claim 6, *supra*, Lashkari discloses this element.

10. **Lashkari anticipates claim 38 of the '664 Patent**

173. Claim 38 depends from claim 26 and further recites "wherein the searching step comprises scanning a network in response to a demand search for the information relevant to the

query associated with the first user." As noted above, "scanning a network" has been construed as looking for or examining items in a network, and "demand search" has been construed as a single search engine query performed upon a user request. Furthermore, I/P Engine has taken the position that "scanning a network" is satisfied by looking for advertisements stored on a distributed database. (*See, e.g.,* 7/2/2012 Infringement Contentions for Google at 6-7). Under I/P Engine's interpretation, the traditional search engines paired with WEBHOUND meet this element by looking for items relevant to a user's search engine query. (*See id.* at 78).

D. <u>Under I/P Engine's infringement allegations, Ryan anticipates Claims 10, 14, 15, 25, 27, and 28 of the '420 Patent and Claims 1, 5, 6, 26, 28, and 38 of the '664 Patent</u>

1. <u>Background on Ryan</u>

174. As discussed above, Ryan discloses a search engine that accepts a search query—termed "keyword" in the patent (Ryan 6:10-11)—and generates a set of search results that match that query. (*See, e.g. id.* at Figure 3B and accompanying text.) Ryan further tracks the behavior of each user with respect to a displayed list of search results. "By updating the database with the selections of many different users, the database can be updated to prioritize those web listings that have been selected the most with respect to a given keyword, and hereby presenting first the most popular web page listings in a subsequent search using the same keyword search entry." (*Id*. at 2:31-37.)

2. <u>Ryan anticipates Claim 10 of the '420 Patent</u>

175. As noted above, I/P Engine's infringement contentions assert that the preamble of claim 10 is not a limitation. To the extent that the preamble is considered a limitation here, Ryan recites a "search engine system," as recited by the preamble to claim 10. As Ryan states, "[t]he present invention relates to a method and apparatus that allows for enhanced database searching,

and more particularly; for use as an internet search engine." (Ryan at 1:8-10.) In fact, the *title* of the Ryan patent is simply "Search Engine."

(a) <u>A system for scanning a network to make a demand search for informons relevant to a query from an individual user</u>

176. The Court construed "scanning a network" as looking for or examining items in a network, and construed "demand search" as a single search engine query performed upon a user request. I/P Engine's infringement allegations assert that retrieving a set of ads from a distributed database meets this limitation. *See, e.g.*, 7/2/12 Infringement Contentions to Google at 6-9. Ryan discloses "scan[ing] for [] key words through a database of web addresses and the text stored on the web sites":

> The search command is transmitted to a server computer, the [*sic*] has a search engine associated with the server computer. The search engine receives the search command, and then using it scans for these key words through a database of web addresses and the text stored on the web sites. Thereafter, the results of the scan are transmitted from the server computer back to the user's computer and displayed on the screen of the user's computer. (Ryan at 1:23-31.)

177. Ryan further discloses that there can be multiple server computers containing the keyword database, and that those server computers can be networked together:

> The present invention is preferably implemented in a network environment wherein each computer contains, typically, a microprocessor, memory and modem, a certain of the computers contain displays and the like, as are well known. As shown in FIG. 1B, a plurality of user sites/computers 100A-100D are shown, as are a plurality of server computers 102A-B, and developer sites/computers 104A-B. It is understood that in a typical internet network, that different server computers 102 can be interconnected together, as is illustrated. (Ryan at 3:66 – 4:8)

178. Moreover, Ryan populates the databases and server computers through a web crawler:

> In order for the search engine to be aware of new web sites and to update its records of existing sites, either the proprietors of the web sites notify the search engine themselves or the information may be obtained via a \`web crawler\` to update the database at the server computer. A web crawler is an automated program which explores and records the contents of a web site and its inks to

> other sites, thereby spreading between sites in an attempt to index all the current sites. (Ryan at 1:32-40.)

See also Ryan at 15:61 – 16:6: "Populating the Web-page Data Table (URL Table) 188. This table is populated in a number of ways, including … web crawlers may also add URL addresses and descriptions (the description is either the first few lines of the web-page or in the HTML coded 'title')."

179. Accordingly, Ryan discloses "[a] system for scanning a network to make a demand search for informons relevant to a query from an individual user."

(b) <u>a content-based filter system for receiving the informons from the scanning system and for filtering the informons on the basis of applicable content profile data for relevance to the query</u>

180. I/P Engine's infringement allegations assert that receiving and filtering advertisements on the basis of content data such as keyword for relevance to the query meets this claim limitation. *See*, *e.g.*, 7/2/12 Infringement Contentions for Google at 9: "Google AdWords receives and filters advertisements on the basis of content data (e.g., ad text, *keyword*, and landing page attributes) for relevance to the query" (emphasis added). Ryan receives and filters search results on the basis of the keyword entered by the user:

> These results are in the form of a list, ranked according to criteria specific to the search engine. These criteria may range from the number of occurrences of the key-words anywhere within the searched text, to methods giving a weighting to key-words used in particular positions (as previously mentioned). When multiple key-words have been used, sites are also ranked according to the number of different key-words applicable. (1:59-66.)

181. As described above, URLs in Ryan can be paired with keyword based on submissions from web site owners or by automated crawlers that process those websites. (Ryan

at 18:36 to 19:52.) This pairing of keywords to web pages is a "content-based filter system" under I/P Engine's infringement contentions.[22]

(c) <u>a feedback system for receiving collaborative feedback data from system users relative to informons considered by such users</u>

182. The Court has construed "collaborative feedback data" as "data from system users regarding what informons such users found to be relevant." (Markman Order at 10.) Ryan receives data from its users regarding what informons those users found to be relevant. As Ryan explains, "human brain power is captured by recording which web pages the user goes to after each keyword search." (Ryan at 9:39-41.) "[T]he surfer trace data that can be collected includes keyword 124, URL 126, user ID 128, IP address 130, date-time 132, brief web page description 134, and is identified as such since it provides a trace or record of how searchers (surfers) use the search engine." (*Id*. at 10:54-58.) This surfer trace data is used to update a table that tracks the number of times a given URL was selected after the user enter a given keyword:

TABLE 3

Links between information suppliers (web-pages) and information requests (key-words)

	Key-word	Key-word	Key-word	Key-word	Key-word
URL address 1	X, Y, Z				
URL address 2					X, Y, Z
URL address 3			X, Y, Z		
URL address 4	X, Y, Z				
URL address 5		X, Y, Z		X, Y, Z	
URL address 6					
URL address 7					

[22] To the extent the "content profile data" and "content-based filter[ing]" from this element require a more elaborate mapping of the informon's content than the keyword-URL matching in Ryan, then this element would be obvious over Ryan in view of Rose. *See* fn. 16, *supra*.

where X is "the cumulative number of significant visits (hits) to each URL addresses [sic] corresponding to each key-word," Y is "the previous cumulative number of significant visits measured at an earlier predetermined instant," and Z is the time the webpage was added to the search engine. (Ryan at 12:16-60.) Furthermore, there can be multiple values of X, Y, and Z for each keyword-URL pair corresponding to different characteristics of the user. For example, Ryan might track the responses among males, females, New Zealanders,[23] Americans, engineers, lawyers, etc. (*Id*. at 12:63 to 13:37.) The table would thus contain the cumulative number of times New Zealanders clicked on ESPN.com after searching for "sports," the cumulative number of times engineers clicked on EPSN.com after searching for "Paris," etc.

(d) __The filter system combining pertaining feedback data from the feedback system with the content profile data in filtering each informon for relevance to the query__

183. Ryan combines the feedback system discussed above with content profile data in filtering each informon for relevance to the query. As described above, Ryan maintains a cumulative count of the number of visits to each URL for each keyword entered by the user. (See "X" in table 3). Moreover, Ryan also maintains such cumulative counts for user groups "representing different countries, occupations, sex, age and so forth." (Ryan at 13:26-27.) This information is used for the "Popular Search" functionality:

> FIG. 6 illustrates the process for determining a list of popular web pages associated with the entry of a keyword 270 in step 272. If this search is selected and a keyword is entered, step 274 follows and produces a list of web pages based on the values of X taken from Table 3 (172, FIG. 5) for the keyword 270 entered. These web pages are identified by a unique web-page(URL) number from Table 3. Thereafter, in step 276 the list of web-page numbers found from step 274 is combined with the URL address and web-page description from Table 2 (188 FIG. 5). In step 278 the resulting list of web pages is then tagged, depending on the results of step 246 in FIG. 5 as described previously, and sent to the user for them to make their selections. (*Id.* at 21:13-26.)

[23] The named inventors of the Ryan patent are from New Zealand.

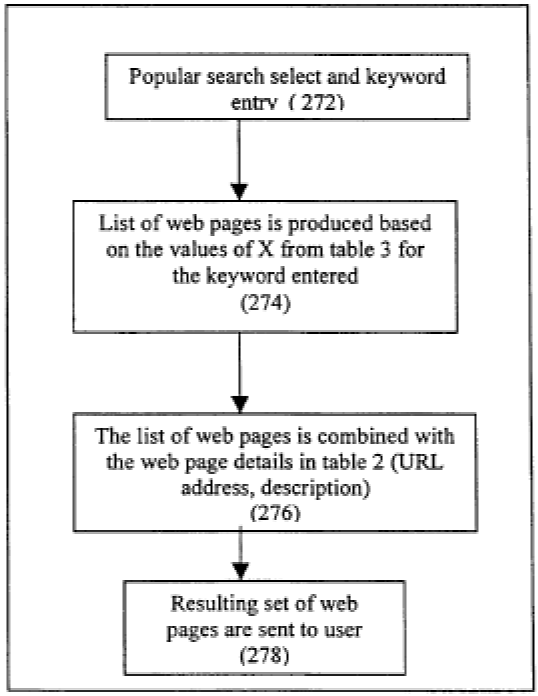

Figure 6

184. Accordingly, Ryan discloses this claim element.

3. <u>Ryan anticipates claims 14 and 15 of the '420 Patent</u>

185. Claim 14 depends from claim 10 and further requires "wherein the collaborative feedback data comprises passive feedback data." Claim 15 depends from claim 14 and further requires "wherein the passive feedback data is obtained by passively monitoring the actual response to a proposed informon." Ryan discloses obtaining passive feedback by monitoring the actual response to a proposed informon: "According to the present invention, collecting the surfer trace data is achieved by sending, in the list of web pages generated by the search to the user, hidden links that will automatically send information back to the search engine (or a subsidiary server). While the user only sees that his intended link is displayed, the hidden link notifies the search engine of the transfer." (*Id.* at 9:41-47.)

186. In fact, Ryan spends some time discussing how to capture user click information within the constraints of web technology:

> The HTTP link associated with the "www.weather.com" label is link.asp?n=1." If the user selects this link, therefore, in a process is invisible to the user, the user is first directed to the link asp page on the site corresponding to the web server using the search engine 10 according to the present invention, and pass parameter n with value 1.
>
> Server side code (application code that runs on the web server) uses this parameter to identify Me URL and description of the user's chosen site, This information is then stored in a database Table along wit other surfer trace data. The server side code then executes a redirect operation to the user's required URL. The user then sees their required page appear. (*Id.* at 10:22-34.)

See also id. at 9:22-30 (describing how to use time stamps to ascertain the user's level of interest).

187. Accordingly, Ryan discloses the limitations of claims 14 and 15 of the '420 Patent.

4. Ryan anticipates claims 25, 27, and 28 of the '420 Patent

188. Claims 25, 27, and 28 contain the same substance as claims 10, 14, and 15, respectively, but are simply recast as method rather than system claims. Thus, Ryan anticipates claims 25, 27, and 28 for the same reasons that it anticipates claims 10, 14, and 15. I incorporate by reference my prior discussion about how Ryan anticipates claims 10, 14, and 15. I also incorporate by reference the claim chart, attached as Exhibit A-7 to this Report, showing how Ryan anticipates these claims.

5. Ryan anticipates claim 1 of the '664 Patent

189. As noted above, I/P Engine's infringement contentions assert that the preamble of claim 1 is not a limitation. To the extent that the preamble is considered a limitation here, Ryan recites "a search system" as required by the preamble to '664 claim 1. As Ryan states, "[t]he present invention relates to a method and apparatus that allows for enhanced database searching, and more particularly; for use as an internet search engine." (Ryan at 1:8-10.)

(a) a scanning system for searching for information relevant to a query associated with a first user in a plurality of users

190. The Court construed "a scanning system" as "a system used to search for information." (Markman Order at 17.) As discussed above with regard to "a system for scanning a network to make a demand search for informons relevant to a query from an individual user" in the '420 Patent, Ryan discloses a search engine, which is "a system used to search for information." Moreover, Ryan—like most search engines—searches for information relevant to a query. Furthermore, Ryan can return different search results based on the identity of the user. For example, "[w]hen the general profile type setting is used (ranked based on X1), the Basketball site would be ranked at the top. When the New Zealand setting is chosen (ranked based on X:2) the rugby site would be highest. This would be a reflection of the preferences of the New Zealanders." (Ryan at 12:12-16.) Moreover, Ryan stores identifying information about each user in Table 5. (Ryan at 14:16-46.)

TABLE 5

User identification Table

User identification	password	email	Default profile	Other information
Joe Bloggs	dogs	jbloggs@AOL	US, Male	

191. Ryan further stores the keyword-URL pairs for each individual user, either at the search engine site or at the individual's computer. (Ryan at 14:47 to 15:28.) This allows Ryan to further customize the search results provided to the user.

192. Accordingly, Ryan contains "a scanning system for searching for information relevant to a query associated with a first user in a plurality of users."

(b) a feedback system for receiving information found to be relevant to the query by other users

193. As discussed above with regard to "a feedback system for receiving collaborative feedback data from system users relative to informons considered by such users" in the '420

Patent, Ryan discloses a feedback system for receiving information found to be relevant to the query by other users. As Ryan explains, "human brain power is captured by recording which web pages the user goes to after each keyword search." (Ryan at 9:39-41.) "[T]he surfer trace data that can be collected includes keyword 124, URL 126, user ID 128, IP address 130, date-time 132, brief web page description 134, and is identified as such since it provides a trace or record of how searchers (surfers) use the search engine." (*Id*. at 10:54-58.) This surfer trace data is used to update a table that tracks the number of times a given URL was selected after the user enter a given keyword:

TABLE 3

Links between information suppliers (web-pages) and information requests (key-words)

	Key-word	Key-word	Key-word	Key-word	Key-word
URL address 1	X, Y, Z				
URL address 2					X, Y, Z
URL address 3			X, Y, Z		
URL address 4	X, Y, Z				
URL address 5		X, Y, Z		X, Y, Z	
URL address 6					
URL address 7					

194. where X is "the cumulative number of significant visits (hits) to each URL addresses [sic] corresponding to each key-word," Y is "the previous cumulative number of significant visits measured at an earlier predetermined instant," and Z is the time the webpage was added to the search engine. (Ryan at 12:16-60.) Furthermore, there can be multiple values of X, Y, and Z for each keyword-URL pair corresponding to different characteristics of the user. For example, Ryan might track the responses among males, females, New Zealanders, Americans, engineers, lawyers, etc. (*Id*. at 12:63 to 13:37.) The table would thus contain the cumulative number of times New Zealanders clicked on ESPN.com after searching for "sports,"

the cumulative number of times engineers clicked on EPSN.com after searching for "Paris," etc. Accordingly, Ryan discloses this claim element.

(c) **a content-based filter system for combining the information from the feedback system with the information from the scanning system and for filtering the combined information for relevance to at least one of the query and the first user**

195. As discussed above with regard to the "filter system combining pertaining feedback data from the feedback system with the content profile data in filtering each informon for relevance to the query" of the '420 Patent, Ryan combines the information from the feedback system with the information from the scanning system.

> FIG. 6 illustrates the process for determining a list of popular web pages associated with the entry of a keyword 270 in step 272. If this search is selected and a keyword is entered, step 274 follows and produces a list of web pages based on the values of X taken from Table 3 (172, FIG. 5) for the keyword 270 entered. These web pages are identified by a unique web-page (URL) number from Table 3. Thereafter, in step 276 the list of web-page numbers found from step 274 is combined with the URL address and web-page description from Table 2 (188 FIG. 5). In step 278 the resulting list of web pages is then tagged, depending on the results of step 246 in FIG. 5 as described previously, and sent to the user for them to make their selections. (*Id.* at 21:13-26.)

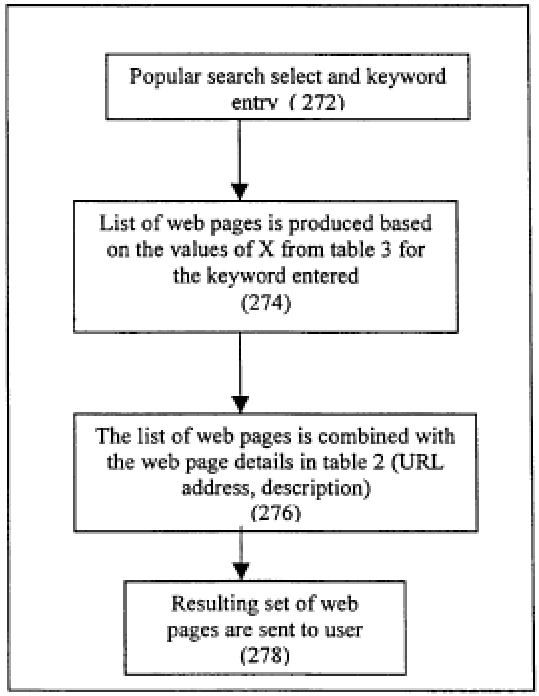

Figure 6

196. Ryan also discloses a "content-based filter system" under I/P Engine's infringement allegations. I/P Engine's infringement allegations assert that receiving and filtering advertisements on the basis of content data such as keyword meets this claim limitation. *See, e.g.,* 7/2/12 Infringement Contentions for Google at 35-36 ("AdWords uses a 'Quality Score' to evaluate an advertisement's relevance . . . The Quality Score is a combination of factors including feedback data, i.e., '[a] keyword's clickthrough rate (CTR),' and content data, i.e., 'the relevance of your ad text, *keyword*, and landing page." (emphasis added). As discussed above with respect to '420 claim 10(b), *supra*, Ryan receives and filters search results on the basis of the keyword entered by the user. Accordingly, Ryan discloses this claim element under I/P Engine's infringement allegations.

6. <u>Ryan anticipates claim 5 of the '664 Patent</u>

197. Claim 5 depends from claim 1 and further requires "wherein the filtered information is an advertisement." Ryan meets this element:

> Another novel feature of the present invention, which indirectly inures to the benefit of the end user, directly benefits the advertiser, because it allows for content to be targeted in real time based upon various criteria. As will be described more fully hereinafter, a content providing algorithm is initially selected which will determine how content is selected in step 34. Step 36 follows, and based upon inputs from users and content providers, which content to show is determined. Thereafter, the advertisements are displayed for the user to see, simultaneously with the display of either keywords and/or web pages. (Ryan at 4:57-67.)

7. Ryan anticipates claim 6 of the '664 Patent

198. Claim 6 depends from claim 1 and further requires "an information delivery system for delivering the filtered information to the first user." Ryan discloses a system that delivers the information to the user: "In step 278 the resulting list of web pages is then tagged, depending on the results of step 246 in FIG. 5 as described previously, and sent to the user for them to make their selections." (Ryan at 21:23-26.)

8. Ryan anticipates claim 26 of the '664 Patent

199. Claim 26 contains essentially the same elements as claim 1, but is recast as a method rather than system claim. For example, where claim 1 requires "a scanning system for searching for information relevant to a query associated with a first user in a plurality of users," claim 26 simply requires "searching for information relevant to a query associated with a first user in a plurality of users." Where claim 1 requires "a feedback system for receiving information found to be relevant to the query by other users," claim 26 simply requires "receiving information found to be relevant to the query by other users." Thus, Ryan anticipates claim 26 for the same reasons that it anticipates claim 1. I incorporate by reference my prior discussion about how Ryan anticipates claim 1, as well as the chart attached as Exhibit A-7 that shows how Ryan anticipates these claims.

9. **Ryan anticipates claim 28 of the '664 Patent**

200. Claim 28 depends from claim 26 and further recites "the step of delivering the filtered information to the first user." As discussed with respect to claim 6, *supra*, Ryan discloses this element: "In step 278 the resulting list of web pages is then tagged, depending on the results of step 246 in FIG. 5 as described previously, and sent to the user for them to make their selections." (Ryan at 21:23-26.)

10. **Ryan anticipates claim 38 of the '664 Patent**

201. Claim 38 requires "[t]he method of claim 26 wherein the searching step comprises scanning a network in response to a demand search for the information relevant to the query associated with the first user." As discussed regarding the "system for scanning a network to make a demand search for informons relevant to a query from an individual user" element of the '420 Patent, Ryan scans a network to make a demand search for information relevant to the query. Accordingly, Ryan discloses this element.

E. **Rose anticipate claims 1, 6, 21, 22, 26, 28, and 38 of the '664 Patent**

1. **Background on Rose**

202. Rose describes a system that predicts how relevant various items in an information database will be to users of the database. "The prediction of relevance is carried out by combining data pertaining to the content of each item of information with other data regarding correlations of interests between users." (Rose at Abstract).

203. Rose performs its content-based analysis by comparing a vector representing a document's content to a vector representing the user's preferences. (*Id.* at 6:11-58). The closer the vectors are to each other, the more relevant the document is judged to be for the user. (*Id.* at 6:56-58).

204. Rose makes its correlation-based analysis by recording feedback from system users about how much they liked documents that they viewed. (*Id.* at 5-26-30). Based on this user feedback, the system determines the degree of correlation in various users' interests. (*Id.* at 6:59-66). This correlation of interests is used to help predict whether a given document will be deemed relevant to a given user. Specifically, a document will be deemed relevant to a user if other users, whose preferences correlate with the user at issue, had given a high rating to the document. (*Id.* at 7:6-19). As noted above, Rose combines the content-based scores and correlation scores to generate an overall score for the document, which indicates the document's relevance to the user. (*See id.* at Abstract, 7:34-36).

205. Rose also discloses that this content-based/correlation-based filtering can be used to filter documents from a wide variety of information systems, including "search results obtained through an online text retrieval service." (*Id.* at 2:54-55; *see also* claim 26).

2. Rose anticipates Claim 1 of the '664 Patent

206. As noted above, I/P Engine's infringement contentions assert that the preamble of claim 1 is not a limitation. To the extent that the preamble is considered a limitation here, Rose recites "a search system" as required by the preamble to '664 claim 1. Specifically, Rose's system can accept a search query from a user and return a set of search results, which qualifies this system as a search system. (*See* Rose at 2:54-55, claim 26).

(a) a scanning system for searching for information relevant to a query associated with a first user in a plurality of users

207. The Court has construed "a scanning system" as "a system used to search for information." Thus construed, Rose meets this claim element because it searches for information relevant to a query associated with a first user. (*See id.* at 2:54-55, claim 26).

(b) <u>a feedback system for receiving information found to be relevant to the query by other users</u>

208. Rose discloses a feedback system for receiving information found to be relevant by other users. Specifically, Rose records users' level of interest in search results presented to them. (*See id.* at 5:7-28).

209. While Rose only teaches receiving information about what is relevant to other users, rather than information that other users deemed relevant *to a particular query*, I/P Engine's infringement allegations ignore the "to a query" sub-element of this claim element. Specifically, I/P Engine alleges that that the "to a query" sub-element is met by receiving information globally from system users, not just information from users who had entered a common query. *See* 7/2/2012 Infringement Contentions for Google at 33-35 (asserting that AdWords meets this limitation by recording how often users in general clicked on a given ad and incorporating this clickthrough rate into the ad's Quality Score). Thus, Rose meets this claim element under I/P Engine's infringement allegations, even if Rose receives feedback from users in general instead of just users who had entered a common search query.

210. Alternatively, modifying Rose to record feedback from a subset of users that had entered the same search query would be a simple and obvious modification to make. It would be obvious to modify Rose in this manner given that other references – such as Bowman – already teach the utility of recording feedback from a subset of users that had entered the same search query. (*See* Bowman at claim 28[c] ("for each item identified in the query result, combining the relative frequencies with which users selected the item in earlier queries specifying each of the terms in the query to producing [sic] a ranking value for the item.")) If Rose were modified in this manner, then Rose would squarely meet the element of "receiving information found to be relevant *to the query* by other users." By receiving feedback from users who had entered the same query about how relevant they found certain search results to be, Rose would inherently be

receiving feedback about how relevant the users found those search results to be *for their shared query*.

(c) **<u>a content-based filter system for combining the information from the feedback system with the information from the scanning system and for filtering the combined information for relevance to at least one of the query and the first user</u>**

211. Rose discloses this element, as it discloses that the search results derived from the scanning system are filtered through a combination of content-based and feedback-based filters. This content-based and feedback-based method is used to filter the search results for relevance to the user. (*See* Rose at Abstract ("Items of information to be presented to a user are ranked according to their likely degree of relevance to that user and displayed in order of ranking. The prediction of relevance is carried out by combining data pertaining to the content of each item of information with other data regarding correlations of interests between users. A value indicative of the content of a document can be added to another value which defines user correlation, to produce a ranking score for a document."); *see also id.* at 7:35-50).

3. Rose anticipates Claim 6 of the '664 Patent

212. Claim 6 depends from claim 1 and further requires "an information delivery system for delivering the filtered information to the first user." Rose discloses this element, as it recites that "[i]nformation *presented to a user via an information access system* is ranked according to a prediction of the likely degree of relevance to the user's interests." (Rose at Abstract (emphasis added)).

4. Rose anticipates Claim 21 of the '664 Patent

213. Claim 21 depends from claim 1 and further recites "wherein the content-based filter system filters by extracting features from the information." Rose discloses this element. Specifically, Rose extracts "attributes" of each information item to ascertain that item's content. (*See id.* at 6:10-25 ("To derive the content-based data, certain elements of the message, e.g., each

word in a document, can be assigned a weight, based on its statistical importance . . . For non-document types of information, the content data can be based upon other attributes that are relevant to a user's interest in that information. For example, in the movie database, the content vector might take into account the type of movie, such as action or drama, the actors, its viewer category rating, and the like.")

5. <u>Rose anticipates Claim 22 of the '664 Patent</u>

214. Claim 22 depends from claim 21 and further recites "wherein the extracted features comprise content data indicative of the relevance to the at least one of the query and the user." Rose discloses this element, because the "attributes" that Rose extracts from an information item's content indicate how relevant that item is to the user. (*See id.*)

6. <u>Rose anticipates Claim 26 of the '664 Patent</u>

215. Claim 26 contains essentially the same elements as claim 1, but is recast as a method rather than system claim. For example, where claim 1 requires "a scanning system for searching for information relevant to a query associated with a first user in a plurality of users," claim 26 simply requires "searching for information relevant to a query associated with a first user in a plurality of users." Where claim 1 requires "a feedback system for receiving information found to be relevant to the query by other users," claim 26 simply requires "receiving information found to be relevant to the query by other users." Thus, Rose anticipates claim 26 for the same reasons that it anticipates claim 1. I incorporate by reference my prior discussion about how Rose anticipates claim 1, as well as the chart attached as Exhibit A-1 which shows how Rose anticipates these claims.

7. <u>Rose anticipates Claim 28 of the '664 Patent</u>

216. Claim 28 depends from claim 26 and further recites "the step of delivering the filtered information to the first user." As discussed with respect to claim 6, *supra,* Rose

discloses this element. (*See* Rose at Abstract) ("[i]nformation *presented to a user via an information access system* is ranked according to a prediction of the likely degree of relevance to the user's interests.") (emphasis added).

8. <u>Rose anticipates Claim 38 of the '664 Patent</u>

217. Claim 38 depends from claim 26 and further recites "wherein the searching step comprises scanning a network in response to a demand search for the information relevant to the query associated with the first user." As noted above, "scanning a network" has been construed simply as looking for or examining items in a network, and "demand search" has been construed as a single search engine query performed upon a user request. Rose discloses this claim element because it looks for search results in response to a user's query. (*See* Rose at 2:54-55, claim 26).

VII. <u>THE ASSERTED CLAIMS ARE OBVIOUS IN LIGHT OF THE PRIOR ART</u>

218. The discussion above demonstrated that the asserted claims are anticipated by one or more of Bowman, Culliss, Lashkari, Ryan, and Rose. To the extent that any of those references do not disclose limitations in the asserted claims, this section demonstrates that those limitations consist only of obvious applications of art known to one of ordinary skill, and thus the claims are invalid for obviousness in light of each reference.

219. Exhibits A-1 through A-7 of this Report are element-by-element claim charts of each of the asserted claims in this case with references to the prior art. These Exhibits are incorporated by reference into the body of this Report and should be considered as part of this Report.

A. <u>Standard for Obviousness</u>

220. I understand that the Supreme Court in *KSR* expanded upon the framework for analyzing obviousness set forth in previous cases including *Graham v. John Deere.* It is my

understanding that in *KSR*, the Supreme Court rejected the Federal Circuit's "rigid" application of the "teaching, suggestion, or motivation" test for obviousness in favor of an "expansive and flexible approach" using "common sense." I understand that in *KSR*, the Supreme Court specifically cautioned against granting patents that are nothing more than combinations of known elements driven by non-innovative factors such as market demands. The Court also provided guidance on how combination patents should be handled. The Supreme Court noted that "[g]ranting patent protection to advances that would occur in the ordinary course without real innovation retards progress and may, in the case of patents combining previously known elements, deprive prior inventions of their value or utility." The Supreme Court also stressed the need for "caution" before validating patents that are merely combinations of elements found in the prior art. In view of this caution, the Court explained that "[t]he combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results."

221. I further understand that the Supreme Court pointed to other factors which may show obviousness. For example, the Supreme Court observed, "[w]hen a work is available in one field of endeavor, design incentives and other market forces can prompt variations of it, either in the same field or a different one. If a person of ordinary skill in the art can implement a predictable variation," it is obvious. Similarly, the Court noted that "[i]f a technique had been used to improve one device, and a person of ordinary skill would recognize that it would improve similar devices in the same way, using the technique is obvious, unless its actual application is beyond his or her skill." Further, "[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

knowledge." Finally, "[i]f a person of ordinary skill can implement a predictable variation of the prior art in the manner claimed, §103 likely bars its patentability."

222. I understand that in *KSR*, the Supreme Court also stated that the factors from *Graham v. John Deere* should be used in the obviousness analysis. These factors are:

(1) The scope and content of the prior art,

(2) Differences between the prior art and the claims asserted,

(3) The level of ordinary skill in the pertinent art.

(4) "Secondary considerations" of non-obviousness

B. The Asserted Patents Are a Combination of Prior Art Elements.

223. Each of the elements of the '420 and '664 Patents was present in the prior art.

1. Scanning a network for information relevant to a query

224. Scanning a network for information relevant to a query appears in '420 claims 10 and 25, as well as '664 claim 38. The Court has construed "scanning a network" as looking for or examining items in a network. I/P Engine has taken the position that this element is satisfied by looking for advertisements in a distributed database. (*See, e.g.*, 7/2/2012 Infringement Contentions for Google at 6-7). Under I/P Engine's interpretation, a wide variety of prior art references look for items in a database or network, thus meeting this element. For example, the Lycos search engine, disclosed as a front-end component of Lashkari's WEBHOUND system, accepts a search query from a user and looks for items relevant to the query. (*See* Lashkari at 78). Bowman's system also accepts a search query from a user and looks for items relevant to that query. (*See* Bowman at claim 28[a-b]). Culliss discloses a search engine that looks for search results matching a user's query. (Culliss at 4:10-26). And Rose's system includes a text retrieval service that looks for and retrieves items matching a user query. (Rose at 2:51-55, claim 26).

2. **Receiving information found to be relevant to the query by other users**

225. Receiving information found to be relevant to the query by other users appears in ‘664 claims 1 and 26. A wide variety of prior art references also receive information found to be relevant to the query by other users. For example, Bowman records how often prior users who had entered the same query had selected a particular search result. (*See* Bowman at Abstract (“[A] software facility . . . produces a ranking value for at least a portion of the items identified in the query result by combining the relative frequencies with which users selected that item from the query results specifying each of the terms specified by the query.”) Culliss records which search results were selected by users who entered a particular query, and raises the scores for terms in the selected search results that match terms in that query. (*See* Culliss at 4:37-49).

3. **Receiving collaborative feedback data**

226. Receiving collaborative feedback data appears in ‘420 claims 10 and 25. The Court construed “collaborative feedback data” as “data from system users regarding what informons such users found to be relevant.” Culliss and Bowman disclose this element for the same reason that they disclose “receiving information found to be relevant to the query by other users.” This is because “collaborative feedback data” *includes* “information found to be relevant to the query by other users” under the Court’s construction – the latter term is a subset of the former.

227. Numerous references besides Culliss and Bowman also disclose receiving collaborative feedback data under the Court’s construction, because they receive data from system users regarding what informons such users found to be relevant. (*See, e.g.*, Rose at 5:8-34; Lashkari at 57).

4. **Combining feedback data with content data in filtering information**

228. Combining feedback data with content data in filtering information, which appears in '420 claims 10 and 25 and '664 claims 1 and 26, was well-known in the art. To put it another way, numerous prior art references combined content-based filtering with feedback-based filtering to filter information. For example, Rose discloses that "[i]tems of information to be presented to a user are ranked according to their likely degree of relevance to that user and displayed in order of ranking. *The prediction of relevance is carried out by combining data pertaining to the content of each item of information with other data regarding correlations of interests between users.*" (Rose at Abstract) (emphasis added). Bowman discloses that an item's relevance score is derived by combining: (1) feedback showing how often other users who entered the same query selected that item; and (2) content analysis showing how many terms from the query appear in the item's content. (Bowman at claims 28-29). Lashkari states that "[t]his thesis presents a novel technique for information filtering that attempts to address the problems faced by both ACF [Automated Collaborative Filtering] and content-based approaches *by combining the two to make use of their complementary strengths*." (Lashkari at 15-16) (emphasis added). And Balabanovic states that "[b]y combining both collaborative and content-based filtering systems, Fab may eliminate many of the weaknesses found in each approach." (Balabanovic at 66).

5. **Receiving passive feedback data**

229. Receiving passive feedback data appears in '420 claims 14, 15, 27, and 28. As discussed above, both Bowman and Culliss teach receiving passive feedback data from users. These references do not require users to explicitly state their interest in documents. Rather, they *infer* user interest by passively monitoring which documents the users select for viewing, purchasing, etc. (*See* Bowman at 7:31-33, 9:2-3; Culliss at 4:32-34).

230. It is unsurprising that these references elected to receive passive (rather than active) feedback from users. As Loeb explains, there are only two basic ways to receive feedback from users: actively—*i.e.*, requiring the user to enter additional information as to his preferences—or passively, *i.e.* deducing those preferences from the user's actions. (Loeb at 40-41.) There are also known benefits to using passive feedback rather than active feedback to gather information about user preferences. For example, Loeb observes that "casual users are not likely to be willing to engage in lengthy interactions with the system in order to articulate current information needs and provide explicit feedback," and thus implicit means are needed to ensure their participation. (*Id*. at 41.) Accordingly, one of ordinary skill would understand that feedback from system users, regarding what information these users found to be relevant, could constitute passive feedback.

6. Filtering advertisements

231. Filtering advertisements appears in '664 claim 5. It was well-known in the art that advertisements are one type of information entity that can be filtered. Indeed, several of the prior art references discussed herein specifically disclose filtering advertisements. (*See* Culliss at 9:56-62; Bowman at 5:4, 9:2-3; Ryan at 4:57-67).

7. Extracting features from information

232. Extracting features from the filtered information appears in '664 claims 21 and 22. As was commonly recognized, it is necessary or helpful to extract features from information items in order to analyze those items' content for purposes of content-based filtering. Accordingly, many of the references discussed in this Report disclose extracting features from information. For example, Rose discloses extracting word features from textual information items and thematic or other descriptive features from non-textual information items. (*See* Rose at 6:10-25 ("To derive the content-based data, certain elements of the message, e.g., each word in

a document, can be assigned a weight, based on its statistical importance . . . For non-document types of information, the content data can be based upon other attributes that are relevant to a user's interest in that information. For example, in the movie database, the content vector might take into account the type of movie, such as action or drama, the actors, its viewer category rating, and the like.") Lashkari extracts document features and uses them in its "Feature-Guided Automated Collaborative Filtering" algorithm. (*See* Lashkari at 35 ("The idea behind the FGACF algorithm is that users don't necessarily correlate on the item level but rather for certain combinations of values of features of these items. Thus the FGACF algorithm treats each item as consisting of a set of *feature values* for a set of *features* defined in the domain.") (emphasis in original).

8. <u>Delivering filtered information to users</u>

233. Delivering filtered information to users appears in '664 claims 6 and 28. Delivering filtered information to users is, unsurprisingly, an element of almost any information filtering system. This is because filtered information has little utility unless it is somehow delivered to a user who has need for such information. Accordingly, numerous prior art references disclose delivering filtered information to users. (*See* Rose at Abstract ("Information *presented to a user* via an information access system is ranked according to a prediction of the likely degree of relevance to the user's interests.") (emphasis added); Bowman at 9:56-58 ("In step **808**, the facility *displays the items* identified in the query result in accordance with the ranking values generated for the items in step **806**") (emphasis added); Culliss at 4:25-31 ("As shown in FIG. 1 at **20**, the search engine will then *display a squib of each of the matched articles* . . . the user can then scroll through the squibs of the articles and select a desired one") (emphasis added).

C. The Combinations In the Asserted Patent Claims Are Predictable And Do Not Yield Any Unpredictable Results.

234. The Supreme Court in *KSR* stated "[w]hen a work is available in one field of endeavor, design incentives and other market forces can prompt variations of it, either in the same field or a different one. If a person of ordinary skill can implement a predictable variation, §103 likely bars its patentability." The Supreme Court also stated that "[t]he combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results."

1. The Combinations in the Asserted Patents Are Predictable

235. Combining the elements of the asserted patents was predictable. The elements were available in combination and only with slight variations in the very same field of information retrieval and filtering. It is my opinion that this combination adds nothing to the nature and quality of each of the individual elements on its own, which I understand the Supreme Court has emphasized in KSR.

236. **Combining content and feedback data to filter information:** It would have been predictable for a filter system to combine content data and feedback data, because content- and feedback-based filtering methods can complement each other and compensate for each other other's weaknesses. Numerous prior art references recognized this fact. As Lashkari states, "[t]his thesis . . . attempts to address the problems faced by both ACF [Automated Collaborative Filtering] and content-based approaches by combining the two to make use of their complementary strengths." (Lashkari at 15-16). And as Balabanovic states, "[b]y combining both collaborative and content-based filtering systems, Fab may eliminate many of the weaknesses found in each approach." (Balabanovic at 66).[24]

[24] The '420 specification recites that "[c]ollaborative filtering . . . is the process of filtering informons, e.g. documents, by determining what informons other users with similar

237. Specifically, content-based filtering alone can be ineffective for filtering information items whose content is difficult for a computer to determine. In particular, computer programs may have difficulty determining the content of non-textual information items like photographs, music clips, and videos, since these items often lack structured syntax for a computer to parse.

238. Conversely, feedback-based filtering alone suffers from a "cold-start" problem: when a feedback system first gets up and running, there are by definition no feedback ratings from prior users. Even after a feedback system gets up and running, feedback-based filtering can prove ineffective if there are a relatively large number of information items and a relatively small number of users. In such case, the feedback coverage might become very sparse, meaning that many items may have few if any user feedback ratings.

239. As references such as Lashkari and Balabanovic recognized, combining content- and feedback-based filtering can overcome the weaknesses that each method suffers from in isolation. For example, even though computers may have difficulty determining the content of photographs, music clips, and videos, human users have no difficulty providing feedback on such items. And even though some items in an information filtering system might have few or no user feedback ratings if the system has many items and few users, the lack of user feedback for an item does not adversely affect a computer program's ability to determine that item's content.

240. Because combining content- and feedback-based filtering methods can overcome the weaknesses that each method suffers from in isolation, it would be predictable for an information filtering system to combine these two approaches.

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interests or needs found to be relevant." (*Id.* at 4:26-29). Thus, collaborative filtering is a type of filtering that relies on user feedback.

241. **Using a content- and feedback-based filter system to filter search results:** Combining a content- and feedback-based filter system with a search engine, and using it to filter search results for relevance to the query or the user, would also have been predictable and obvious. Indeed, the prosecution history to the ‘420 Patent illustrates this point. In a December 6, 2000 Office Action, the Examiner rejected the ‘420 Patent over the parent ‘799 Patent on the ground that it would have been obvious to combine the ‘799 Patent’s content/collaborative filtering method with a search engine. (*See* December 6, 2000 Office Action at 3). The applicants acquiesced to this obviousness ruling by filing a terminal disclaimer that restricted the ‘420 Patent’s term to that of the ‘799 Patent. (*See* May 7, 2001 Amendment and Response at 5).

242. I agree with the Examiner that it would have been obvious to combine a content- and feedback-based based filtering system with a search engine, so as to filter search results for relevance to a query or a user. By the mid-1990’s, it was well-known that search engines were powerful information-retrieval methods. Yet it was also well-known that search engines could retrieve massive amounts of potentially-irrelevant data. Thus, it would have been obvious to combine search engines with existing information filtering methods – such as methods that used content- and feedback-based filtering – in order to present a smaller and more relevant body of search results for the user. For example, Lashkari explicitly states that its WEBHOUND system, which uses content-based and collaborative filtering, can be combined with existing search engines such as Lycos or Yahoo! to filter search results returned by those search engines. (*See* Lashkari at 78).

243. **Scanning a network for information relevant to a query:** As noted above, the Court has construed “scanning a network” as looking for or examining items in a network. Under this interpretation, scanning a network for information relevant to a query would have been a predictable element of a search engine system (whether or not the search engine was

combined with a content- and feedback-based filter). Search engines commonly used networked computers or servers, and a predictable part of a search engine function would be looking for search results on those networks that are relevant to a user query.

244. **Using passive feedback data:** It would have been predictable to employ *passive* feedback data in any information filtering system that used feedback data. This is because passive feedback is one of only two types of feedback that can be received, and there were known advantages to receiving passive feedback. As Loeb explains, user feedback can either be active—*i.e.*, requiring the user to enter additional information as to his preferences—or passive, *i.e.* deducing those preferences from the user's actions. (Loeb at 40-41.) There are known benefits to using passive feedback rather than active feedback to gather information about user preferences. For example, "casual users are not likely to be willing to engage in lengthy interactions with the system in order to articulate current information needs and provide explicit feedback," and thus implicit means are needed to ensure their participation. (*Id*. at 41.) Accordingly, it would be predictable and obvious to employ passive feedback in a feedback-based information filtering system.

245. **Extracting features from information:** Just as using passive feedback data would be a predictable element of any feedback-based filter system, extracting features from information items would be a predictable element of any content-based filter system. This is because extracting features from information items is a well-known and effective way of *determining* those items' content. As Rose explains, one can determine items' content by extracting word features from textual items or extracting non-word features from non-textual items – *e.g.*, extracting genre and actor information to determine the content of a movie. (Rose at 6:10-25). Because content-based filtering requires analyzing the content of the items to be filtered, and because feature extraction is a simple and well-known method of determining an

item’s content, feature extraction would be a predictable element of a content-based filter system.

246. **Delivering filtered information to users:** As noted above, even the most sophisticated information-filtering system has little utility if the filtered information cannot be somehow delivered to the users who have a need for it. Accordingly, it would be predictable for any information-filtering method to include the element of delivering filtered information to users.

247. **Filtering advertisements:** There are no technical or conceptual difficulties in filtering advertisements as opposed to filtering other types of digital media. Thus, it would be predictable for an information filtering system to filter advertisements. Indeed, this would allow such a system to be used in the lucrative market for computerized advertising services – a market that was well-established by the asserted patents’ priority date of December 1998. Accordingly, it is unsurprising that many of the prior art references discussed in this Report specifically disclose filtering advertisements. (*See* Culliss at 9:56-62; Bowman at 5:4, 9:2-3; Ryan at 4:57-67).

D. Claims 10, 14, 15, 25, 27, and 28 of the ‘420 Patent and claim 5 of the ‘664 Patent are obvious over Rose in view of Bowman

1. Claim 10 of the ‘420 Patent is obvious over Rose in view of Bowman

248. As noted above, I/P Engine’s infringement contentions assert that the preamble of claim 10 is not a limitation. To the extent that the preamble is considered a limitation here, Rose recites a “search engine system,” as recited by the preamble to claim 10. Specifically, Rose discloses filtering “*search results* obtained through an online text retrieval service.” (*Id.* at 2:54-55) (emphasis added). Similarly, Rose discloses that its information access system may comprise “an electronic search and retrieval system.” (Claim 26).

(a) a system for scanning a network to make a demand search for informons relevant to a query from an individual user

249. As noted above, I/P Engine takes the position that '420 claim 10(a) is satisfied if a system conducts a search for information in response to a user query. Rose meets this element, because Rose's system accepts a search query from a user and returns a set of search results in response. (*See id.* at 2:54-55; claim 26).

(b) a content-based filter system for receiving the informons from the scanning system and for filtering the informons on the basis of applicable content profile data for relevance to the query

250. Rose discloses a content-based filter system that filters informons on the basis of applicable content profile data. Specifically, the search results in Rose's system are filtered by comparing a vector representing a document's content to a vector representing the user's preferences. (*Id.* at 6:11-58). The closer the vectors are to each other, the more relevant the document is judged to be for the user. (*Id.* at 6:56-58).

251. While Rose's comparison of document vector to user vector filters for relevance to the user rather than relevance to the query, it would be obvious modify Rose so that Rose filtered for relevance to the query. As Rose discloses, any sort of information content can be described by a vector. (*Id.* at 6:26-35). Thus, while Rose compares a search result vector against a vector representing the user profile, Rose's method could be just as easily used to compare a search result vector against a vector representing the user's *query*. Moreover, one of skill the art would be motivated to modify Rose in this manner. As discussed above, there are a limited number of ways to filter content-based information: chiefly, one could filter for relevance to a user or to a user's query. Furthermore, other references such as Bowman already teach the utility of filtering search results for relevance to a query. *See* Section VI.A, *supra* (explaining how

Bowman combines content-based and feedback-based methods to filter search results for relevance to a query).

252. One of skill in the art would be motivated to combine Bowman with Rose, such that Rose's system would filter information for relevance *to the query*. Rose and Bowman are both directed to the problem of efficiently filtering large amounts of information. Moreover, they both solve this problem in similar ways – namely, by combining content data with feedback data to create a hybrid content/feedback filtering method. Because Rose and Bowman propose similar approaches to solving the same problem, one of skill in the art would be strongly motivated to combine their teachings.

(c) <u>a feedback system for receiving collaborative feedback data from system users relative to informons considered by such users</u>

253. Rose discloses a feedback system for receiving collaborative feedback data from system users relative to informons considered by such users. Specifically, Rose receives feedback from system users about how highly they rated search results presented to them. (*See* Rose at 5:31-46). For each user, Rose uses the feedback from users most similar to that user to determine how relevant a given search result will be for that user. (*See id.* at 6:59-7:10). In other words, Rose judges that a search result will be deemed more relevant to a given user if other users who are similar to that user had rated that search result highly.

(d) <u>The filter system combining pertaining feedback data from the feedback system with the content profile data in filtering each informon for relevance to the query</u>

254. Rose combines the feedback data with the content profile data to filter each document for relevance. *See* Rose at Abstract ("Items of information to be presented to a user are ranked according to their likely degree of relevance to that user and displayed in order of ranking. *The prediction of relevance is carried out by combining data pertaining to the content*

of each item of information with other data regarding correlations of interests between users.”) (emphasis added); *see also id.* at 7:35-50.

255. While Rose uses this hybrid filtering method to filter documents for relevance to the user, it would be obvious to modify Rose so that it filtered for relevance to the query. This could be done simply by comparing each document vector to a query vector instead of to a user vector, and by recording feedback from the subset of other users who had entered the same search query (instead of recording feedback from all users). There would be no technical difficulties to modifying Rose in this manner. Moreover, one of skill the art would be motivated to modify Rose in this manner, given the limited number of ways to do relevance filtering and the fact that other references such as Bowman already teach the utility of filtering search results for relevance to a query. *See also* Section VII.D.1(b), *supra* (explaining why one of skill in the art would be motivated to combine Rose’s and Bowman’s teachings).

2. <u>Claims 14 and 15 of the ‘420 Patent are obvious over Rose in view of Bowman</u>

256. Claim 14 depends from claim 10 and further requires “wherein the collaborative feedback data comprises passive feedback data.” Claim 15 depends from claim 14 and further requires “wherein the passive feedback data is obtained by passively monitoring the actual response to a proposed informon.” Rose discloses a feedback system where users actively state their level of interest in each document that they view. (*See* Rose at 5:8-30). However, Bowman teaches passive feedback. Bowman’s feedback data is derived from passively monitoring users’ actual response to search results – namely, monitoring how frequently users who had entered the same query selected each of those search results. (*See* Bowman at 2:31-35).

257. It would have been obvious to modify Rose so that it utilized passive feedback in the manner that Bowman does. There are only two basic types of user feedback that can be collected – active feedback and passive feedback. Moreover, one of skill in the art would

understand that passive feedback has advantages over active feedback, particularly for casual users who might not have the patience or interest to provide active feedback on each document that they view. (*See* Loeb at 40-41). *See also* Section VII.D.1(b), *supra* (explaining why one of skill in the art would be generally motivated to combine Rose's and Bowman's teachings).

3. **<u>Claims 25, 27, and 28 of the '420 Patent are obvious over Rose in view of Bowman</u>**

258. Claims 25, 27, and 28 contain the same substance as claims 10, 14, and 15, respectively, but are simply recast as method rather than system claims. Thus, claims 25, 27, and 28 are obvious over Rose in view of Bowman for the same reasons that claims 10, 14, and 15 are obvious over Rose in view of Bowman. I incorporate by reference my prior discussion about how claims 10, 14, and 15 are obvious over Rose in view of Bowman. I also incorporate by reference the chart attached to this Report as Exhibit A-1, showing how these claims are obvious over Rose in view of Bowman.

4. **<u>Claim 5 of the '664 Patent is obvious over Rose in view of Bowman</u>**

259. As disclosed above, Rose anticipates claim 1 of the '664 Patent. Claim 5 depends from claim 1 and further requires "wherein the filtered information is an advertisement." To the extent Rose does not disclose that its filtered information includes advertisements,[25] Bowman does disclose this element because it discloses filtering information representing purchasable products. (*See* Bowman at 5:4; 9:2-3; claim 7). It would be obvious to one of skill in the art that Rose could also be used to filter advertisements. There is nothing inherently different about advertisements compared to other digital media, and nothing about the workings of Rose's system would prevent it from filtering advertisements. Moreover, one of skill in the art would be motivated to use Rose's system to filter advertisements, since this would allow Rose's system to be used in the lucrative market for computerized advertising services. *See also* Section

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[25] Rose refers to messages generically. (*See* Rose at 3:36-37).

VII.D.1(b), *supra* (explaining why one of skill in the art would be generally motivated to combine Rose's and Bowman's teachings).

260. For the same reasons, claim 5 would be obvious over Rose in view of either Culliss or Ryan, each of which (like Bowman) discloses filtering advertisements. (*See* Culliss at 9:56-62; Ryan at 4:57-67).

E. **Claims 14, 15, 27, and 28 of the '420 Patent and claim 5 of the '664 Patent are obvious over Lashkari in view of Bowman**

261. As detailed in Section VI.C, *supra*, Lashkari anticipates all asserted claims except: (a) claims 14, 15, 27, and 28 of the '420 Patent and (b) claim 5 of the '664 Patent. As explained below, each of these claims would have been obvious over Lashkari in view of Bowman.

1. **Claims 14, 15, 27, and 28 of the '420 Patent are obvious over Lashkari in view of Bowman**

262. Claims 14, 15, 27, and 28 of the '420 Patent add the requirements of receiving passive feedback data that is obtained by passively monitoring the user's actual response to a proposed informon. Lashkari discloses a feedback system where users actively state their level of interest in each document that they view. (*See* Lashkari at 57). However, Bowman teaches passive feedback that is derived from passively monitoring users' actual response to search results – namely, monitoring how frequently users who had entered the same query selected each of those search results. (*See* Bowman at 2:31-35).

263. It would have been obvious to modify Lashkari so that it utilized passive feedback in the manner that Bowman does. There are only two basic types of user feedback that can be collected – active feedback and passive feedback. Moreover, one of skill in the art would understand that passive feedback has advantages over active feedback, particularly for casual

users who might not have the patience or interest to provide active feedback on each document that they view. (*See* Loeb at 40-41).

264. Furthermore, just as one of skill in the art would be motivated to apply Bowman's teachings to Rose, one of skill in the art would be motivated to apply Bowman's teachings to Lashkari. Lashkari and Bowman are both directed to the problem of efficiently filtering large amounts of information. Moreover, they both solve this problem by combining content data with feedback data to create a hybrid content/feedback filtering method. Because Lashkari and Bowman propose similar approaches to solving the same problem, one of skill in the art would be motivated to combine their teachings.

2. **<u>Claim 5 of the '664 Patent is obvious over Lashkari in view of Bowman</u>**

265. Claim 5 of the '664 Patent depends from claim 1 and further requires "wherein the filtered information is an advertisement." Though Lashkari does not specifically disclose that its filtered information includes advertisements, Bowman does disclose this element because it discloses filtering information entities representing purchasable products. (*See* Bowman at 5:4; 9:2-3; claim 7). It would be obvious to one of skill in the art that Lashkari could also be used to filter advertisements. There is nothing inherently different about advertisements compared to other digital media, and nothing about the workings of Lashkari's system would prevent it from filtering advertisements. Moreover, one of skill in the art would be motivated to use Lashkari's system to filter advertisements, since this would allow Lashkari's system to be used in the lucrative market for computerized advertising services. *See also* Section VII.E.1, *supra* (explaining why one of skill in the art would be generally motivated to combine Lashkari's and Bowman's teachings).

266. For the same reasons, claim 5 would be obvious over Lashkari in view of either Culliss or Ryan, each of which (like Bowman) discloses filtering advertisements. (*See* Culliss at 9:56-62; Ryan at 4:57-67).

F. <u>Claims 21 and 22 of the '664 Patent are obvious over Ryan in view of Rose</u>

267. As detailed in Section VI.D, *supra*, Ryan anticipates all asserted claims (under I/P Engine's infringement allegations) except claims 21 and 22 of the '664 Patent. Claim 21 depends from claim 1 and further requires "wherein the content-based filter system filters by extracting features from the information." Claim 22 depends from claim 21 and further requires "wherein the extracted features comprise content data indicative of the relevance to the at least one of the query and the user."

268. To the extent Ryan does not disclose the added limitations of claims 21 and 22, these claims would be obvious over Ryan in view of Rose. Rose meets the limitations of claims 21 and 22 because it extracts "attribute" features from each information item to ascertain that item's content, and these features comprise content data indicative of the item's relevance to the user. (*See* Rose at 6:10-25 ("To derive the content-based data, certain elements of the message, e.g., each word in a document, can be assigned a weight, based on its statistical importance . . . For non-document types of information, the content data can be based upon other attributes that are relevant to a user's interest in that information. For example, in the movie database, the content vector might take into account the type of movie, such as action or drama, the actors, its viewer category rating, and the like.")

269. It would have been obvious to combine Rose's feature-extraction methods with Ryan, because feature extraction is a simple and commonly-known method of determining an item's content for purposes of content-based filtering. Thus, it would have been obvious to apply this method to any system (such as Ryan's system) that employed content-based filtering.

Furthermore, both Rose and Ryan are both devoted to the same problem of filtering large amounts of information, and they propose broadly similar solutions that involve the utilization of content data and feedback data. Given the common problem that Rose and Ryan are directed towards, and the similar solutions that they propose for this problem, one of skill in the art would be motivated to combine these two references' teachings.

G. <u>The Combinations In the Asserted Patents Do Not Yield Unpredictable Results</u>

270. As the Supreme Court observed in *KSR*, "[t]he combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results." In my opinion, there is nothing unpredictable that results from combining the elements of the asserted patents. Each of the various elements was well known in the prior art, and their combination introduces nothing new. Indeed, many of the prior art references disclose goals and advantages very similar to those claimed in the asserted patents, as discussed above.

271. For example, the asserted patents' combination of content-based and feedback-based filtering yields no unpredictable results. To the contrary, this combination simply yields an improved filtering process by letting the content- and feedback-based methods compensate for each other's weaknesses – just as the prior art had predicted. For example, Lashkari and Balabanovic disclose combining content-based and collaborative filtering precisely so that these methods may complement each other and compensate for each other's weaknesses. (*See* Lashkari at 15-16; Balabanovic at 66). Rose similarly explains that a one-dimensional content-based filtering approach is overly simplistic, and "[i]t is desirable to . . . provide a system that takes into account a variety of attributes that are relevant to a user's likely interest in a particular item of information. In this regard, it is particularly desirable to provide an information

relevance filtering technique which utilizes community feedback as one of the factors in the prediction." (Rose at 2:16-22).

272. The asserted patents' use of this hybrid filtering method to filter *search results* also yields no unpredictable results. To the contrary, it was entirely predictable that search results could filtered just like any other information stream – as the prior art recognized. For example, Lashkari discloses that its hybrid WEBHOUND filtering system may be appended to a traditional search engine in order to filter the vast amounts of information that the search engine might return in response to a user query. (Lashkari at 78). In a similar vein, Bowman explains that "a new, more effective technique for automatically ordering query results in accordance with collective and individual user behavior would have significant utility." (Bowman at 1:55-57).

H. <u>One Skilled In The Art Would Have Been Motivated To Pursue The Claimed Combinations Through Market Forces And Trends</u>

273. In *KSR*, the Supreme Court also observed that "when 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. If this leads to the anticipated success, it is likely the product not of innovation but of ordinary skill and common sense. In that instance the fact that a combination was obvious to try might show that it was obvious under sec. 103."

274. Here, one of ordinary skill would have been motivated to pursue the claimed combinations. First, the explosive growth in the quantity of Internet information by the mid-1990's created a need for powerful and sophisticated methods of filtering this information. As Lashkari noted, "[t]he increasing availability of inexpensive computing power coupled with the rapid proliferation of computer networks and connectivity has created a revolution in terms of an average user's access to vast amounts of information. However, this ease of access to vast

quantities of information has sharply exacerbated a growing problem of personal information overload . . . The solution lies in developing increasingly sophisticated and personalized tools that can help users in filtering these vast quantities of information." (Lashkari at 13-14).

275. As for *how* to create such sophisticated and powerful filtering methods, it was well-known that content-based and collaborative filtering methods each had disadvantages that could be overcome by combining the two. For example, Balabanovic explains that "[b]y combining both collaborative and content-based filtering systems, Fab may eliminate many of the weaknesses found in each approach." (Balabanovic at 66). Even *the asserted patents themselves* recognize, in their "Background of the Invention" section, that it was previously known that content-based and collaborative filtering be used together to filter search results. (1:17-26, 1:41-45). Thus, it would have been obvious to one of skill in the art to combine content-based filtering and collaborative or feedback filtering to filter search results for relevance to a query or user, as taught by the asserted patents.

276. Indeed, the marketplace was quick to embrace these types of solutions even before the December 3, 1998 filing date of the asserted patents. By mid-1998, for example, the Direct Hit system was unveiled in the marketplace, winning partnerships with several commercial search engines. Direct Hit took as its input the content-filtered search results that traditional search engines returned. It then applied its own collaborative filtering methods to these search results by looking at how relevant other users had found these search results to be.[26] The end result was a set of search results that had been subjected to both content-based and collaborative filtering.

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[26] *See* http://www.pcworld.com/article/9531/direct_hit_tools_help_surfers_search_smarter.html; http://internettourbus.com/arch/1998/TB082598.HTM

I. <u>The *Graham* Factors Demonstrate That the '420 and '664 Patent Claims Which Merely Combine Known Elements Are Obvious</u>

277. I understand that the Supreme Court in *KSR* instructed that the factors in *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1 (1966), for applying the statutory language of 35 U.S.C. § 103, are as follows:

> Under § 103, the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved. Against this background the obviousness or nonobviousness of the subject matter is determined.

Graham also set forth a broad inquiry and invited courts, where appropriate, to look at any secondary considerations that would prove instructive:

> Such secondary considerations as commercial success, long felt but unresolved needs, failure of others, etc., might be utilized to give light to the circumstances surrounding the origin of the subject matter sought to be patented.

1. <u>The Scope and Content of the Prior Art</u>

278. The first *Graham* factor, "the scope and content of the prior art," shows the asserted patents to be obvious. As detailed throughout this Report, each element of the asserted patents existed in the prior art. *See* Section VII.B, *supra*.

279. In particular, the idea of combining content-based filtering with collaborative or feedback-based filtering was well-known in the art. (*See* Balabanovic at 66; Rose at Abstract). Also known was the idea that such hybrid methods could be used to filter search results for relevance to a query. (*See* Bowman at claims 28-29; Culliss at 4:37-49 and 14:34-36). The idea that feedback data could comprise passive feedback data was also well-known in the art, given the knowledge that passive feedback had important advantages over active feedback for casual users who might be disinclined to provide active feedback on documents that they view. (Loeb at 41). And the idea that these methods could be used to filter advertisements was also well-known in the art. (*See* Culliss at 9:56-62; Bowman at 5:4, 9:2-3; Ryan at 4:57-67).

2. **<u>Differences Between the Prior Art and the Claims at Issue</u>**

280. As to the second factor, the "differences between the prior art and the claims asserted," each element of the asserted patents existed before and each claim of the patents is anticipated as detailed above. To the extent there is any difference at all between the prior art and the claims, however, it would be obvious to one of ordinary skill to add any missing elements of the asserted claims to each prior art reference described above.

281. For instance, and as explained further in Sections VII.B and VII.C, *supra*, the concept of filtering information using a combination of content- and feedback-based methods was well-known in the art and would have been obvious. (*See, e.g.*, Rose at Abstract, Bowman at claims 28-29, Lashkari at 15-16, Balabanovic at 66). The concept that such methods could be used to filter search results for relevance to a query or user was also well-known and obvious. (*See, e.g.*, Bowman at claims 28-29; Lashkari at 78; December 6, 2000 Office Action at 3). The concept that feedback-based filtering could employ *passive* feedback data was also well-known and obvious. (*See, e.g.*, Bowman at 7:31-33; Culliss at 4:32-34; Loeb at 40-41). And the concept that these methods could be used to filter advertisements was also well-known and obvious. (*See* Culliss at 9:56-62; Bowman at 5:4, 9:2-3; Ryan at 4:57-67).

3. **<u>Level of Ordinary Skill in the Pertinent Art</u>**

282. The third *Graham* factor is the level of ordinary skill in the pertinent art. As the Supreme Court recognized in *KSR*, "[a] person of ordinary skill is also a person of ordinary creativity, not an automaton."

283. The asserted patents apply non-novel information filtering techniques to the problem of determining the relevance of documents to a query and/or a user. One skilled in the art would be familiar with the underlying techniques and would immediately see the possibility

of applying them to the problem of the patents, as evidenced by the numerous prior art systems using the same techniques towards the same end.

284. In my opinion, an individual with a BS degree in computer science or having equivalent programming experience to someone with such a degree, plus 2-3 years of experience in the field of information retrieval, would be aware of the scope and content of the prior art.

4. The Secondary Considerations Set Forth in *Graham* Do Not Alter the Conclusion of Obviousness

285. I understand that secondary considerations that could prove instructive on the issue of obviousness include commercial success, praise and awards, long felt but unresolved needs and failure of others. In this case, it is my opinion that there are no secondary considerations that overcome the obviousness determination.[27]

(a) Commercial Success

286. I understand that the asserted patents were never successfully commercialized. Indeed, named inventor Andrew Lang could not name any entity that even created a prototype product embodying the asserted patents, much less a commercially successful product. (Lang Dep. at 64:23-65:5).

(b) Praise and awards

287. Likewise, the asserted patents were never accorded and praise or awards by others. Mr. Lang testified that could not name any "awards or acclaim" given to "the patents themselves or to technology that implements [them]." (*Id.* at 262:10-22).

[27] Notably, Google served an Interrogatory on I/P Engine asking what secondary considerations I/P Engine would rely upon to rebut a claim of obviousness, and I/P Engine did not identify any secondary considerations in response to this interrogatory. (*See* I/P Engine's Third Supplemental Objections and Responses to Google's First Set of Interrogatories at 9 (July 2, 2012)). This confirms my belief that there are no secondary considerations that might rebut the obviousness of the asserted patents.

(c) **Long-Felt But Unresolved Need**

288. There was no long-felt but unresolved need for the inventions in the asserted patents. While the explosive growth of Internet information did create a need for sophisticated methods of filtering this information, numerous systems and publications (including the Bowman, Culliss, Lashkari, Rose, and Ryan references discussed above) quickly arose to satisfy this need.

(d) **Failure of Others**

289. For the same reason, there was no failure by others to implement the inventions in the asserted patents. To the contrary, these inventions were implemented in at least Lashkari's WEBHOUND system and described in great detail in the Bowman, Culliss, Rose, and Ryan references.

VIII. THE PTO FOUND THAT ROSE, LASHKARI, LOEB, AND OTHER REFERENCES RAISE A SUBSTANTIAL NEW QUESTION AS TO THE PATENTABILITY OF THE ASSERTED '420 CLAIMS

290. I understand that, on July 18, 2012, the Patent Office issued a Communication finding that six prior art references raised a substantial new question of patentability ("SNQ") as to all asserted claims of the '420 Patent. This Communication was issued in response to an *ex parte* re-examination request filed by Google.

291. Regarding the anticipatory references discussed in the body of this Report, the Communication found that Rose and Lashkari each raise an SNQ as to the validity of independent claims 10 and 25. The Communication held that "[w]hen used with text retrieved from static databases (Rose at 3:26-28), Rose discloses 'a search engine operated with collaborative and content-based filtering.'" (Communication at 7). The Communication similarly found that "Lashkari [] discloses 'a search engine operated with collaborative and

content-based filtering.'" (*Id.* at 10). The Communication also found that the Loeb, Herz,[28] Goldberg,[29] and GroupLens[30] references raise an SNQ as to the asserted claims. (*See id.* at 6-11).

292. Finally, the Communication held that the '420 Patent is entitled to a priority date of December 3, 1998 and cannot claim an earlier priority date based on the parent '799 Patent. *See id.* at 5:

> "the 'search engine system' recited by claims 10 and 25 of the '420 Patent does not appear to be adequately disclosed by parent '799 patent for the purposes of 35 U.S.C. § 112, first paragraph. Consequently, these claims (and their dependents) do not appear to be entitled to the benefit of the filing date of the '799 Patent. The priority date for claims 10, 14, 15, 25, 27, and 28 of the '420 Patent is determined to be the filing date of the '149 Application, 3 December 1998."

IX. CONCLUSIONS

293. None of the Asserted Claims is valid.

294. All the Asserted Claims are anticipated.

295. All the Asserted Claims are obvious.

Executed on July 25, 2012, in Philadelphia, Pennsylvania.

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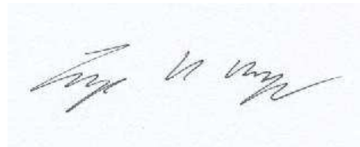
[28] "Herz" refers to U.S. Patent No. 5,835,087 to Herz et al.

[29] "Goldberg" refers to Goldberg, D., Nichols, D., Oki, B., and Terry, D. (1992). *Using Collaborative Filtering to Weave an Information Tapestry*, Communications of the ACM, December 1992, Vol. 35, No. 12.

[30] "GroupLens" refers to Resnick, P., Iacouvou, N., Suchak, M., Bergstrom, P., and Riedl, J. (1994). *GroupLens: An Open Architecture for Collaborative Filtering of Netnews*, Proceedings of ACM 1994 Conference on Computer Supported Cooperative Work (1994).



Exhibits A-1 through A-7

(Claim Charts Appended to this Report)

Exhibit A-1

U.S. Patent Claim Charts for the asserted '664 and '420 patents against U.S. Patent No. 6,202,058 to Rose et al. ("Rose")

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Claim language of U.S. Patent No. 6,775,664 ("the '664 Patent")	**Disclosure in Rose**
1. [preamble] A search system comprising:	*See* Rose at 2:51-55 ("The relevance predicting technique of the present invention is applicable to all different types of information access systems. For example, it can be employed to filter messages provided to a user in an electronic mail system *and search results obtained through an online text retrieval service*") (emphasis added); Claim 26 ("The system of claim 14, wherein said information access system comprises an electronic search and retrieval system.") To the extent this reference does not teach this claim element, this reference in combination with the knowledge of one of ordinary skill in the art renders this claim element obvious. See, e.g.: Herz at 6:42-58. Lashkari at 59. Tapestry at 63. Balabanovic at 69-70. GroupLens at 2. Culliss at Abstract, 4:20-26. Bowman at 5:31-32; claim 28[a-b].

Claim language of U.S. Patent No. 6,775,664 (“the '664 Patent”)	**Disclosure in Rose**
	Ryan at Abstract, 1:8-10, 1:20-23.
[a] a scanning system for searching for information relevant to a query associated with a first user in a plurality of users;	*See* chart for claim 1 [preamble], *supra*.
[b] a feedback system for receiving information found to be relevant to the query by other users; and	*See* Rose at 6:59-7:10 (“A second factor in the prediction of a user’s interest in information is based upon a correlation with the indications provided by other users. Referring to Fig. 6, each time a user retrieves a document and subsequently provides an indication of interest, the result can be stored in a table. From this table, a correlation matrix R can be generated, whose entries indicate the degree of correlation between the various users’ interests in commonly retrieved messages. . . Subsequently, when a user accesses the system, the feedback table and the correlation matrix are used as another factor in the prediction of the likelihood that the user will be interested in any given document.”) To the extent this reference does not teach this claim element, this reference in combination with the knowledge of one of ordinary skill in the art renders this claim element obvious. See, e.g.: Herz at 6:13-18, 10:44-47, 19:9-14; 23:45-24:13. Lashkari at 59-60, 18. Tapestry at 63. GroupLens at 1, 2, 5-10. Culliss at Abstract; 4:37-41.

Claim language of U.S. Patent No. 6,775,664 (“the '664 Patent”)	Disclosure in Rose
	Bowman at Abstract, claim 28[c], 2:32-34. Ryan at 2:31-37.
[c] a content-based filter system for combining the information from the feedback system with the information from the scanning system and for filtering the combined information for relevance to at least one of the query and the first user.	*See* Rose at Abstract (“Items of information to be presented to a user are ranked according to their likely degree of relevance to that user and displayed in order of ranking. The prediction of relevance is carried out by combining data pertaining to the content of each item of information with other data regarding correlations of interests between users. A value indicative of the content of a document can be added to another value which defines user correlation, to produce a ranking score for a document.”); 6:5-11 (“In accordance with the present invention[], the ranking of messages is carried out by combining data based upon an attribute of the message, for example its content, with other data relating to correlations of indications provided by other users who have retrieved the message.”); 7:35-50. To the extent this reference does not teach this claim element, this reference in combination with the knowledge of one of ordinary skill in the art renders this claim element obvious. See, e.g.: Herz at 18:39-43. Lashkari at 15-16, 60. Tapestry at 61, 63. Balabanovic at 69, 66. GroupLens at 2, 3. Culliss at 14:34-36, 13:35-42.

Claim language of U.S. Patent No. 6,775,664 (“the '664 Patent”)	Disclosure in Rose
	Bowman at 9:28-53; claim 29. Ryan at 1:59-66, 23:38-49.
5. The search system of claim **1** wherein the filtered information is an advertisement.	Rose generically refers to “messages,” which would include advertisements. *See* Rose at 3:35-44. To the extent this reference does not teach this claim element, this reference in combination with the knowledge of one of ordinary skill in the art renders this claim element obvious. *See, e.g.*: Herz at 61:4-18. Culliss at 9:58-62. Bowman at 5:4, 9:2-3, claim 7. Ryan at 4:57-59, 22:49-55.
6. The search system of claim **1** further comprising an information delivery system for delivering the filtered information to the first user.	*See* Rose at Abstract (“Information presented to a user via an information access system is ranked according to a prediction of the likely degree of relevance to the user’s interests.”); Fig. 7. To the extent this reference does not teach this claim element, this reference in combination with the knowledge of one of ordinary skill in the art renders this claim element obvious. See, e.g.: Herz at 6:13-18, Fig. 10 at 1106. GroupLens at 10, 11.

Claim language of U.S. Patent No. 6,775,664 (“the '664 Patent”)	**Disclosure in Rose**
	Culliss at 4:25-31. Bowman at 9:56-58. Ryan at 21:14-26, 23:47-49.
21. The search system of claim **1** wherein the content-based filter system filters by extracting features from the information.	*See* Rose at 2:35-38 (“The prediction of relevance is carried out by combining data pertaining to one or more attributes of each item of information with other data regarding correlations of interest between users.”); 6:10-25 (“To derive the content-based data, certain elements of the message, e.g., each word in a document, can be assigned a weight, based on its statistical importance . . . For non-document types of information, the content data can be based upon other attributes that are relevant to a user’s interest in that information. For example, in the movie database, the content vector might take into account the type of movie, such as action or drama, the actors, its viewer category rating, and the like.”) To the extent this reference does not teach this claim element, this reference in combination with the knowledge of one of ordinary skill in the art renders this claim element obvious. See, e.g.: Herz at 6:18-29. Lashkari at 15-16, 60. Tapestry at 67. Balabanovic at 69. GroupLens at 3.

Claim language of U.S. Patent No. 6,775,664 (“the '664 Patent”)	Disclosure in Rose
	Culliss at 14:34-36. Bowman at 9:50-53; claim 29. Ryan at 16:4-9.
22. The search system of claim **21** wherein the extracted features comprise content data indicative of the relevance to the at least one of the query and the user.	*See* chart for Claim 21, *supra*.
26. A method for obtaining information relevant to a first user comprising:	*See* chart for Claim 1 (preamble).
searching for information relevant to a query associated with a first user in a plurality of users;	*See* chart for Claim 1(a)
receiving information found to be relevant to the query by other users;	*See* chart for Claim 1(b).
combining the information found to be relevant to the query by other users with the searched information; and	*See* chart for Claim 1(b).
content-based filtering the combined information for relevance to at least one of the query and the first user.	*See* chart for Claim 1(c).
28. The method of claim 26 further comprising the step of delivering the filtered information to the first user.	*See* chart for Claim 6, *supra*.
38. The method of claim 26 wherein the searching step comprises scanning a network in response to a demand search for the information	*See* chart for Claim 1 [a], *supra*.

Claim language of U.S. Patent No. 6,775,664 (“the '664 Patent”)	**Disclosure in Rose**
relevant to the query associated with the first user.	

Claim language of U.S. Patent No. 6,314,420 (“the ‘420 Patent”)	**Disclosure in Rose**
10. [preamble] A search engine system comprising:	*See* chart for ‘664 Patent, Claim 1(preamble), *supra*.
[a] a system for scanning a network to make a demand search for informons relevant to a query from an individual user;	*See* chart for '664 Patent, Claim 1(a), *supra*.
[b] a content-based filter system for receiving the informons from the scanning system and for filtering the informons on the basis of applicable content profile data for relevance to the query; and	*See* chart for ‘664 Patent, Claim 1(c), *supra*.
[c] a feedback system for receiving collaborative feedback data from system users relative to informons considered by such users;	*See* chart for ‘664 Patent, Claim 1(b), *supra*.
[d] the filter system combining pertaining feedback data from the feedback system with the content profile data in filtering each informon for relevance to the query.	*See* chart for ‘664 Patent, Claim 1(c), *supra*.
14. The system of claim **10** wherein the collaborative feedback data comprises passive feedback data.	To the extent this reference does not teach this claim element, this reference in combination with the knowledge of one of ordinary skill in the art renders this claim element obvious. *See, e.g.*: Herz at 10:44-47. Tapestry at 62. GroupLens at 6, 10. Loeb at 41.

Claim language of U.S. Patent No. 6,314,420 (“the ‘420 Patent”)	Disclosure in Rose
	Culliss at Abstract; 4:32-34. Bowman at 2:31-35; 7:31-33; 9:2-3. Ryan at 9:22-30, 9:41-48.
15. The system of claim **14** wherein the passive feedback data is obtained by passively monitoring the actual response to a proposed informon.	To the extent this reference does not teach this claim element, this reference in combination with the knowledge of one of ordinary skill in the art renders this claim element obvious. See, e.g.: Herz at 10:44-47. Tapestry at 62. GroupLens at 6, 10. Loeb at 41. Culliss at Abstract; 4:32-34. Bowman at 2:31-35; 7:31-33; 9:2-3. Ryan at 9:22-30, 9:41-48.
25. A method for operating a search engine system comprising:	*See* chart for Claim 10 (preamble).
scanning a network to make a demand search for informons relevant to a query from an individual user;	*See* chart for Claim 10(a).
receiving the informons in a content-based filter	*See* chart for Claim 10(b).

Claim language of U.S. Patent No. 6,314,420 (“the ‘420 Patent”)	**Disclosure in Rose**
system from the scanning system and filtering the informons on the basis of applicable content profile data for relevance to the query;	
receiving collaborative feedback data from system users relative to informons considered by such users; and	*See* chart for Claim 10(c).
combining pertaining feedback data with the content profile data in filtering each informon for relevance to the query.	*See* chart for Claim 10(d).
27. The method of claim **25** wherein the collaborative feedback data provides passive feedback data.	*See* chart for claim 14, *supra*.
28. The method of claim **27** wherein the passive feedback data is obtained by passively monitoring the actual response to a proposed informon.	*See* chart for claim 14, *supra*.

Exhibit A-2

U.S. Patent Claim Charts for the asserted '664 and '420 patents against U.S. Patent No. 5,835,087 to Herz et al. ("Herz")

Claim language of U.S. Patent No. 6,775,664 ("the '664 Patent")	**Disclosure in Herz Reference**
1. [preamble] A search system comprising:	*See* Herz at 6:42-58 ("The specific embodiment of this system . . . uses interest feedback from users to construct a 'target profile interest summary' for each user, for example in the form of a 'search profile set' consisting of a plurality of search profiles, each of which corresponds to a single topic of high interest for the user. The system further includes a profile processing module which estimates each user's interest in various target objects . . . and generates for each user a customized rank-ordered listing of target objects most likely to be of interest to that user.") *See id.* at 26:20-37 ("One use of these searching techniques is to search for target objects that match a search profile from the user's search profile set . . . In one method, a 'webcrawler' program running on a central computer periodically scans all servers in search of new target objects . . .") To the extent this reference does not teach this claim element, this reference in combination with the knowledge of one of ordinary skill in the art renders this claim element obvious. See, e.g.: Rose at 2:51-55, Claim 26. Lashkari at 59. Tapestry at 63. Balabanovic at 69-70.

Claim language of U.S. Patent No. 6,775,664 (“the '664 Patent”)	Disclosure in Herz Reference
	GroupLens at 2. Culliss at Abstract, 4:20-26. Bowman at 5:31-32; claim 28[a-b] Ryan at Abstract, 1:8-10, 1:20-23.
[a] a scanning system for searching for information relevant to a query associated with a first user in a plurality of users;	*See* Herz at 26:20-37 (“One use of these searching techniques is to search for target objects that match a search profile from the user’s search profile set . . . In one method, a ‘webcrawler’ program running on a central computer periodically scans all servers in search of new target objects . . .”) *See id.* at Fig. 16. *See also* chart for claim 1(preamble). To the extent this reference does not teach this claim element, this reference in combination with the knowledge of one of ordinary skill in the art renders this claim element obvious. See, e.g.: Rose at 2:51-55. Lashkari at 78. Tapestry at 63. Balabanovic at 69. GroupLens at 2.

Claim language of U.S. Patent No. 6,775,664 (“the '664 Patent”)	Disclosure in Herz Reference
	Culliss at Abstract, 4:20-26. Bowman at 5:31-32; claim 28[a-b] Ryan at Abstract, 1:8-10, 1:20-23.
[b] a feedback system for receiving information found to be relevant to the query by other users; and	*See* Herz at 6:13-18 (“In all these cases, the information delivery process in the preferred embodiment is based on determining the similarity between a profile for the target object and the profiles of target objects for which the user (*or a similar user*) has provided positive feedback in the past”) (emphasis added); 10:44-47 (“For example, if the user has often liked movies that Customer C_{17} and Customer C_{190} have rented, then the user may like other such movies, which have similar values for attribute i.”); 19:9-14 (“The method of determining a user’s interest relies on the following heuristic: when X and Y are similar target objects (have similar attributes), and U and V are similar users (have similar attributes), then topical interest f(U, X) is predicated to have a similar value to the value of topical interest f(V, Y).”); 23:45-24:13. To the extent this reference does not teach this claim element, this reference in combination with the knowledge of one of ordinary skill in the art renders this claim element obvious. See, e.g.: Rose at 6:59. Lashkari at 59-60, 18. Tapestry at 63. Balabanovic at 69, 66.

Claim language of U.S. Patent No. 6,775,664 (“the '664 Patent”)	Disclosure in Herz Reference
	GroupLens at 1, 2, 5-10. Culliss at Abstract; 4:37-41. Bowman at Abstract, claim 28[c], 2:32-34. Ryan at 2:31-37.
[c] a content-based filter system for combining the information from the feedback system with the information from the scanning system and for filtering the combined information for relevance to at least one of the query and the first user.	*See* Herz at 18:39-43 (“The interest that a given target object X holds for a user U is assumed to be a sum of two quantities: q(U, X), the intrinsic ‘quality’ of X plus f(U, X), the ‘topical interest’ that users like U have in target objects like X.”) To the extent this reference does not teach this claim element, this reference in combination with the knowledge of one of ordinary skill in the art renders this claim element obvious. See, e.g.: Rose at Abstract, 6:5-11. Lashkari at 15-16, 60. Tapestry at 61, 63. Balabanovic at 69, 66. GroupLens at 2, 3. Culliss at 14:34-36, 13:35-42. Bowman at 9:28-53; claim 29.

Claim language of U.S. Patent No. 6,775,664 (“the '664 Patent”)	**Disclosure in Herz Reference**
	Ryan at 1:59-66, 23:38-49.
5. The search system of claim **1** wherein the filtered information is an advertisement.	*See* Herz at 61:4-18 (“A consumer who buys a product is deemed to have provided positive relevance feedback on advertisements for that product, and a consumer who buys a product apparently because of a particular advertisement (for example, by using a coupon clipped from that advertisement) is deemed to have provided particularly high relevance feedback on that advertisement . . . Given a database of such relevance feedback, the disclosed technology is then used to match advertisements with those users who are most interested in them . . .”) To the extent this reference does not teach this claim element, this reference in combination with the knowledge of one of ordinary skill in the art renders this claim element obvious. *See, e.g.*: Culliss at 9:58-62. Bowman at 5:4, 9:2-3, claim 7. Ryan at 4:57-59, 22:49-55.
6. The search system of claim **1** further comprising an information delivery system for delivering the filtered information to the first user.	*See* Herz at 6:13-18 (“the information delivery process in the preferred embodiment is based on determining the similarity between a profile for the target object and the profiles of target objects for which the user (or a similar user) has provided positive feedback in the past”); Fig. 10 at 1106 (“Server Delivers Article to User”). To the extent this reference does not teach this claim element, this reference in combination with the knowledge of one of ordinary skill in the art renders this claim element obvious. See, e.g.: GroupLens at 10, 11.

Claim language of U.S. Patent No. 6,775,664 (“the '664 Patent”)	Disclosure in Herz Reference
	Rose at Abstract. Culliss at 4:25-31. Bowman at 9:56-58. Ryan at 21:14-26, 23:47-49.
21. The search system of claim **1** wherein the content-based filter system filters by extracting features from the information.	*See* Herz at 6:18-29 (“The individual data that describe a target object and constitute the target object’s profile are herein termed ‘attributes’ of the target object. Attributes may include, but are not limited to, the following: (1) long pieces of text (a newspaper story, a movie review, a product description or an advertisement), (2) short pieces of text (name of a movie’s director, name of town from which an advertisement was placed, name of the language in which an article was written), (3) numeric representations (price of a product, rating given to a movie, reading level of a book), (4) associations with other types of objects (list of actors in a movie, list of persons who have read a document).”) To the extent this reference does not teach this claim element, this reference in combination with the knowledge of one of ordinary skill in the art renders this claim element obvious. See, e.g.: Rose at 2:35-38, 6:10-25. Lashkari at 15-16, 60. Tapestry at 67. Balabanovic at 69.

Claim language of U.S. Patent No. 6,775,664 (“the '664 Patent”)	**Disclosure in Herz Reference**
	GroupLens at 3. Culliss at 14:34-36. Bowman at 9:50-53; claim 29. Ryan at 16:4-9.
22. The search system of claim **21** wherein the extracted features comprise content data indicative of the relevance to the at least one of the query and the user.	*See* chart for claim 21, *supra*. *See* Herz at 10:44-47 (“For example, if the user has often liked movies that Customer C_{17} and Customer C_{190} have rented, then the user may like other such movies, which have similar values for attribute i.”) To the extent this reference does not teach this claim element, this reference in combination with the knowledge of one of ordinary skill in the art renders this claim element obvious. See, e.g.: Rose at 2:35-38, 6:10-25. Lashkari at 35. Tapestry at 67, 63. Balabanovic at 69. GroupLens at 3.
26. A method for obtaining information relevant to a first user comprising:	*See* chart for Claim 1 [preamble].
searching for information relevant to a query associated with a first user in a plurality of	*See* chart for Claim 1[a].

Claim language of U.S. Patent No. 6,775,664 (“the '664 Patent”)	**Disclosure in Herz Reference**
users;	
receiving information found to be relevant to the query by other users;	*See* chart for Claim 1[b].
combining the information found to be relevant to the query by other users with the searched information; and	*See* chart for Claim 1[b].
content-based filtering the combined information for relevance to at least one of the query and the first user.	*See* chart for Claim 1[c].
28. The method of claim **26** further comprising the step of delivering the filtered information to the first user.	*See* chart for claim 6, *supra*.
38. The method of claim **26** wherein the searching step comprises scanning a network in response to a demand search for the information relevant to the query associated with the first user.	*See* chart for Claim 1[a], *surpa*.

Claim language of U.S. Patent No. 6,314,420 ("the '420 Patent")	**Disclosure in Herz Reference**
10. [preamble] A search engine system comprising:	*See* chart for '664 Patent, claim 1(preamble), *supra*.
[a] a system for scanning a network to make a demand search for informons relevant to a query from an individual user;	*See* chart for '664 Patent, claim 1(a).
[b] a content-based filter system for receiving the informons from the scanning system and for filtering the informons on the basis of applicable content profile data for relevance to the query; and	*See* chart for '664 Patent, claim 1(c), *supra*.
[c] a feedback system for receiving collaborative feedback data from system users relative to informons considered by such users;	*See* chart for '664 Patent, claim 1(b), *supra*.
[d] the filter system combining pertaining feedback data from the feedback system with the content profile data in filtering each informon for relevance to the query.	*See* chart for '664 Patent, claim 1(c), *supra*.
14. The system of claim **10** wherein the collaborative feedback data comprises passive feedback data.	*See* Herz at 10:44-47 ("For example, if the user has often liked movies that Customer C_{17} and Customer C_{190} have rented, then the user may like other such movies, which have similar values for attribute i.") To the extent this reference does not teach this claim element, this reference in combination with the knowledge of one of ordinary skill in the art renders this claim element obvious. See, e.g.: Tapestry at 62. GroupLens at 6, 10.

Claim language of U.S. Patent No. 6,314,420 (“the '420 Patent”)	Disclosure in Herz Reference
	Loeb at 41. Culliss at Abstract; 4:32-34. Bowman at 2:31-35; 7:31-33; 9:2-3. Ryan at 9:22-30, 9:41-48.
15. The system of claim **14** wherein the passive feedback data is obtained by passively monitoring the actual response to a proposed informon.	*See* chart for Claim 14, *supra*.
25. A method for operating a search engine system comprising:	*See* chart for Claim 10 [preamble].
scanning a network to make a demand search for informons relevant to a query from an individual user;	*See* chart for Claim 10[a].
receiving the informons in a content-based filter system from the scanning system and filtering the informons on the basis of applicable content profile data for relevance to the query;	*See* chart for Claim 10[b].
receiving collaborative feedback data from system users relative to informons considered by such users; and	*See* chart for Claim 10[c].
combining pertaining feedback data with the content profile data in filtering each informon for relevance to the query.	*See* chart for Claim 10[d].
27. The method of claim **25** wherein the	*See* chart for Claim 14, *supra*.

Claim language of U.S. Patent No. 6,314,420 (“the '420 Patent”)	**Disclosure in Herz Reference**
collaborative feedback data provides passive feedback data.	
28. The method of claim **27** wherein the passive feedback data is obtained by passively monitoring the actual response to a proposed informon.	*See* chart for Claim 14, *supra*.

Exhibit A-3

U.S. Patent Claim Charts for the asserted '664 and '420 patents against Lashkari, "Feature Guided Automated Collaborative Filtering," MIT Masters Thesis (September 1995) ("Lashkari")

Claim language of U.S. Patent No. 6,775,664 ("the '664 Patent")	**Disclosure in Lashkari**
1. [preamble] A search system comprising:	*See* Lashkari at 59 ("Users can search the WEBHOUND database for documents containing a particular URL fragment . . . or by keywords in the title . . ."); *see also* chart for claim 1[a], *infra*. To the extent this reference does not teach this claim element, this reference in combination with the knowledge of one of ordinary skill in the art renders this claim element obvious. See, e.g.: Rose at 2:51-55, Claim 26. Herz at 6:42-58. Tapestry at 63. Balabanovic at 69-70. GroupLens at 2. Culliss at Abstract, 4:20-26. Bowman at 5:31-32; claim 28[a-b]. Ryan at Abstract, 1:8-10, 1:20-23.
[a] a scanning system for searching for	*See* Lashkari at 78 ("WEBHOUND is primarily an information filtering

Claim language of U.S. Patent No. 6,775,664 ("the '664 Patent")	Disclosure in Lashkari
information relevant to a query associated with a first user in a plurality of users;	service. Popular WWW search engines such as Lycos [24], WebCrawler [29], Yahoo [44], etc. are primarily information retrieval engines (as opposed to information filtering systems). The two are complementary – a WEBHOUND like front-end to a popular search engine such as Lycos, could enable users with WEBHOUND accounts to filter the results of their searches on the extensive databases compiled by these search engines in a personalized fashion. As a concrete example, let's say a user is searching for documents on *Indian Cooking*. He types the keywords *Indian Cooking* into the Lycos search form. The number of documents matching both keywords numbers in the hundreds. Even though any good search engine will order the matches in descending order of match, there are still too many documents for the average user to go through. However, if the user had a WEBHOUND account, the resulting matches could be filtered through WEBHOUND and only the top ranked ones (in terms of predicted rating) need be returned.") *See also* chart for claim 1(preamble).
[b] a feedback system for receiving information found to be relevant to the query by other users; and	*See* Lashkari at 59-60 ("Users can ask WEBHOUND to recommend documents using simple ACF . . . Users can ask WEBHOUND to recommend documents using FGACF"); 18 ("Automated Collaborative Filtering (ACF) [] refers to the system automatically determining correlations amongst users in their evaluation of items, and using these correlations to recommend interesting items.") To the extent this reference does not teach this claim element, this reference in combination with the knowledge of one of ordinary skill in the art renders this claim element obvious. See, e.g.: Rose at 6:59-7:10. Herz at 6:13-18, 10:44-47, 19:9-14; 23:45-24:13.

Claim language of U.S. Patent No. 6,775,664 (“the '664 Patent”)	**Disclosure in Lashkari**
	Tapestry at 63. Balabanovic at 69, 66. GroupLens at 1, 2, 5-10. Culliss at Abstract; 4:37-41. Bowman at Abstract, claim 28[c], 2:32-34. Ryan at 2:31-37.
[c] a content-based filter system for combining the information from the feedback system with the information from the scanning system and for filtering the combined information for relevance to at least one of the query and the first user.	*See* Lashkari at 15-16 (“This thesis presents a novel technique for information filtering that attempts to address the problems faced by both ACF and content-based approaches by combining the two to make use of their complementary strengths. The technique we present, *Feature Guided Automated Collaborative Filtering* (FGACF), uses easily extractable features of items to dynamically partition the domain and so allow ACF to be applied relative to a set of features.”); 60 (“Users can ask WEBHOUND to recommend documents using FGACF.”) To the extent this reference does not teach this claim element, this reference in combination with the knowledge of one of ordinary skill in the art renders this claim element obvious. See, e.g.: Rose at Abstract, 6:5-11. Herz at 18:39-43. Tapestry at 61, 63.

Claim language of U.S. Patent No. 6,775,664 (“the '664 Patent”)	Disclosure in Lashkari
	Balabanovic at 69, 66. GroupLens at 2. Culliss at 14:34-36, 13:35-42. Bowman at 9:28-53; claim 29. Ryan at 1:59-66, 23:38-49.
5. The search system of claim **1** wherein the filtered information is an advertisement.	To the extent this reference does not teach this claim element, this reference in combination with the knowledge of one of ordinary skill in the art renders this claim element obvious. *See, e.g.*: Herz at 61:4-18. Culliss at 9:58-62. Bowman at 5:4, 9:2-3, claim 7. Ryan at 4:57-59, 22:49-55.
6. The search system of claim **1** further comprising an information delivery system for delivering the filtered information to the first user.	*See* Chart for Claim 1[a].
21. The search system of claim **1** wherein the content-based filter system filters by extracting features from the information.	*See* Chart for Claim 1[c].
22. The search system of claim **21** wherein the	*See* Lashkari at 35 (“The idea behind the FGACF algorithm is that users don’t

Claim language of U.S. Patent No. 6,775,664 ("the '664 Patent")	Disclosure in Lashkari
extracted features comprise content data indicative of the relevance to the at least one of the query and the user.	necessarily correlate on the item level but rather for certain combinations of values of features of these items. Thus the FGACF algorithm treats each item as consisting of a set of *feature values* for a set of *features* defined in the domain.") To the extent this reference does not teach this claim element, this reference in combination with the knowledge of one of ordinary skill in the art renders this claim element obvious. See, e.g.: Rose at 2:35-38, 6:10-25. Herz at 6:29-33. Tapestry at 67, 63. Balabanovic at 69. GroupLens at 3. Culliss at 14:34-36. Bowman at 9:50-53; claim 29. Ryan at 16:4-9.
26. A method for obtaining information relevant to a first user comprising:	*See* chart for Claim 1[preamble].
searching for information relevant to a query associated with a first user in a plurality of users;	*See* chart for Claim 1[a]
receiving information found to be relevant to the	*See* chart for Claim 1[b].

Claim language of U.S. Patent No. 6,775,664 (“the '664 Patent”)	**Disclosure in Lashkari**
query by other users;	
combining the information found to be relevant to the query by other users with the searched information; and	*See* chart for Claim 1[b].
content-based filtering the combined information for relevance to at least one of the query and the first user.	*See* chart for Claim 1[c].
28. The method of claim **26** further comprising the step of delivering the filtered information to the first user.	*See* chart for Claim 6.
38. The method of claim **26** wherein the searching step comprises scanning a network in response to a demand search for the information relevant to the query associated with the first user.	*See* chart for Claim 1[a].

Claim language of U.S. Patent No. 6,314,420 (“the '420 Patent”)	**Disclosure in Lashkari**
10. [preamble] A search engine system comprising:	*See* chart for ‘664 Patent, Claim 1(preamble), *supra*.
[a] a system for scanning a network to make a demand search for informons relevant to a query from an individual user;	*See* chart for ‘664 Patent, Claim 1(a), *supra*.
[b] a content-based filter system for receiving the informons from the scanning system and for filtering the informons on the basis of applicable content profile data for relevance to the query; and	*See* chart for ‘664 Patent, Claim 1(c), *supra*.
[c] a feedback system for receiving collaborative feedback data from system users relative to informons considered by such users;	*See* chart for ‘664 Patent, Claim 1(b), *supra*.
[d] the filter system combining pertaining feedback data from the feedback system with the content profile data in filtering each informon for relevance to the query.	*See* chart for ‘664 Patent, Claim 1(c), *supra*.
14. The system of claim **10** wherein the collaborative feedback data comprises passive feedback data.	To the extent this reference does not teach this claim element, this reference in combination with the knowledge of one of ordinary skill in the art renders this claim element obvious. See, e.g.: Herz at 10:44-47. Tapestry at 62. GroupLens at 6, 10. Loeb at 41.

Claim language of U.S. Patent No. 6,314,420 (“the '420 Patent”)	**Disclosure in Lashkari**
	Culliss at Abstract; 4:32-34. Bowman at 2:31-35; 7:31-33; 9:2-3. Ryan at 9:22-30, 9:41-48.
15. The system of claim **14** wherein the passive feedback data is obtained by passively monitoring the actual response to a proposed informon.	*See* chart for claim 14, *supra*.
25. A method for operating a search engine system comprising:	*See* chart for Claim 10[preamble].
scanning a network to make a demand search for informons relevant to a query from an individual user;	*See* chart for Claim 10[a].
receiving the informons in a content-based filter system from the scanning system and filtering the informons on the basis of applicable content profile data for relevance to the query;	*See* chart for Claim 10[b].
receiving collaborative feedback data from system users relative to informons considered by such users; and	*See* chart for Claim 10[c].
combining pertaining feedback data with the content profile data in filtering each informon for relevance to the query.	*See* chart for Claim 10[d].
27. The method of claim **25** wherein the collaborative feedback data provides passive feedback data.	*See* chart for claim 14, *supra*.

Claim language of U.S. Patent No. 6,314,420 ("the '420 Patent")	**Disclosure in Lashkari**
28. The method of claim **27** wherein the passive feedback data is obtained by passively monitoring the actual response to a proposed informon.	*See* chart for claim 14, *supra*.

<u>**Exhibit A-4**</u>

U.S. Patent Claim Charts for the asserted '664 and '420 patents against Balabanovic et al., "Fab: Content-Based, Collaborative Recommendation," Communications of the ACM (March 1997) ("Balabanovic")

Claim language of U.S. Patent No. 6,775,664 ("the '664 Patent")	**Disclosure in Balabanovic Reference**
1. [preamble] A search system comprising:	*See* Balabanovic at 69 ("The collection stage gathers pages relevant to a small number of topics, computer-generated clusters of interests which track the changing tastes of the user population"); 69-70 ("We have implemented several different kinds of collection agents . . . *Index agents* construct queries to pass to various commercial Web search engines that have already performed exhaustive indexing.") To the extent this reference does not teach this claim element, this reference in combination with the knowledge of one of ordinary skill in the art renders this claim element obvious. See, e.g.: Rose at 2:51-55, Claim 26. Herz at 6:42-58. Lashkari at 59. Tapestry at 63. GroupLens at 2. Culliss at Abstract, 4:20-26. Bowman at 5:31-32; claim 28[a-b].

Claim language of U.S. Patent No. 6,775,664 (“the '664 Patent”)	Disclosure in Balabanovic Reference
	Ryan at Abstract, 1:8-10, 1:20-23.
[a] a scanning system for searching for information relevant to a query associated with a first user in a plurality of users;	*See* Chart for Claim 1 [preamble].
[b] a feedback system for receiving information found to be relevant to the query by other users; and	*See* Balabanovic at 69 (“Pages found by the collection agents are sent to the central router, which forwards them on to those users whose profiles they match above some threshold . . . When the user has requested, received, and looked over their recommendations, they are required to assign appropriate ratings from a 7-point scale. The user's ratings are used to update their personal selection agent's profile, and are also forwarded back to the originating collection agents, which will use them to adapt their profiles. Additionally, any highly rated pages are passed directly to the user's nearest neighbors – other people with similar profiles. These collaborative recommendations are processed by the receiving user's selection agent in the same way as the pages from the central router."); *see also id.* at 66 ("By combining both collaborative and content-based filtering systems, Fab may eliminate many of the weaknesses found in each approach . . . here we describe the two approaches for content-based and collaborative recommendation, explain how a hybrid system can be created, and then describe Fab, an implementation of such a system.”) To the extent this reference does not teach this claim element, this reference in combination with the knowledge of one of ordinary skill in the art renders this claim element obvious. See, e.g.: Rose at 6:59-7:10. Herz at 6:13-18, 10:44-47, 19:9-14; 23:45-24:13. Lashkari at 59-60, 18.

Claim language of U.S. Patent No. 6,775,664 (“the '664 Patent”)	**Disclosure in Balabanovic Reference**
	Tapestry at 63. GroupLens at 1, 2, 5-10. Culliss at Abstract; 4:37-41. Bowman at Abstract, claim 28[c], 2:32-34. Ryan at 2:31-37.
[c] a content-based filter system for combining the information from the feedback system with the information from the scanning system and for filtering the combined information for relevance to at least one of the query and the first user.	*See* chart for Claim 1[b].
5. The search system of claim **1** wherein the filtered information is an advertisement.	To the extent this reference does not teach this claim element, this reference in combination with the knowledge of one of ordinary skill in the art renders this claim element obvious. *See, e.g.*: Herz at 61:4-18. Culliss at 14:34-36, 13:35-42. Bowman at 9:28-53; claim 29. Ryan at 1:59-66, 23:38-49.
6. The search system of claim **1** further comprising an information delivery system for delivering the filtered information to the first user.	*See* Chart for Claim 1[b].

Claim language of U.S. Patent No. 6,775,664 (“the '664 Patent”)	Disclosure in Balabanovic Reference
21. The search system of claim **1** wherein the content-based filter system filters by extracting features from the information.	*See* Balabanovic at 69 (“Every agent maintains a profile, based on words contained in Web pages which have been rated.”) To the extent this reference does not teach this claim element, this reference in combination with the knowledge of one of ordinary skill in the art renders this claim element obvious. See, e.g.: Rose at 2:35-38, 6:10-25. Herz at 6:18-29. Lashkari at 15-16, 60. Tapestry at 67. GroupLens at 3. Culliss at 14:34-36. Bowman at 9:50-53; claim 29. Ryan at 16:4-9.
22. The search system of claim **21** wherein the extracted features comprise content data indicative of the relevance to the at least one of the query and the user.	*See* Balabanovic at 69 (“Every agent maintains a profile, based on words contained in Web pages which have been rated. A collection agent's profile represents its current topic, whereas a selection agent's profile represents a single user's interests. Pages found by the collection agents are sent to the central router, which forwards them on to those users whose profiles they match above some threshold.”) To the extent this reference does not teach this claim element, this reference in

Claim language of U.S. Patent No. 6,775,664 (“the '664 Patent”)	Disclosure in Balabanovic Reference
	combination with the knowledge of one of ordinary skill in the art renders this claim element obvious. See, e.g.: Rose at 2:35-38, 6:10-25. Herz at 6:29-33. Lashkari at 35. Tapestry at 67, 63. GroupLens at 3. Culliss at 14:34-36. Bowman at 9:50-53; claim 29. Ryan at 16:4-9.
26. A method for obtaining information relevant to a first user comprising:	*See* chart for Claim 1[preamble].
searching for information relevant to a query associated with a first user in a plurality of users;	*See* chart for Claim 1[a].
receiving information found to be relevant to the query by other users;	*See* chart for Claim 1[b].
combining the information found to be relevant to the query by other users with the searched information; and	*See* chart for Claim 1[b].
content-based filtering the combined information	*See* chart for Claim 1[c].

Claim language of U.S. Patent No. 6,775,664 (“the '664 Patent”)	**Disclosure in Balabanovic Reference**
for relevance to at least one of the query and the first user.	
28. The method of claim **26** further comprising the step of delivering the filtered information to the first user.	*See* chart for Claim 1[b].
38. The method of claim **26** wherein the searching step comprises scanning a network in response to a demand search for the information relevant to the query associated with the first user.	*See* chart for Claim 1[a].

Claim language of U.S. Patent No. 6,314,420 (“the '420 Patent”)	**Disclosure in Balabanovic Reference**
10. [preamble] A search engine system comprising:	*See* chart for ‘664 Patent, Claim 1(preamble), *supra*.
[a] a system for scanning a network to make a demand search for informons relevant to a query from an individual user;	*See* chart for '664 Patent, Claim 1(a), *supra*.
[b] a content-based filter system for receiving the informons from the scanning system and for filtering the informons on the basis of applicable content profile data for relevance to the query; and	*See* chart for '664 Patent, Claim 1(c), *supra*.
[c] a feedback system for receiving collaborative feedback data from system users relative to informons considered by such users;	*See* chart for '664 Patent, Claim 1(b), *supra*.
[d] the filter system combining pertaining feedback data from the feedback system with the content profile data in filtering each informon for relevance to the query.	*See* chart for '664 Patent, Claim 1(c), *supra*.
14. The system of claim **10** wherein the collaborative feedback data comprises passive feedback data.	To the extent this reference does not teach this claim element, this reference in combination with the knowledge of one of ordinary skill in the art renders this claim element obvious. See, e.g.: Herz at 10:44-47. Tapestry at 62. GroupLens at 6, 10. Loeb at 41.

Claim language of U.S. Patent No. 6,314,420 (“the '420 Patent”)	**Disclosure in Balabanovic Reference**
	Culliss at Abstract; 4:32-34. Bowman at 2:31-35; 7:31-33; 9:2-3. Ryan at 9:22-30, 9:41-48.
15. The system of claim **14** wherein the passive feedback data is obtained by passively monitoring the actual response to a proposed informon.	*See* chart for claim 14, *supra*.
25. A method for operating a search engine system comprising:	*See* chart for Claim 10 (preamble).
scanning a network to make a demand search for informons relevant to a query from an individual user;	*See* chart for Claim 10(a).
receiving the informons in a content-based filter system from the scanning system and filtering the informons on the basis of applicable content profile data for relevance to the query;	*See* chart for Claim 10(b).
receiving collaborative feedback data from system users relative to informons considered by such users; and	*See* chart for Claim 10(c).
combining pertaining feedback data with the content profile data in filtering each informon for relevance to the query.	*See* chart for Claim 10(d).
27. The method of claim **25** wherein the collaborative feedback data provides passive feedback data.	*See* chart for claim 14, *supra*.
28. The method of claim **27** wherein the passive	*See* chart for claim 14, *supra*.

Claim language of U.S. Patent No. 6,314,420 (“the '420 Patent”)	**Disclosure in Balabanovic Reference**
feedback data is obtained by passively monitoring the actual response to a proposed informon.	

Exhibit A-5

U.S. Patent Claim Charts for the asserted '664 and '420 patents against U.S. Patent No. 6,185,558 ("Bowman")

Claim language of U.S. Patent No. 6,775,664 ("the '664 Patent")	Disclosure in Bowman
1. [preamble] A search system comprising:	*See* Bowman at 5:31-32 (stating that Bowman's system includes "a query server for generating query results from queries.") *See id.* at Claim 28[a-b] ("A computer-readable medium whose contents cause a computer system to rank items in a search result by: receiving a query specifying one or more terms; generating a query result identifying a plurality of items satisfying the query") *See id.* at 1:18-22 ("Many World Wide Web sites permit users to perform searches to identify a small number of interesting items among a much larger domain of items. As an example, several web index sites permit users to search for particular web sites among most of the known web sites.") To the extent this reference does not teach this claim element, this reference in combination with the knowledge of one of ordinary skill in the art renders this claim element obvious. See, e.g.: Herz at 6:42-58. Lashkari at 59. Tapestry at 63. Balabanovic at 69-70.

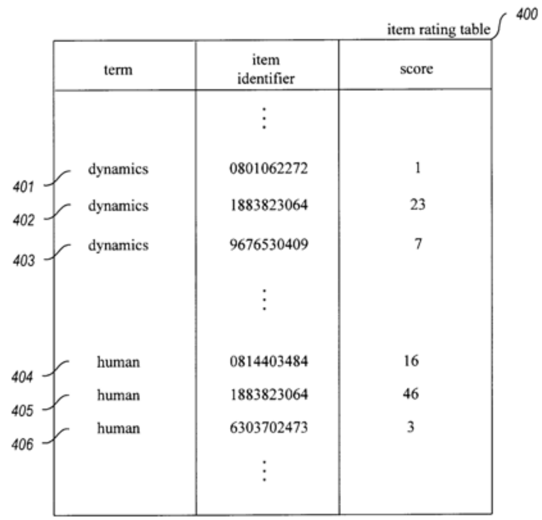
Claim language of U.S. Patent No. 6,775,664 (“the '664 Patent”)	**Disclosure in Bowman**
	GroupLens at 2. Rose at 2:51-55. Culliss at Abstract, 4:20-26. Ryan at Abstract, 1:8-10, 1:20-23.
[a] a scanning system for searching for information relevant to a query associated with a first user in a plurality of users;	Bowman at 1:28-37 (“In order to perform a search, a user submits a query containing one or more query terms. The query also explicitly or implicitly identifies a domain of items to search. For example, a user may submit a query to an online bookseller containing terms that the user believes are words in the title of a book. A query server program processes the query to identify within the domain items matching the terms of the query. The items identified by the query server program are collectively known as a query result.”) *Id.* at 1:20-25 (“As an example, several web index sites permit users to search for particular web sites among most of the known web sites. Similarly, many online merchants, such as booksellers, permit users to search for particular products among all of the products that can be purchased from a merchant. In many cases, users perform searches in order to ultimately find a single item within an entire domain of items.”) *Id.* at 4:43-48 (“By ordering and/or subsetting the items in the query result in this way in accordance with collective and individual user behavior rather than in accordance with attributes of the items…”) *Id.* at 5:14-16 (“Further, rating scores may be produced by a rating function that combines different types of information reflecting collective and individual user preferences.”)

Claim language of U.S. Patent No. 6,775,664 (“the '664 Patent”)	Disclosure in Bowman
	Id. at 5:31-35 (“The memory 130 preferably contains a query server 131 for generating query results from queries, a query result ranking facility 132 for automatically ranking the items in a query result in accordance with collective user preferences, and item rating tables 133 used by the facility.”) *Id.* at 7:65-67 (“In response to receiving the HTTP request documented in Log Entry 1, the query server generates a query result for the query and returns it to the web client submitting the query.”) *See also* chart for claim 1(preamble), *supra*. To the extent this reference does not teach this claim element, this reference in combination with the knowledge of one of ordinary skill in the art renders this claim element obvious. See, e.g.: Herz at 6:42-58. Lashkari at 59. Tapestry at 63. Balabanovic at 69-70. GroupLens at 2. Rose at 2:51-55. Culliss at Abstract, 4:10-26
[b] a feedback system for receiving information found to be relevant to the query by other users; and	Bowman at Abstract (“[A] software facility . . . produces a ranking value for at least a portion of the items identified in the query result by combining the relative frequencies with which users selected that item from the query results

Claim language of U.S. Patent No. 6,775,664 (“the '664 Patent”)	Disclosure in Bowman
	specifying each of the terms specified by the query.”) *Id.* at Claim 28[c] (“for each item identified in the query result, combining the relative frequencies with which users selected the item in earlier queries specifying each of the terms in the query to produce a ranking value for the item.”) *Id.* at 2:32-34 (“The scores in the rating table preferably reflect, for a particular item and term, how often users have selected the item when the item has been identified in query results produced for queries containing particular term.”) *Id.* at 6:26-31 (“In augmenting the item rating table 300, the facility identifies the selection of the item having item identifier ‘1883823064’ from a query result produced by a query specifying the query terms ‘human’ and ‘dynamics’. FIG. 4 shows the state of the item rating table after the item rating table is augmented by the facility to reflect this selection.”) *Id.* at 2:62-3:2 (“The facility may also use the ranking values to subset the items in the query result to a smaller number of items. By ordering and/or subsetting the items in the query result in this way in accordance with collective and individual user behavior . . . the facility substantially increases the likelihood that the user will quickly find within the query result the particular item or items that he or she seeks.”) *Id.* at 8:21-27 (“Where information about user selections is stored in web server logs such as those discussed above, the facility preferably identifies user selections by traversing these logs. Such traversal can occur either in a batch processing mode after a log for a specific period of time has been completely generated, or in a real-time processing mode so that log entries are processed as soon as they are generated.”)

<table>
<tr><th>Claim language of U.S. Patent No. 6,775,664 (“the '664 Patent”)</th><th>Disclosure in Bowman</th></tr>
<tr><td></td><td>

Id. at Fig. 4:



To the extent this reference does not teach this claim element, this reference in combination with the knowledge of one of ordinary skill in the art renders this claim element obvious. See, e.g.:

Herz at 6:13-18, 10:44-47, 19:9-14; 23:45-24:13.

Lashkari at 59-60, 18.

Tapestry at 63.

GroupLens at 1, 2, 5-10.

Rose at 6:59-7:10.

</td></tr>
</table>

Claim language of U.S. Patent No. 6,775,664 (“the '664 Patent”)	Disclosure in Bowman
	Culliss at Abstract; 4:37-41. Ryan at 2:31-37.
[c] a content-based filter system for combining the information from the feedback system with the information from the scanning system and for filtering the combined information for relevance to at least one of the query and the first user.	Bowman at 9:28-53 (“The facility uses rating tables that it has generated to generate ranking values for items in new query results . . . scores may be adjusted to more directly reflect the number of query terms that are matched to the item, so that items that match more query terms than others are favored in the rankings.”) *Id.* at claim 29 (“The computer-readable medium of claim **28** wherein the contents of the computer-readable medium further cause the computer system to perform the step of adjusting the ranking value produced for each item identified in the query result to reflect the number of terms specified by the query that are matched by the item.”) *Id.* at 1:42-45 (“As another example, the list may be ordered based on the extent to which each identified item matches the terms of the query.”) *Id.* at 2:40-47 (“To generate a ranking value for a particular item in a query result, the facility combines the rating scores corresponding to that item and the terms of the query. In embodiments in which the goal is to generate ranking values for each item in the query result, the facility preferably loops through the items in the query results and, for each item, combines all of the rating scores corresponding to that item and any of the terms in the query.”) *Id.* at 9:28-43 (“The facility uses rating tables that it has generated to generate ranking values for items in new query results. FIG. 8 is a flow diagram showing the steps preferably performed by the facility to order a query result using a rating table by generating a ranking value for each item in the query result. In steps 801-807, the facility loops through each item identified in the

Claim language of U.S. Patent No. 6,775,664 (“the '664 Patent”)	**Disclosure in Bowman**
	query result. In step 802, the facility initializes a ranking value for the current item. In steps 803-805, the facility loops through each term occurring in the query. In step 804, the facility determines the rating score contained by the most recently-generated rating table for the current term and item. In step 805, if any terms of the query remain to be processed, then the facility loops up to step 803, else the facility continues in step 806. In step 806, the facility combines the scores for the current item to generate a ranking value for the item.”) To the extent this reference does not teach this claim element, this reference in combination with the knowledge of one of ordinary skill in the art renders this claim element obvious. See, e.g.: Herz at 18:39-43. Lashkari at 15-16, 60. Tapestry at 61, 63. Balabanovic at 69, 66. GroupLens at 2, 3. Rose at Abstract, 6:5-11. Culliss at 14:34-36, 13:35-42. Ryan at 1:59-66, 23:38-49.
5. The search system of claim **1** wherein the filtered information is an advertisement.	Bowman at 5:4, 9:2-3, claim 7 (disclosing that system users can purchase the items represented by the search results, which effectively render the search

Claim language of U.S. Patent No. 6,775,664 (“the '664 Patent”)	**Disclosure in Bowman**
	results as advertisements for those items) To the extent this reference does not teach this claim element, this reference in combination with the knowledge of one of ordinary skill in the art renders this claim element obvious. *See, e.g.*: Herz at 61:4-18. Culliss at 9:58-62. Ryan at 4:57-59, 22:49-55.
6. The search system of claim **1** further comprising an information delivery system for delivering the filtered information to the first user.	*See* Bowman at 9:56-58 (“In step **808**, the facility displays the items identified in the query result in accordance with the ranking values generated for the items in step **806**”) *Id.* at 2:63-3:3 (“By ordering and/or subsetting the items in the query result in this way in accordance with collective and individual user behavior rather than in accordance with attributes of the items, the facility substantially increases the likelihood that the user will quickly find within the query result the particular item or items that he or she seeks.”) *Id.* at 10:30-34 (“In step 907, the facility selects for prominent display items having the top three combined scores. In additional embodiments, the facility selects a small number of items having the top combined scores that is other than three.”) To the extent this reference does not teach this claim element, this reference in combination with the knowledge of one of ordinary skill in the art renders this claim element obvious. See, e.g.:

Claim language of U.S. Patent No. 6,775,664 (“the '664 Patent”)	**Disclosure in Bowman**
	Herz at 6:13-18, Fig. 10 at 1106. GroupLens at 10, 11. Rose at Abstract. Culliss at 4:25-31. Ryan at 21:14-26, 23:47-49.
21. The search system of claim **1** wherein the content-based filter system filters by extracting features from the information.	*See* Bowman at 9:50-53; claim 29 (disclosing the extraction of words from the content of each search result in order to determine how many of the words from the query are found in the search result.) *Id.* at 3:16-24 (“Various embodiments of the invention base rating scores on different kinds of selection actions performed by the users on items identified in query results. These include whether the user displayed additional information about an item, how much time the user spent viewing the additional information about the item, how many hyperlinks the user followed within the additional information about the item, whether the user added the item to his or her shopping basket, and whether the user ultimately purchased the item.”) *Id.* at 7:46-55:

Claim language of U.S. Patent No. 6,775,664 (“the '664 Patent”)	Disclosure in Bowman
	1. Friday, Feb. 13, 1998 16:59:27 2. User Identifier=82707238671 3. HTTP_REFERER=http://www.amazon.com/book_ query_page 4. PATH_INFO=/book_query 5. author=“Seagal” 6. title=“Human Dynamics” Log Entry 1 To the extent this reference does not teach this claim element, this reference in combination with the knowledge of one of ordinary skill in the art renders this claim element obvious. See, e.g.: Herz at 6:18-29. Lashkari at 15-16, 60. Tapestry at 67. Balabanovic at 69. GroupLens at 3. Rose at 2:35-38; 6:10-25. Culliss at 14:34-36. Ryan at 16:4-9.
22. The search system of claim **21** wherein the extracted features comprise content data indicative of the relevance to the at least one of	*See* chart for claim 21, *supra*.

Claim language of U.S. Patent No. 6,775,664 (“the '664 Patent”)	Disclosure in Bowman
the query and the user.	
26. A method for obtaining information relevant to a first user comprising:	*See* chart for Claim 1.
searching for information relevant to a query associated with a first user in a plurality of users;	*See* chart for Claim 1(a)
receiving information found to be relevant to the query by other users;	*See* chart for Claim 1(b).
combining the information found to be relevant to the query by other users with the searched information; and	*See* chart for Claim 1(b).
content-based filtering the combined information for relevance to at least one of the query and the first user.	*See* chart for Claim 1(c).
28. The method of claim 26 further comprising the step of delivering the filtered information to the first user.	*See* chart for Claim 6, *supra*.
38. The method of claim 26 wherein the searching step comprises scanning a network in response to a demand search for the information relevant to the query associated with the first user.	*See* chart for Claim 1(a), *supra*.

Claim language of U.S. Patent No. 6,314,420 (“the ‘420 Patent”)	**Disclosure in Bowman**
10. [preamble] A search engine system comprising:	*See* chart for ‘664 Patent, Claim 1(preamble), *supra*.
[a] a system for scanning a network to make a demand search for informons relevant to a query from an individual user;	*See* chart for ‘664 Patent, Claim 1(a), *supra*.
[b] a content-based filter system for receiving the informons from the scanning system and for filtering the informons on the basis of applicable content profile data for relevance to the query; and	*See* chart for ‘664 Patent, Claim 1(c), *supra*.
[c] a feedback system for receiving collaborative feedback data from system users relative to informons considered by such users;	*See* chart for ‘664 Patent, Claim 1(b), *supra*.
[d] the filter system combining pertaining feedback data from the feedback system with the content profile data in filtering each informon for relevance to the query.	*See* chart for ‘664 Patent, Claim 1(c), *supra*.
14. The system of claim **10** wherein the collaborative feedback data comprises passive feedback data.	Bowman at 2:31-35 (“The scores in the rating table preferably reflect, for a particular item and term, how often users have selected the item when the item has been identified in query results produced for queries containing particular term.”) *Id.* at 7:31-33 (disclosing that user selections can comprise user requests to see more information about one or more of the search results presented to them). *Id.* at 9:2-3 (disclosing that user selections can also comprise a request to purchase the item(s) corresponding to the search result(s))

Claim language of U.S. Patent No. 6,314,420 (“the ‘420 Patent”)	Disclosure in Bowman
	Id. at 3:17-23 (“Various embodiments of the invention base rating scores on different kinds of selection actions performed by the users on items identified in query results. These include whether the user displayed additional information about an item, how much time the user spent viewing the additional information about the item, how many hyperlinks the user followed within the additional information about the item, whether the user added the item to his or her shopping basket, and whether the user ultimately purchased the item.”) To the extent this reference does not teach this claim element, this reference in combination with the knowledge of one of ordinary skill in the art renders this claim element obvious. See, e.g.: Herz at 10:44-47. Tapestry at 62. GroupLens at 6, 10. Loeb at 41. Culliss at Abstract; 4:32-34. Ryan at 9:22-30, 9:41-48.
15. The system of claim **14** wherein the passive feedback data is obtained by passively monitoring the actual response to a proposed informon.	*See* chart for Claim 14.
25. A method for operating a search engine system comprising:	*See* chart for Claim 10(preamble).

Claim language of U.S. Patent No. 6,314,420 ("the '420 Patent")	**Disclosure in Bowman**
scanning a network to make a demand search for informons relevant to a query from an individual user;	*See* chart for Claim 10(a).
receiving the informons in a content-based filter system from the scanning system and filtering the informons on the basis of applicable content profile data for relevance to the query;	*See* chart for Claim 10(b).
receiving collaborative feedback data from system users relative to informons considered by such users; and	*See* chart for Claim 10(c).
combining pertaining feedback data with the content profile data in filtering each informon for relevance to the query.	*See* chart for Claim 10(d).
27. The method of claim **25** wherein the collaborative feedback data provides passive feedback data.	*See* chart for Claim 14.
28. The method of claim **27** wherein the passive feedback data is obtained by passively monitoring the actual response to a proposed informon.	*See* chart for Claim 15.

<u>Exhibit A-6</u>

U.S. Patent Claim Charts for the asserted '664 and '420 patents against U.S. Patent No. 6,006,222 ("Culliss")

Claim language of U.S. Patent No. 6,775,664 ("the '664 Patent")	**Disclosure in Culliss**
1. [preamble] A search system comprising:	*See* Culliss at 4:10-26 (explaining that Culliss' system accepts a search query from a user and returns squibs of articles that match the query) *Id.* at Abstract ("As users enter search queries and select articles, the scores are altered. The scores are then used in subsequent searches to organize the articles that match a search query.") *Id.* at 1:17-20 ("The present invention relates to search engines, and more particularly pertains to a method for organizing information by monitoring the search activity of users.") To the extent this reference does not teach this claim element, this reference in combination with the knowledge of one of ordinary skill in the art renders this claim element obvious. See, e.g.: Herz at 6:42-58. Lashkari at 59. Tapestry at 63. Balabanovic at 69-70. GroupLens at 2. Rose at 2:51-55.

Claim language of U.S. Patent No. 6,775,664 ("the '664 Patent")	Disclosure in Culliss
	Bowman at 5:31-32; claim 28[a-b] Ryan at Abstract, 1:8-10, 1:20-23.
[a] a scanning system for searching for information relevant to a query associated with a first user in a plurality of users;	Culliss at 4:11-15 ("The search engine then identifies in any conceivable manner the articles which are associated with the matched key terms. This can be done by comparing all or part of the search query, or terms equivalent to those in the search query with the key terms in the index to identify the key terms which match the search query. The search engine may account for Boolean logic operators in the search query.") *Id.* at 1:44-47 ("The search engine then compares the search query with the key terms from the articles and retrieves at least a portion of the articles having key terms which match the search query. The search engine will then display to the user the portion of the article such as the title. The user can then scroll through these retrieved portions of the articles and select a desired article.") *Id.* at Abstract ("A method of organizing information in which the search activity of a user is monitored and such activity is used to organize articles in a subsequent search by the same or another user who enters a similar search query.") *See also* chart for claim 1(preamble), *supra*.
[b] a feedback system for receiving information found to be relevant to the query by other users; and	Culliss at Abstract ("As users enter search queries and select articles, the scores are altered. The scores are then used in subsequent searches to organize the articles that match a search query.") *Id.* at 4:37-41 ("Once the user has selected a matched article, and as shown in FIG. 1 at 40, the index can be altered such that the key term scores for the

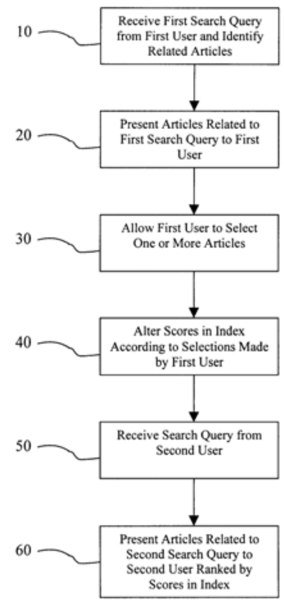
<table>
<tr><th>Claim language of U.S. Patent No. 6,775,664 (“the '664 Patent”)</th><th>Disclosure in Culliss</th></tr>
<tr><td></td><td>selected matched article under the matched key terms are altered relative to other key term scores.”)

Id. at 7:60-67 (“If the user selected only article A3, the key term scores for selected matched article A3 under the matched key term groupings Alpha-Gamma would be altered. Additionally, the key term scores for selected matched article A3 under the matched key term groupings Alpha-Alpha and Gamma-Gamma could also be altered since the key terms Alpha and Gamma are each represented individually in the results of the search query.”)</td></tr>
<tr><td></td><td>Id. at 4:50-65 (“Thus, after executing the search query "Alpha AND Gamma," the search engine would display the squib of matched articles A1 and A3. If the user selected only article A3, the index could be altered such that the key term scores for the selected matched article A3 under the matched key terms Alpha and Gamma are altered relative to the other key term scores. The index would then look like this:</td></tr>
<tr><td></td><td>
<table>
<tr><th colspan="5">Index</th></tr>
<tr><th>Alpha</th><th>Beta</th><th>Gamma</th><th>Delta</th><th>Epsilon</th></tr>
<tr><td>A1 - 1
A2 - 1
A3 - 2</td><td>A1 - 1</td><td>A1 - 1
A3 - 2</td><td>A2 - 1
A3 - 1</td><td>A1 - 1
A3 - 1</td></tr>
</table>
”)

Id. at 5:49-54 (“Further, the key term total scores for both article A1 and article A3 under the matched key terms could also be altered. If the positive score is added to the key term scores for the selected matched article A3 under</td></tr>
</table>

Claim language of U.S. Patent No. 6,775,664 (“the '664 Patent”)	Disclosure in Culliss
	the matched key terms Alpha and Gamma, and the positive score is added to the key term total scores for the matched articles A1 and A3 (regardless of whether they were selected or not) under the matched key terms, the index would then look like this:”) *See id.* at 13:28-30 (“Each subsequent user would thus benefit from the prior human judgments about which key terms or groupings are relevant to which articles.”) To the extent this reference does not teach this claim element, this reference in combination with the knowledge of one of ordinary skill in the art renders this claim element obvious. See, e.g.: Herz at 6:13-18, 10:44-47, 19:9-14; 23:45-24:13. Lashkari at 59-60, 18. Tapestry at 63. GroupLens at 1, 2, 5-10. Rose at 6:59-7:10. Bowman at Abstract, claim 28[c], 2:32-34. Ryan at 2:31-37.
[c] a content-based filter system for combining the information from the feedback system with the information from the scanning system and for filtering the combined information for relevance	Culliss at 14:34-36 (disclosing that a key term score for a search result may be initially determined by the content of the search result – namely, how many times the key term appears in the search result’s content.)

Claim language of U.S. Patent No. 6,775,664 (“the '664 Patent”)	Disclosure in Culliss
to at least one of the query and the first user.	*Id.* at 13:35-42 (“the comparison scores could be continuously combined with the ranking provided by the search engine to supplement or correct such a ranking. For example, the search engine may rank or organize the articles by providing a relevancy score, such ad the percentile relevancy provided by the search engines ‘Excite’ ™ or ‘Lycos’ ™. “) *Id.* at 5:1-5 (“To this end, the key term scores of each matched article under each of the matched key terms of the new search could then be associated in any possible manner to create a comparison score for each matched article. For example, the key term scores could be added, multiplied together or averaged to create the comparison score for that matched article.”) *Id.* at 4:65-5:3 (“For the next search by either the same or a different user, the invention could then rank the matched articles by using the key term scores, as shown in FIG. 1 at 50 and 60. To this end, the key term scores of each matched article under each of the matched key terms of the new search could then be associated in any possible manner to create a comparison score for each matched article.”) *Id.* at Fig. 1:

Claim language of U.S. Patent No. 6,775,664 (“the '664 Patent”)	Disclosure in Culliss
	 **FIGURE 1** *Id.* at 16:23-60 (claim 1) To the extent this reference does not teach this claim element, this reference in combination with the knowledge of one of ordinary skill in the art renders this claim element obvious. See, e.g.: Herz at 18:39-43. Lashkari at 15-16, 60. Tapestry at 61, 63.

Claim language of U.S. Patent No. 6,775,664 (“the '664 Patent”)	**Disclosure in Culliss**
	Balabanovic at 69, 66. GroupLens at 2, 3. Rose at Abstract, 6:5-11 Bowman at 9:28-53; claim 29. Ryan at 1:59-66, 23:38-49.
5. The search system of claim **1** wherein the filtered information is an advertisement.	Culliss at 9:58-62 (“For example, the user may enter the category key terms ‘Apartments’ and ‘Los Angeles’ or the category key terms ‘Romantic’ and ‘Comedy’ to find articles (i.e. advertisements or movies) which fall under two or more category key terms.”) To the extent this reference does not teach this claim element, this reference in combination with the knowledge of one of ordinary skill in the art renders this claim element obvious. *See, e.g.*: Herz at 61:4-18. Bowman at 5:4, 9:2-3, claim 7. Ryan at 4:57-59, 22:49-55.
6. The search system of claim **1** further comprising an information delivery system for delivering the filtered information to the first user.	Culliss at 4:25-31 (“As shown in FIG. 1 at **20**, the search engine will then display a squib of each of the matched articles . . . the user can then scroll through the squibs of the articles and select a desired one”) *Id.* at 5:7-10 (“The matched articles can then be displayed to the user in order of comparison score superiority, such as by displaying the matched article

Claim language of U.S. Patent No. 6,775,664 (“the '664 Patent”)	**Disclosure in Culliss**
	with the highest comparison score first.”) *Id.* at 6:42-45 (“The invention could then display the article A3 to the user in a superior position to article A1 because the comparison score for matched article A3 is higher.”) *See id.* at 16:53-60 (Claim 1(i)) To the extent this reference does not teach this claim element, this reference in combination with the knowledge of one of ordinary skill in the art renders this claim element obvious. See, e.g.: Herz at 6:13-18, Fig. 10 at 1106. GroupLens at 10, 11. Rose at Abstract. Bowman at 9:56-58. Ryan at 21:14-26, 23:47-49.
21. The search system of claim **1** wherein the content-based filter system filters by extracting features from the information.	Culliss at 14:34-36 (disclosing that Culliss extracts words from the content of each search result in order to determine how often the words from the query are found in these search results.) *Id.* at 3:61-63 (“The articles are each associated with one or more of these key terms by any conceivable method of association, such as through indexing all words or through meta-tag headers containing key words selected by the author or editor.”)

Claim language of U.S. Patent No. 6,775,664 (“the '664 Patent”)	Disclosure in Culliss
	Id. at 14:47-50 (“The squib may comprise any portion, hypertext link to or representation of the matched article, such as the title, headings, first few lines of text, audio, video or any other type of information.”) To the extent this reference does not teach this claim element, this reference in combination with the knowledge of one of ordinary skill in the art renders this claim element obvious. See, e.g.: Herz at 6:18-29. Lashkari at 15-16, 60. Tapestry at 67. Balabanovic at 69. GroupLens at 3. Rose at 2:35-38; 6:10-25. Bowman at 9:50-53; claim 29. Ryan at 16:4-9.
22. The search system of claim **21** wherein the extracted features comprise content data indicative of the relevance to the at least one of the query and the user.	*See* chart for Claim 21, *supra*.
26. A method for obtaining information relevant to a first user comprising:	*See* chart for Claim 1.
searching for information relevant to a query	*See* chart for Claim 1(a)

Claim language of U.S. Patent No. 6,775,664 (“the '664 Patent”)	Disclosure in Culliss
associated with a first user in a plurality of users;	
receiving information found to be relevant to the query by other users;	*See* chart for Claim 1(b).
combining the information found to be relevant to the query by other users with the searched information; and	*See* chart for Claim 1(b).
content-based filtering the combined information for relevance to at least one of the query and the first user.	*See* chart for Claim 1(c).
28. The method of claim 26 further comprising the step of delivering the filtered information to the first user.	*See* chart for Claim 6, *supra*.
38. The method of claim 26 wherein the searching step comprises scanning a network in response to a demand search for the information relevant to the query associated with the first user.	*See* chart for Claim 1(a), *supra*.

Claim language of U.S. Patent No. 6,314,420 (“the ‘420 Patent”)	**Disclosure in Culliss patent Reference**
10. [preamble] A search engine system comprising:	*See* chart for ‘664 Patent, Claim 1(a), *supra*.
[a] a system for scanning a network to make a demand search for informons relevant to a query from an individual user;	*See* chart for ‘664 Patent, Claim 1(a), *supra*.
[b] a content-based filter system for receiving the informons from the scanning system and for filtering the informons on the basis of applicable content profile data for relevance to the query; and	*See* chart for ‘664 Patent, Claim 1(c), *supra*.
[c] a feedback system for receiving collaborative feedback data from system users relative to informons considered by such users;	*See* chart for ‘664 Patent, Claim 1(b), *supra*.
[d] the filter system combining pertaining feedback data from the feedback system with the content profile data in filtering each informon for relevance to the query.	*See* chart for ‘664 Patent, Claim 1(c), *supra*.
14. The system of claim **10** wherein the collaborative feedback data comprises passive feedback data.	Culliss at Abstract (“As users enter search queries and select articles, the scores are altered”) *Id.* at 4:32-34 (disclosing that Culliss passively monitors whether the user performs such selection actions as “opening, retrieving, reading, viewing, listening to or otherwise closely inspecting the article.”) *Id.* at 4:37-41 (“Once the user has selected a matched article, and as shown in FIG. 1 at 40, the index can be altered such that the key term scores for the selected matched article under the matched key terms are altered relative to other key term scores.”)

Claim language of U.S. Patent No. 6,314,420 (“the ‘420 Patent”)	Disclosure in Culliss patent Reference
	Id. at 11:45-53 (“For example, if the user selected only article A3 after executing a search query containing the rating key term X-Rated, the key term score for article A3 under the rating key term X-Rated would be altered relative to the other rating key term scores.”) To the extent this reference does not teach this claim element, this reference in combination with the knowledge of one of ordinary skill in the art renders this claim element obvious. See, e.g.: Herz at 10:44-47. Tapestry at 62. GroupLens at 6, 10. Bowman at 2:31-35; 7:31-33; 9:2-3. Ryan at 9:22-30, 9:41-48.
15. The system of claim **14** wherein the passive feedback data is obtained by passively monitoring the actual response to a proposed informon.	*See* chart for Claim 14, *supra*.
25. A method for operating a search engine system comprising:	*See* chart for Claim 10(a).
scanning a network to make a demand search for informons relevant to a query from an individual user;	*See* chart for Claim 10(a).
receiving the informons in a content-based filter	*See* chart for Claim 10(b).

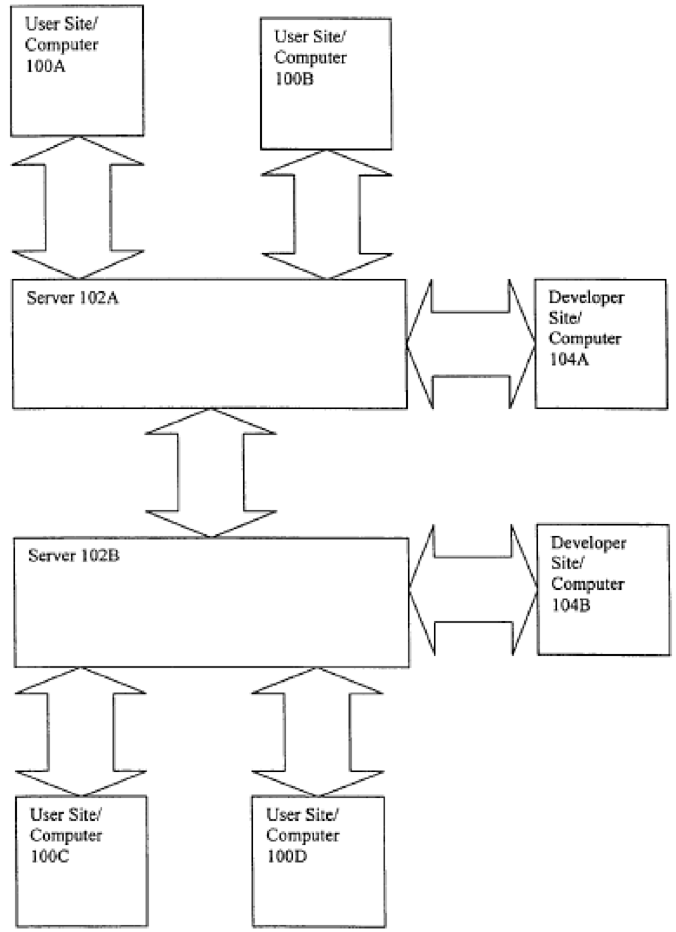
Claim language of U.S. Patent No. 6,314,420 (“the ‘420 Patent”)	**Disclosure in Culliss patent Reference**
system from the scanning system and filtering the informons on the basis of applicable content profile data for relevance to the query;	
receiving collaborative feedback data from system users relative to informons considered by such users; and	*See* chart for Claim 10(c).
combining pertaining feedback data with the content profile data in filtering each informon for relevance to the query.	*See* chart for Claim 10(d).
27. The method of claim **25** wherein the collaborative feedback data provides passive feedback data.	*See* chart for Claim 14.
28. The method of claim **27** wherein the passive feedback data is obtained by passively monitoring the actual response to a proposed informon.	*See* chart for Claim 15.

<u>**Exhibit A-7**</u>

U.S. Patent Claim Charts for the asserted '664 and '420 patents against U.S. Patent No. 6,421,675 ("Ryan")

Claim language of U.S. Patent No. 6,775,664 ("the '664 Patent")	**Disclosure in Ryan**
1. [preamble] A search system comprising:	Ryan at Abstract ("The present invention provides for a method of updatig an internet search engine database with the results of a user's selection of specific web page listings from the general web page listing provided to the user as a result of his initial keyword search entry. By updating the database with the selections of many different users, the database can be updated to prioritize those web listings that have been selected the most with respect to a given keyword, and thereby presenting first the most popular web page listings in a subsequent search using the same keyword search entry.") *Id.* at 1:8-10 ("The present invention relates to a method and apparatus that allows for enhanced database searching, and more particularly; for use as an internet search engine.") To the extent this reference does not teach this claim element, this reference in combination with the knowledge of one of ordinary skill in the art renders this claim element obvious. See, e.g.: Herz at 6:42-58. Lashkari at 59. Tapestry at 63. Balabanovic at 69-70. GroupLens at 2.

Claim language of U.S. Patent No. 6,775,664 (“the '664 Patent”)	Disclosure in Ryan
	Culliss at Abstract, 4:20-26. Bowman at 5:31-32; claim 28[a-b] Rose at 2:51-55, claim 26.
[a] a scanning system for searching for information relevant to a query associated with a first user in a plurality of users;	Ryan at 1:23-31 (“The search command is transmitted to a server computer, the has a search engine associated with the server computer. The search engine receives the search command, and then using it scans for these key words through a database of web addresses and the text stored on the web sites. Thereafter, the results of the scan are transmitted from the server computer back to the user's computer and displayed on the screen of the user's computer.”) *Id.* at 1:32-40 (“In order for the search engine to be aware of new web sites and to update its records of existing sites, either the proprietors of the web sites notify the search engine themselves or the information may be obtained via a `web crawler` to update the database at the server computer. A web crawler is an automated program which explores and records the contents of a web site and its inks to other sites, thereby spreading between sites in an attempt to index all the current sites.”) *Id.* at 8:52-57 (“Step 114, discussed in detail hereinafter, is the process of selecting web pages from novel new search engine data sets produced in accordance with the present invention. This can run, if desired, in parallel with step 116 which obtains a selection of web pages from other existing search engines.”) *Id.* at Fig. 1B:

Claim language of U.S. Patent No. 6,775,664 ("the '664 Patent")	Disclosure in Ryan
	 Figure 1B *See also* chart for claim 1(preamble), *supra*.
[b] a feedback system for receiving information	Ryan at 2:31-37 ("By updating the database with the selections of many

Claim language of U.S. Patent No. 6,775,664 (“the '664 Patent”)	Disclosure in Ryan
found to be relevant to the query by other users; and	different users, the database can be updated to prioritize those web listings that have been selected the most with respect to a given keyword, and hereby presenting first the most popular web page listings in a subsequent search using the same keyword search entry.”) *Id.* at 9:17-30 (“Depending on the relevance of the site, the user may spend time reading, downloading, exploring further pages, embedded links and so forth, or if the site appears irrelevant/uninteresting, the user may return directly back to the search results after a short period. The time difference between the two selections is recorded as the difference between two date/time data 132 from subsequent selections from the list of web page searches (in this embodiment one can only measure the time spent at one web page if another selection is made after visiting that web page--this then provides another surfer trace 132 which allow a time difference to be calculated). This surfer trace data on the popularity of web pages is used to the subsequent searches, as described further hereinafter.”) *Id.* at 9:39-44 (“As described above, human brain power is captured by recording which web pages the user goes to after each keyword search. According to the present invention, collecting the surfer trace data is achieved by sending, in the list of web pages generated by the search to the user, hidden links that will automatically send information back to the search engine (or a subsidiary server).”) *Id.* at 10:7-41 (“Thus, the search results page according to the present invention is therefore differently formatted from conventional search engines' results pages. The difference is in action rather than content. Visually, the page looks the same to the user as standard search results from other search engines. An example illustrates this point: In a conventional search the results page for a search of the keyword ‘Weather’ may read: 1. www.weather.com Today's weather forecast. Today is expected to be fine ad sunny everywhere. The

Claim language of U.S. Patent No. 6,775,664 ("the '664 Patent")	Disclosure in Ryan
	HTTP link associated with the 'www.weather.com' label is 'http:l/www.weather.com'. This means that if the user selects this link, they will navigate to this page directly. In contrast, according to the present invention, the tagged result page for the search made suing the keyword 'Weather' may read 1. www.weather com Today's weather forecast. Today is expected to be fine and sunny everywhere. The HTTP link associated with the 'www.weather.com' label is link.asp?n=1. If the user selects this link, therefore, in a process is invisible to the user, the user is first directed to the link asp page on the site corresponding to the web server using the search engine 10 according to the present invention, and pass parameter n with value 1. Server side code (application code that runs on the web server) uses this parameter to identify Me URL and description of the user's chosen site, This information is then stored in a database Table along wit other surfer trace data. The server side code then executes a redirect operation to the user's required URL. The user then sees their required page appear. The source of search results is independent to this activity. The destination page of the user is independent of this activity. The process is one of recording a user keyword and destination into a database. This method of tracking can only record the initial web-page visited after a keyword search. If the user continues to return to the search results list then subsequent web-page visits can be recorded.") *Id.* at 10:54-58 ("As previously mentioned, the surfer trace data that can be collected includes keyword 124, URL 126, user ID 128, IP address 130, date-time 132, brief web page description 134, and is identified as such since it provides a trace or record of how searchers (surfers) use the search engine.") *Id.* at 12:16-60 ("Keyword URL Link Table (172) The contents of keyword URL lilt table 172 of FIG. 4 are shown in more detail in Table 3 shown below. This table is of particular significance with respect to the present invention because it contain information about the inks between information supplies (URL addresses or web pages) and information requests

Claim language of U.S. Patent No. 6,775,664 (“the '664 Patent”)	**Disclosure in Ryan**
	(Keywords). This data is recorded in further data sets which describes the relationship between the Key-words and occurrences as defined by the following three parameters. the cumulative number of significant visits (hits) to each URL addresses corresponding to each key-word (herein referred to as X or weighting factor X). This is a measure of the popularity of the URL for each keyword and is determine from the surfer traces. the previous cumulative number of significant visits measured at an earlier predetermined instant; (herein referred to as Y or weighting factor Y) a date time factor relating to the instant of the creation or input of each said web-page(herein referred to as Z or weighting factor Z). Z is the data time in which a web-page developer submitted a web-page to the search engine. Not all combinations of key-words and URL addresses will have data for X, Y and Z.

TABLE 3

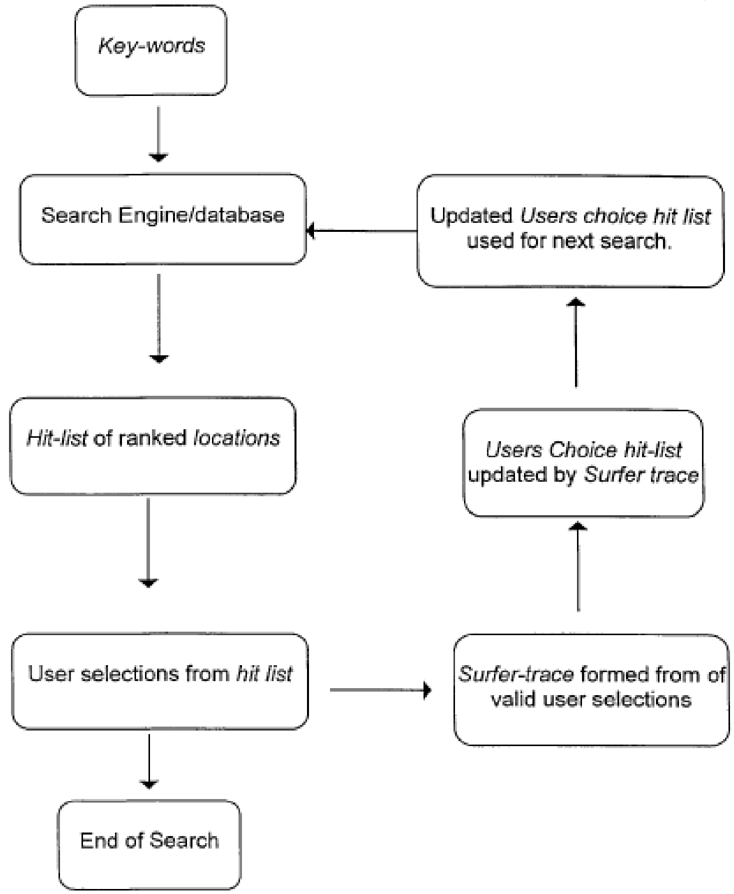
Links between information suppliers (web-pages) and information requests (key-words)

	Key-word	Key-word	Key-word	Key-word	Key-word
URL address 1	X, Y, Z				
URL address 2					X, Y, Z
URL address 3			X, Y, Z		
URL address 4	X, Y, Z				
URL address 5		X, Y, Z		X, Y, Z	
URL address 6					
URL address 7					

”)

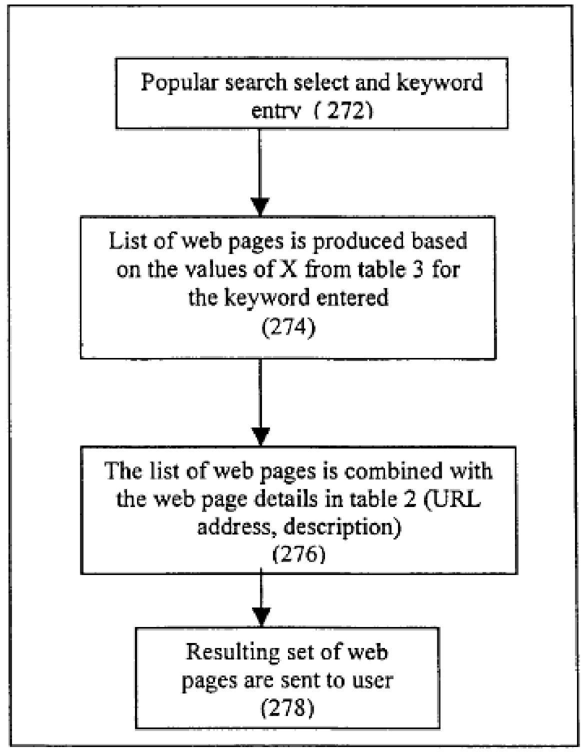
Id. at 16:31-43 (“As mentioned above, the simplest method of recording a link

Claim language of U.S. Patent No. 6,775,664 (“the '664 Patent”)	**Disclosure in Ryan**
	(‘useful visit’ or ‘hit’) between a keyword and a URL would be to count each keyword, URL paring in a surfer trace as a ‘hit’. A more meaningful and sophisticated method is only to count a location selection as a valid if the user meets certain criteria. This criterion could be the user exceeding a specified time at a location. If this criterion was not met, the selection would not be increase the cumulative value of X in Table 3. It is also possible to increment the value of X based on the time spent at the web page. The longer the time spent the more this increments the value of X. X does not have to be a whole number.”) *Id.* at Figure 3B:

Claim language of U.S. Patent No. 6,775,664 ("the '664 Patent")	Disclosure in Ryan
	 Figure 3B To the extent this reference does not teach this claim element, this reference in combination with the knowledge of one of ordinary skill in the art renders this claim element obvious. See, e.g.:

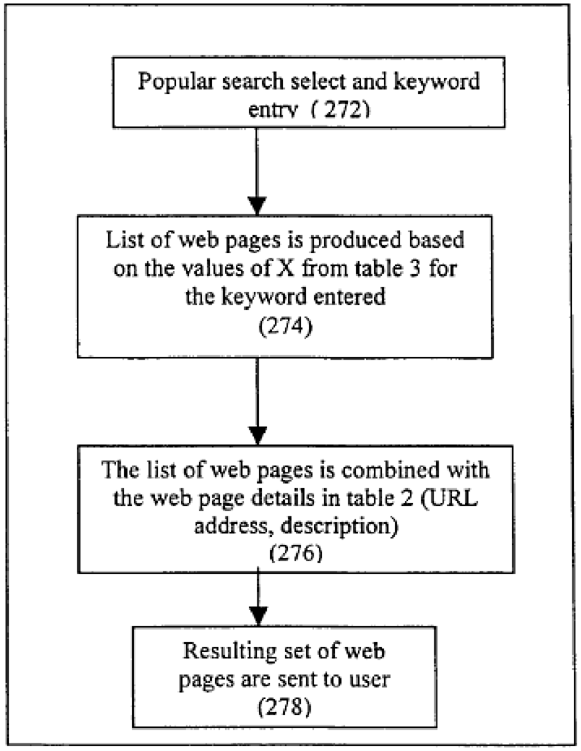
Claim language of U.S. Patent No. 6,775,664 (“the '664 Patent”)	Disclosure in Ryan
	Herz at 6:13-18, 10:44-47, 19:9-14; 23:45-24:13. Lashkari at 59-60, 18. Tapestry at 63. GroupLens at 1, 2, 5-10. Culliss at Abstract; 4:37-41. Bowman at Abstract, claim 28[c], 2:32-34. Rose at 6:59-7:10.
[c] a content-based filter system for combining the information from the feedback system with the information from the scanning system and for filtering the combined information for relevance to at least one of the query and the first user.	Ryan at 1:59-66 (“These results are in the form of a list, ranked according to criteria specific to the search engine. These criteria may range from the number of occurrences of the key-words anywhere within the searched text, to methods giving a weighting to key-words used in particular positions (as previously mentioned). When multiple key-words have been used, sites are also ranked according to the number of different key-words applicable.”) *Id.* at 13:8-18 (“In his example the global popularity (using the general profile type) for the Rugby and Basketball URL addresses are 520 and 4000 respectively and 52 and 20 respectively for the New Zealand profile type. When the general profile type setting is used (ranked based on X1), the Basketball site would be ranked at the top. When the New Zealand setting is chosen (ranked based on X:2) the rugby site would be highest. This would be a reflection of the preferences of the New Zealanders. This is a very simple method of storing the preference of different groups of people.”)

Claim language of U.S. Patent No. 6,775,664 (“the '664 Patent”)	**Disclosure in Ryan**
	Id. at 20:30-45 (“The numbers (X, Y and Z) in Table 3, which correspond to keyword URL link table 172 in FIG. 5 contain all the information required to give the following types of searches 58: Popular-list search ranked hit-list of the most popular URLs for that keyword based on the number X Hot off the press search ranked hit-list of newest URLs for the keyword based on the date/time (Z) High-flyers search ranked hit-list of best emerging URLs based the difference between X and Y Random search hit-list that is a random sample of URLs that have any of the numbers X, Y or Z Date created search this is hit-list based on the date time Z and the user-specified date of interest (not just the newest).”) *Id.* at 21:14-26 (“FIG. 6 illustrates the process for determining a list of popular web pages associated with the entry of a keyword 270 in step 272. If this search is selected and a keyword is entered, step 274 follows and produces a list of web pages based on the values of X taken from Table 3 (172, FIG. 5) for the keyword 270 entered. These web pages are identified by a unique web-page(URL) number from Table 3. Thereafter, in step 276 the list of web-page numbers found from step 274 is combined with the URL address and web-page description from Table 2 (188 FIG. 5). In step 278 the resulting list of web pages is then tagged, depending on the results of step 246 in FIG. 5 as described previously, and sent to the user for them to make their selections.”) *Id.* at 23:38-49 (“Upon entry of a keyword in step 402, that keyword is used to select from a combination of web page selections associated with that keyword. A shown, for example, in step 404, an equally weighted combination of conventional, popular, highflier, new and past search results is used to obtain a list of web page numbers. Thereafter, in step 406 the list of web-page numbers found from step 404 is combined with the URL address and web-page description from Table 2 (188 FIG. 5). In step 408 the resulting list of web pages is then tagged, depending on the results of step 246 in FIG. 5 as described previously, and sent to the user for them to make their selections.”)

Claim language of U.S. Patent No. 6,775,664 (“the '664 Patent”)	Disclosure in Ryan
	Id. at Fig. 6:  **Figure 6** To the extent this reference does not teach this claim element, this reference in combination with the knowledge of one of ordinary skill in the art renders this claim element obvious. See, e.g.: Herz at 18:39-43.

Claim language of U.S. Patent No. 6,775,664 (“the '664 Patent”)	Disclosure in Ryan
	Lashkari at 15-16, 60. Tapestry at 61, 63. Balabanovic at 69, 66. GroupLens at 2, 3. Culliss at 14:34-36, 13:35-42. Bowman at 9:28-53; claim 29. Rose at Abstract.
5. The search system of claim **1** wherein the filtered information is an advertisement.	Ryan at 4:57-59 (“Another novel feature of the present invention, which indirectly inures to the benefit of the end user, directly benefits the advertiser, because it allows for content to be targeted in real time based upon various criteria. As will be described more fully hereinafter, a content providing algorithm is initially selected which will determine how content is selected in step 34. Step 36 follows, and based upon inputs from users and content providers, which content to show is determined. Thereafter, the advertisements are displayed for the user to see, simultaneously with the display of either keywords and/or web pages.”) *Id.* at 7:8-13 (“Content Provider's list: This is a list (associated with each key-word) of content providers which must typically [that] pay to illustrate content with the key-word. The price paid is dependent on the number of other content providers, the amount they spend and the number of times the key word is searched for.”)

Claim language of U.S. Patent No. 6,775,664 (“the '664 Patent”)	Disclosure in Ryan
	Id. at 22:49-55 (“This is a list of content, such as advertisements, associated with the key-word, which the user cannot control. The ones that have paid the most will be at the top of the list, as described further hereinafter, in accordance with the preferred embodiment of the invention. Of course, other systems for identifying the order of paying content providers can also be implemented.”) To the extent this reference does not teach this claim element, this reference in combination with the knowledge of one of ordinary skill in the art renders this claim element obvious. *See, e.g.*: Herz at 61:4-18. Culliss at 9:58-62. Bowman at 5:4, 9:2-3, claim 7.
6. The search system of claim **1** further comprising an information delivery system for delivering the filtered information to the first user.	Ryan at 21:14-26 (“FIG. 6 illustrates the process for determining a list of popular web pages associated with the entry of a keyword 270 in step 272. If this search is selected and a keyword is entered, step 274 follows and produces a list of web pages based on the values of X taken from Table 3 (172, FIG. 5) for the keyword 270 entered. These web pages are identified by a unique web-page(URL) number from Table 3. Thereafter, in step 276 the list of web-page numbers found from step 274 is combined with the URL address and web-page description from Table 2 (188 FIG. 5). In step 278 the resulting list of web pages is then tagged, depending on the results of step 246 in FIG. 5 as described previously, and sent to the user for them to make their selections.”) *Id.* at 23:47-49 (“In step 408 the resulting list of web pages is then tagged, depending on the results of step 246 in FIG. 5 as described previously, and sent to the user for them to make their selections.”)

Claim language of U.S. Patent No. 6,775,664 ("the '664 Patent")	Disclosure in Ryan
	Id. at Fig. 6:  **Figure 6** To the extent this reference does not teach this claim element, this reference in combination with the knowledge of one of ordinary skill in the art renders this claim element obvious. See, e.g.: Herz at 6:13-18, Fig. 10 at 1106.

Claim language of U.S. Patent No. 6,775,664 (“the '664 Patent”)	Disclosure in Ryan
	GroupLens at 10, 11. Culliss at 4:25-31. Bowman at 9:56-58. Rose at Abstract.
21. The search system of claim **1** wherein the content-based filter system filters by extracting features from the information.	Ryan at 16:4-9 (“[W]eb crawlers may also add URL addresses and descriptions (the description is either the first few lines of the web-page or in the HTML coded "title"). This is not an essential element of the system but it could be a method to obtain URL's and descriptions. With this search system web crawlers are more likely to be used to verify the information rather than find new information.”) To the extent this reference does not teach this claim element, this reference in combination with the knowledge of one of ordinary skill in the art renders this claim element obvious. See, e.g.: Herz at 6:18-29. Lashkari at 15-16, 60. Tapestry at 67. Balabanovic at 69. GroupLens at 3. Culliss at 14:34-36.

Claim language of U.S. Patent No. 6,775,664 (“the '664 Patent”)	Disclosure in Ryan
	Bowman at 9:50-53; claim 29. Rose at 2:35-38.
22. The search system of claim **21** wherein the extracted features comprise content data indicative of the relevance to the at least one of the query and the user.	*See* chart for Claim 1(c) and Claim 21.
26. A method for obtaining information relevant to a first user comprising:	*See* chart for Claim 1.
searching for information relevant to a query associated with a first user in a plurality of users;	*See* chart for Claim 1(a)
receiving information found to be relevant to the query by other users;	*See* chart for Claim 1(b).
combining the information found to be relevant to the query by other users with the searched information; and	*See* chart for Claim 1(b).
content-based filtering the combined information for relevance to at least one of the query and the first user.	*See* chart for Claim 1(c).
28. The method of claim 26 further comprising the step of delivering the filtered information to the first user.	*See* chart for Claim 6, *supra*.
38. The method of claim 26 wherein the searching step comprises scanning a network in response to a demand search for the information relevant to the query associated with the first	*See* chart for Claim 1(a), *supra*.

Claim language of U.S. Patent No. 6,775,664 (“the '664 Patent”)	**Disclosure in Ryan**
user.	

Claim language of U.S. Patent No. 6,314,420 (“the ‘420 Patent”)	**Disclosure in Ryan**
10. [preamble] A search engine system comprising:	*See* chart for ‘664 Patent, Claim 1(a), *supra*.
[a] a system for scanning a network to make a demand search for informons relevant to a query from an individual user;	*See* chart for ‘664 Patent, Claim 1(a), *supra*.
[b] a content-based filter system for receiving the informons from the scanning system and for filtering the informons on the basis of applicable content profile data for relevance to the query; and	*See* chart for ‘664 Patent, Claim 1(c), *supra*.
[c] a feedback system for receiving collaborative feedback data from system users relative to informons considered by such users;	*See* chart for ‘664 Patent, Claim 1(b), *supra*.
[d] the filter system combining pertaining feedback data from the feedback system with the content profile data in filtering each informon for relevance to the query.	*See* chart for ‘664 Patent, Claim 1(c), *supra*.
14. The system of claim **10** wherein the collaborative feedback data comprises passive feedback data.	Ryan at 9:22-30 (“The time difference between the two selections is recorded as the difference between two date/time data 132 from subsequent selections from the list of web page searches (in this embodiment one can only measure the time spent at one web page if another selection is made after visiting that web page--this then provides another surfer trace 132 which allow a time difference to be calculated). This surfer trace data on the popularity of web pages is used to the subsequent searches, as described further hereinafter.”) *Id.* at 9:41-48 (“According to the present invention, collecting the surfer trace data is achieved by sending, in the list of web pages generated by the search to the user, hidden links that will automatically send information back to the

Claim language of U.S. Patent No. 6,314,420 (“the ‘420 Patent”)	Disclosure in Ryan
	search engine (or a subsidiary server). While the user only sees that his intended link is displayed, the hidden link notifies the search engine of the transfer, which process can be executed with a Java applet.”) To the extent this reference does not teach this claim element, this reference in combination with the knowledge of one of ordinary skill in the art renders this claim element obvious. See, e.g.: Herz at 10:44-47. Tapestry at 62. GroupLens at 6, 10. Loeb at 41. Culliss at Abstract; 4:32-34. Bowman at 2:31-35; 7:31-33; 9:2-3. Culliss at Abstract; 4:32-34.
15. The system of claim **14** wherein the passive feedback data is obtained by passively monitoring the actual response to a proposed informon.	Ryan at 9:22-30 (“The time difference between the two selections is recorded as the difference between two date/time data 132 from subsequent selections from the list of web page searches (in this embodiment one can only measure the time spent at one web page if another selection is made after visiting that web page--this then provides another surfer trace 132 which allow a time difference to be calculated). This surfer trace data on the popularity of web pages is used to the subsequent searches, as described further hereinafter.”) *Id.* at 9:41-48 (“According to the present invention, collecting the surfer trace

Claim language of U.S. Patent No. 6,314,420 (“the ‘420 Patent”)	Disclosure in Ryan
	data is achieved by sending, in the list of web pages generated by the search to the user, hidden links that will automatically send information back to the search engine (or a subsidiary server). While the user only sees that his intended link is displayed, the hidden link notifies the search engine of the transfer, which process can be executed with a Java applet.”) *Id.* at 9:62-65 (“In one specific embodiment, the user must visit a particular web site for greater than a predetermined period of time, such as one minute or fifteen minutes, depending on what is an appropriate time to have looked at the site.”) *See also* chart for claim 14, *supra*.
25. A method for operating a search engine system comprising:	*See* chart for Claim 10(a).
scanning a network to make a demand search for informons relevant to a query from an individual user;	*See* chart for Claim 10(a).
receiving the informons in a content-based filter system from the scanning system and filtering the informons on the basis of applicable content profile data for relevance to the query;	*See* chart for Claim 10(b).
receiving collaborative feedback data from system users relative to informons considered by such users; and	*See* chart for Claim 10(c).
combining pertaining feedback data with the content profile data in filtering each informon for relevance to the query.	*See* chart for Claim 10(d).
27. The method of claim **25** wherein the collaborative feedback data provides passive	*See* chart for Claim 14.

Claim language of U.S. Patent No. 6,314,420 (“the ‘420 Patent”)	**Disclosure in Ryan**
feedback data.	
28. The method of claim **27** wherein the passive feedback data is obtained by passively monitoring the actual response to a proposed informon.	*See* chart for Claim 15.

Exhibit B
Materials Considered

All documents cited in the Report.

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U.S. Patent No. 6,775,664.
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Exhibit C
(CV Appended to this Report)

EXHIBIT C

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Education

1979-84	*Massachusetts Institute of Technology* PhD in Chemical Engineering	Boston, MA
1975-79	*Stanford University* BS in Chemical Engineering (with distinction).	Stanford, CA

Experience

1990-2012	*University of Pennsylvania* Associate Professor of Computer and Information Science Associate Professor of Chemical and Biomolecular Engineering Associate Professor of Bioengineering (2010-12) Associate Professor of Electrical and Systems Engineering (1996-2012) Associate Professor of Operations and Information Management, Wharton (2000-12) Associate Professor of Genomics and Computational Biology, SOM (2002-12)	Philadelphia, PA
2007	*Google* (on leave)	New York, NY
1999	*CMU* (sabbatical)	Pittsburgh, PA
1984-90	*University of Pennsylvania* Assistant Professor of Chemical Engineering Assistant Professor of Computer and Information Science (1987–90)	Philadelphia, PA
1982 (summer)	*Boston Consulting Group* Associate: Strategic business analysis.	Boston, MA
1979 (summer)	*Shell Oil,* Westhollow Research Center Engineer: Developed computer model for catalytic cracking plant.	Houston, TX
1976-78 (summers)	*Chevron USA,* Richmond Refinery Design Engineer (three summer co-op program).	Richmond, CA

Awards

- Presidential Young Investigator
- National Science Foundation (NSF) Graduate Fellow
- F.E. Terman Award

Research interests

Machine Learning and Database Mining

- *Methods:* machine learning, data mining, text mining
- *Applications:* information extraction, recommender systems, computational biology

Recent Administration at Penn

- Assoc. Director of the Penn Center for Bioinformatics (PCBI) (2004-12)
- Executive Committee, Genomics and Computational Biology (2002-8)
- Admissions Committee, Genomics and Computational Biology (2002-4)
- Director, Executive Masters in Technology Management (EMTM), SEAS and Wharton (1996-2004)
- Director, CIS Graduate Admissions (2000-2)

Public Service

Conferences Chaired

- International Conference on Knowledge Discovery and Data Mining (ACM SIG-KDD), 2006.
- Gordon Research Conference on Statistics in Chemistry and Chemical Engineering, 1997.

Associate Editor

- Journal of Machine Learning Research

Program committees served on (last three years only)

- American Association for Artificial Intelligence (AAAI)
- ACM Knowledge Discovery and Data Mining (KDD)
- World Wide Web (WWW)
- IEEE International Conference on Data Mining (ICDM)
- International Conference on Machine Learning (ICML)
- SIAM International Conference on Data Mining (ICDM)

Courses taught

Undergraduate

ChE 231	Thermodynamics
ChE 350	Fluid Mechanics
CIS 140/	Cognitive Science
CSE 120	Programming Languages and Techniques
CSE/ChE 270	Expert Systems
CSE 391	Artificial Intelligence
EAS 410	Model Building with Modern Statistics

Graduate

ChE 500	Applied Mathematics I

ChE 501	Applied Mathematics II
ChE 640	Fluid Dynamics
ChE 641	Heat and Mass Transfer
ChE 700	Bifurcation Theory
CIS 520	Machine Learning / Artificial Intelligence
CIS/GCB 535	Introduction to BioInformatics
CIS 620	Machine Learning
CIS 700	Machine Learning in Bioinformatics
EMTM 554	Data Mining
EMTM 605	Advances in Artificial Intelligence
MGMT 560	Management of Technology
MGMT 732	Technology for Managers

Masters Students

2009	Paramveer Dhillon	"Transfer Learning using Feature Selection."
2003	Alex Vasserman	"Identifying Chemical Names in Biomedical Text: An Investigation of the Substring Co-occurrence Based Approaches"
1988	Michael R. Weinstein Kodak	"Process scheduling using artificial intelligence"

Doctoral Students

current	Paramveer Dhillon (CIS)	"TBA"
current	Weichen Wu (CIS)	"TBA"
2010	Perry Evans (GCB)	"Modeling virus-host networks"
2010	Ted Sandler (CIS)	"Regularization and Model Selection with Networks of Features"
2009	Bill Kandylas (CIS)	"Online clustering and citation analysis using Streemer"
2008	Gary Morris (CIS)	"Active relational learning for kinship analysis"
2006	Jing Zhou (ESE) Microsoft	"Streaming Feature Selection"
2005	Andrew Schein Amaranth LLC	"Active learning using A-optimality"
2004	Sasha Popescul Yahoo	"Statistical Learning from Relational Databases"
2004	Panos Markopoulos McKinsey	"The Information Gap: Understanding Product Information Dissemination"
2003	Eugene Buehler Merck	"Statistical Models for the analysis of heterogeneous biological data sets"

2002	Roy Kwon U. of Toronto	"Approximate Mechanisms and Algorithms for Combinatorial Auctions" (with G. Anandalingam)
2000	David Parkes Harvard U.	"Iterative Combinatorial Auctions: Achieving Economic and Computational Efficiency"
1999	Rinaldo Jose Oregon	"On the optimal coordination of profit maximizing divisions using auctions and price theory"
1995	Evi Gazi Chem. Ind. Inst. Toxicology	"Verification of controllers for incompletely-known chemical plants" (with W.D. Seider)
1995	Jack Vinson Pharmacia	"Automated first principles reasoning using qualitative and quantitative models"
1993	Bill Foster BMS	"The significance of neuronal ionic conductances in the cardiorespiratory nucleus of the solitary tract of the rat and in Hodgkin-Huxley models"
1993	Catherine Catino Air Products	"Automated modeling of chemical plants with application to hazard and operability studies"
1993	Dimitris Psichogios JP Morgan	"Process control using structured neural networks"
1990	Stephen Grantham Merck	"Automated reasoning from first principles using qualitative physics"
1989	Charles X. Ling U. Western Ontario	"Inductive learning and invention in domains with primitive recursive structures"
1989	Paul P. Durand Exxon-Mobil	"Percolation and transport in random media with application to high temperature superconductors"
1989	Thomas J. Balsano Amoco	"Unidirectional solidification of an anisotropic binary alloy"
1989	Ralph Gonzales U. Rutgers, Camden	"Learning by progressive subdivision of state space"
1988	Steven J. Weinstein Kodak	"The low flow rate limit for immiscible fluid systems in narrow gaps"
1988	Francis X. Kelly Exxon-Mobil	"Growth morphologies in rapid solidification"

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- US 5,951,623 Lempel-Ziv data compression technique utilizing a dictionary prefilled with frequent letter combinations, words and/or phrases
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