

Declaration of Dr. Loren G. Terveen
U.S. Patent No. 11,106,744

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

X CORP.,
Petitioner

v.

SEARCH AND SHARE TECHNOLOGIES, LLC,

Patent Owner

Case IPR2026-00235
U.S. Patent No. 11,106,744

DECLARATION OF LOREN G. TERVEEN, PH.D.

CLAIMS 1–20

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I, Loren G. Terveen, declare as follows.

1. My name is Loren G. Terveen.
2. I have been retained as an independent expert in connection with the above-captioned Petition for *Inter Partes* Review (“IPR”) to provide my analyses and opinions on certain technical issues related to U.S. Patent No. 11,106,744 (hereinafter “the ’744 Patent”).

I. Introduction

3. I am currently a Professor of Computer Science & Engineering at the University of Minnesota.

4. I received a B.A. Degree in Computer Science, Mathematics, and History from University of South Dakota in 1984. I received a M.S. Degree in Computer Science from the University of Texas in 1988, and a Ph.D. in Computer Science from University of Texas in 1991.

5. My research and teaching focus on human-computer interaction, user interface design, and social computing. I have several decades of experience in these specialties of computer science in both industry and academia. I worked for AT&T Laboratories from 1991 through 2002, during which time I conducted research and developed systems that solved problems in software engineering, web information seeking and organization, and recommender systems. As part of this research, I developed a number of systems on the World Wide Web, which involved, among

other things, storing information in databases, generating HTML pages in response to user requests, and providing interactive search and browsing interfaces to users through the Common Gateway Interface (CGI) and other technologies. In all my research, I designed, implemented, and tested graphical user interfaces. I have been employed full-time as a professor at the University of Minnesota since 2002, during which time I have taught classes in computer science, human-computer interaction and social computing, and have conducted, supervised, and published research in the field, much of which has involved information organization and seeking systems.

6. I have taught numerous courses at the University of Minnesota in computer science, human-computer interaction, and user interface design. Additionally, I have published over 150 peer-reviewed articles related to these subjects, a book, contributed chapters in six additional books, and have given over 50 presentations all across the United States and internationally similarly on these topics..

7. I am a named inventor in thirteen issued U.S. patents. Some of these patents are related to user interfaces, rule-based agents, web-based applications, and methods for selecting and displaying information to users. My published research and patents have addressed searching for information on the World Wide Web, creating databases for Web information, and the design and implementation of user interfaces for intelligent systems.

8. I am a member of multiple societies, including the Association for Computing Machinery (ACM), the oldest, largest, and most prestigious computing society in the world. From 2015-2018 I served as President of ACM's Special Interest Group on Computer Human Interaction, one of its largest and most active special interest groups. I also am a member of the ACM Council, the highest governing body of the ACM. I received the ACM Distinguished Scientist Award in 2009. I have served on the editorial board of ACM's Transactions on Human-Computer Interaction and the Communications of the ACM, and I have served as a reviewer for numerous journals, including ACM Computing Surveys, IEEE Transactions on Data and Knowledge Engineering, the International Journal of Human-Computer Studies, and the Journal of Computer-Supported Cooperative Work.

9. A copy of my curriculum vitae ("CV") is attached as Appendix A.

10. I am familiar with the technology of the '744 Patent.

11. I understand that the '744 Patent was filed on January 14, 2019 as a U.S. Patent Application No. 16/247,361. As shown on the cover page of the '744 Patent, the U.S. Patent Application No. 16/247,361 is a continuation of application No. 15/142,479, which was filed on April 29, 2016. EX1001, Cover. As further shown on the second page of the '744 Patent publication, the U.S. Patent Application No. 15/142,479 is a continuation of application No. 13/420,503, which was filed on

March 14, 2012. EX1001, p. 2. As also shown on the second page of the '744 Patent publication, the '744 Patent claims priority to the provisional application No. 61/452,595, which was filed on March 14, 2011. EX1001, p. 2.

12. I am familiar with the knowledge and capabilities of a person of ordinary skill in the art at the time of the earliest possible priority date of the '744 Patent – March 14, 2011.

13. I have reviewed the following references in preparing this declaration, all of which I understand to be prior art to the '744 Patent:

- U.S. Patent Application Publication No. 2006/0059134 (“Palmon”) (EX1003), which published on March 16, 2006;
- U.S. Patent Application Publication No. 2005/0234891 (“Walther”) (EX1004), which published on October 20, 2005;
- U.S. Patent Application Publication No. 2005/0256866 (“Lu”) (EX1005), which published on November 17, 2005.

14. I provide below the list of exhibits that I have considered in preparing this Declaration. I have reviewed and considered the following exhibits, and all other documents mentioned in my declaration. Additionally, my opinions are based on my technical education, training and experience in the field.

Exhibit No.	DESCRIPTION
1001	U.S. Patent No. 11,106,744 (“’744 Patent”)
1003	U.S. Patent Publication No. 2006/0059134 to <i>Palmon</i> (“Palmon”).

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Exhibit No.	DESCRIPTION
1004	U.S. Patent Publication No. 2005/0234891 to <i>Walther</i> (“Walther”).
1005	U.S. Patent Publication No. 2005/0256866 to <i>Lu</i> (“Lu”).
1006	U.S. Patent Publication No. 2009/0299824 to <i>Barnes Jr.</i> (“Barnes”).
1007	U.S. Patent Publication No. 2010/0011282 to <i>Dollard et al.</i> (“Dollard”).
1008	File History of U.S. Patent No. 11,106,744
1009	File History of U.S. Patent Application No. 15/142,479
1010	File History of U.S. Patent Application No. 13/420,503
1011	U.S. Patent No. 6,219,045 to <i>Leahy et al.</i> (“Leahy”).
1012	Comparison Between Claims of the ’744 Patent and Claims of the U.S. Patent Application No. 13/420,503, as filed.
1013	U.S. Patent No. 8,788,492 to <i>Lu et al.</i> (“ <i>Lu Patent</i> ”)
1014	File History of U.S. Patent Application No. 11/081,860 (“Walther Application”).
1015	U.S. Patent Publication No. 2006/0069699 to <i>Smadja et al.</i> (“Smadja”)

15. I am being compensated at my usual and customary rate for the time I spent in connection with this IPR. My compensation is not and will not be affected by the outcome of this IPR.

16. I have no financial interest in the outcome of the case. I also do not have any financial interest in X Corp., X Holdings Corp., or X.AI Holdings Corp.

17. I do not have personal contact with nor knowledge of the named inventors of the ’744 Patent.

II. Relevant Law

18. I am not an attorney. For the purposes of this declaration, counsel has informed me about the following aspects of patent law, which I have applied in my analysis and conclusions.

A. Person of Ordinary Skill in the Art

19. I understand that the factors considered in determining the ordinary level of skill in a field of art include: the level of education and experience of persons working in the field, including that of the named inventor; the types of problems encountered in the field; the teachings of the prior art regarding solutions to such problems; the sophistication and general state of the technology at the time of the alleged invention; and, where relevant, the types of testing described in the patent and the skills required to perform such testing.

20. I understand that a person of ordinary skill in the art (“POSITA”) is not a specific real individual, but rather is a hypothetical person having the qualities reflected by the factors described above. I further understand that, for purposes of my analysis, a POSITA would have been aware of the prior art that was publicly accessible as of the patent’s priority date, and would have possessed ordinary creativity—i.e., a POSITA is not an automaton and would have been able to consider and combine teachings from multiple prior art references.

B. Claim Construction

21. I have been informed that claim construction is a matter of law that will ultimately be determined by the Board. To determine the meaning of claim terms for purposes of this inter partes review, I have been informed that one should generally use the ordinary and customary meaning as understood by a POSITA at the time of the claimed priority date, in view of the claim language, the patent specification, and the file history/prosecution history. I also understand that, under limited circumstances, treatises and dictionaries may be consulted to inform the meaning attributed by a POSITA to a claim term.

22. Further, I understand that although a claim term should be read in light of the specification, limitations should not be imported into the claim from the specification. I understand that interpreting a claim term in a manner that excludes a preferred embodiment is often inaccurate. I have also been informed that the prosecution history can facilitate the meaning of a claim term or claim by demonstrating how the inventor understood the invention and by showing whether the inventor limited a claim term or claim during the course of prosecution or otherwise caused the claim scope to be narrower than it otherwise would be.

C. Anticipation

23. I understand that a patent claim is invalid as anticipated if a single prior art reference discloses each and every limitation of the challenged claim, either explicitly or implicitly, including by inherency.

24. I also understand that the words used in a prior art reference need not be identical to the claim language for the reference to disclose a claim limitation.

25. I understand that, to establish inherency, the prior art reference must necessarily disclose the limitation; it is not sufficient that the reference might possibly practice or contain the claimed limitation.

26. I also understand that a reference anticipates if a POSITA, upon reviewing the reference, would have been able to make and use the subject matter disclosed in the reference in the manner claimed.

27. I further understand that drawings and photographs in a prior art reference can disclose claim limitations where they depict the structure or features that are claimed.

D. Obviousness

28. I understand that a claim is unpatentable if it would have been obvious. Obviousness of a claim requires that the claim would have been obvious from the perspective of a POSITA at the time of the claimed priority date, considering the

claim as a whole. I understand that a claim could have been obvious from a single prior art reference or from a combination of two or more prior art references.

29. I have been informed that in an *inter partes* review, the Patent Trial and Appeal Board (the “Board”) evaluates obviousness of a claim under a preponderance of the evidence standard, which means that the Board determines that a claim is unpatentable for being obvious when the claim is more likely obvious than nonobvious.

30. I understand that an obviousness analysis considers, among other things, the scope and content of the prior art, differences (if any) between the claimed subject matter and the prior art, and the level of ordinary skill in the pertinent art. I also understand that, for purposes of an obviousness analysis, prior art references considered should be from the same field of endeavor or reasonably pertinent to the particular problem addressed.

31. I further understand that a claim would have been obvious if it unites old elements with no change to their respective functions, or merely substitutes one element for another known in the field, and that combination yields predictable results. While it may be helpful to identify a reason for this combination, I understand that there is no strict requirement of finding an express teaching, suggestion, or motivation to combine within the references. When a product is available, design incentives and other market forces can prompt variations of it,

either in the same field or different one. If a POSITA can implement a predictable variation, obviousness likely bars its patentability. For the same reason, if a technique has been used to improve one device and a POSITA would recognize that it would improve similar devices in the same way, using the technique would have been obvious. I understand that a claim would have been obvious if common sense directs one to combine multiple prior art references or add missing features to reproduce the alleged invention recited in the claims.

32. I further understand that, for combinations of references, a claim may be unpatentable for obviousness where a POSITA would have been motivated to combine or modify the prior art to arrive at the claimed subject matter and would have had a reasonable expectation of success in doing so. I understand that the reason to combine or modify may be found in the prior art as a whole, the nature of the problem to be solved, design incentives or other market forces, or the background knowledge of a POSITA.

33. I further understand that certain factors may support or rebut the obviousness of a claim. I understand that such secondary considerations include, among other things, commercial success of the patented invention, skepticism of those having ordinary skill in the art at the time of invention, unexpected results of the invention, any long-felt but unsolved need in the art that was satisfied by the alleged invention, the failure of others to make the alleged invention, praise of the

alleged invention by those having ordinary skill in the art, and copying of the alleged invention by others in the field. I understand that there must be a nexus—a connection—between any such secondary considerations and the alleged invention.

34. I understand that in considering obviousness, it is important not to determine obviousness using the benefit of hindsight derived from the descriptions found in the patent being considered.

III. Summary of Opinions

35. For the reasons explained below, I conclude that claims 1-20 of the '744 Patent are anticipated and rendered obvious by the prior art.

Grounds	Claims	Statutory Ground	Prior Art Reference(s)
I	1-3, 5-6, 8-12, 14-15, 17-19	35 U.S.C. §102	US2006/0059134 (“Palmon”) (EX1003)
II	1-3, 5-6, 8-12, 14-15, 17-19	35 U.S.C. §103	Palmon
III	1-19	35 U.S.C. §103	Palmon in view of US2005/0234891 (“Walther”) (EX1004)
IV	19-20	35 U.S.C. §103	Palmon in view of Walther (EX1004) and US2005/0256866 (“Lu”) (EX1005)

IV. Overview of the '744 Patent

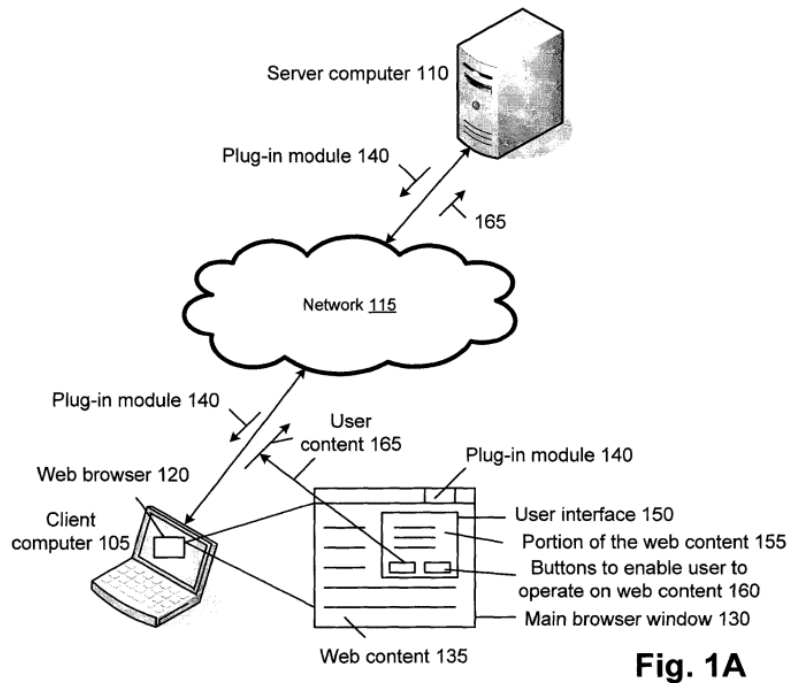
A. Summary of the '744 Patent

36. I have reviewed the '744 Patent. *See* EX1001.

37. The '744 Patent describes a web-search system where the search results are provided and ordered based on user contributions. EX1001, 8:41-49 (“Thus, unlike other search engines ... which use bots/web crawlers to follow links in web pages to discover content and then sort the indexed content through an algorithm, the ranking of the web content in the search results 290 is based on human input.”). In particular, the system of the '744 Patent permits a user viewing web content that is displayed in the main browser window to send the server (1) an identification for that content (such as a URL of the web page being displayed in the main window of the web browser), along with (2) accompanying “user content” (such as ratings, snippets, tags/keywords, or other contributions). EX1001, 7:63-8:11, 9:67-10:4. After receiving these submissions, the server “indexes the first web content,” and later responds to another user’s search by returning results that include that earlier-identified content in a position relative to other user-identified content. EX1001, 1:40-53, 8:12-16, claim 1.

38. Figures 1A and 3B depict how the process operates from the user’s side. In Figure 1A, the client computer (105) runs a web browser (120). The web browser (120) in turn shows web content (135) in the main browser window (130). The browser also shows a user interface (150) that is separate from the main window (130). EX1001, 3:53-61; 4:16-22. Through that separate user interface, the user may submit to the server an identification for the web content being shown, such as its

URL, and “user content”—for example, keywords/tags and other notes. EX1001, 4:22-30, 7:48-8:12.



EX1001, Figure 1A.

39. Figure 3B illustrates one example of this separate user interface (325), which allows the user to enter the URL for a website and supply the related user content. EX1001, 10:29-33.

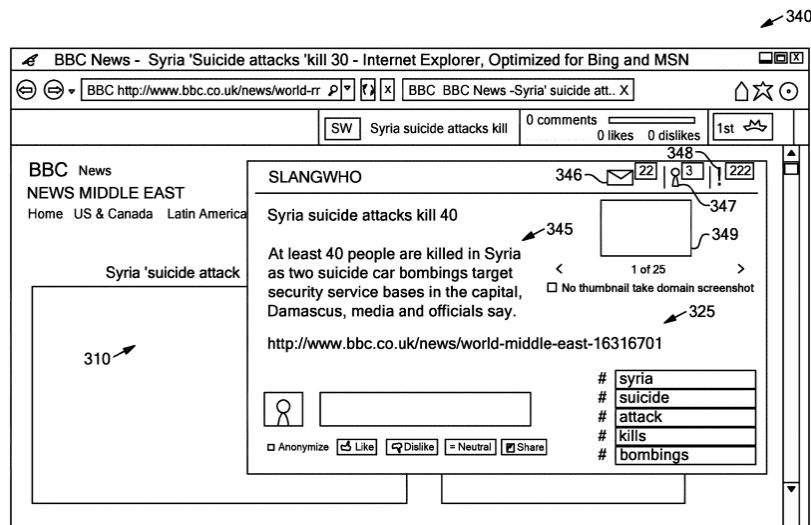
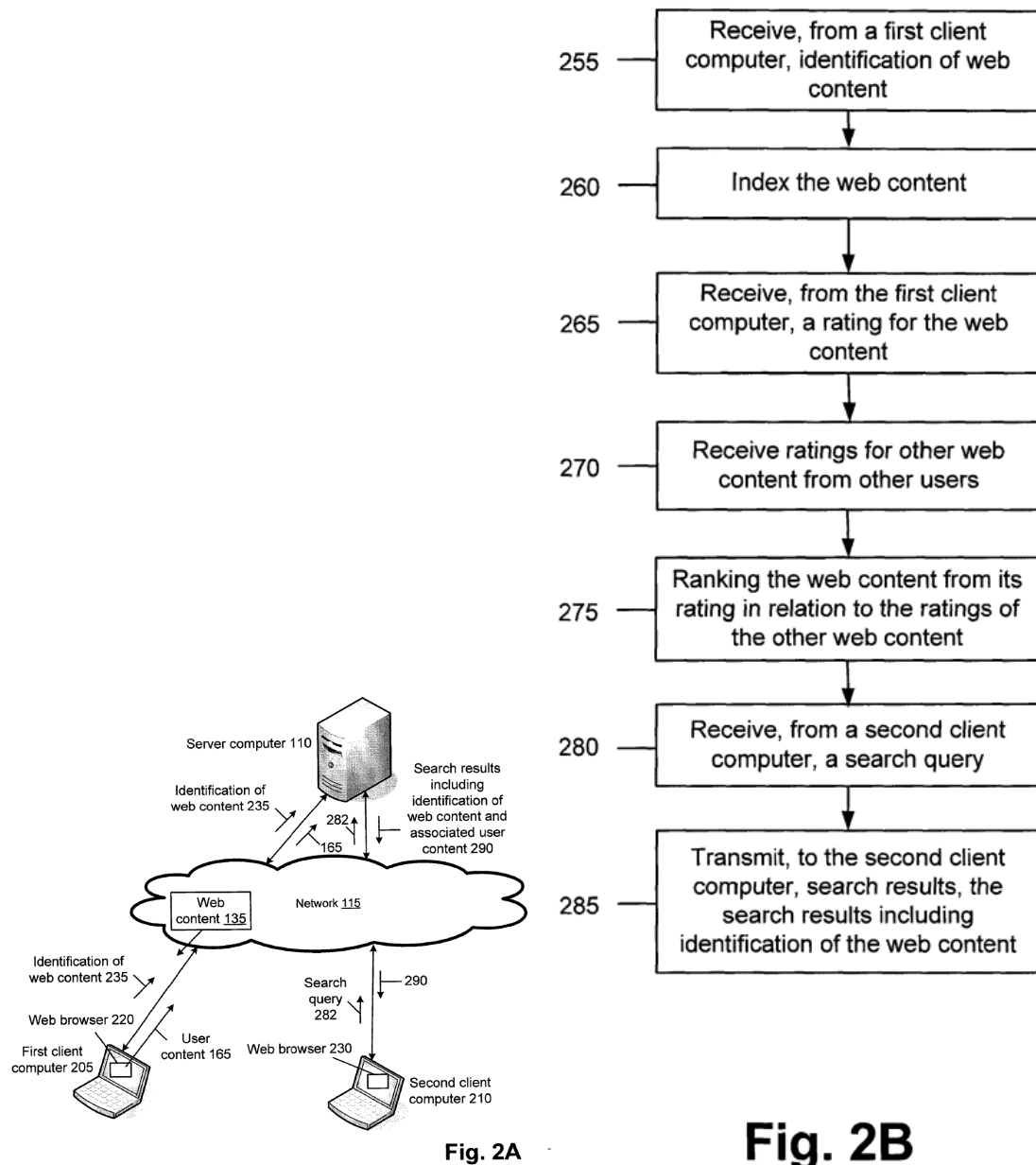


Fig. 3B

EX1001, Figure 3B.

40. Figures 2A-2B show server-side handling of the user's submission. In this process, the server receives the identification of the web content and "indexes the web content" for "inclusion in search results." EX1001, 8:12-16, Figure 2B. This indexing includes "receiving keywords for the first web content" and using those keywords to index the identified web content so that the URL for the website can later be retrieved in response to search queries by other users. EX1001, 1:63-65.



EX1001, Figures 2A-2B.

41. In particular, when a different user provides a search query (Operation 280), the server returns search results (Operation 285) that include web content

previously identified by other users, with the content ranked or displayed “relative to identifications of other web content received from other users.” EX1001, 1:47-53.

B. Summary of Relevant Prosecution Histories

42. I have reviewed the file history of the ’744 Patent and its parent application, which I summarize below. *See* EX1008.

43. The application for the ’744 Patent was filed on January 14, 2019 as U.S. Patent Application No. 16/247,361 (the “’361 Application”). EX1001, Cover. The ’361 Application is a continuation of U.S. Patent Application No. 15/142,479 (the “’479 Application”), which was filed April 29, 2016. EX1001, Cover. The ’479 Application is a continuation of U.S. Patent Application No. 13/420,503 (the “’503 Application”), filed March 14, 2012. EX1001, p. 2. The ’503 Application claims priority to U.S. Provisional Application No. 61/452,595, filed March 14, 2011. EX1001, p. 2.

1. Prosecution History Of The ’503 Application

44. Before addressing the prosecution history of the ’744 Patent itself, I briefly summarize the relevant record of its grand-parent application, the ’503 Application. This earlier prosecution history provides helpful context because in the ’503 Application, the applicant originally filed claims that were identical to the issued claims of the ’744 Patent. *See* EX1012 (showing a comparison between the issued claims in the ’744 Patent and the original claims of the ’503 Application).

During prosecution of the '503 Application, the examiner twice rejected all twenty claims as being obvious over US2009/0299824 ("Barnes") (EX1006) in view of US2010/0011282 ("Dollard") (EX1007). EX1010, 83-88, 128-140.

45. After the Applicant did not succeed in persuading the examiner to withdraw those rejections, the applicant made substantive amendments to the independent claims. Those amendments added limitations focusing on (i) a user interface that is separate from the main browser window, (ii) ranking web contents based on users' rating, and (iii) presenting search results based on that ranking. EX1010, 166-170, 230-234. Despite those amendments, the examiner maintained the obviousness rejection over the same references. EX1010, 189-200.

46. The Applicant then amended the independent claims by adding an additional functional requirement for the "user interface." In particular, the Applicant amended the claims to require that "*the user interface automatically selects a portion of the web content and displays the portion of the web content within the first user interface based on settings received from the user via the user interface that include settings to display one or more of the following from the web content: a picture, an icon, a sentence, and a paragraph.*" (underlined limitations added via amendment). EX1010, 283.

47. Following this amendment, the examiner issued a Notice of Allowance and the claims—after being amended to include this additional requirement—issued in U.S. Patent No. 9,338,215. EX1010, 337.

2. Prosecution History Of The '744 Patent

48. In the '361 Application that eventually issued as the '744 Patent, Applicant filed identical claims to those originally filed in the grand-parent '503 Application. *Compare*, EX1010, 40-43 *with* EX1001, claims 1-20; EX1012. In contrast to the '503 Application where the claims were twice rejected (*see* paragraphs 44-47 above), the examiner allowed these claims in the '361 Application without requiring any amendments.

49. In particular, the examiner in the '361 Application did not rely on either Barnes or Dollard. EX1008, 188. Instead, the examiner issued rejections based on US7,801,885 (“Verma”) and US2011/0040787 (“Cierniak”). EX1008, 120-126.

50. In response, Applicant did not amend any claims. EX1008, 182-185. Instead, Applicant focused on the portion of the claim directed to how the server generates and delivers results, and argued that Verma does not disclose “transmitting, by the server computer, search results to the web browser of the second client computer, the search results comprising the first web content identified by the first user in a position relative to identifications of other web content received from other users.” EX1008, 186. As I understand Applicant’s position, the key issue

was whether Verma's results, as delivered to the user, include user-identified content integrated into the results list in the manner recited by the claim—i.e., with the first user's identified web content appearing in a position that is determined relative to content identified by other users. EX1008, 186.

51. Applicant contended that Verma uses a two-stage process in which the system first retrieves “regular search results” from a conventional search engine and only afterward applies a second step that refines or supplements those results using “user recommended results.” EX1008, 186-187. In other words, Applicant characterized Verma as relying on an initial set of results produced through a conventional search mechanism, with user recommendations applied later as a separate refinement. EX1008, 186-187. Applicant contrasted that with what it described as the claimed operation, asserting that the claimed “search results utilize the indexed first web content” rather than simply modifying a preexisting list of conventional results, and further asserting that “human input affects the search results in real time,” unlike “search engines, such as GOOGLE® and BING®.” EX1008, 187 (quoting EX1001, 8:41-49).

52. After Applicant submitted its response, the examiner withdrew the rejections and allowed the claims in the '361 Application without requiring any amendments. EX1008, 182-185, 207-213. This outcome is notable because the same

claim language had previously been rejected during prosecution of the grand-parent '503 Application. EX1008, 182-185, 207-213.

V. Level of Ordinary Skill in the Art

53. As I noted above in Paragraph 28, I have been informed by the counsel that a patent and the prior art should be analyzed within the framework of a POSITA.

54. I considered the factors I noted in the Paragraphs 19-20. I have been unable to locate any information regarding the education level of the inventors. The references applied by the Examiner in rejecting the claims during the prosecution of the '744 Patent indicate that the relevant work involved building and comparing search systems that retrieve and rank web content in response to user queries, and that also involve user-facing mechanisms for providing inputs and receiving results. EX1008, 120-126.

55. Accordingly, in my opinion, a POSITA as of the earliest claimed priority date of the '744 Patent (i.e., March 14, 2011) would have a bachelor's degree in computer science, computer engineering, electrical engineering, or equivalent training, and a minimum of two years of experience in the field of information retrieval and user interfaces in computer systems. I note that a higher level of education or specific skills in the industry may make up for less experience and vice versa.

56. I met and/or exceeded these requirements for POSITA as of March 14, 2011, for at least the reasons provided above in Paragraphs 3-11.

VI. Overview of the Primary Prior Art References

A. Overview of Palmon (EX1003)

57. Palmon is a U.S. Patent Application Publication No. 2006/0059134, published on March 16, 2006. EX1003, Cover. I have been informed by counsel that Palmon is prior art to the '744 Patent.

58. Palmon is directed to a system for web search, in which searching is “guided by a set of topics such as keywords.” EX1003, [0003]. In particular, Palmon discloses a “topic-guided searching” process where a user can refine a search in multiple steps by selecting one or more “topics” as part of the search. EX1003, [0011], [0017] (“Each step of the hierarchical search includes selecting a topic or providing a search phrase, and results in a set of suggested topics for furthering the search. At any stage, results for the search so far, e.g., URLs of the information items, are also provided.”).

59. Palmon depicts the topic-guided search workflow in Figure 2 (below), which involves a user at a client device interacting with a search server to carry out the search across a network. EX1003, [0036], [0050]-[0051], Figure 1.

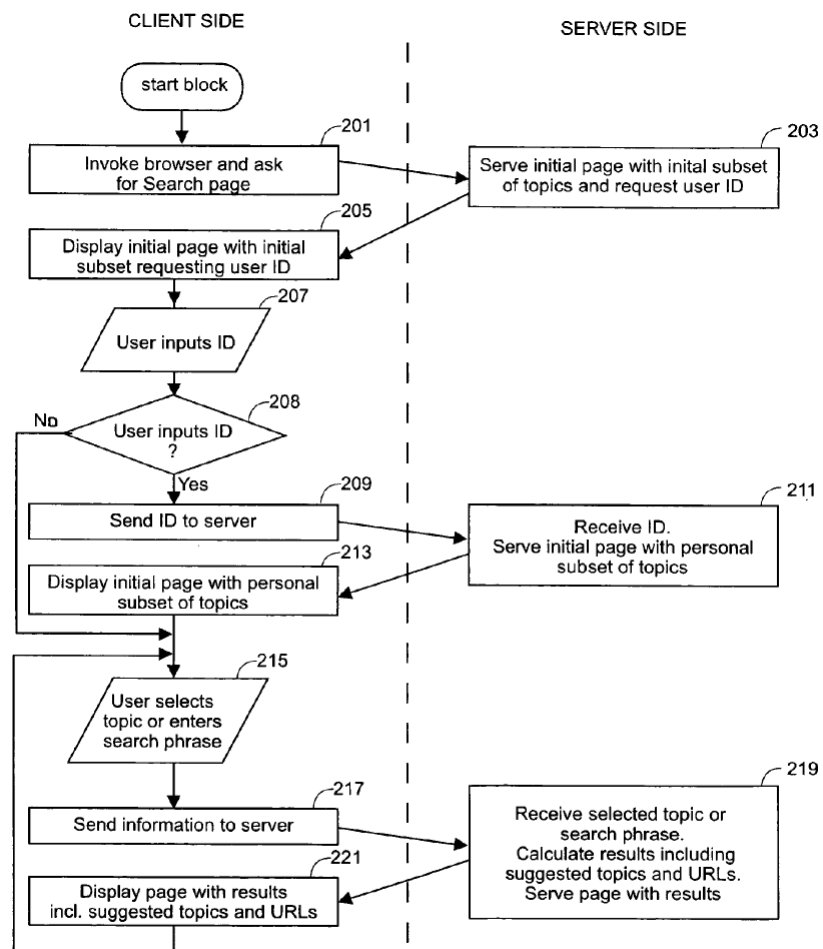


FIG. 2

EX1003, Figure 2.

60. For instance, after the user signs in (steps 201-212), the client device, at step 213, displays a “new initial page with the personalized subset of topics” for the user. EX1003, [0056] (“At the client side, in 213, the new initial page with the personalized subset of topics is presented to the user on the display 119 with provision for the user to select one of the topics, e.g., by clicking on the display of a topic, or by the user entering a search phrase and causing a search, e.g., by pressing

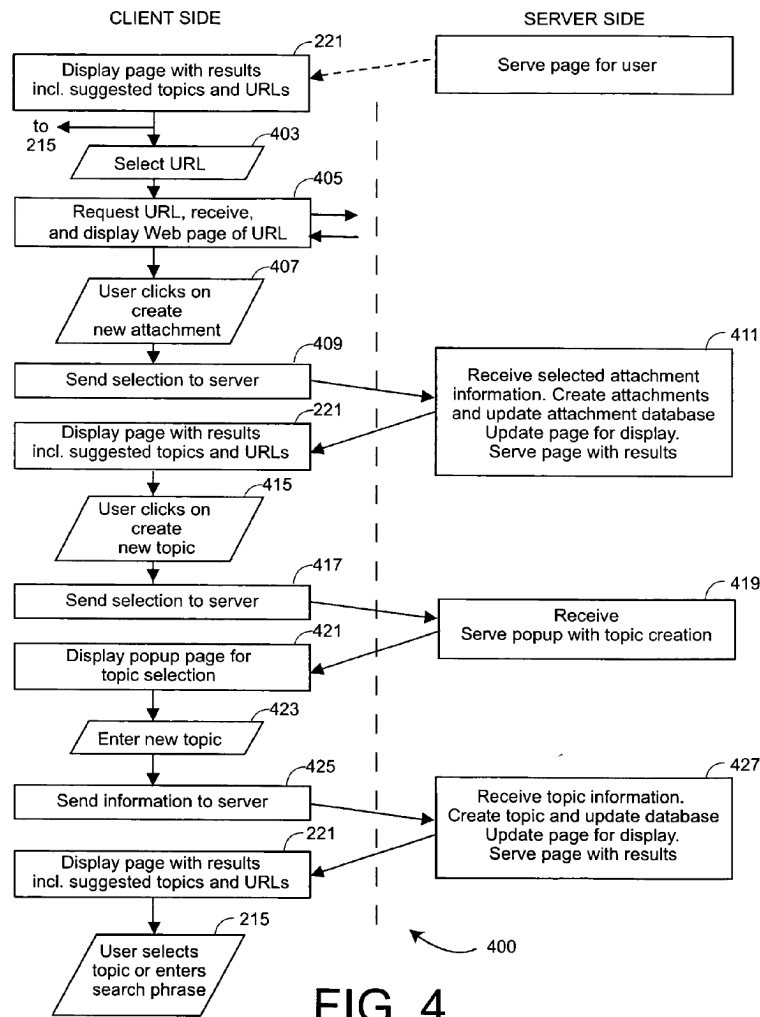
a button labeled search on the initial page.”). Furthermore, in steps 215-217, the user initiates a search by “select[ing] a topic or input[ing] a search phrase”—collectively referred to as the “search request information”—and providing it to the search server. EX1003, [0058].

61. After “the search request information is received” at the search server 151, “the search engine in 219 generates results based on the search request information.” EX1003, [0059]. The search results “include *one or more URLs that meet the search request information* according to one or more search criteria (*see below*), and further includes *one or more sets of suggested topics* that the searcher may select such that the searcher's electing any of the suggested topics will further direct the search.” EX1003, [0059].

62. After the server returns results, at step 221 the client device displays those results and then pauses for further user input—specifically, for the user “to select a topic, e.g., one of the suggested topics ... [or] to enter a new search phrase” as a way to continue narrowing the search in a hierarchical manner. EX1003, [0061], [0063], [0071]. Palmon refers to “the set of topics selected during a particular search by a particular searcher” as a “search topic path.” EX1003, [0071] (“By a search topic path is meant the set of topics selected during a particular search by a particular searcher.”).

63. Palmon explains that users can link one or more topics to a particular URL so that, when a searcher later selects one of those topics during a search, the resulting output can include that URL (along with other URLs linked to the same topic). EX1003, [0048], [0099]. Palmon describes this linkage by stating that “[e]ach topic is attached to at least one URL” and that “by an attachment is meant an association between a URL and a topic.” EX1003, [0048]. Thus, in Palmon, the user-created association between a topic and a URL is referred to as an “attachment.” EX1003, [0048], [0099].

64. An example workflow for “a user providing attachment information” is shown in Figure 4 of Palmon. EX1003, [0101]. As shown, in step 405, the user is viewing a webpage “on the main window of the Web browser.” EX1003, [0102]. Next, at step 407, the user initiates the attachment process by “click[s] on a ‘add current page’ button on the explorer bar.” EX1003, [0102]. The client then transmits the user’s request to the server; as Palmon explains, in step 409, “[t]he user’s request, including *the search topic path and the page URL* is sent ... to the server,” and, in step 411, the server responds by “creat[es] an attachment between the URL and each topic in the search topic path for that user.” EX1003, [0102].

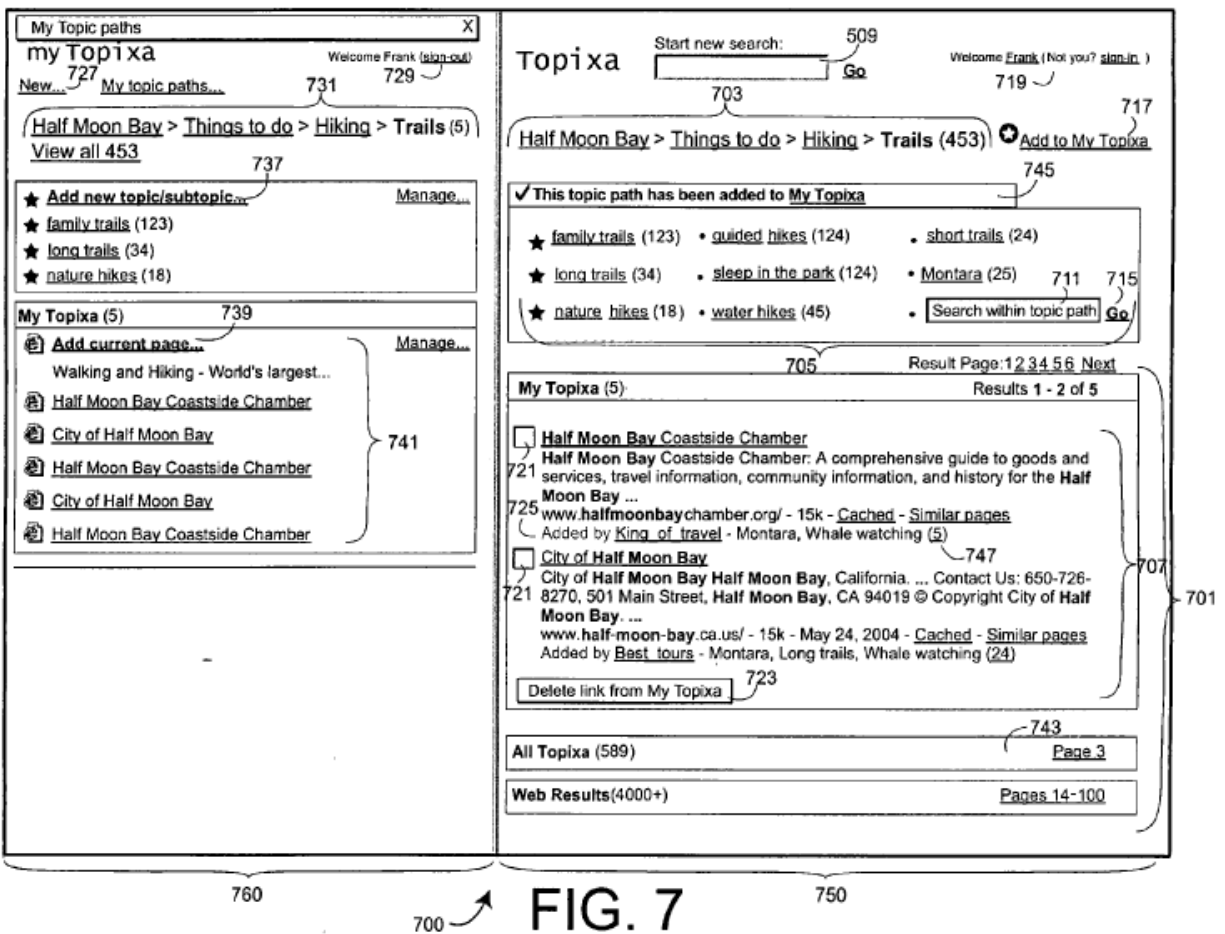


EX1003, Figure 4.

65. Palmon also describes performing the topic-guided search and creating attachments through the user interface shown in Figure 7 (below). That interface includes “a main display area 750 and a user-specific explorer bar (*or other additional window*) 760.” EX1003, [0206]. In this example, “[t]he main display window 750 ... includes the URL results 701” for the current search. EX1003, [0208], [0213]. When “a user selects a Web page by clicking on one of the results

701,” the system causes “the main window 750” to display the selected Webpage. EX1003, [0217].

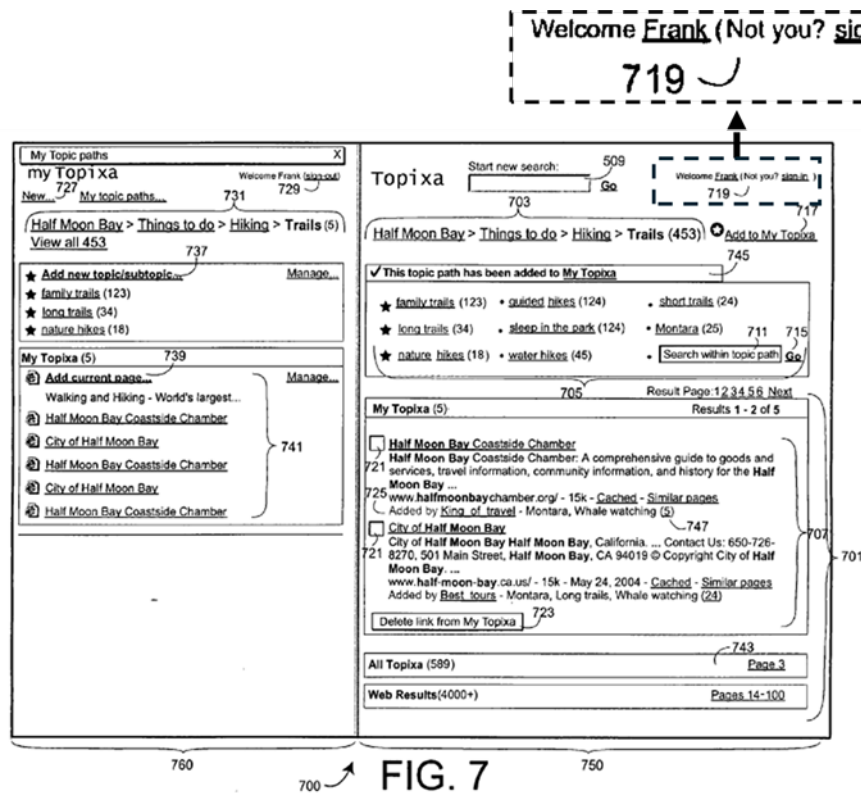
66. The explorer bar (or similar panel) 760 provides the controls for creating attachments. For instance, Palmon discloses that the explorer bar (or similar panel) 760 “includes a clickable object 739, labeled in FIG. 7 as ‘Add current page’ for adding an attachment between the currently displayed search topic path, and the Web page displayed in the main window 750.” EX1003, [0217]. Palmon explains that, after the user has selected a page from the results so that it is displayed in the main window, clicking this control “causes information to be sent to the server that adds attachments between the URL displayed in the main window and each topic in the currently displayed search topic path 731.” EX1003, [0217]. And as I noted above, Palmon’s explorer bar can be implemented as an “additional window.” EX1003, [0206] (“The presented user interface display 700 includes a main display area 750 and a user-specific explorer bar (or *other additional window*) 760.”).



EX1003, Figure 7.

67. Palmon describes that “the user interface provides for the user a mechanism to select a displayed URL to be a ‘favorite’ URL.” EX1003, [0132]. Palmon explains that marking a URL as a favorite is a form of positive rating, and that, “whenever a URL is marked as a favorite, a new attachment between the URL and at least one topic is created.” EX1003, [0122]. Palmon further states that these user-created, positively rated attachments are maintained for the user in “a list of associated (‘favorite’) attachments.” EX1003, [0131].

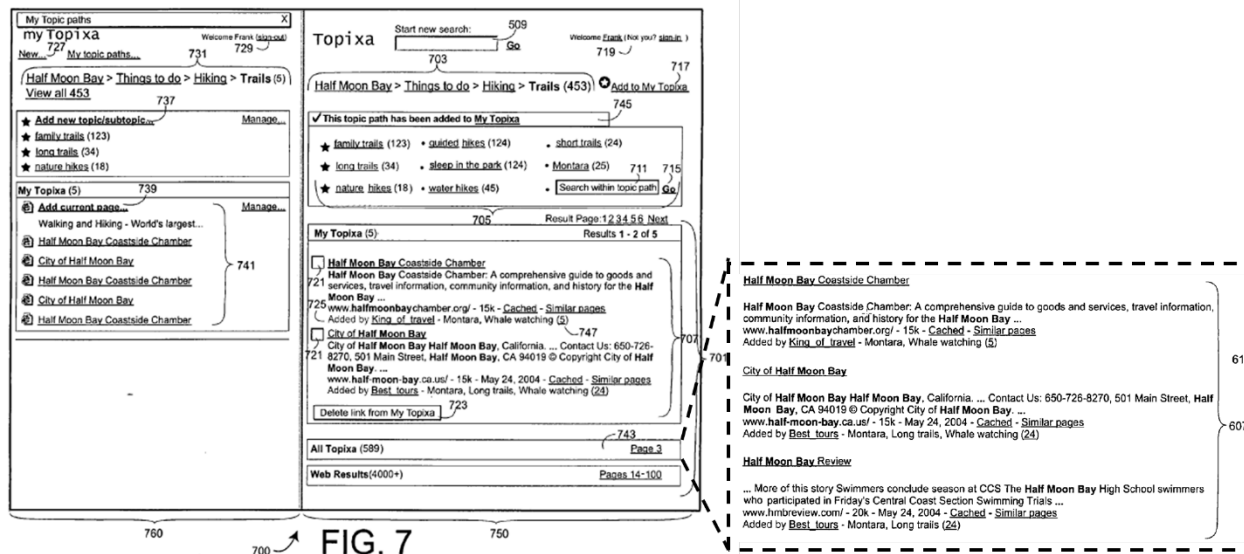
68. The server relies on the attachments when determining search results responsive to search queries, and those queries may be submitted by users other than the users who created the attachments. By way of illustration, Palmon's Figure 7 shows results presented to a querying user named Frank, even though some of the attachments shown in the results were submitted by different users—such as King_of_travel or Best_tours. EX1003, [0206] (“The presented user interface display 700 includes an indication 719 of the current user, in this example as a Welcome message with a username selected by the user during registration.”).



EX1003, Figure 7.

69. Palmon further explains that when a user runs a search, the client device can display the results “in three different presentations,” as illustrated in Figure 7. EX1003, [0208]. “The first includes the positively rated, e.g., ‘favorite’ results, that is, those URLs that have attachments to the topic(s) of the search topic path that the user has ‘selected’ to be included as the user’s ‘Favorite’ attachments.” EX1003, [0208], [0211] (“favorites results 707”). “The second list 743 is of the overall results, e.g., the URLs presented in list 607 of FIG. 6.”—which are not limited to URLs specifically associated with the user. EX1003, [0208]. The third list of results consist of “results of searching the Web for the terms in the search topic path.” EX1003, [0213].

70. While Palmon’s Figure 7 does not visually depict the entries in the “second list 743,” Palmon nonetheless states that “[t]he second list 743 is of the overall results, e.g., the URLs presented in *list 607 of FIG. 6*.” EX1003, [0208]. Based on that disclosure, a POSITA would have understood that the second list 743 corresponds to “the URLs presented in list 607 of FIG. 6” (EX1003, [0208]), as I have shown in the illustration below.



EX1003, Figures 6, 7.

B. Overview of Walther (EX1004)

71. Walther describes improving a traditional search process by using information that users provide about webpages (or sites) to influence how search results are displayed and ordered. In particular, Walther teaches collecting user-supplied metadata for documents and then relying on that metadata when ranking and presenting search results. Walther calls this user-supplied metadata “annotations.” EX1004, [0009], [0019]. *See also* EX1004, [0018] (“the term ‘annotation’ refers generally to any descriptive and/or evaluative metadata related to a document (e.g., a Web page or site) that is collected from a user and thereafter stored in association with that user.”). Walther further explains that the annotations can take several forms, including “a rating (which may be favorable or unfavorable)

of the document, a list of keywords identifying a topic (or topics) of the document, a free-text description of the document.” EX1004, [0018].

72. Walther explains that users can provide annotations through an interface that is presented as part of the search workflow. For example, Walther describes a search results page that includes a “Save This” button next to a result, which “launches a page ... via which the user can annotate that particular hit.” EX1004, Figure 6; [0117]; [0123] (“At step 806, an *annotation editing interface* for the subject page is displayed. The editing interface is advantageously displayed in a *separate window* or dialog box that opens when a ‘Save This’ button is activated.”). Walther refers to this *separate window* as an annotation editing interface, and it allows the user to enter information such as ratings, keywords, or free-text comments for the selected page, as illustrated in Figure 9. EX1004, [0050], [0126]. Walther further states that the interface is configured so the user can review the page being annotated while supplying the annotation, or can readily switch between the page and the annotation interface. EX1004, [0123] (“[T]he editing interface is arranged on the user’s display in such a way that the user can look at both the subject page and the annotation or easily flip back and forth between the two.”).

Save This

URL: 902

Title 904

Save what? 908

☒ This page only

☐ All URLs beginning with 910 912

Keywords 916

Description 914 918

Rating: 920

☐

☐

☒ None

922 924

FIG. 9

EX1004, Figure 9.

73. Walther also describes relying on previously stored annotations to improve how search results are shown to a user and how they are ordered. In particular, Walther explains that “stored annotations can be used ... to enhance and personalize search and browsing operations,” including “to affect the manner in which search results are presented” and ranked. EX1004, [0019], [0051], [0133]-[0136]. As an example, Walther teaches that the results can be ranked based on user ratings—for example, by using “an aggregate rating (e.g., an average rating)” derived from “every user who has provided ... a rating.” EX1004, [0072] (“In one

embodiment, user annotation module 164 also initiates an automatic refresh of the results page in response to the new annotation data. During this refresh operation, the hits listed on the results page may be reranked using the new data, and an updated results page reflecting the new rankings is transmitted to the user. In cases where the new annotation includes a favorable rating, the new page may also list the newly annotated site among the “favored” results. Accordingly, the user’s new annotations can have an immediate effect on the displayed results of the current search, as well as being stored for use in processing future queries from that user.”). *See also* EX1004, [0180]-[0181].

C. Overview of Lu (EX1005)

74. Lu describes “search systems and methods that leverage user annotations of documents, including annotations provided by the querying user as well as annotations provided by *other users* who have a trust relationship to the querying user.” EX1005, [0006]. Lu further explains that such “[a]nnnotations may include ... a rating ... of the page or site, one or more keywords or labels identifying a topic (or topics) of the page or site, [and/or] a free-text description of the page or site.” EX1005, [0050], [0085].

75. Lu teaches incorporating annotations from other users—particularly those in a querying user’s “trust network”—into the querying user’s search experience. Lu explains that “judgments from the querying user as well as from other

users selected by the querying user as members of his or her ‘trust network’” may be used, and that “annotations by any member of a querying user’s trust network can be integrated into the results of subsequent searches of the corpus by the querying user” and can “enhance the querying user’s experience of browsing the corpus.” EX1005, [0015]. Consistent with that disclosure, Lu further explains that “the existence of annotations by a user’s trust network members may be included in pages reporting search results for queries entered by that user,” such as “a search results page 900 enhanced with annotation information.” EX1005, [0158].

76. Figure 9B (below) provides an example of how Lu incorporates trust-network annotations into the search experience. Lu explains that, after a user submits a query, the search server returns a “search results page 940 that provides excerpts from the comments made by trust network members in ‘My Web’ section 948.” EX1005, [0163]. Lu further describes that, in this display, “[e]ach hit 950 is accompanied by comments 952 extracted from annotations by trust network members.” EX1005, [0163].

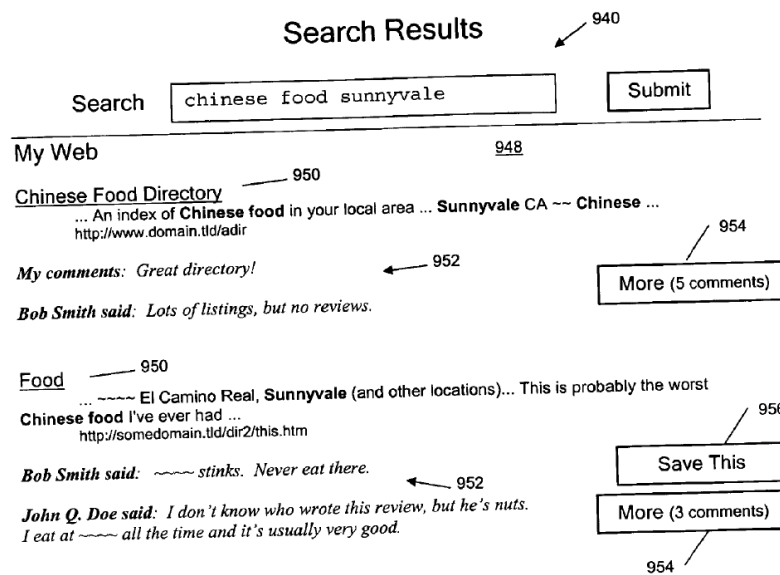


FIG. 9B

EX1005, Figure 9B.

VII. Claim Construction

77. I have been asked to determine if any particular claim terms should be construed so the Board can understand how the prior art references read on the challenged claims.

78. As such, I have reviewed the claims, specification, and file history of the '744 Patent.

79. I have not identified any terms that the Board needs to construe for the purposes of this IPR.

VIII. Specific Invalidity Grounds

80. As I explained in Paragraph 35, I conclude that claims 1-20 of the '744 Patent are anticipated and/or rendered obvious by the prior art. In the sections below, I explain in detail how claims 1-20 of the '744 Patent are not patentable over prior art.

A. Grounds I and II: Palmon Anticipates (Ground I) Or Renders Obvious (Ground II) Claims 1-3, 5-6, 8-12, 14-15, and 17-19

81. In my opinion, claims 1-3, 5-6, 8-12, 14-15, and 17-19 are all anticipated or rendered obvious by Palmon for at least the following reasons.

1. Independent Claim 1

i. [1Pre] A method comprising:

82. I understand that the preamble may not limit the claims. Regardless, in my opinion, Palmon discloses [1Pre].

83. Palmon discloses “[a] *computer implemented method*, and a software product for directing a search aided by a set of topics, the topics not necessarily having a hierarchy.” EX1003, Abstract. *See also* EX1003, Claim 1, [0017]-[0022], Figures 2, 4, 7.

ii. [1A] receiving, by a server computer from a first client computer operated by a first user, an identification of first web content displayed by a web browser of the first client computer in a main browser window, the identification of the first web content transmitted by the first user to the server computer via a user interface separate from the main browser window;

84. In my opinion, Palmon discloses, or renders obvious [1A].

85. Because limitation [1A] includes multiple requirements, I address Palmon's disclosure on an element-by-element basis and explain how Palmon satisfies each portion of [1A]. **First**, Palmon discloses “*receiving, by a server computer from a first client computer operated by a first user, an identification of first web content displayed by a web browser of the first client computer in a main browser window.*”

86. Palmon describes a system in which a user uses a client device running a web browser, as illustrated in Figure 1. EX1003, [0036], [0050]-[0051].

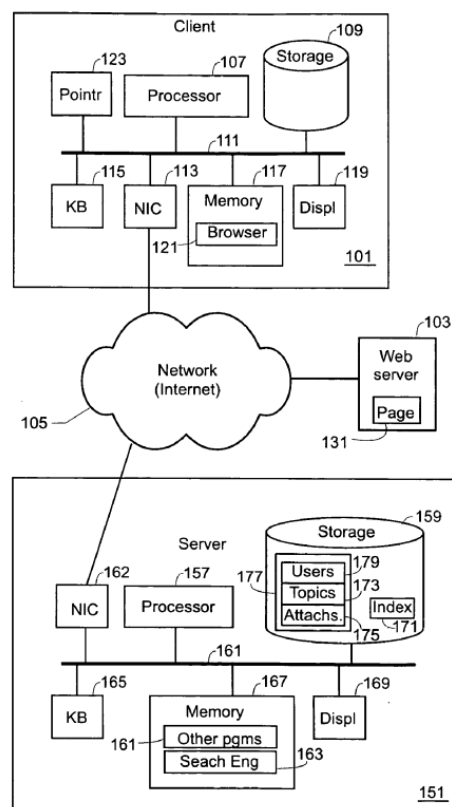


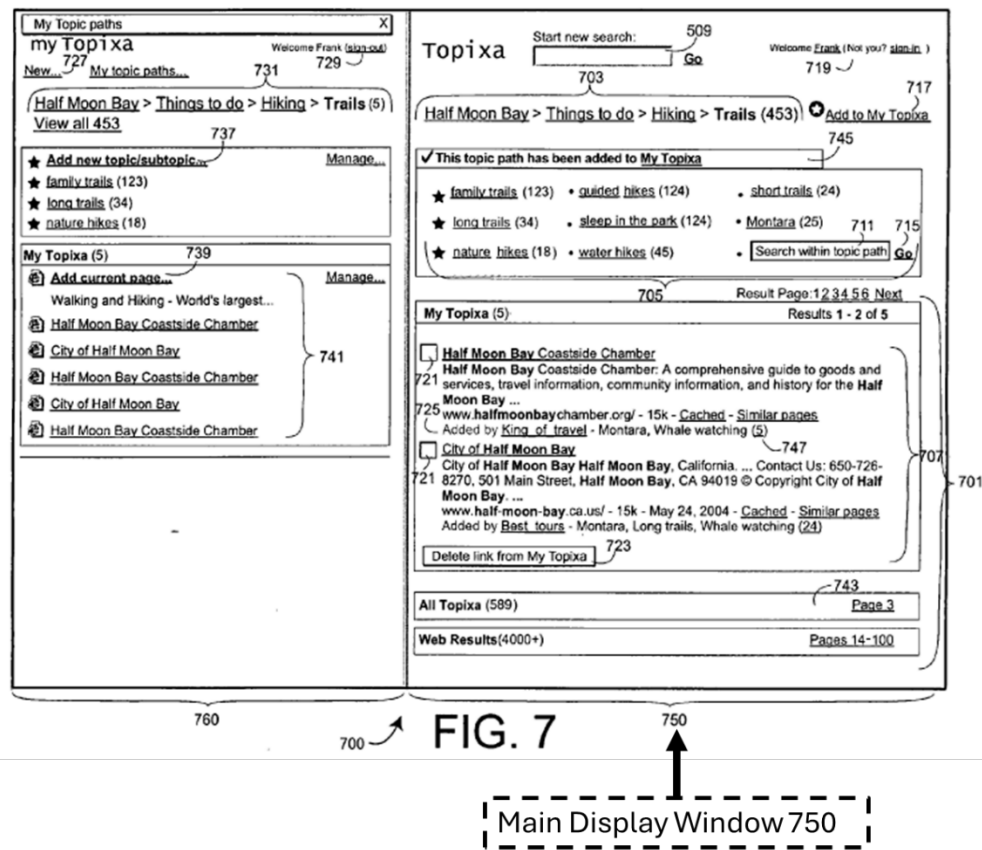
FIG. 1

EX1003, Figure 1.

87. In particular, Palmon explains that “[t]he client 101 includes a **browser application** 121 shown in Fig. 1.” EX1003, [0040]. Palmon further states that the browser application is used to present the user-facing portions of the system. EX1003, [0040] (“The user interface assumed in this description is implemented as pages that are displayed on the client's display 119 using a browser application 121.”). Palmon describes this user interface includes a “main display window 750” that can show a selected webpage. EX1003, [0208], [0217] (“The explorer bar (or similar panel) 760 further includes a clickable object 739, labeled in FIG. 7 as “Add current page” for adding an attachment between the currently displayed search topic path, and the **Web page displayed in the main window 750**. Thus, a user selects a Web page by clicking on one of the results 701. **This causes that URL to be served and displayed in the main window 750.**”).

88. Palmon describes the client device 101 as a “computer” with conventional computing components, stating that “exemplary client machine such as client 101 typically includes a processing system of at least one processor 107, a memory subsystem 117, a display subsystem 119, a keyboard 115, a pointing and selecting device 123 such as a mouse or another input device, all such input devices collectively shown as 123, local storage 109, and a network interface (NIC) 113 coupling the processor system to the network 105.” EX1003, [0037], Figure 1. Thus,

Palmon discloses web content (i.e., “*first web content*”) being displayed by a browser application (i.e., a “*web browser*”) executing on the client device (i.e., a “*first client computer*”) in a main display window 750 (i.e., “*a main browser window*”), as illustrated in Figure 7 below.



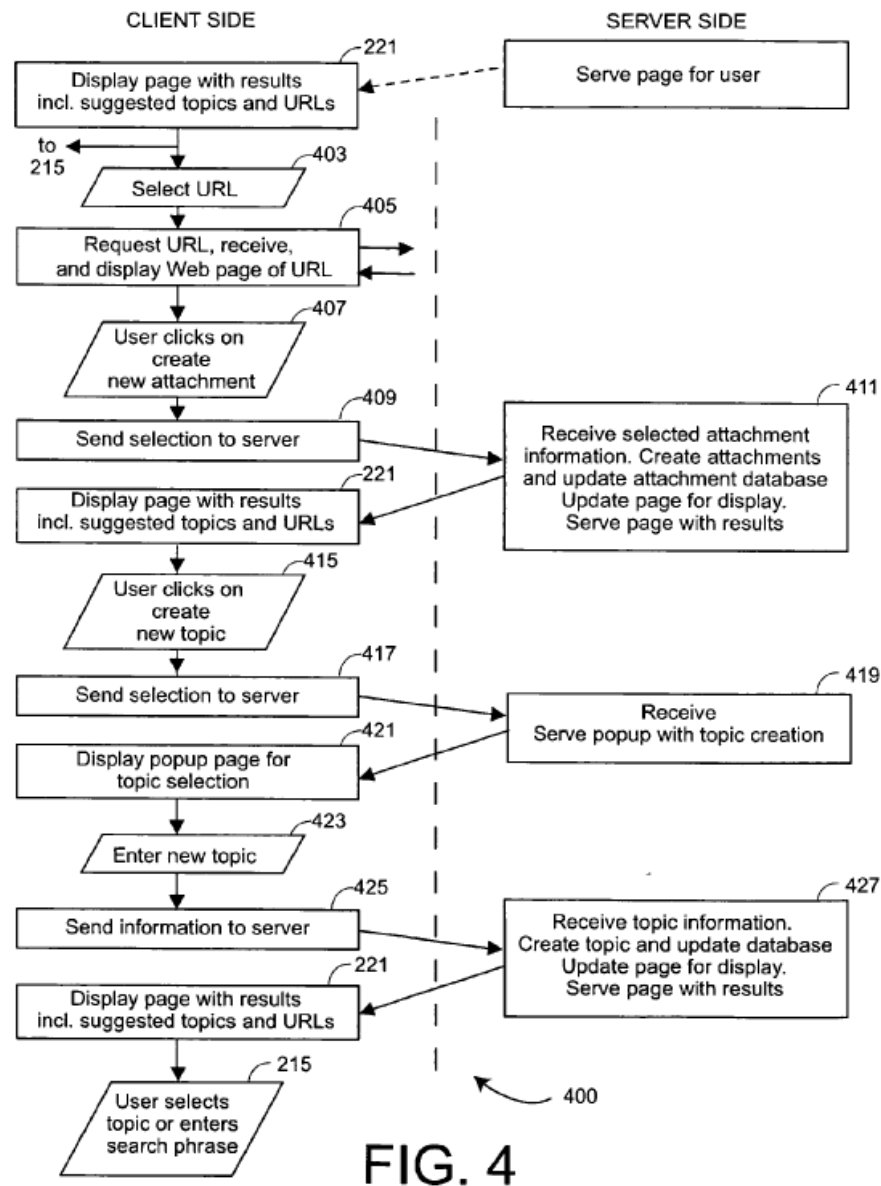
EX1003, Figure 7.

89. Palmon likewise satisfies the portion of [1A] requiring “*receiving, by a server computer from a first client computer operated by a first user, an identification of first web content*” displayed in the main display window 750. As I explained in Paragraphs 57-70, Palmon describes a topic-guided search in which the

user refines the search over multiple iterations by selecting topics through the interface. EX1003, [0061], [0063], [0071], [0208], [0213]. The database that enables this search is made of user-defined attachments. EX1003, [0048] (“The attachments are shown in FIG. 1 as an attachment data structure 175 that is part of the data structure 177.”). Palmon’s attachment is “an association between a URL and a topic.” EX1003, [0048]. More specifically, Palmon discloses that “[e]ach attachment is defined by at least the <URL,topic> doublet.” EX1003, [0048]; *see also* EX1003, [0099]. In practical terms, when a user creates one of these attachments, the server obtains the URL that identifies the web page the user is associating with the topic(s), and maintains that URL as part of the attachment information so that it can later be retrieved in connection with topic-guided searching. EX1003, [0048], [0099]. For that reason, Palmon’s attachment mechanism involves the server receiving from the user’s client an identification of the web content—namely, the URL—corresponding to the page being associated and later returned in search. EX1003, [0048], [0099].

90. As an illustration, Palmon explains that when a user is viewing a webpage in the main display window 750, the user may “click[] on an ‘add current page’ button on the explorer bar” which triggers transmission of identifying information for that page to the server. EX1003, [0102]. Palmon states that, in step 409, “[t]he user’s request, *including* the search topic path and the *page URL [is] sent ... to the server, e.g., the server 151.*” EX1003, [0102]. Palmon further explains

that, “[o]n the server side, in [step] 411,” the system “receiv[es] the attachment information,” which Palmon describes as an attachment defined by at least a “<**URL**,topic> doublet.” EX1003, [0102], [0048]; *see also* EX1003, [0101]. Similarly, Palmon teaches that a user may mark a URL “as a favorite,” and that doing so results in “a new attachment between the URL and at least one topic,” which likewise requires the server to obtain the URL and the associated topic information from the user’s client. EX1003, [0122].

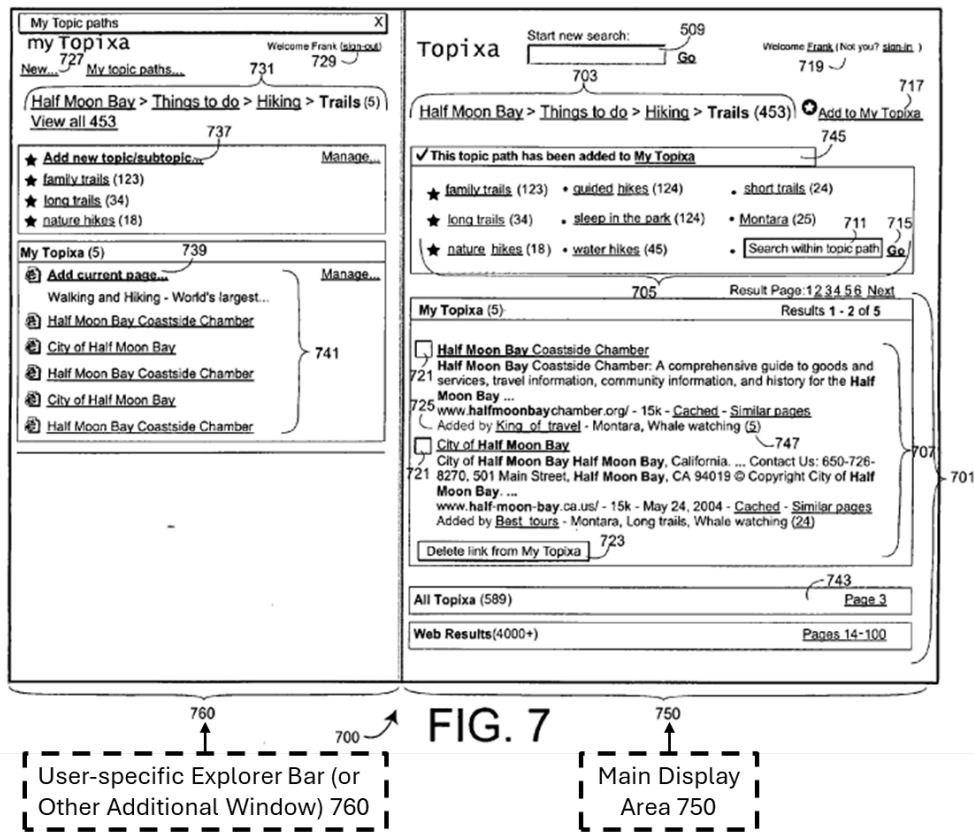


EX1003, Figure 4.

91. Thus, Palmon discloses that the server 151 (“a server computer”) obtains from the client device 101 used by the user (“a first client computer operated by a first user”) the page URL identifying the webpage shown in the main display window 750 (“an identification of first web content”).

92. ***Second***, Palmon discloses or at least renders obvious that “*the identification of the displayed web content [is] transmitted to the server computer via a user interface separate from the main browser window.*”

93. Palmon explains that the URL for the page being viewed is sent to server 151 through a separate control area—described as “a user-specific explorer bar or other additional panel”—rather than through the portion of the browser where the webpage itself is displayed. EX1003, [0101]-[0102]. Palmon’s Figure 7 likewise depicts this separation, stating that “[t]he presented user interface display 700 includes a main display area 750 and a user-specific explorer bar (***or other additional window***) 760.” EX1003, [0206]. The main display area 750 is where the webpage is shown, while the explorer bar/window 760 contains the controls used to submit the page URL (e.g., via the “Add current page” control described in Palmon). EX1003, [0217]. Thus, in Palmon, the transmission of the page identification occurs through the user-specific explorer bar/ ***additional window***, which is distinct from—and therefore “*a user interface separate from*”—the main display area 750 (“*main browser window*”) that presents the webpage. EX1003, [0206], [0101]-[0102].



EX1003, Figure 7.

iii. [1B] indexing, by the server computer, the first web content; and

94. In my opinion, Palmon discloses [1B].

95. As an initial matter, the '744 Patent describes "*indexing*" the first web content as including "receiving keywords for the first web content" (EX1001, 1:63-65) and then using those keywords to associate the first web content "for inclusion in search results." See EX1001, 8:15-17 ("The server computer 110 indexes the web content (Operation 260) for, for example, *inclusion in search results.*"); 8:55-57 ("the human user may specify a few *keywords* for the content identified by the user, and the content is indexed *using the human identified keywords.*"); 9:19-23 ("The snippet 155 is populated into the user interface 150 to help the user create a 'blog-entry' like submission to the server computer 110 to *index the article with user content 165* (e.g., user selected keywords, rating, comments)."). See also EX1001, Claim 6 ("The method of claim 1, wherein the indexing of the first web content further comprises receiving, by the server computer, keywords for the first web content."). Palmon discloses [1B] to the same extent as the '744 Patent.

96. Palmon discloses that a user who is viewing a webpage in the main display window 750 may “click[] on an ‘add current page’ button on the explorer bar” and submit “attachment information”—including “the *search topic path* and the page URL”—to the server. EX1003, [0102]. Palmon explains that the “search topic path” is “the set of topics selected during a particular search by a particular searcher.” EX1003, [0071]. After the user submits this information, the server “*receives the attachment information*, and creates the attachment(s) ..., including creating an *attachment between the URL and each topic* in the search topic path for that user.” EX1003, [0102]. Palmon characterizes the resulting attachment as “an *association* between a URL and a topic,” which is “defined by at least the <URL,topic> doublet.” EX1003, [0048].

97. Palmon also makes clear that its “topics” function as *keywords* that guide the search process. For instance, Palmon states that “the present invention is related to searching for information guided by a set of *topics such as keywords*.” EX1003, [0003]. Consistent with that description, Palmon explains that a searcher refines the search by selecting topics to view results associated with those topics: “by selecting a search topic A, the searcher will be shown a set of results under, i.e., attached to topic A.” EX1003, [0071]. Palmon further confirms that these topics correspond to keyword-style labels used to categorize information, explaining that

“categories or *keywords*—called topics herein—” may be attached to items of information. EX1003, [0005].

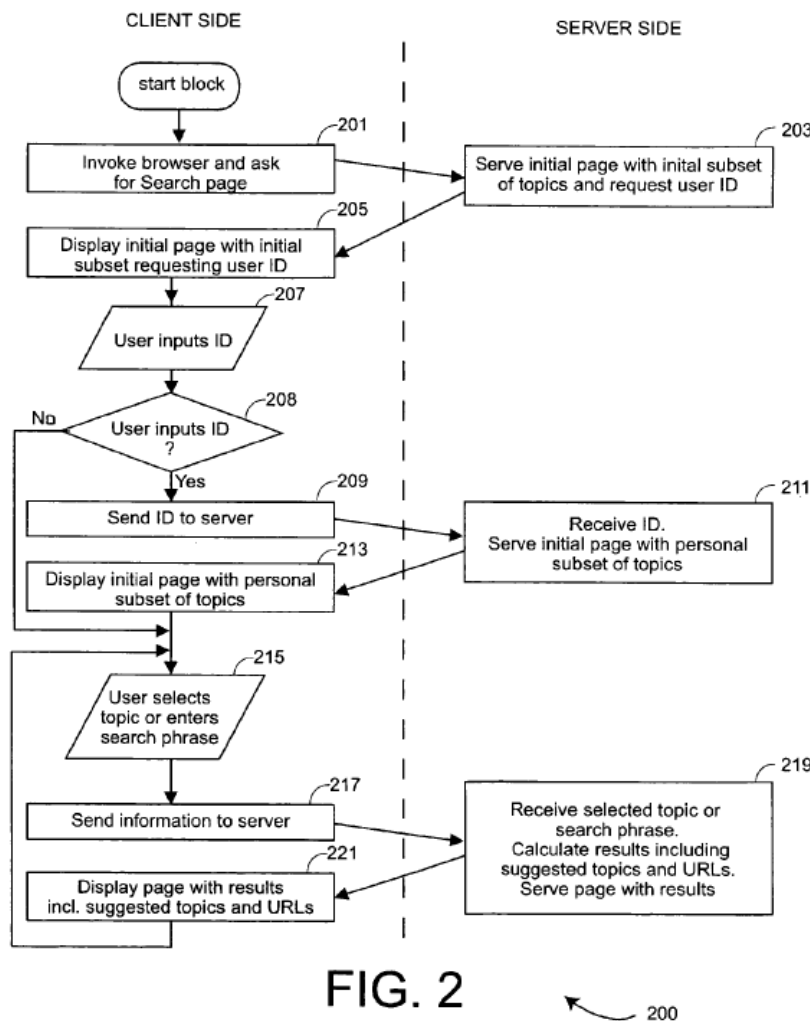
98. Accordingly, Palmon teaches that the server receives both (i) a topic/keyword and (ii) an identifier of a webpage (e.g., a URL), and then links the webpage to the topic/keyword so that the webpage can later be returned when that topic is used during searching. EX1003, [0048], [0071], [0102]. This is the same type of “*indexing*” described in the ’744 Patent, which explains that “indexing [] the first web content includes receiving keywords for the first web content” (EX1001, 1:63-65) and associating the identified content with those keywords “for, for example, inclusion in search results.” EX1001, 8:15-17; *see also* EX1001, 8:55-57.

- iv. **[1C] in response to receiving a search query from a web browser of a second client computer operated by a second user, transmitting, by the server computer, search results to the web browser of the second client computer, the search results comprising the first web content identified by the first user in a position relative to identifications of other web content received from other users.**

99. In my opinion, Palmon discloses or renders obvious [1C].

100. *First*, Palmon discloses that the search server receives a search request from another (“*a second*”) user —i.e., “*receiving a search query from a web browser of a second client computer operated by a second user.*”

101. As I already discussed above in Paragraphs 57-70, Palmon explains that the user begins a search through the interface by “select[ing] a topic,” which Palmon treats as part of the “search request information.” EX1003, [0058]. Palmon further shows that this search request information (“*search query*”) is sent from the client to the search server 151, where it is received at the server-side step identified as 219 in Figure 2. *See* EX1003, Figure 2 (step 219).



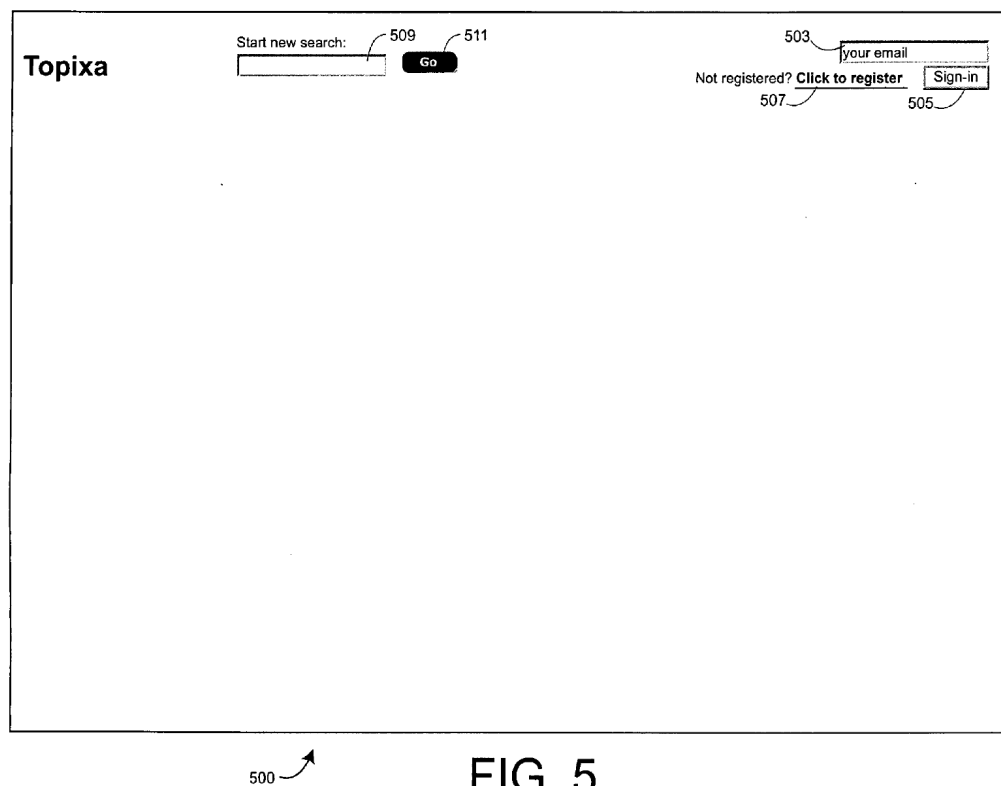
EX1003, Figure 2.

102. For instance, Palmon describes “an initial user interface display 500” that allows a user to provide search request information to the server. EX1003, [0192]. Palmon explains that this interface includes “provision in the form of a window 509 and a button 511 for a searcher to enter an initial search phrase.” EX1003, [0193].

103. Palmon states that the user interface may also present “an initial subset of the set of topics.” EX1003, [0194]. Using this interface, the user can submit the search request information by “enter[ing] a search phrase” or by “selecting one of the topics, e.g., by clicking on the presented topic.” EX1003, [0195].

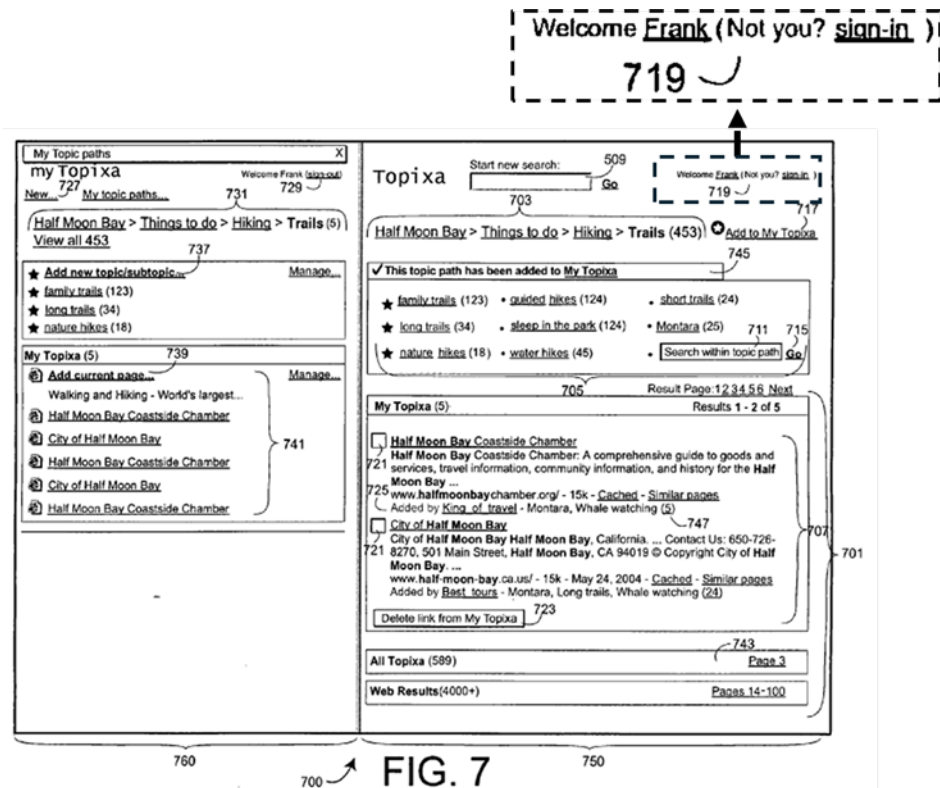
104. Palmon further states that this user interface is delivered through the browser, explaining that the user interface is “implemented as pages that are displayed on the client’s display 119 using a ***browser application 121***,” and that “the Web browser displays the initial page on the display 119.” EX1003, [0040], [0054].

105. Thus, Palmon teaches that the user’s search request information is provided via a web browser and received at the server as a search query submitted by a user operating a client computer (“*receiving a search query from a web browser of a [] client computer operated by a [] user.*”). EX1003, [0040], [0192]-[0195].



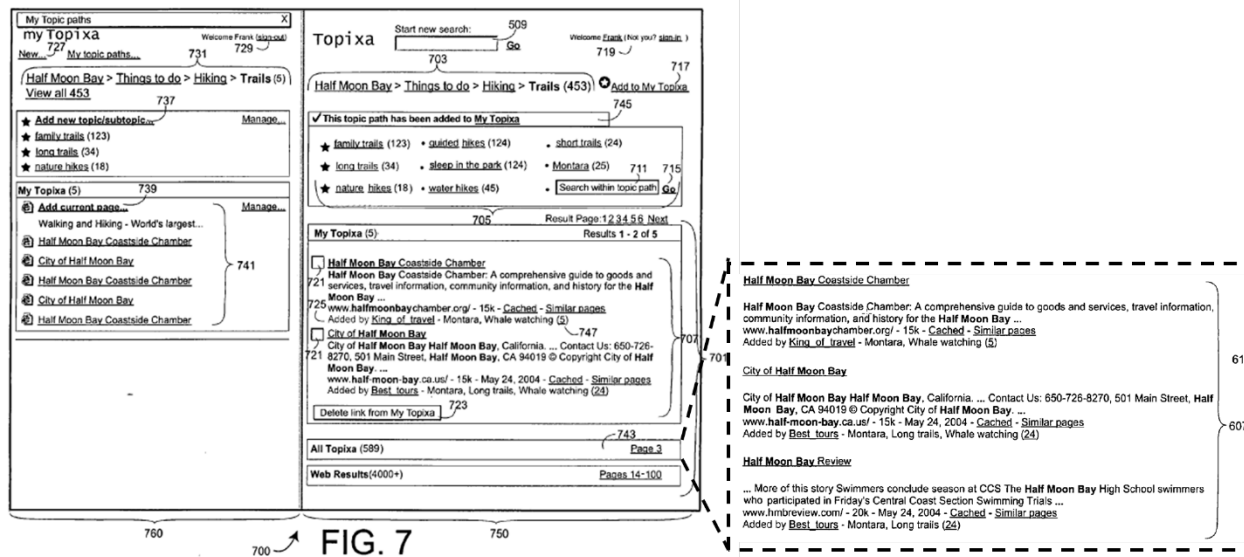
EX1003, Figure 5.

106. Palmon also contemplates that the search query is submitted “from a web browser ... operated by a *second* user,” meaning the person conducting the search may be different from the person who previously associated URLs with topics. Palmon explains that attachments are user-attributed—i.e., a user can create an attachment and that attachment is “credited to the user.” EX1003, [0099]. Palmon’s Figure 7 (reproduced below) illustrates this in a user-specific interface that identifies the active account holder, showing “an indication 719 of the current user.” EX1003, [0206]. In that example, the interface indicates that the current user is Frank. EX1003, [0206].



EX1003, Figure 7.

107. As I already explained in Paragraphs 57-70, Palmon explains that the main window 750 can present *Frank's* search results “in three different presentations.” EX1003, [0208]. One of those presentations is “the second list 743 ... of the overall results, e.g., the URLs presented in list 607 of FIG. 6,” which is distinct from any list limited to Frank’s own saved or favored items. EX1003, [0208]. The “second list 743” appears as shown below in the combined Figure of Figures 7 and 6.



EX1003, Figures 6, 7.

108. As shown in the Figure above, the entries in that overall-results list reflect URLs that were “[a]dded by” users other than Frank—such as “King_of_travel” and “Bell_tours”. *See also* EX1003, [0210] (“FIG. 7 shows the favorite URLs in detail. For each result, a title and a short description is provided in the display, linked to the URL such that the searcher selecting (clicking) on any of the displayed results causes the Web page defined by the URL to be displayed. In one embodiment, *an identifier 725 of the user who first defined the attachment of the URL is also presented.*”).

109. This illustrates that the user who previously contributed or associated particular URLs with the system (i.e., the “*first user*”, such as “King_of_travel”) can be *different* from the user who is conducting the search and receiving results (here,

Frank (“*second user*”). EX1003, [0208], [0210]. Palmon also confirms that the system supports multiple accounts by describing “[a] set of users.” EX1003, [0046].

110. Thus, Palmon teaches that the server receives search request information (“*search query*”) from a user interface operated by a searching user such as Frank (a “*second user*”), even though the returned results may include URLs added by users other than Frank, such as “King_of_travel” (a “*first user*”). EX1003, [0046], [0208], [0210].

111. In addition, Palmon discloses that the server receives the search query “*from a web browser of a **second** client computer*” used by Frank (“*second user*”). Palmon describes a networked client–server system in which the server communicates with multiple “clients.” EX1003, [0036]. This type of multi-client arrangement was typical for Internet systems using the client–server model. EX1011, 1:9-11; EX1015, [0080]-[0081]; Figure 1. Thus, a POSITA would have understood that Frank (“*second user*”) submits his search query using a different client device (“*second client device*”) than the client device used by King_of_travel (“*first user*”).

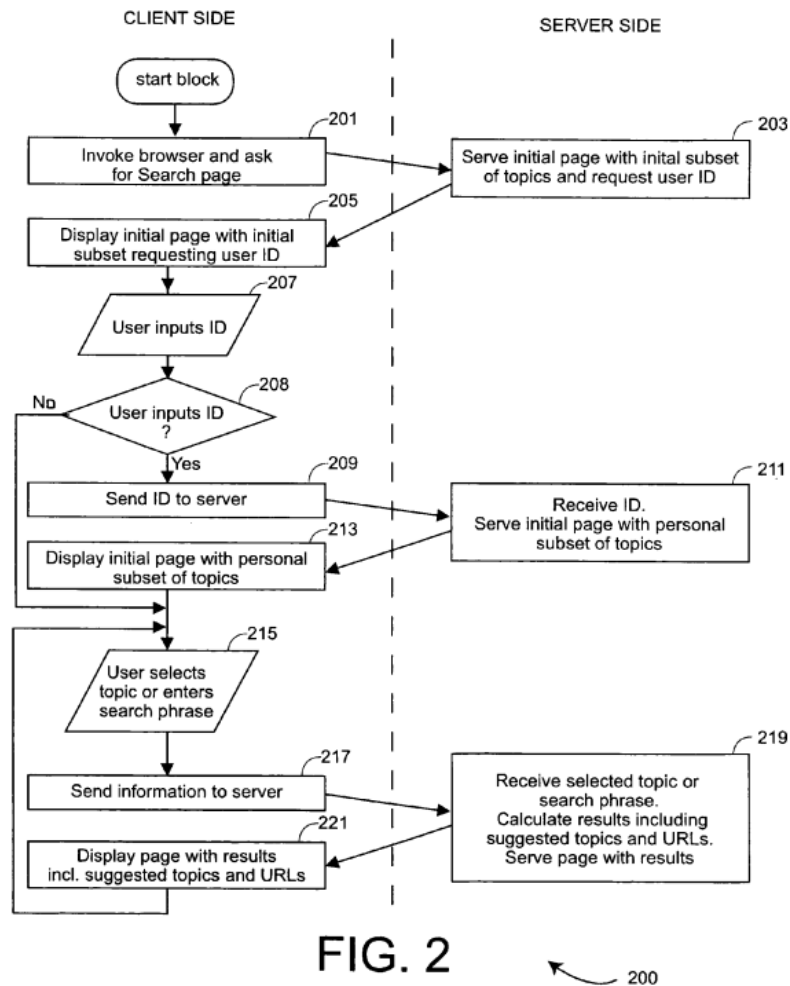
112. In addition, a POSITA would have found it obvious to deploy Palmon in the customary way such systems were used—namely, with different users accessing the server from different machines. Considering Palmon together with the conventional client–server practices discussed above, having the server obtain the

search request information from a web browser executing on a second client computer used by a second user would have been an ordinary, straightforward implementation decision.

113. Accordingly, Palmon discloses, or renders obvious that a server can obtain search request information (i.e., the “*search query*”) through a browser-based user interface (i.e., “*from a web browser*”) running on another client device (i.e., a “*second client computer*”) used by someone other than the user who provided the earlier content association (i.e., a “*second user*”).

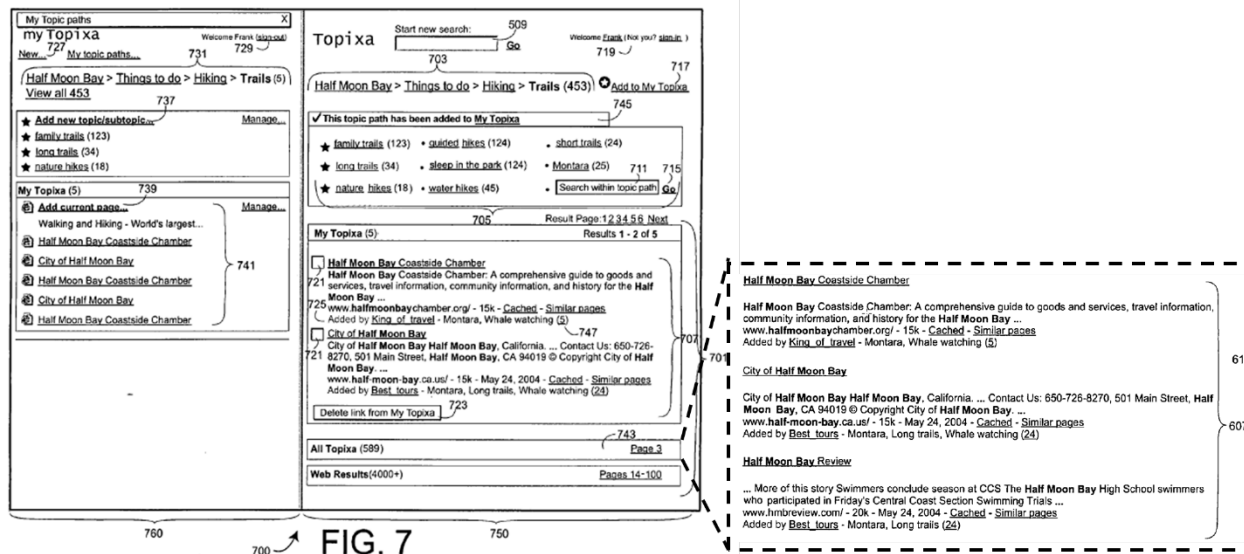
114. **Second**, Palmon teaches that, after the server receives the search request information (i.e., the “*search query*”), the server “*transmit[s] ... search results to the web browser of the second client computer.*” Palmon explains that once the server has the search request information from Frank’s client device (which, as I explained above, is a second client device), the server “generates results based on the search request information.” EX1003, [0059]. Subsequently, the server then provides to Frank “a new page containing the search results.” EX1003, [0060]. These search results include “one or more URLs that meet the search request information.” EX1003, [0059].

115. This process is also illustrated in Figure 2. At step 219, the server receives a topic or a search phrase, and serves a page with results. EX1003, Figure 2 (step 219).



EX1003, Figure 2.

116. Frank's client device then presents those results to Frank at the next step shown in Figure 2, where the served page is "received and displayed." EX1003, Figure 2 (step 221). Palmon also states that these pages are displayed through the browser, explaining that "[t]he user interface ... is implemented as pages that are displayed on the client's display 119 using a browser application 121." EX1003, [0040]; *see also* EX1003, [0054] ("Web browser").



EX1003, Figures 6, 7.

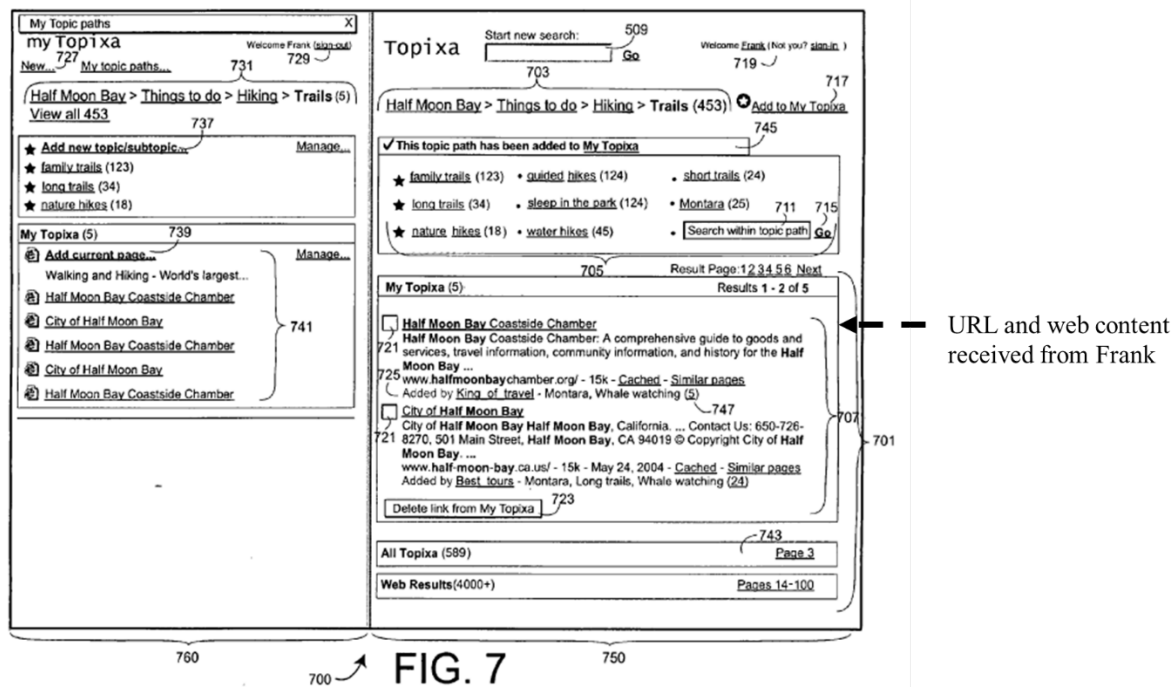
117. Third, Palmon teaches that “the search results compris[e] the first web content identified by the first user in a position relative to identifications of other web content received from other users.” In my view, this language draws a distinction between the underlying “web content” and an “identification[] of [a] web content.” The ’744 Patent describes “web content” broadly, stating that it “includes web pages, videos, photographs, blogs, news, media, song.” EX1001, 1:23-24. The ’744 Patent also explains that the system can *identify* particular web content using information such as a URL, stating that “submitting of this identification of web content 235 occurs when the user submits (via the user interface 150) a **URL** of the web page.” EX1001, 7:65-8:2.

118. Viewed in that context, the '744 Patent does not appear to clearly describe search results that contain the “*web content*” itself while also containing URLs (or other identifiers) for “*other web content.*” See EX1001, 8:31-49.

119. Nevertheless, Palmon meets this limitation as written—requiring the search results to include “*the first web content*” itself “*in a position relative to identifications of other web content received from other users*” (the “first interpretation”)—Palmon discloses results that present content items in an ordered list alongside other result entries. And to the extent the limitation requires the results to provide an identification of the “*first web content*” and “*identifications of other web content*” (the “second interpretation”), Palmon likewise discloses that the system returns search results identifying information items (e.g., URLs) as part of the results listing.

120. Figure 7 of Palmon illustrates the search results returned by the server for the current topic “Trails.” Within the main display window 750, the “My Topixa” panel presents Frank’s “favorite” URLs 707—i.e., URLs that Frank has marked as favorites and that are therefore maintained as user-specific attachments. EX1003, [0208], [0211] (“‘My Topixa’ is the list of favorite attachments under the search topic path.”); see also EX1003, [0122] (“whenever a URL is marked as a favorite, ***a new attachment between the URL and at least one topic is created***, with each such attachment including the particular user”). Consistent with that description, the

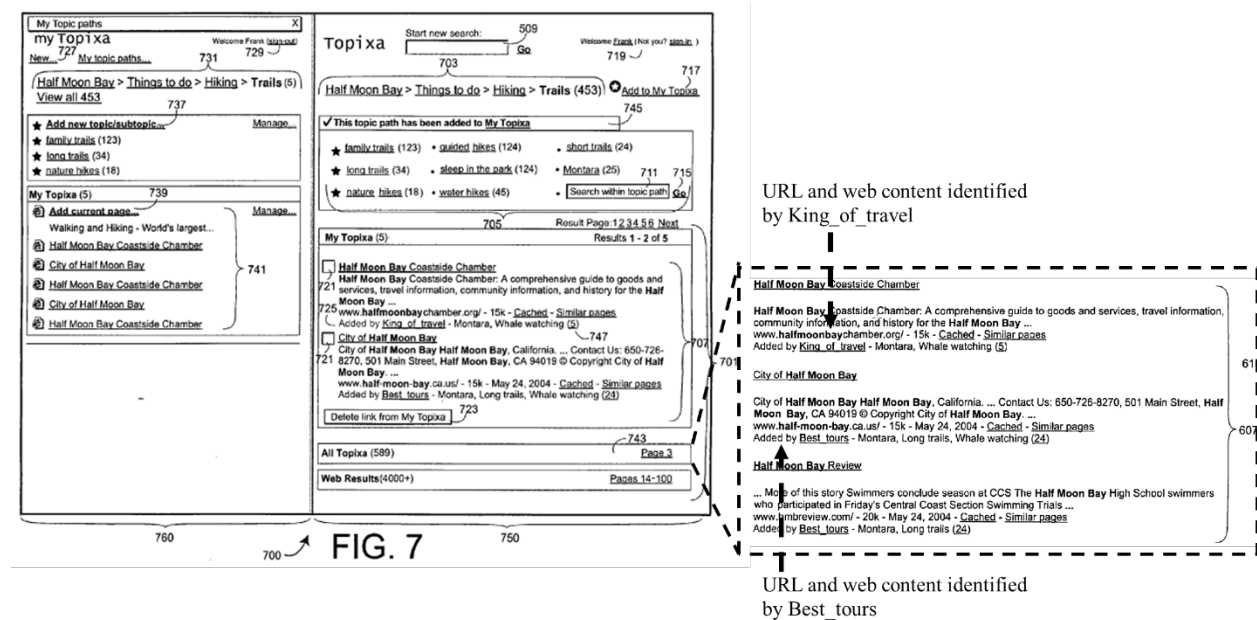
favorites list is shown with information describing the corresponding web content—such as the page title (“Half Moon Bay Coastside Chamber”) and descriptive text about the page (“A comprehensive guide to goods and services, travel information, community information, and history of the Half Moon Bay ...”).



EX1003, Figure 7.

121. As I already explained in Paragraphs 57-70, Palmon also describes an “overall results” view—i.e., a second list 607 (illustrated below)—that presents “the overall results” rather than results tied to a particular user’s saved items. EX1003, [0208]. Those overall results include entries whose attachments were created by users other than Frank, including “King_of_travel” and “Best_tours,” as noted above.

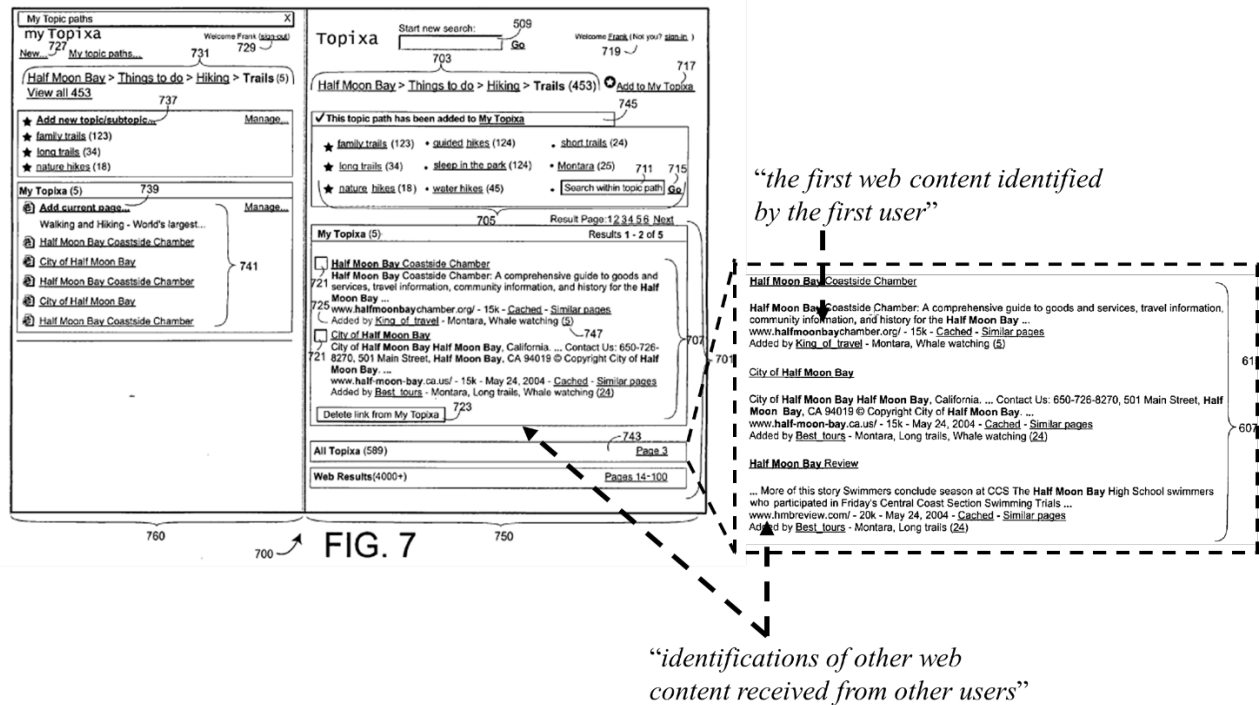
122. In that list, each entry is shown with the URL and information describing the corresponding web content. For instance, the entry for www.half-moon-bay.ca.us/ is displayed with the page title (“City of Half Moon Bay”) and text from the page (e.g., “Contact Us: 650-726-8270”). Thus, Palmon’s overall results present URLs contributed by users such as “King_of_travel” and “Best_tours,” together with descriptive information reflecting the associated web content.



EX1003, Figures 6, 7.

123. Accordingly, Palmon’s results presentation places the URL and associated web content that were added by “King_of_travel” (“first user”) alongside—and in an ordered arrangement relative to—other result entries, including entries associated with Frank and entries added by “Best_tours,” who are

both “*other users*” from the “*first user*” who added the “*first web content*,” as illustrated below.



EX1003, Figures 6, 7.

124. To the extent that “*other users*” is interpreted to be different from both the “*first user*” and “*second user*” (requires at least a third and a fourth user different from the first and second users), Palmon teaches that as well. Palmon’s teachings are not limited to a system with three users. As explained in Paragraph 109, Palmon confirms that the system supports multiple accounts by describing “[a] set of users.” EX1003, [0046]. *See also* EX1003, [0055] (“The search engine 163 in 211 receives the information, looks up the user ID (denoted UserID herein) in the *set of users* in table 179 to authorize the user, and assuming successful authorization, in 211 serves

a new initial page.”). Thus, a POSITA would have understood that the search results taught by Palmon would include URLs and web contents for which the attachments were created by users other than King_of_travel (“*first user*”), Frank (“*second user*”), and Best_tours. Accordingly, Palmon teaches that the search results include URLs and web contents provided by Best_tours as explained above, as well as by other users from “the *set of users* in table 179.” EX1003, [0055].

125. Additionally, it would have been obvious to provide the search results include URLs and web contents provided by Best_tours as explained above, as well as by other users identified in “the *set of users* in table 179” (EX1003, [0055]) because Palmon expressly contemplates a system that serves multiple users. Providing Palmon’s system to such multiple users would have been well within the skill of a POSITA since that would have merely amounted to implementing the functionality expressly disclosed by Palmon using software code.

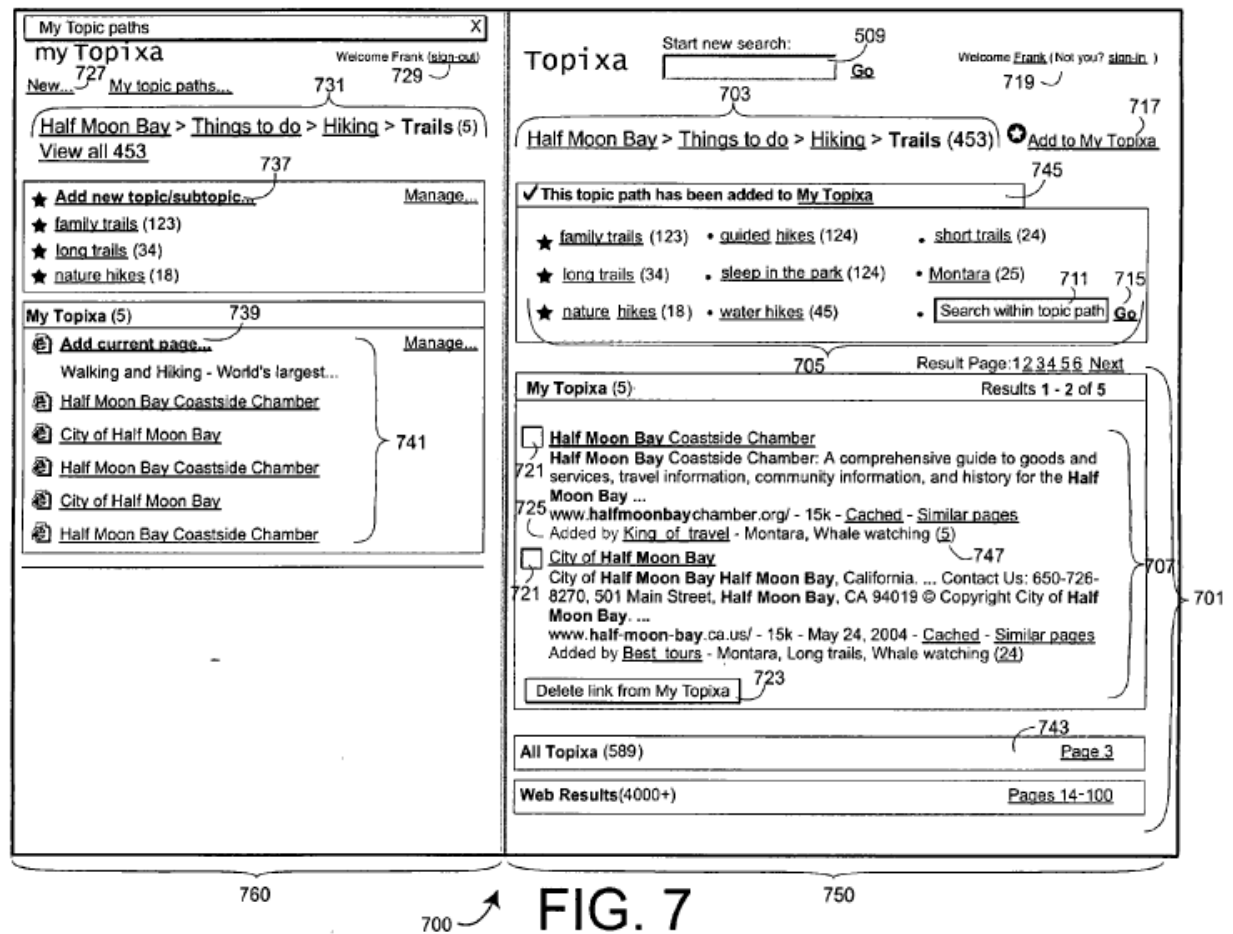
2. Claim 2

- i. **[2] The method of claim 1, wherein the receiving of the identification of first web content further comprises receiving, by the server computer, a rating associated with the first web content from the first user.**

126. In my opinion, Palmon discloses the additional limitation of claim 2.

127. As I already explained above in Paragraphs 57-70, and 84-93, Palmon explains that the server receives “attachment information” submitted from a client

device. EX1003, [0102]. Palmon further teaches that this attachment information can include a user-provided rating associated with the URL. In particular, Palmon teaches that “each user may *rate* an attachment between a URL and a topic, so that in general, an attachment can include the quadruple of information: the user, the topic, the URL, and the *rating* in the attachment data structure (table) 175.” EX1003, [0117]. Palmon also states that “[a] *URL* viewed under a search topic path also may be actively *rated by a user*, and such a *rating of the URL creates and rates a new user-specific attachment* between the URL and each topic in the search topic path.” EX1003, [0120]. *See also* EX1003, [0122] (“a user viewing URLs, e.g., that are attached to one or more topics as a result of a search, may positively *rate* any of the viewed URLs.”). Thus, in the context of Figure 7, a user such as “King_of_travel”—who creates the attachment for “www.halfmoonbaychamber.org”—can also provide a rating for that URL, with the rating information being included in the attachment that is sent to, and stored by, the server.



EX1003, Figure 7.

128. Accordingly, Palmon teaches that “*the receiving of the identification of first web content*” for purposes of creating an attachment also involves the server obtaining a user-provided rating for that URL (“*a rating associated with the first web content*”) from the user who submits the attachment information (“*first user*”).

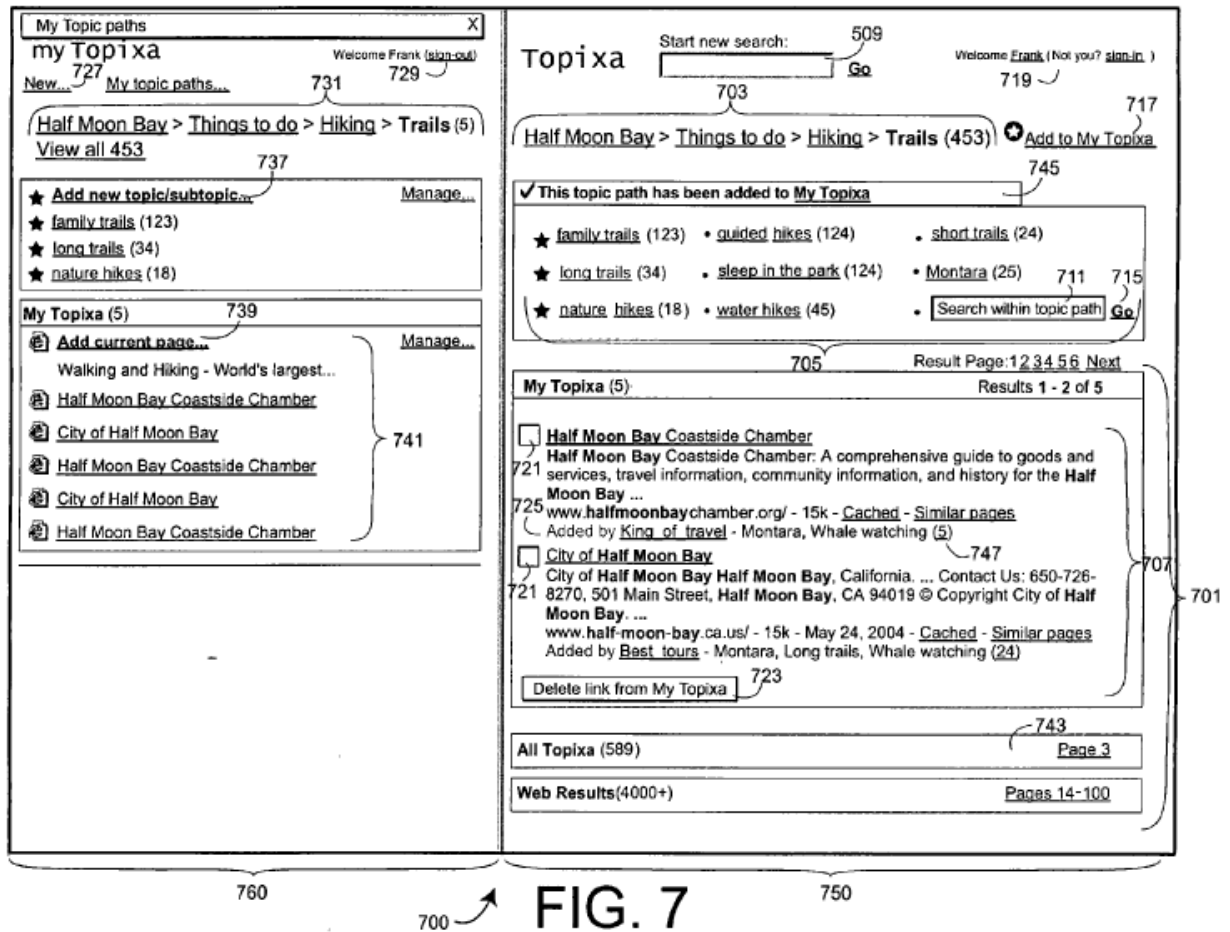
3. Claim 3

- i. [3] The method of claim 2, wherein the receiving of the identification of first web content further comprises receiving, by the server computer, ratings associated with the other web content from the other users.**

129. In my opinion, Palmon discloses the additional limitation of claim 3.

130. As I already explained in Paragraphs 126-128, Palmon teaches that a user may rate a URL and provide both the URL and the rating to the server as part of the information used to create an attachment. EX1003, [0102], [0117], [0120], [0122]. Palmon also explains that this capability is available system-wide, stating that “each user may rate an attachment between a URL and a topic.” EX1003, [0117].

131. In the context of Figure 7, for the reasons I explained in Paragraphs 126-128, Frank, Best_tours, and/or any other users serviced by Palmon’s system (which are “*other users*” as explained in Paragraphs 117-125) can rate the URLs and send the rating information to the server.



EX1003, Figure 7.

4. Claim 5

- i. [5] The method of claim 2, wherein the rating associated with the first web content is selected from a group of rating types consisting of like, dislike, and neutral.

132. In my opinion, Palmon discloses the additional limitation of claim 5.

133. Counsel has informed me, and I understand, that claim 5 requires showing that the rating is one of “like, dislike, or neutral.”

134. As I already explained in Paragraphs 126-128, Palmon discloses that each user can rate a URL. EX1003, [0120] (“A URL viewed under a search topic path also may be actively rated by a user.”); [0121]-[0127]. Palmon explains, for example, that “a user viewing URLs, e.g., that are attached to one or more topics as a result of a search, may positively rate any of the viewed URLs,” and that this action is “also called marking the URL as a ‘*favorite*’ URLs.” EX1003, [0122]. Palmon likewise teaches the opposite action—i.e., that a user can “*negatively rat[e]* a URL, e.g., a URL in a search result,” such as “e.g., by marking the URL as ‘*junk*.’” EX1003, [0126]. Palmon further describes how these ratings are stored, explaining that, in the two-rating embodiment, attachments can be represented “as a quadruple <UserID, Topic, URL, NegRate>, where NegRate is a binary quantity that is false (value 0) for a positive rating and true (value 1) for a negative rating.” EX1003, [0119].

135. Accordingly, Palmon teaches that the rating associated with the URL (“the rating associated with the first web content”) can be one of two alternatives—either a positive rating (“*like*”) or a negative rating (“*dislike*”).

5. Claim 6

- i. [6] **The method of claim 1, wherein the indexing of the first web content further comprises receiving, by the server computer, keywords for the first web content.**

136. In my opinion, Palmon discloses the additional limitation of claim 6.

137. As I already explained in Paragraphs 94-98, Palmon explains that a user who is viewing a webpage may “click[] on an ‘add current page’ button on the explorer bar” and submit “attachment information”—including “the *search topic path* and the page URL”—to the server. EX1003, [0102]. Palmon defines the “search topic path” as “the set of topics selected during a particular search by a particular searcher.” EX1003, [0071]. Palmon and further teaches that its “set of topics” are “*keywords*.” EX1003, [0003]. After the submission, the server “*receives the attachment information*” and “creat[es] an *attachment between the URL and each topic* in the search topic path,” which stores the URL of the first web content in association with those keyword topics for later retrieval—i.e., indexing the first web content. EX1003, [0102].

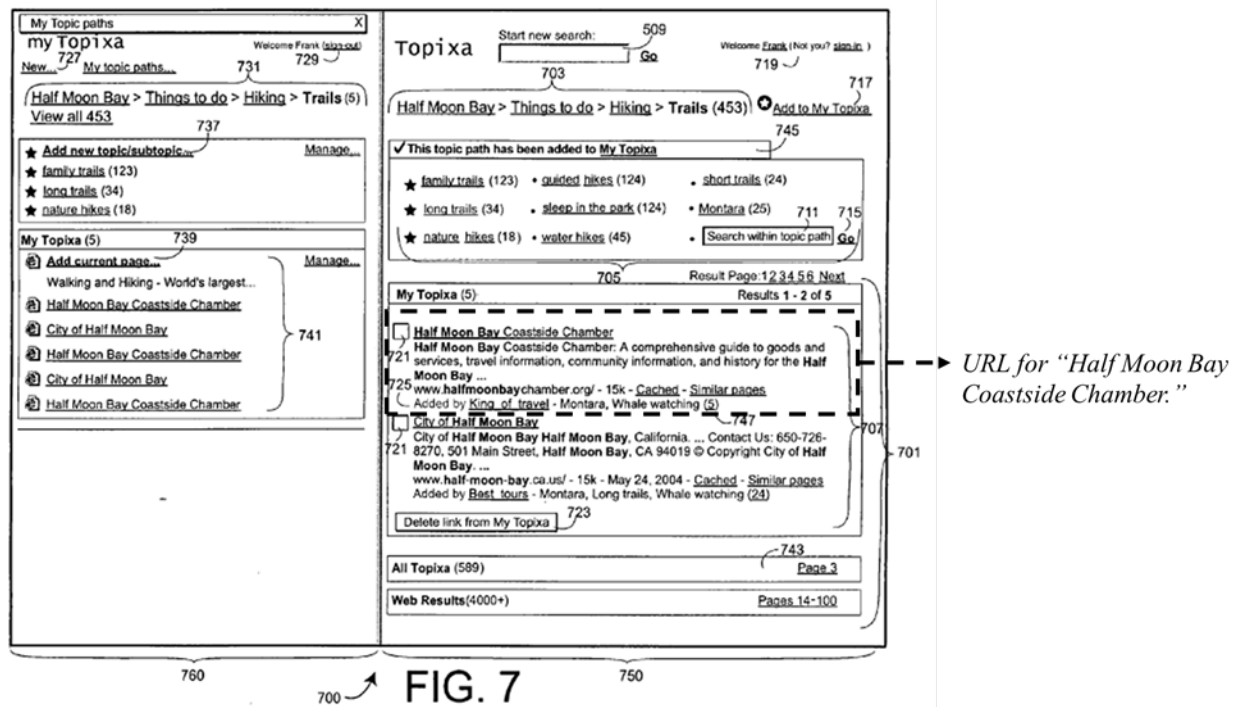
138. Accordingly, when Palmon’s system creates the attachment (“*indexing of the first web content*”), the server receives, for the submitted web content, the associated *search topic path* containing multiple topics for that web content (“*keywords for the first web content*”).

6. Claim 8

- i. [8] The method of claim 1, wherein the first web content is same as the other web content.**

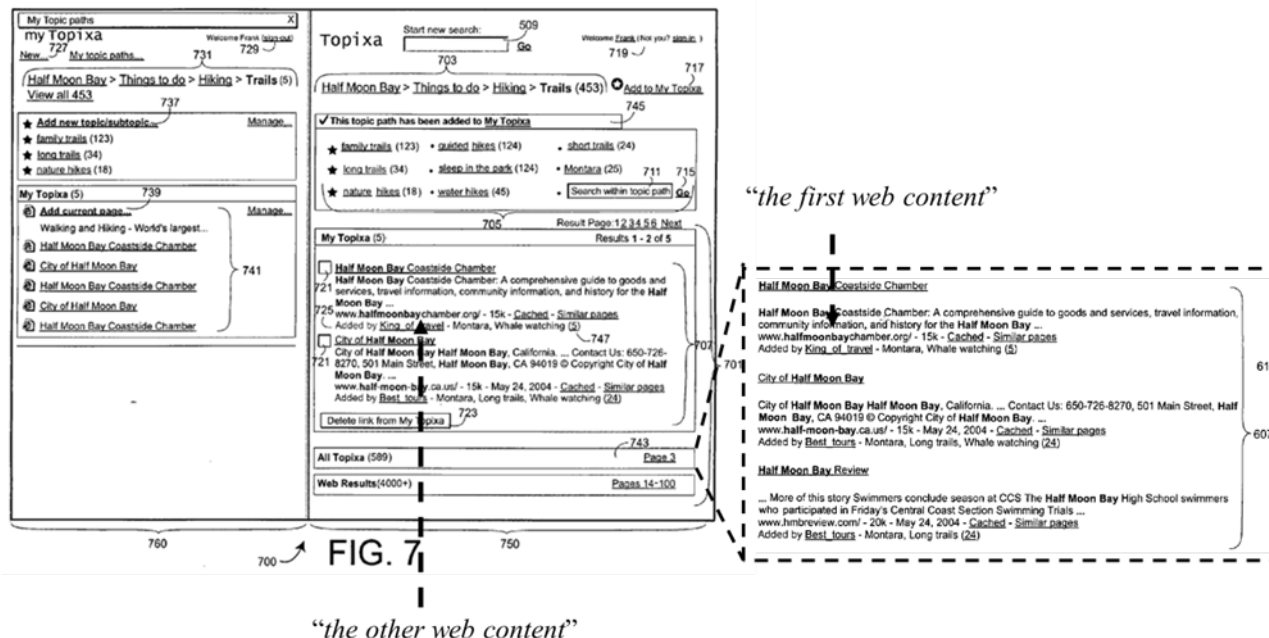
139. In my opinion, Palmon discloses or at least renders obvious the additional limitation of claim 8.

140. Palmon describes search results that include “*other web content*” identified by users different from the first user. As I explained in Paragraphs 99-123, Figure 7 of Palmon shows Frank’s user interface, which includes a “My Topixa” portion that lists Frank’s own “favorite” URLs within the main display area 750. Palmon explains that “whenever a URL is marked as a favorite, a new attachment between the URL and at least one topic is created, with each such attachment including the particular user, as if this was the first user to create the attachment.” EX1003, [0122]. In other words, the URLs shown in “My Topixa” correspond to content associated with Frank (i.e., a user other than the first user), and therefore constitute “*other web content*.” EX1003, [0211]. As shown in Palmon’s Figure 7, this “*other web content*” includes the URL and descriptive information for “Half Moon Bay Coastsides Chamber.” EX1003, Figure 7.



EX1003, Figure 7.

141. Palmon likewise describes results that include “*first web content*” identified by “King_of_travel” (the “*first user*”). As I explained in Paragraphs 99-123, Frank’s search results include “overall results, e.g., the URLs presented in list 607 of FIG. 6.” EX1003, [0208]. Those “overall results” encompass entries added by users other than Frank, including “King_of_travel” (“*first user*”), and therefore include the URL and corresponding descriptive information for “Half Moon Bay Coastsides Chamber” (the “*first web content*”). See EX1003, Figures 6 and 7.



EX1003, Figures 6, 7.

142. In the example discussed above, the “*first web content*”—“Half Moon Bay Coastside Chamber”—is also shown as the “*other web content*,” because that same “Half Moon Bay Coastside Chamber” entry also appears in Frank’s results. And as I explained in Paragraphs 99-123, Frank is the “*second user*,” and thus is one of the “*other users*” (i.e., users other than “*first user*”).

143. Therefore, Palmon teaches that the “*first web content*” and the “*other web content*” need not be different content items, and instead may be the same web content.

144. To the extent that the “*other users*” must be different from both the “*first user*” and the “*second user*,” and the “*other web content*” in the search results must be identified by users other than the “*first user*” or “*second user*” (as explained

in Paragraphs 124-125), Palmon teaches that “*the first web content is same as the other web content*” even under such interpretation.

145. Palmon teaches that multiple users can create an attachment between a URL and a topic. For example, Palmon explains that “the result of a first user defining a first attachment between a first topic and a first information item [e.g., a webpage] and a second user defining an attachment between the first topic and the first information item is that *at least two attachments exist* between the first topic and the first information item.” EX1003, Claim 36. *See also* EX1003, Claim 27 (“multiple attachments defined by different users can exist between a particular topic and a particular information item.”). Indeed, Palmon teaches that “an attachment can include the quadruple of information: *the user*, the topic, the URL, and the rating in the attachment data structure (table) 175.” EX1003, [0117].

146. Palmon also teaches that when Frank performs a search by selecting a topic, the search interface presents the overall results that includes “a set of results ... *attached to* topic A.” EX1003, [0071]. Accordingly, Palmon teaches that the overall results shown in Figures 6 and 7 include *all* attachments associated with a selected topic—including multiple attachments corresponding to the same URL because multiple attachments may have been created by different users. Thus, a POSITA would have understood that the overall results include attachments created by different users, even if the attachments correspond to the same URL (i.e., same

web content). Indeed, Palmon does not teach performing any deduplication of URLs in the search results.

147. Thus, Palmon teaches that the search results include the “*first web content*” identified by “King_of_travel” (the “*first user*”) and the “*other web content*” identified by another user (e.g., Best_tours), where the “*first web content*” and the “*other web content*” correspond to the same underlying URL.

148. At a minimum, it would have been obvious to present search results that include all attachments stored for a selected topic path, including those provided by multiple users corresponding to the same URL, as explained above. A POSITA would have been motivated to do so for at least the following reasons. First, Palmon teaches that a user is associated with a credibility level, indicating the quality of attachments created by a particular user. *See* EX1003, [0147] (“the credibility measure for a user is a measure of how many other users positively rate the topics first created by a user.”). *See also* EX1003, [0033], [0146]-[0161]. Thus, a POSITA would have been motivated to present search results that present all attachments by all users, so that a querying user can determine the reliability of each attachment based on who provided the attachment.

149. Additionally, multiple independent attachments to the same URL provide corroborative evidence that the URL is relevant to the selected topic. Displaying those multiple attachments would predictably improve the user’s ability

to assess relevance by showing that more than one user associated the same content with the topic.

150. Furthermore, a POSITA would have been motivated to present multiple attachments for the same URL to avoid having the system make an arbitrary selection among different users' attachments. For instance, Palmon discloses that the search result includes a "credibility 747 of the user" who first defined the attachment. EX1003, [0203]. Palmon discloses that the "measure of credibility is ... influenced by a contribution index that indicates how much the user has contributed to the system, in terms of the number of original attachments the user has created for the system." EX1003, [0144]. Thus, if an attachment is first created by "new user" or someone who does not contribute to the system a lot, it might appear as less relevant even if many other users have positively rated the attachment.

151. A POSITA would have had a reasonable expectation of success in making this modification because the modification would have merely entailed presenting all attachments stored in the attachment database, which would have been well within the skill of a POSITA. Furthermore, Palmon already stores the relevant attachment records; the modification would only impact how existing records are presented in the results. No changes to how attachments are created or stored are required—only how the server selects and renders matching attachment records.

152. To the extent Claim 8 is interpreted to require that *each* instance of “*other web content*” is also “*first web content*,” Palmon at least renders that arrangement obvious.

153. As explained above, Palmon teaches that its system can maintain multiple attachment records for the same “Topic and URL,” including records attributable to different users. Accordingly, a POSITA would have found it obvious from Palmon that King_of_travel (“*first user*”) would create attachments for all web content for which “*other users*” have created attachments.

154. This represents a straightforward and predictable application of Palmon’s disclosed functionality, and a POSITA would not have needed to modify Palmon’s system to enable that use. Rather, the scenario would involve the ordinary operation of Palmon’s features—i.e., multiple users creating attachments involving the same “Topic and URL”—and would predictably result in the same underlying web content being identified by more than one user and therefore appearing both as “*first web content*” and as “*other web content*” in the search results. And because Palmon already contemplates multiple attachments for the same URL, implementing this would have required no system changes, no redesign, and no deviation from Palmon’s disclosed operation.

7. Claim 9

- i. [9] The method of claim 1, wherein the receiving of an identification of first web content further comprises receiving a rating on the first web content, wherein the rating is a score assigned by the user of the first client computer.

155. In my opinion, Palmon discloses the additional limitation of claim 9.

156. **First**, as I already explained in Paragraphs 126-128, Palmon discloses that “*the receiving of an identification of first web content further comprises receiving a rating on the first web content.*”

157. **Second**, Palmon additionally teaches that “*the rating is a score assigned by the user of the first client computer.*” Palmon explains that, in some embodiments, the rating can take the form of “an **integer rating** between 0 and 5, [or] an **integer rating** between 0 and 10.” EX1003, [0118]. A numerical “integer rating” within a specified range is, in substance, a score.

158. Furthermore, as I discussed in Paragraphs 126-128, Palmon assigns that rating based on the input provided by the user who submits the attachment information for the URL. Thus, the rating (i.e., the score) is assigned by the same user who operates the client device that transmits the attachment information to the server—namely, “*the user of the first client computer.*”

8. Claim 10

159. As I will show further below, claim 10 is materially identical to claim 1, except for [10Pre] and [10A]. For the same reasons I discussed above with respect to [1A]–[1C], Palmon discloses or at least renders obvious [10B]–[10D]. *See* Paragraphs 94-123. The additional limitations [10Pre] and [10A] are addressed below, and as explained in the following paragraphs, Palmon discloses these additional limitations.

i. [10Pre] A computing device comprising:

160. I understand that the preamble may not limit the claims. Regardless, in my opinion, Palmon discloses [10Pre].

161. Palmon discloses a client–server architecture that includes “a search server 151.” EX1003, [0036] (“An exemplary client 101 is connected to ... a search server 151.”); Figure 1. Palmon further explains that “search server 151” is implemented as a “*computing device*” with conventional hardware elements, including “a processing system of at least one processor 157, a memory subsystem 167, ... local storage 159, and a NIC [network interface card] 162 coupling the processor system to the network 105.” EX1003, [0038]. Accordingly, Palmon discloses a *computing device*, as required by [10Pre].

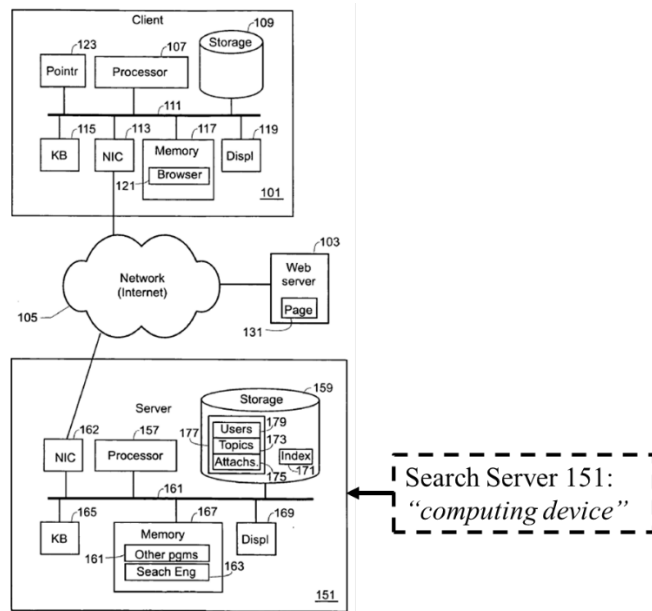


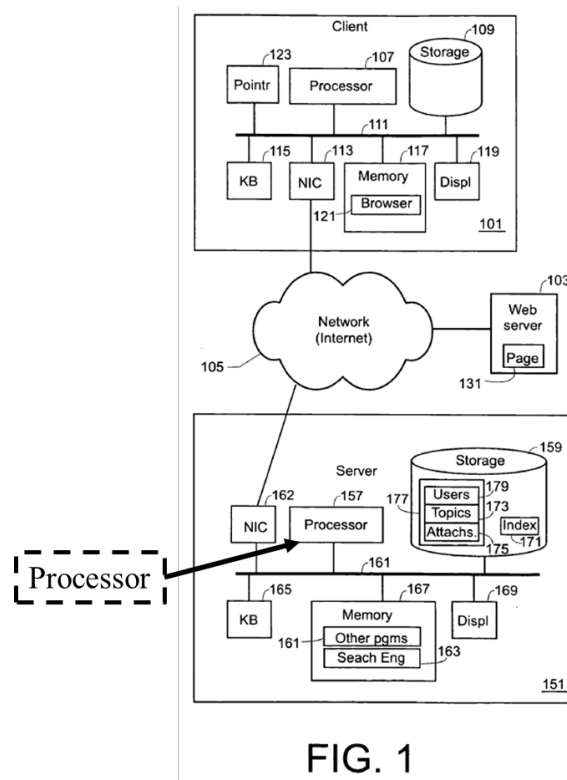
FIG. 1

EX1003, Figure 1.

ii. [10A] at least one processor; and a storage medium tangibly storing thereon program logic configured to instruct the at least one processor to at least:

162. In my opinion, Palmon discloses [10A].

163. As an initial matter, Palmon discloses “*at least one processor.*” See EX1003, [0038] (“An exemplary search server such as *search server 151* includes a processing system of *at least one processor 157*, a memory subsystem 167, a display subsystem 169, a keyboard 165, local storage 159, and a NIC 162 coupling the processor system to the network 105.”).



EX1003, Figure 1.

164. Furthermore, Palmon discloses “a storage medium tangibly storing thereon program logic configured to instruct the at least one processor.” Palmon explains that “search server 151 includes ... a memory subsystem 167.” EX1003, [0038]; Figure 1. Palmon also states that “search server 151 includes a search engine application 163 shown in Figure 1 as being in memory 167.” EX1003, [0038], [0041]; Figure 1. Palmon further explains that the search engine application 163 includes “a set of instructions implementing an embodiment of the invention.” EX1003, [0041]. Accordingly, Palmon discloses that the memory subsystem 167 (“storage medium”) stores instructions (“tangibly storing thereon program logic”)

that are configured to instruct at least one processor 157 (*“the at least one processor”*).

- iii. **[10B] receive, from a first client computer operated by a first user, an identification of first web content displayed by a web browser of the first client computer in a main browser window, the identification of the first web content transmitted by the first user via a user interface separate from the main browser window;**

165. As I noted in Paragraph 157, in my opinion Palmon discloses or renders obvious [10B] for the reasons I already discussed in Paragraphs 84-93 in connection with [1A].

- iv. **[10C] index the first web content; and**

166. As I noted in Paragraph 157, in my opinion Palmon discloses [10C] for the reasons I already discussed in Paragraphs 94-98 in connection with [1B].

- v. **[10D] in response to receiving a search query from a web browser of a second client computer operated by a second user, transmit search results to the web browser of the second client computer, the search results comprising the first web content identified by the first user in a position relative to identifications of other web content received from other users.**

167. As I noted in Paragraph 157, in my opinion Palmon discloses or renders obvious [10D] for the reasons I already discussed in Paragraphs 99-123 in connection with [1C].

9. Claim 11

- i. [11] The computing device of claim 10, wherein the program logic configured to instruct the at least one processor to receive further comprises program logic to instruct the at least one processor to receive a rating associated with the first web content from the first user.**

168. In my opinion Palmon discloses the additional limitation of claim 11 for the same reasons I already discussed in Paragraphs 126-128 in connection with claim 2.

10. Claim 12

- i. [12] The computing device of claim 10, wherein the program logic configured to instruct the at least one processor to receive further comprises program logic to instruct the at least one processor to receive ratings associated with the other web content from the other users.**

169. In my opinion Palmon discloses the additional limitation of claim 12 for the same reasons I already discussed in Paragraphs 129-131 in connection with claim 3.

11. Claim 14

- i. [14] The computing device of claim 11, wherein the rating associated with the first web content is selected from a group of rating types consisting of like, dislike, and neutral.**

170. In my opinion, Palmon discloses the additional limitation of claim 14 for the same reasons I already discussed in Paragraphs 132-135 in connection with claim 5.

12. Claim 15

- i. [15] The computing device of claim 10, wherein program logic configured to instruct the at least one processor to index further comprises program logic configured to instruct the at least one processor to receive keywords for the first web content.**

171. In my opinion Palmon discloses the additional limitation of claim 15 for the same reasons I already discussed in Paragraphs 136-138 in connection with claim 6.

13. Claim 17

- i. [17] The computing device of claim 10, wherein the first web content is the same as the other web content.**

172. In my opinion Palmon discloses or renders obvious the additional limitation of claim 17 for the same reasons I already discussed in Paragraphs 139-151 in connection with claim 8.

14. Claim 18

- i. **[18] The computing device of claim 10, wherein the program logic configured to instruct the at least one processor to receive further comprises program logic to instruct the at least one processor to receive a rating on the first web content, wherein the rating is a score assigned by the user of the first client computer.**

173. In my opinion Palmon discloses or renders obvious the additional limitation of claim 18 for the same reasons I already discussed in Paragraphs 153-156 in connection with claim 9.

15. Claim 19

- i. **[19Pre] A non-transitory computer readable storage medium storing computer program instructions configured instruct a computer processor to perform at least:**

174. I understand that the preamble may not limit the claims. Regardless, in my opinion Palmon discloses [19Pre] for the reasons I already provided in Paragraphs 158-162 in connection with limitations [10Pre] and [10A].

175. For example, Palmon describes a “search server 151” that includes “a processing system of at least one processor 157” along with “a memory subsystem 167.” EX1003, [0038], Fig. 1. Palmon also states that “search server 151 includes a search engine application 163 shown in Figure 1 as being in memory 167,” and that the search engine application 163 includes “a set of instructions implementing an embodiment of the invention.” EX1003, [0038], [0041], Fig. 1. Accordingly,

Palmon discloses that memory subsystem 167 corresponds to a “*non-transitory computer readable storage medium*” that is “*storing computer program instructions*” configured to direct processor 157 (a “computer processor”) to carry out the claimed operations.

- ii. **[19A] receiving, by a server computer from a first client computer operated by a first user, an identification of first web content displayed by a web browser of the first client computer in a main browser window, and a user content created by the first user of the web browser;**

176. In my opinion, Palmon discloses [19A].

177. As an initial matter, Palmon discloses “*receiving, by a server computer from a first client computer operated by a first user, an identification of first web content displayed by a web browser of the first client computer in a main browser window*” for the reasons I discussed in Paragraphs 85-91.

178. Additionally, Palmon also discloses “*receiving ... a user content created by the first user of the web browser.*” According to the ’744 Patent, “user content” includes “user selected **keywords**.” See EX1001, 9:19-27 (“to index the article with user content 165 (e.g., user selected **keywords**, rating, comments).”).

179. Palmon discloses that the server receives keywords associated with a URL for web content, and those keywords are *user content*. In particular, and for the reasons I discussed in Paragraphs 94-98 in connection with limitation [1B], Palmon describes that a user who is viewing a webpage may “click[] on an ‘add current page’

button on the explorer bar” and submit “attachment information”—including “the *search topic path* and the page URL”—to the *server computer*. EX1003, [0102]. Palmon defines that “search topic path” as “the set of topics selected during a particular search by a particular searcher.” EX1003, [0071]. And Palmon further explains that its topics are “*keywords*.” EX1003, [0003] (“In particular, the present invention is related to searching for information guided by a set of *topics such as keywords*.”).

180. Palmon further explains that the user can generate the topics/keywords through the same explorer-bar interface used for creating attachments. For example, Palmon states that “the user-specific explorer panel includes mechanisms for the user to *create a new topic*, e.g., by clicking on an ‘Add new topic’ button on the *explorer panel*.” EX1003, [0110]; Claim 11. Palmon also explains that “[w]hen a user creates a new topic, the user at the same time or later creates one or more attachments between the newly created topic and one or more URL.” EX1003, [0109].

181. Accordingly, Palmon teaches that the server receives one or more keywords “*user content*” created by the user who creates the attachment (“*first user*”) using the user-specific explorer panel, and that this explorer panel a part of the “web browser.”

iii. [19B] indexing, by the server computer, the first web content based at least in part on the user content;

182. In my opinion, Palmon discloses [19B].

183. As an initial matter, Palmon discloses “*indexing, by the server computer, the first web content*” for the reasons I explained in Paragraphs 94-98 in connection with limitation [1B].

184. Furthermore, Palmon also teaches that the *indexing* is “*based at least in part on the user content.*” In particular, Palmon explains that “[w]hen a user creates a new topic [which is *user content*], the user at the same time or later *creates one or more attachments* between *the newly created topic* and one or more URL.” EX1003, [0109]. *See also* EX1003, [0107], [0111].

iv. [19C] storing, by the server computer, the user content in association with the identification of the first web content; and

185. In my opinion, Palmon discloses [19C].

186. Palmon teaches that user-created topic information (“*user content*”) is transmitted to the server. In particular, Palmon explains that when a user creates a new topic, “the information of the new topic is sent to the server. On the server side, in 427, the method receives the new topic information, and *updates the set of topics 173 in the database 177.*” EX1003, [0111].

187. Palmon further teaches that the server maintains an association between that user-created topic and the URL identifying the relevant web content. Specifically, Palmon states that “[w]hen a user creates a new topic, the user at the same time or later *creates one or more attachments* between *the newly created topic* and one or more URL.” EX1003, [0109]. Palmon further discloses that this association is stored “by updating the set of attachments (table 175) in the database 177”. EX1003, [0102].

188. As I already explained in Paragraphs 94-98 in connection with limitation [1B], an attachment is “an *association* between a URL and a topic,” which is “defined by at least the *<URL,topic>* doublet.” EX1003, [0048]. Therefore, when an attachment between the newly created topic and the URL is created and sent to the server, the server stores the topic (which is “*user content*”) *in association with* the URL of the webpage that is displayed (“*identification of the first web content*”) in the database 177.

- v. **[19D] in response to receiving a search query from a web browser of a second client computer operated by a second user, transmitting, by the server computer, search results to the web browser of the second client computer,**

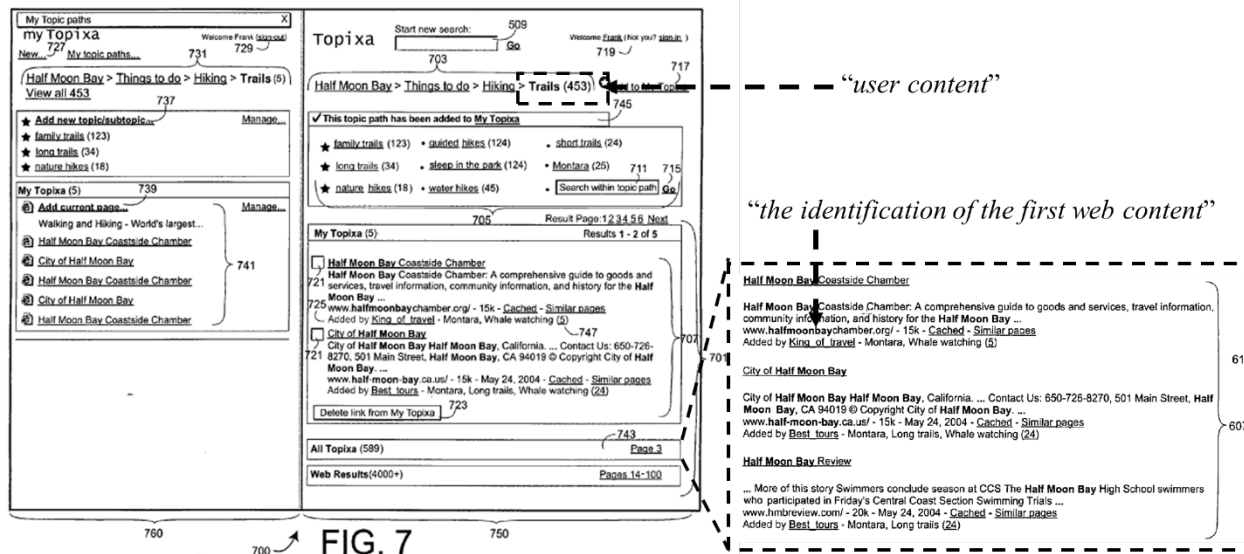
189. In my opinion, Palmon discloses [19D] for the reasons I already discussed in Paragraphs 99-116 in connection with limitation [1C].

- vi. **[19E] the search results comprising the identification of the first web content and the user content associated with the first web content.**

190. In my opinion, Palmon discloses, or at least renders obvious the additional limitation of [19E].

191. As I already explained in Paragraphs 99-123, Palmon shows in Figure 7 search results returned from the server that identify the user's current topic selection. In particular, Palmon explains that "the main window 750 includes an indication of the search topic path 703, in this case again 'Half Moon Bay>Things to do>Hiking>**Trails**.'" EX1003, [0207]. Thus, Palmon's results interface expressly identifies the current topic path, including the current topic "Trails." EX1003, [0207], Figure 7.

192. Palmon also teaches that the search results include a list of URL hits 707 corresponding to the identified current topic. For example, Palmon explains that the results display includes "second list 743" that includes "the overall results, e.g., the URLs presented in **list 607 of FIG. 6**," as illustrated below. EX1003, [0208]. *See also* Paragraphs 69-70, above. Furthermore, as I explained in Paragraphs 99-123, the list 607 includes "*search results comprising the first web content identified by the first user,*" i.e., King_of_travel," as illustrated below.



EX1003, Figures 6, 7.

193. As I already explained in Paragraphs 174-179, Palmon discloses that the topic, including the current topic “Trails,” may be created by the user for the first time. In those cases, the current topic “Trails” would be *“the user content associated with the first web content,”* as I have indicated in the Figure above.

194. In addition, it would have been obvious to implement Palmon’s interface in Figure 7 so that, instead of displaying the topic “Trails,” the interface displays topics newly created by a user. Palmon already teaches both (i) presenting topics in the user interface as part of the “search topic path” and (ii) allowing users to create new topics. Implementing the interface to display user-created topics in the same manner as preexisting topics therefore would have merely amounted to a simple substitution of one known element (preexisting topics per Palmon) for another (newly created topics as taught by Palmon). That straightforward

substitution would have obtained the predictable results of providing a user interface that shows the search results for the newly created topics.

B. Ground III: Palmon In View Of Walther Renders Obvious Claims 1-19

1. Independent Claim 1

195. As I already explained in Paragraphs 82-123 Palmon discloses, or renders obvious Claim 1.

196. Nevertheless, to the extent Patent Owner contends that Palmon's explorer bar implemented as "*additional window*" does not teach or suggest "a user interface separate from the main browser window," such a user interface would have been obvious in view of Walther.

197. As I already explained in Paragraphs 66-68, Palmon teaches a user interface provided in an "*additional window*" separate from the main display area. EX1003, [0206]. That interface includes an "add current page" control that transmits the URL of the currently displayed page to the server. EX1003, [0101]-[0102], [0117]-[0119], [0206], [0217].

198. A POSITA would have understood that the user interface in the additional window 760 could be implemented in various ways. For example, Walther teaches that the interface may be a "separate window" that, as the name suggests, is separate from the main display area. EX1004, [0123]. Specifically, as I

explained in Paragraph 72, Walther teaches that a search results page may include a “Save This” button next to a result that “launches a *page* or dialog box via which the user can annotate that particular hit.” EX1004, Figure 6, [0117]. And in particular, Walther teaches that “editing interface is advantageously displayed in a *separate window* ... that opens when a “Save This” button is activated.” EX1004, [0123]. This “editing interface is arranged on the user’s display in such a way that the user can look at both the subject page and the annotation or easily flip back and forth between the two.” EX1004, [0123]. That page or dialog box is illustrated in Figure 9 of Walther and is separate from the display of the subject page. EX1004, [0123]-[0124], Figure 9.

FIG. 9

EX1004, Figure 9.

199. A POSITA would have found it obvious to combine Palmon with Walther such that activating Palmon’s “add current page” control would invoke Walther’s user interface that is displayed in a “*separate window*” to obtain the user’s input for the page and transmit that input to Palmon’s server for storage. EX1003, [0102], EX1004, [0117], [0126].

200. A POSITA would have been motivated to incorporate Walther’s annotation interface into Palmon for multiple reasons. For instance, Walther’s interface is specifically designed to enable the user to view the main display while

providing information on the separate user interface. EX1004, [0117], [0123]-[0124]. Furthermore, Walther's interface is compatible with Palmon, because Palmon already contemplates a user-specific interface separate from the main window. EX1003, [0102], [0206], [0217]. And a POSITA would have readily understood that Walther's user interface, which is disclosed as a "*separate window*" is one known way to implement the user-specific interface.

201. In my opinion, a POSITA would also have had a reasonable expectation of success in combining the two references. In Palmon, user input is captured via a user-facing interface and communicated to the server for storage as attachment-related information. EX1003, [0102], [0117]-[0119]. Walther simply provides one way to implement an interface for collecting and submitting that information. EX1003, [0102], [0117]-[0119]; EX1004, [0117], [0124]. Implementing Palmon's "add current page" function using Walther's user interface would have been straightforward and would have predictably yielded Palmon's attachments using Walther's known user interface. EX1003, [0102], [0117]-[0119], [0206], [0217]; EX1004, [0117], [0123]-[0124].

202. Lastly, the combination would have been obvious because it would have merely amounted to substituting one known user-interface implementation (Palmon's user interface in an "additional window") with another known user-interface implementation (Walther's interface that is in a "*separate window*") to

obtain the predictable result of providing a user interface that is separate from the main display area.

2. Claim 2

- i. **[2] The method of claim 1, wherein the receiving of the identification of first web content further comprises receiving, by the server computer, a rating associated with the first web content from the first user.**

203. In my opinion, Palmon discloses the additional limitation of claim 2 for the reasons I discussed in Paragraphs 126-128.

3. Claim 3

- i. **[3] The method of claim 2, wherein the receiving of the identification of first web content further comprises receiving, by the server computer, ratings associated with the other web content from the other users.**

204. In my opinion, Palmon discloses the additional limitation of claim 3 for the reasons I discussed in Paragraphs 129-131.

4. Claim 4

- i. **[4] The method of claim 3, further comprising ranking, by the server computer, the first web content from the rating in relation to the ratings of the other web content received from the other users.**

205. In my opinion, Palmon in view of Walther renders obvious the additional limitation of claim 4.

206. As I already explained in Paragraphs 126-128, Palmon teaches that “each user may *rate* an attachment between a URL and a topic, so that in general, an

attachment can include the quadruple of information: the user, the topic, the URL, and the **rating** in the attachment data structure (table) 175.” EX1003, [0117]; *see also* EX1003, [0102], [0120], [0122].

207. Palmon does not expressly disclose ranking search results based on user-provided ratings. That concept, however, was well known in the art. For example, Walther teaches that user-supplied “annotations”—including ratings—can be used “affect the manner in which search results are presented.” EX1004, [0018]-[0019]; *see also* EX1004, [0051]. Consistent with that disclosure, Walther explains that “query response module 162 might incorporate the user’s ratings ... in the ranking of search results.” EX1004, [0068]. Walther further teaches that search results may be “reranked using ratings contained in the annotations.” EX1004, [0147].

208. Walther further teaches that re-ranking search results may rely on a collective or “global” score derived from multiple users’ feedback. Specifically, Walther explains that the re-ranking can be based on “an aggregate rating (e.g., an average rating)” taken from “every user who has provided ... a rating.” EX1004, [0072]. Walther provides an example in which the server “collect[s] all ratings that any user might have assigned to the page or site having that URL.” EX1004, [0180]. Walther explains that “[t]hese ratings are then averaged or combined in some other manner to determine a **global rating** for the page or site” and that the resulting global

rating “may be used as a factor in the search-results ranking algorithm.” EX1004, [0180]-[0181].

209. A POSITA would have found it obvious to combine Palmon with Walther such that Palmon’s server re-ranks URLs in the search results using each URL’s global ratings. In that manner, Palmon’s server “*rank[s] ... the first web content*” and “*other web content*” according to their associated global ratings.

210. Walther explains that global ratings are derived from ratings supplied by “every user who has provided ... a rating.” EX1004, [0072]. Thus, where the “*first web content*” has been rated only by the first user (e.g., by adding the URL to that user’s list of favorite URLs, EX1003, [0122]), the global rating for the “*first web content*” is simply the first user’s rating. Conversely, where “*the other web content*” has been rated only by “*the other users*” (e.g., by adding the URL of “*the other web content*” to their list of favorite URLs, EX1003, [0122]), the global rating for “*the other web content*” reflects “*the ratings of the other web content received from the other users.*”

211. Therefore, Palmon together with Walther teaches that Palmon’s server (“*server computer*”) “*rank[s] ... the first web content from*” the global rating of the first web content (“*the rating*”) in relation to the global rating of “*the other web content*” (“*the ratings ... received from the other users*”).

212. A POSITA would have been motivated to incorporate Walther's ranking approach into Palmon's system to modify the ordering of search results. Walther explains that aggregated annotations—such as aggregated ratings—“can be used for purposes such as resolving ambiguity in search queries.” EX1004, [0191]. Walther further teaches that this benefit applies even where “the user's identity or particular interests are not known” (EX1004, [0191]), because the aggregation can still be used to refine result presentation to “enhance the user's experience.” EX1004, [0189]. As I explained above, Palmon already collects user ratings in a manner sufficient to support the calculation of such aggregated ratings. EX1003, [0102], [0117], [0120], [0122]. And because Walther teaches that re-ranking the results would “enhance the user's experience” with the search system (EX1004, [0189]), a POSITA would have been motivated to re-rank search Palmon's results using the aggregated ratings.

213. A POSITA would have had a reasonable expectation of success in making the combination because Palmon already collects the rating information that Walther uses for ranking; applying Walther's re-ranking technique therefore would have merely involved using a known technique (Walther's re-ranking) to improve a similar system (Palmon's search system) in the same manner (re-ranking the search results based on the user's ratings of webpages). Implementing this functionality

would have amounted to routine software integration, well within the capabilities of a POSITA.

5. Claim 5

- i. [5] The method of claim 2, wherein the rating associated with the first web content is selected from a group of rating types consisting of like, dislike, and neutral.**

214. In my opinion, Palmon discloses the additional limitation of claim 5 for the reasons I discussed in Paragraphs 132-135.

6. Claim 6

- i. [6] The method of claim 1, wherein the indexing of the first web content further comprises receiving, by the server computer, keywords for the first web content.**

215. In my opinion, Palmon discloses the additional limitation of claim 6 for the reasons I discussed in Paragraphs 136-138.

7. Claim 7

- i. The method of claim 1, wherein the receiving of the identification of the first web content further comprises receiving, by the server computer from the first client computer, a comment on the first web content.**

216. In my opinion Palmon in view of Walther renders obvious the additional limitation of claim 7.

217. As I already explained in Paragraphs 89-91, Palmon discloses that a URL (“*identification of first web content*”) is sent to a server when making an attachment.

218. While Palmon discloses that the attachment can include keywords and ratings (EX1003, [0048]), Palmon does not expressly teach that the server also receives “*a comment on the first web content.*” That feature, however, was well known in the art. Walther, for example, describes collecting user-provided annotations that include a “free-text description of the document.” EX1004, [0050]. A free-text description of a webpage—such as the narrative entered in Figure 9 (field 918)—functions as “*a comment on the first web content*” because it records the user’s written remarks about that page. Walther further confirms that these written remarks are retained and later retrievable through a dedicated control, called “Show My *Comments*.” See EX1004, [0119] (“search toolbar 706 also includes a ‘*Show My Comments*’ button 714 that appears in an active state whenever the user is viewing a page that she has previously *annotated*; the user can operate button 714 to view *her previous annotation.*”).

Save This

URL: 902

Title 904

Save what? 908

☒ This page only

☐ All URLs beginning with 912

Keywords 916

Description 918

Rating: 920

☐

☐

☒ None

922 924

Text box 918 is for free-form text entry

FIG. 9

EX1004, Figure 9.

219. It would have been obvious to combine Palmon with Walther such that Palmon's server would also collect a "free-text description" of a webpage as part of an attachment. Palmon already discloses that, when a user submits an attachment, the server "*receiv[es]* the attachment information" (EX1003, [0102]) and that the attachment information includes user-provided metadata, such as the topic associated with the URL and a user rating. EX1003, [0048]; [0101]. Given Walther's disclosure that user-provided annotations can include "free-text descriptions of the web page" (EX1004, [0091]), a POSITA would have found it obvious for Palmon's

attachment submission to include that additional descriptive text alongside the other attachment metadata sent to the server.

220. A POSITA would have been motivated to combine Palmon with Walther such that Palmon's server would also collect a "free-text description" of a webpage as part of an attachment. Walther teaches that annotations, such as the "free-text description," can be "advantageously used in responding to current and future queries submitted by that user." EX1004, [0077]. Walther further teaches that the description may be used in multiple concrete ways—for instance, to generate an abstract of the webpage or to present the descriptive text in connection with the webpage display. EX1004, [0128] ("the abstract is generated by using the user-supplied keywords and/or *description*..."); [0139] ("Where the annotation includes metadata (e.g., a description) ..., such metadata may be displayed overlaying or near ... the part of the page to which it is connected."). In view of these disclosed benefits, a POSITA would have been motivated to collect and store the "free-text description" taught by Walther within Palmon's attachment.

221. A POSITA also would have had a reasonable expectation of success in making this combination. Palmon already discloses that a user submits an attachment request that conveys a URL together with associated, user-provided information to a server. EX1003, [0101]-[0102], [0117]-[0119]. Walther teaches that a user may supply additional annotation content—such as a "free-text description"—that can be

stored and later used in connection with that same document identifier. EX1004, [0018], [0077]. In view of these teachings, adding Walther's "free-text description" to the information transmitted and stored with Palmon's URL would have been an ordinary and predictable extension of Palmon's existing attachment submission, not a redesign or departure from Palmon's disclosed approach.

222. Furthermore, incorporating Walther's "free-text description" of a webpage as part of a Palmon's attachment would have merely amounted to using a known technique (Walther's collection of free-text description for use in web search applications) to improve similar system (Palmon's server that performs webpage searches) in the same way (using Walther's free-text description to provide enhanced search experience).

8. Claim 8

- i. [8] The method of claim 1, wherein the first web content is same as the other web content.**

223. In my opinion, Palmon discloses the additional limitation of claim 8 for the reasons I discussed in Paragraphs 139-151.

9. Claim 9

- i. **[9] The method of claim 1, wherein the receiving of an identification of first web content further comprises receiving a rating on the first web content, wherein the rating is a score assigned by the user of the first client computer.**

224. In my opinion, Palmon discloses the additional limitation of claim 9 for the reasons I discussed in Paragraphs 153-156.

10. Independent Claim 10

225. As I already explained in Paragraphs 157-165, Palmon discloses or renders obvious claim 10.

226. To the extent Patent Owner contends that Palmon's "additional window 760" does not teach or suggest "*a user interface separate from the main browser window,*" such a user interface would have been obvious in view of Walther, as I already discussed in Paragraphs 194-200.

11. Claim 11

- i. **[11] The computing device of claim 10, wherein the program logic configured to instruct the at least one processor to receive further comprises program logic to instruct the at least one processor to receive a rating associated with the first web content from the first user.**

227. In my opinion Palmon discloses the additional limitation of claim 11 for the same reasons I already discussed in Paragraph 201 in connection with claim 2.

12. Claim 12

- i. [12] The computing device of claim 10, wherein the program logic configured to instruct the at least one processor to receive further comprises program logic to instruct the at least one processor to receive ratings associated with the other web content from the other users.**

228. In my opinion Palmon discloses the additional limitation of claim 12 for the same reasons I already discussed in Paragraph 202 in connection with claim 3.

13. Claim 13

- i. [13] The computing device of claim 12, further comprising program logic configured to instruct the at least one processor to rank the first web content from the rating in relation to the ratings of the other web content received from the other users.**

229. In my opinion Palmon discloses or renders obvious the additional limitation of claim 13 for the same reasons I already discussed in Paragraphs 203-211 in connection with claim 4.

14. Claim 14

- i. [14] The computing device of claim 11, wherein the rating associated with the first web content is selected from a group of rating types consisting of like, dislike, and neutral.**

230. In my opinion, Palmon discloses the additional limitation of claim 14 for the same reasons I already discussed in Paragraphs 132-135 in connection with claim 5.

15. Claim 15

- i. [15] The computing device of claim 10, wherein program logic configured to instruct the at least one processor to index further comprises program logic configured to instruct the at least one processor to receive keywords for the first web content.**

231. In my opinion Palmon discloses the additional limitation of claim 15 for the same reasons I already discussed in Paragraphs 136-138 in connection with claim 6.

16. Claim 16

- i. [16] The computing device of claim 10, wherein the program logic configured to instruct the at least one processor to receive further comprises program logic to instruct the at least one processor to receive, from the first client computer, a comment on the first web content.**

232. In my opinion Palmon discloses or renders obvious the additional limitation of claim 16 for the same reasons I already discussed in Paragraphs 214-220 in connection with claim 7.

17. Claim 17

- i. [17] The computing device of claim 10, wherein the first web content is the same as the other web content.**

233. In my opinion Palmon discloses or renders obvious the additional limitation of claim 17 for the same reasons I already discussed in Paragraphs 139-151 in connection with claim 8.

18. Claim 18

- i. [18] The computing device of claim 10, wherein the program logic configured to instruct the at least one processor to receive further comprises program logic to instruct the at least one processor to receive a rating on the first web content, wherein the rating is a score assigned by the user of the first client computer.**

234. In my opinion Palmon discloses or renders obvious the additional limitation of claim 18 for the same reasons I already discussed in Paragraphs 153-156 in connection with claim 9.

19. Independent Claim 19

235. As I already explained in Paragraphs 172-192, Palmon discloses or renders obvious claim 19.

C. Ground IV: Palmon in Combination with Walther And Lu Renders Obvious Claims 19 and 20

1. Palmon In View Of Walther and Lu

i. Palmon In View Of Walther's Annotations And Their Presentation In Search Results ("Palmon-Walther Combination")

236. As I already explained in Paragraphs 57-70, Palmon discloses a "topic-guided searching" that allows users to search webpages by selecting or searching for "topics." EX1003, [0011], [0017]. In support of that workflow, Palmon teaches that users may link topics to particular URLs by creating an "attachment," i.e., an association between a topic and a URL that enables subsequent topic selections to retrieve the associated content. EX1003, [0048], [0099].

237. Palmon teaches that when a user creates an attachment, the user can supply additional metadata for the URL, including a rating. For example, Palmon explains that "[a] *URL* viewed under a search topic path also may be actively *rated by a user*, and such a *rating of the URL* creates and rates a new user-specific attachment." EX1003, [0120]. *See also* EX1003, [0122] ("a user viewing URLs, e.g., that are attached to one or more topics as a result of a search, may positively rate any of the viewed URLs."). Consistent with this disclosure, Palmon further states that

“an attachment can include the quadruple of information: the user, the topic, the URL, and the *rating*.” EX1003, [0117].

238. Although Palmon does not expressly describe associating a URL with metadata beyond ratings, the use of additional user-supplied metadata associated with URLs was well known in the art. For example, as I already explained in Paragraphs 71-73, Walther discloses a search server that obtains user-provided metadata for a web page—referred to as “annotations.” EX1004, [0009], [0065]. Walther further teaches that these annotations are collected through an annotation editing interface presented to the user. EX1004, Figure 9, [0050], [0072], [0126]. Walther explains that the annotations stored for a given page may include “a rating (which may be favorable or unfavorable) of the document, a list of keywords identifying a topic (or topics) of the document, [and] a free-text description of the document.” EX1004, [0018]. Walther also teaches that such annotations are maintained in association with the page’s URL and stored together in a database that is coupled to the search server. *See* EX1004, [0076] (“each annotation is a *structured entry* in a-personalization database 166”), [0083]-[0085], Figure 3.

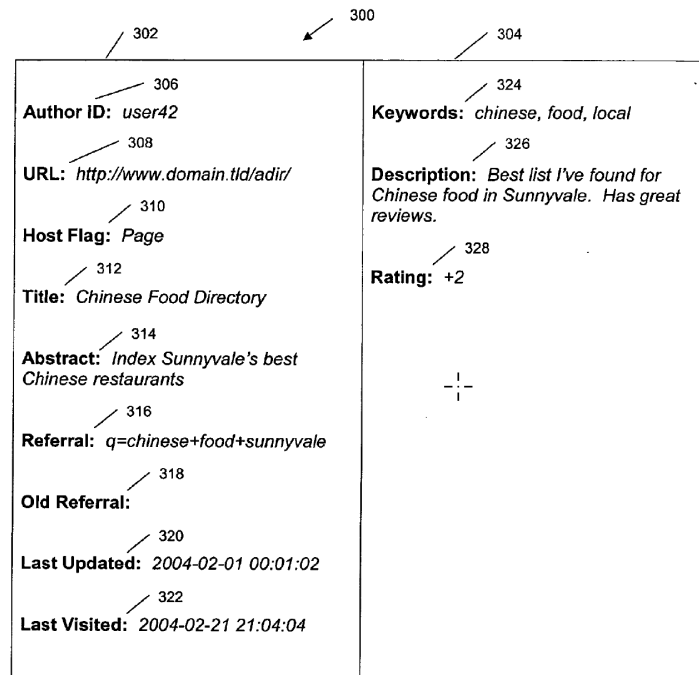


FIG. 3

EX1004, Figure 3.

239. Walther additionally discloses that a search server may rely on stored annotations to supplement and personalize the search results that are returned to a user. EX1004, [0009], [0019], [0066]. For instance, when the user submits a search query, Walther describes providing a “results page” that includes “a personalized results area (‘My Results’), in which any hits that the user has previously annotated are displayed.” EX1004, [0137]-[0138]. *See also* EX1004, [0126] (“search server 160 accesses a user’s library of annotations to provide additional information on a search results page generated in response to a query from that user.”). Figure 12 depicts such a results page 1200, reproduced below.

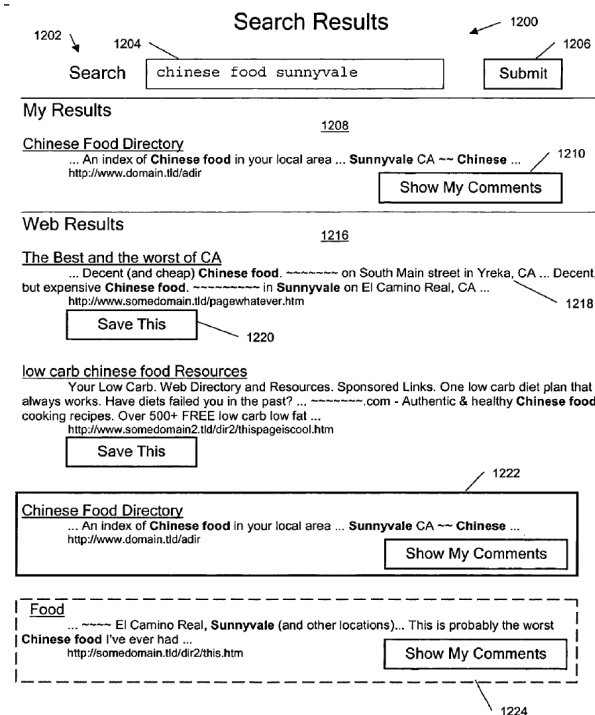


FIG. 12

EX1004, Figure 12.

240. For items that are shown in the personalized results area, Walther explains that the interface permits “the user [to] activate to view her previous annotation.” EX1004, [0138]. Walther’s Figure 13, which I have reproduced below, illustrates an example “annotation view page 1300” that presents the user’s previously stored annotations for the relevant URL, including fields for “Keywords,” “Description,” and “Rating.” EX1004, [0139], Figure 13. And while Figure 13 depicts those annotations on a separate view page 1300, Walther also teaches an alternative presentation in which the annotation content is shown directly on the

search results page—i.e., “the annotation may be displayed *in-line in [search results]/ page 1200.*” EX1004, [0139].

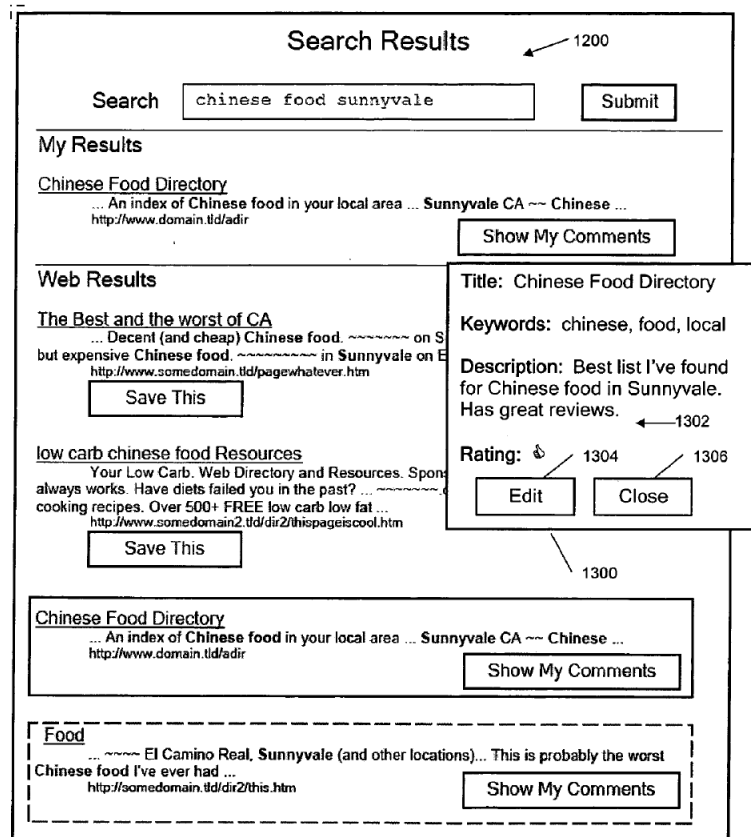


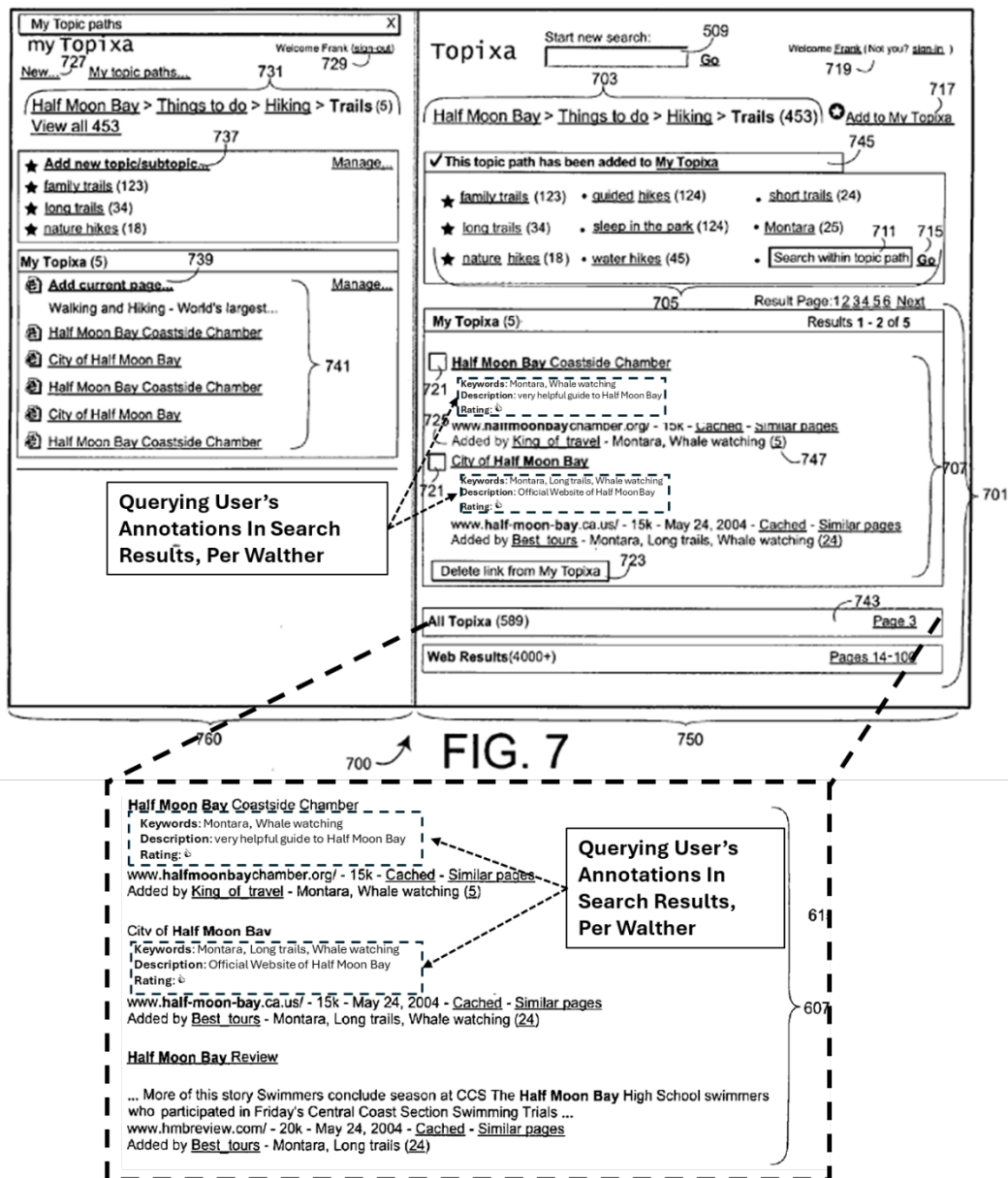
FIG. 13

EX1004, Figure 13.

241. A POSITA would have found it obvious to combine Palmon with Walther such that Palmon’s system includes Walther’s annotation functionality. In particular, a POSITA would have found it obvious to modify Palmon so that: (1) when attachment is created, Palmon’s server obtains and stores user annotations—rating and text description—via an annotation editing interface as taught by Walther

(EX1004, [0018], [0050], [0077], [0083]-[0085], Figure 9); and (2) when the search results are presented, Palmon's server provides—for one or more URLs in the search results—the querying user's keywords/topics, rating, and free-text description associated with the URL, presented in-line with the search results, consistent with Walther and as illustrated below (EX1004, [0138]-[0139]).

Palmon-Walther Combination



EX1003, Figures 6, 7.

242. A POSITA would have been motivated to make the combination of Palmon and Walther to arrive at the combination described above for three independent reasons.

243. First, Walther explains that “[o]nce collected, annotation data can be used in various ways to enhance the user’s searching and Web browsing experience.” EX1004, [0134]. Consistent with that teaching, a POSITA would have been motivated to apply Walther’s annotation techniques in Palmon’s system to “enhance the user’s searching and Web browsing experience” (EX1004, [0134]), including by collecting and presenting the querying user’s annotations together with the corresponding search results, as exemplified in Figure 13 of Walther. Therefore, a POSITA would have been motivated to obtain and display the keywords/topics, ratings, and text descriptions alongside search results in Palmon’s system, as illustrated above.

244. Second, Palmon and Walther are directed to the same technical problem and are compatible. Palmon and Walther both teach associating webpages with metadata. *See* EX1003, [0048], [0099] (associating URLs with topics and ratings); EX1004, [0018] (associating URLs with topics, ratings, and text descriptions). Palmon and Walther both further teach enhancing search-result presentation by showing URLs together with the associated metadata so that users can more efficiently assess relevance. *See* EX1003, [0208], Figure 7 (displaying keywords/topics along with URLs); EX1004, [0133], Figure 13 (displaying keywords/topics, rating, description along with URLs). Because Palmon and Walther address the same general problem—enabling users to more quickly evaluate

search results using metadata/annotations—a POSITA would have understood that Walther’s broader set of metadata would readily be applicable to Palmon’s system. Therefore, a POSITA would have been motivated to collect and use not only Palmon’s metadata (keywords/topics and ratings) but also Walther’s text descriptions—so that Palmon’s system likewise collects and displays that expanded set of metadata with the search results.

245. Third, the combination of Palmon and Walther would have required nothing more than the predictable application of known techniques to achieve their well-established functions. Walther discloses well-known and understood mechanisms for collecting and presenting multiple forms of metadata. EX1004, [0134], [0136], [0139]-[0140]. Palmon already collects and displays metadata associated with URLs. EX1003, [0206]-[0207]; EX1004, [0134], [0136], [0139]-[0140]. Adapting Palmon’s system to collect additional metadata (free-text descriptions in addition to keywords and ratings) and to present this metadata as is disclosed by Walther would have been a straightforward, predictable design choice that enhances a user’s ability to evaluate search results, while leaving Palmon’s fundamental operation intact.

246. A POSITA would have had a reasonable expectation of success in combining Palmon and Walther for at least two reasons. First, as I already discussed above, a POSITA would have appreciated that Palmon and Walther are highly

compatible. Therefore, combining Palmon and Walther would have required nothing more than applying a known technique (e.g., Walther's technique of collecting, storing, and displaying user annotations—topics/keywords, ratings, and text descriptions—in search results (EX1004, [0018], [0136]-[0139], [0142])) to enhance a similar system (e.g., Palmon's search system that also collects and stores a rating and topics/keywords and displays the topics/keywords (EX1003, [0117]-[0119])) in the same manner (e.g., augmenting search results to display text descriptions of a webpage in addition to a rating and topics/keywords). As such, a POSITA would have expected that integrating Walther's annotation techniques into Palmon would operate as intended—the search results would be displayed with keywords/topics, ratings, and text descriptions.

247. Second, the combination of Palmon and Walther would have been straightforward and predictable. Palmon describes maintaining URL-associated metadata as an “attachment,” which includes user ID, keyword/topic, URL, and rating. EX1003, [0117]-[0119]. Walther likewise describes storing URL-based annotations that encompass keywords/topics, ratings, and free-text descriptions, and Walther further teaches presenting that annotation information in connection with search results. EX1004, [0018], [0136]-[0139], [0142]. Thus, integrating Walther's annotation content into Palmon would have involved supplementing Palmon's existing attachment framework to capture, retain, and present the additional fields

Walther describes (e.g., topics/keywords, ratings, and free-text descriptions) as part of the results display—an incremental software implementation well within the capabilities of a POSITA. EX1003, [0117]-[0119], [0206]-[0207]; EX1004, [0136], [0139], [0142].

248. Lastly, the combination of Palmon and Walther would have been obvious because it would have involved applying Walther’s established approach for collecting and storing user annotations—and for using those annotations to supplement search-result presentation—within Palmon’s disclosed topic-guided search framework, yielding the expected and predictable outcome of “enhanc[ing] the user’s searching and Web browsing experience.” EX1003, [0206]-[0207]; EX1004, [0120], [0134], [0136], [0138]-[0139].

**ii. Palmon-Walther Combination, Further In View Of
Lu’s Presentation Of Other User’s Annotations In
Search Results (“Palmon-Walther-Lu Combination”)**

249. The search results in the Palmon-Walther Combination only include the querying user’s annotations. However, it was also well known in the art that search results may additionally include annotations contributed by users other than the querying user, rather than being limited to the querying user’s annotations alone.

250. For example, Lu discloses “search systems and methods that leverage ... annotations provided by other users who have a trust relationship to the querying user.” EX1005, [0006]. As I explained in Paragraphs 74-76, in response to a user’s

search query, Lu's search server generates a search results page that includes a "personalized ('My Web') results area, in which any hits that members of the querying user's trust network have previously annotated are displayed." EX1005, [0158]-[0159]. Lu further explains that the "search results page [also] provides excerpts from the comments made by trust network members in 'My Web' section 948." EX1005, [0163]. In particular, "[e]ach hit 950 [in the search results] is accompanied by *comments 952* extracted from *annotations by trust network members.*" EX1005, [0163].

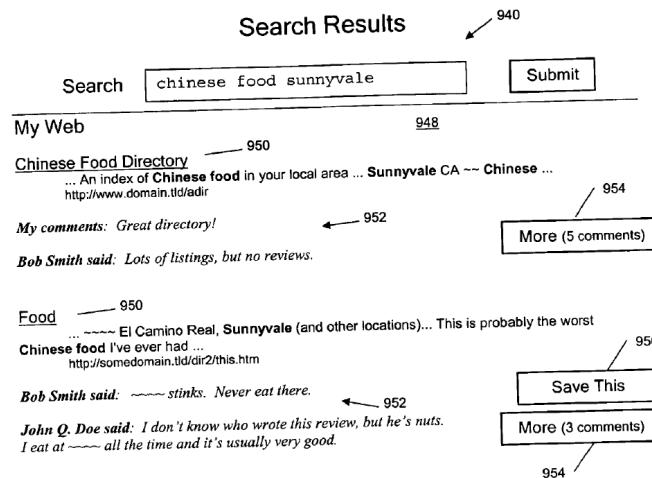
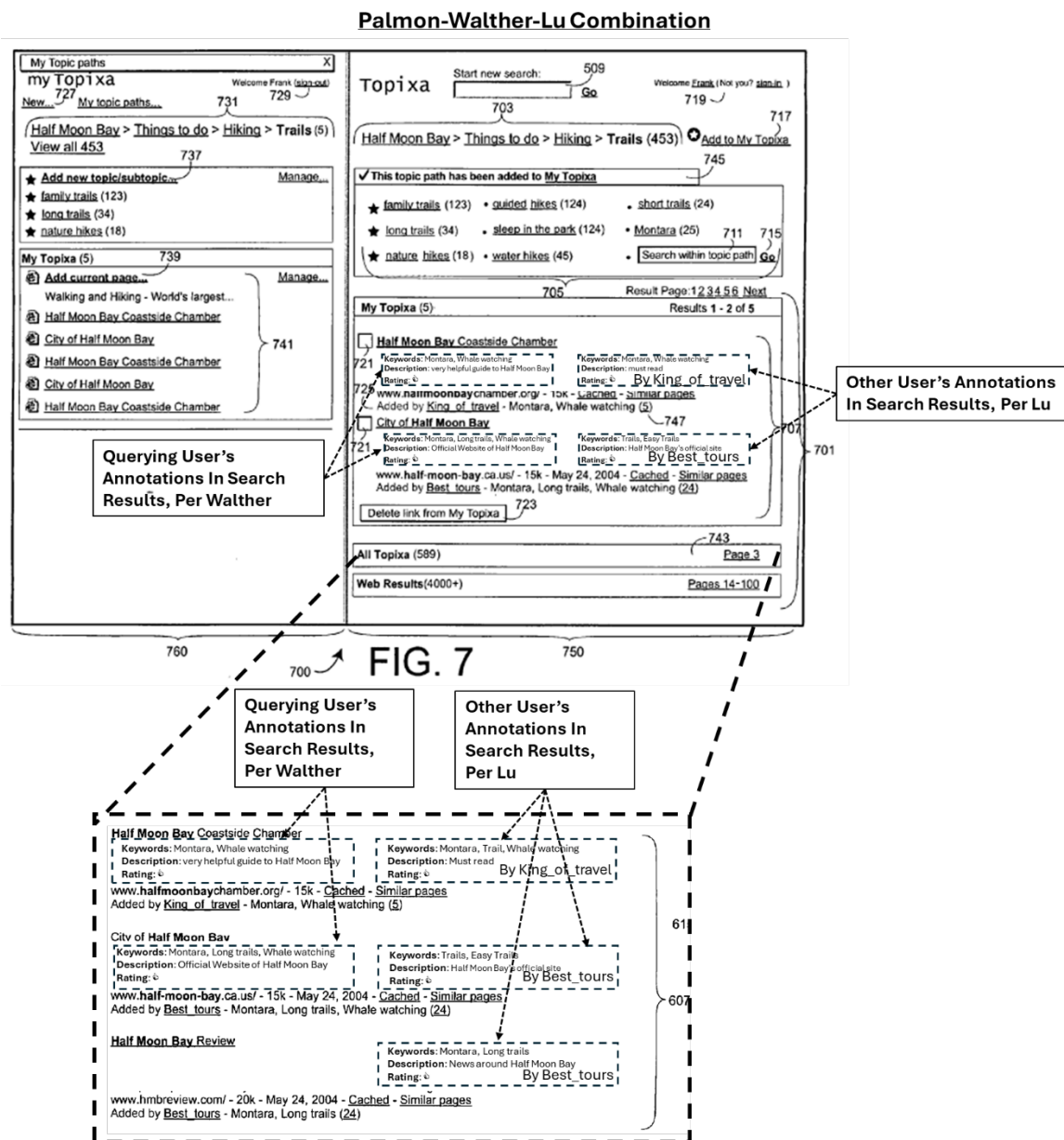


FIG. 9B

EX1005, Figure 9B.

251. A POSITA would have found it obvious to combine the Palmon-Walther system with Lu so that search results are further enhanced to show annotations supplied by users other than the querying user—such as users who

created the attachment(s) associated with a given URL. In the resulting system, the search results page would display URLs together with the querying user's annotations as well as annotations from users other than the querying user who created the attachments for those URLs, thereby furnishing additional context that aids the querying user in assessing the search results, as illustrated below.



EX1003, Figures 6, 7.

252. A POSITA would have been motivated to further combine the Palmon-Walther system with Lu as described above for at least two independent reasons. First, Lu teaches that annotations supplied by users other than the querying user can “enhance the querying user’s experience,” and further explains that one mechanism for leveraging those annotations is to present them in connection with the querying user’s search results. EX1005, [0015], [0163]. Consistent with those teachings, a POSITA would have been motivated to incorporate Lu’s approach into the Palmon-Walther system to further improve the user’s searching and web browsing experience by adding socially informed context to the search results.

253. Second, a POSITA would have understood that Lu’s teachings fit squarely within the Palmon-Walther combined system. As I explained in Paragraphs 234-246, the search results page in the Palmon-Walther system already presents URLs together with the querying user’s stored annotations. Lu teaches adding another source of the same kind of information—annotations authored by users other than the querying user, including users in a trust network—to that results presentation. Implementing Lu’s disclosure therefore would have involved augmenting the existing results display to incorporate third-party annotations, which is an incremental and predictable extension of the Palmon-Walther annotation framework.

254. A POSITA would have been further motivated to incorporate Lu into the Palmon-Walther system because Lu incorporates Walther by reference in its entirety. EX1005, [0005]. In particular, Lu expressly explains that it is “related to commonly-owned co-pending U.S. patent application Ser. No. _____ (Attorney Docket No. 017887-013720US), filed _____, entitled ‘Search Systems and Methods with Integration of User Annotations,’ the disclosure of which is incorporated herein by reference for all purposes.” EX1005, [0005].

255. A POSITA would have readily understood that this incorporation-by-reference statement of Lu incorporates Walther by reference. For one, the title of Walther matches the incorporated reference. EX1004, Cover, EX1005, [0005]. Furthermore, the attorney docket number 017887-013720US matches Walther’s attorney docket number (*see* EX1014, 1) (showing that Walther’s attorney docket number was 017887-013720US).

256. For these reasons, a POSITA would have readily understood that Lu builds directly on Walther’s search system framework that incorporates annotations. Therefore, Lu’s multi-user-annotation teachings align with—and would have been understood as an obvious, incremental extension of—the Palmon-Walther combination.

257. A POSITA would have had a reasonable expectation of success in combining the Palmon-Walther system with Lu for two reasons. First, as I already

alluded to, Lu's disclosure is highly compatible with Palmon-Walther system. As such, a POSITA would have readily understood that displaying others' annotations in search results, as taught by Lu in the search results of Palmon-Walther would have merely amounted to using a known technique to improve similar systems to enhance the querying user's search experience.

258. Second, combining the Palmon-Walther system with Lu would have been straightforward and predictable. In the Palmon-Walther system, the search results already include querying user's annotations. Lu teaches additionally obtaining annotations from others—particularly users with a trust relationship to the querying user—and presenting those annotations with the corresponding URLs in the search results. EX1005, [0006], [0158], [0163]. Applying Lu's technique to the Palmon-Walther Combination would have been straightforward because the Palmon-Walther search results already identify URLs, and the change would simply involve retrieving the relevant annotations from others and incorporating them into the search results in the manner illustrated by Lu. EX1003, Figure 7; EX1004, [0139]-[0140], Figure 13; EX1005, [0163]. This implementation would have amounted to known functionality carried out in software, which falls within the ordinary skill of a POSITA once the desired function is identified.

2. Claim 19

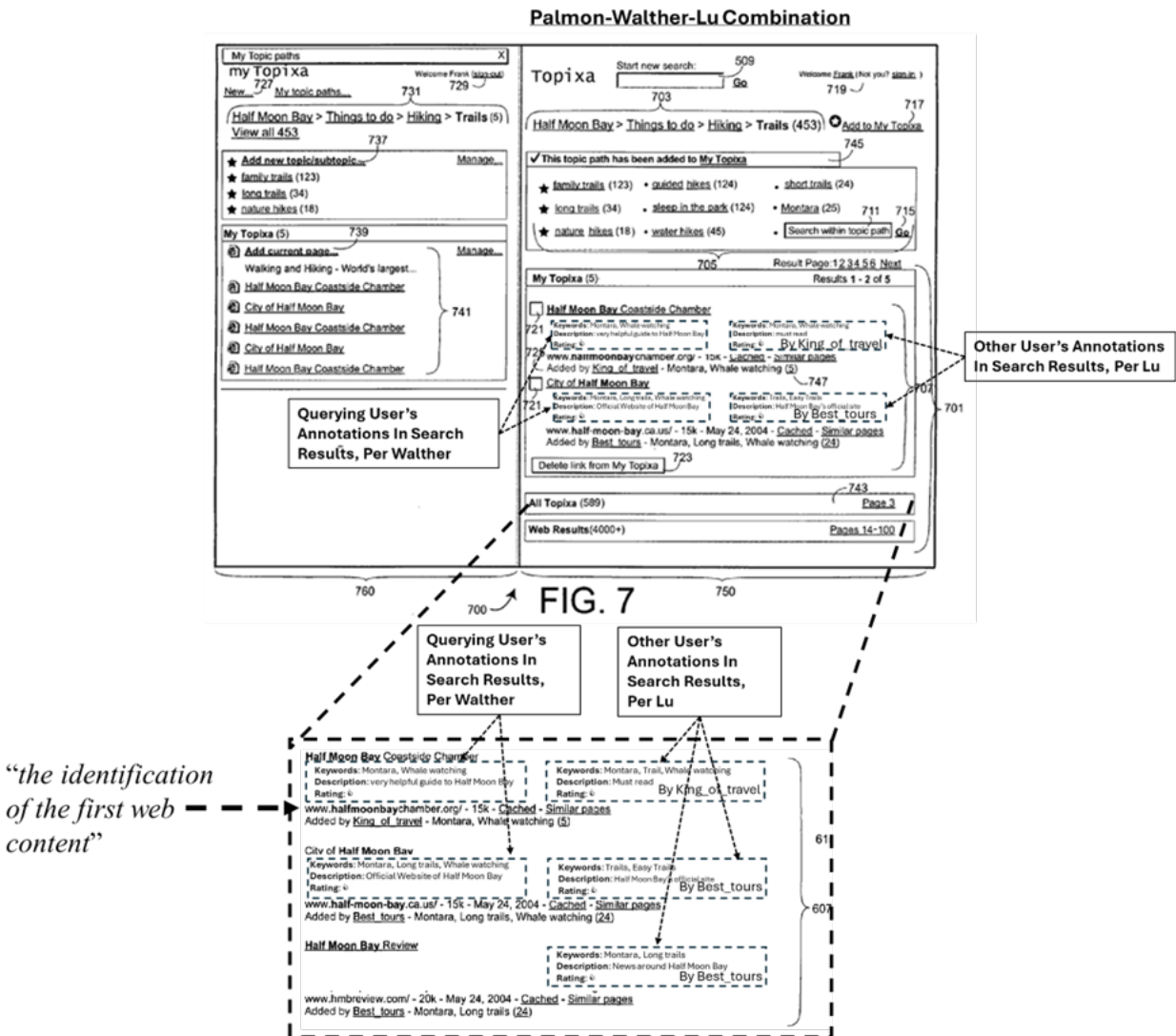
- i. [19Pre] A non-transitory computer readable storage medium storing computer program instructions configured instruct a computer processor to perform at least:**

259. In my opinion, the Palmon-Walther-Lu Combination teaches [19Pre] for the reasons I already provided in Paragraphs 172-173.

- ii. [19A] receiving, by a server computer from a first client computer operated by a first user, an identification of first web content displayed by a web browser of the first client computer in a main browser window, and a user content created by the first user of the web browser;**

260. In my opinion, the Palmon-Walther-Lu Combination teaches [19A].

261. First, Palmon-Walther-Lu Combination discloses “*receiving, by a server computer from a first client computer operated by a first user, an identification of first web content displayed by a web browser of the first client computer in a main browser window*” for the reasons I already explained in Paragraphs 85-91. For instance, as illustrated below, in the Palmon-Walther-Lu Combination the server has received attachment information for the webpage “Half Moon Bay Coastsides Chamber” (“*first web content*”) from a user called “King_of_travel” (“*first user*”), which would have included the URL for the webpage “Half Moon Bay Coastsides Chamber” (“*an identification of first web content*”) as explained in Paragraphs 85-91.



EX1003, Figures 6, 7.

262. Furthermore, the Palmon-Walther-Lu Combination also discloses that the server “receiv[es] ... a user content created by the first user of the web browser.” For example, as I explained in Paragraphs 174-179, Palmon teaches that the server receives one or more keywords/topics associated with a URL of the web content. Similarly, Walther teaches that “a user can create and save an annotation.” EX1004, [0019]. This annotation is “descriptive and/or evaluative metadata related to a

document (e.g., a Web page or site).” EX1004, [0050]. Walther explains that such annotation may include “a rating ... [and] a free-text description” of the webpage. EX1004, [0018], [0050], [0090]-[0092]. Walther further teaches that these user-created annotations are provided to, and maintained by, the server-side system components. *See* EX1004, [0065] (“Personalization database 166 ... includes ... records of user-supplied annotations for various Web pages or sites.”); [0070] (“When the user elects to annotate a hit page or site, user annotation module 164 receives the new annotation data from the user (e.g., via client system 120) and updates personalization database 166.”), [0076], [0083]-[0085].

263. Accordingly, for the reasons set forth above, the Palmon-Walther-Lu Combination teaches that the server receives one or more key words/topics, rating, and text description of the URL—collectively, “*user content*”—that are created and provided by the first user of the web browser.

iii. [19B] indexing, by the server computer, the first web content based at least in part on the user content;

264. In my opinion, Palmon-Walther-Lu Combination discloses [19B].

265. In particular, Palmon-Walther-Lu Combination teaches “*indexing, by the server computer, the first web content based at least in part on*” the topic/keyword (“*user content*”), for the reasons I already explained in Paragraphs 180-182. For instance, Palmon discloses that the server “index[es] ... the first web

content based at least in part on” one or more created keywords/topics (“*user content*”). See Paragraphs 180-182, above.

266. To the extent it is determined that [19B] requires indexing the first web content using the entirety of the “*user content*,” the Palmon-Walther-Lu Combination teaches that interpretation. For instance, Walther explains that user annotations—including the rating and text description—are maintained in association with a web page (URL) and stored together in a database coupled to the search server. See EX1004, [0071], [0076] (“each annotation is a ***structured entry*** in a-personalization database 166”), [0083]-[0085], Figure 3. Walther further teaches leveraging those annotations in search-related operations, including to identify and refine which URLs are returned and how they are ordered in the results. See, e.g., EX1004, [0101] (“A checkbox 506 allows the user to request a display of only those annotations that include one or more user-specified keywords.”); [0137] (“after ***comparisons between hits and annotations*** are completed, the results list is optionally reranked using ***ratings*** contained in the annotations.”); [0141] (“a user’s annotations may be used to identify hits during a search operation. ... In one such embodiment, the keywords and ***description fields of the annotations are searched***, and an ***annotated page is identified as a hit*** if the search terms appear in one of these fields, regardless of whether the annotated page was identified as a hit in the search of page index 170.”).

267. Therefore, the Palmon-Walther-Lu Combination discloses that a server computer that indexes webpages (“*the first web content*”) based at least in part on the entirety of the user annotations (keywords/topics, ratings, text descriptions) (“*user content*”).

iv. **[19C] storing, by the server computer, the user content in association with the identification of the first web content; and**

268. In my opinion, the Palmon-Walther-Lu Combination discloses [19C].

269. Palmon teaches that, when a user supplies topics/keywords for a URL, the server retains that association by creating an attachment, as I already explained in Paragraphs 183-186. Walther similarly discloses that user-provided metadata—such as a rating and a text description—is saved together with the associated URL in “a ***structured entry*** in a-personalization database 166,” as depicted in Figure 3 of Walther (below). In view of these teachings, the Palmon-Walther-Lu combined system stores the keywords/topics, rating, and text description (collectively, “*user content*”) in association with the URL (“*the identification of the first web content*”).

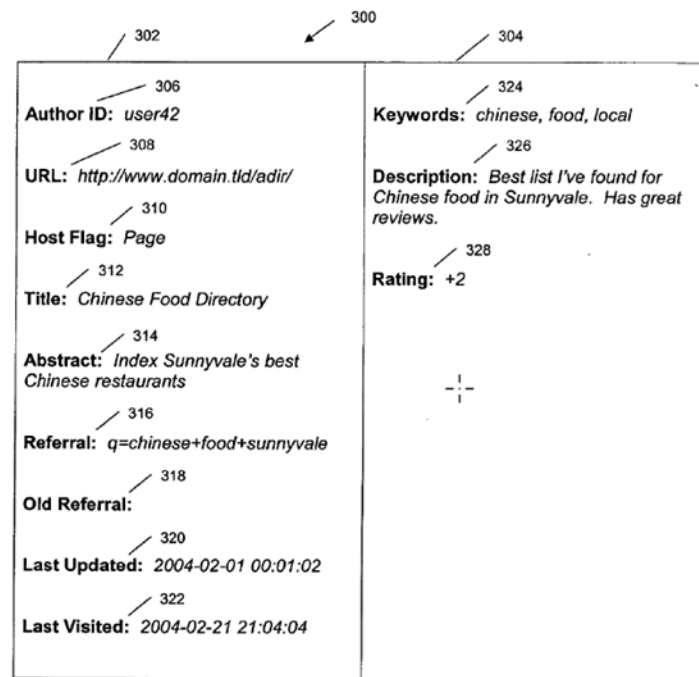


FIG. 3

EX1004, Figure 3.

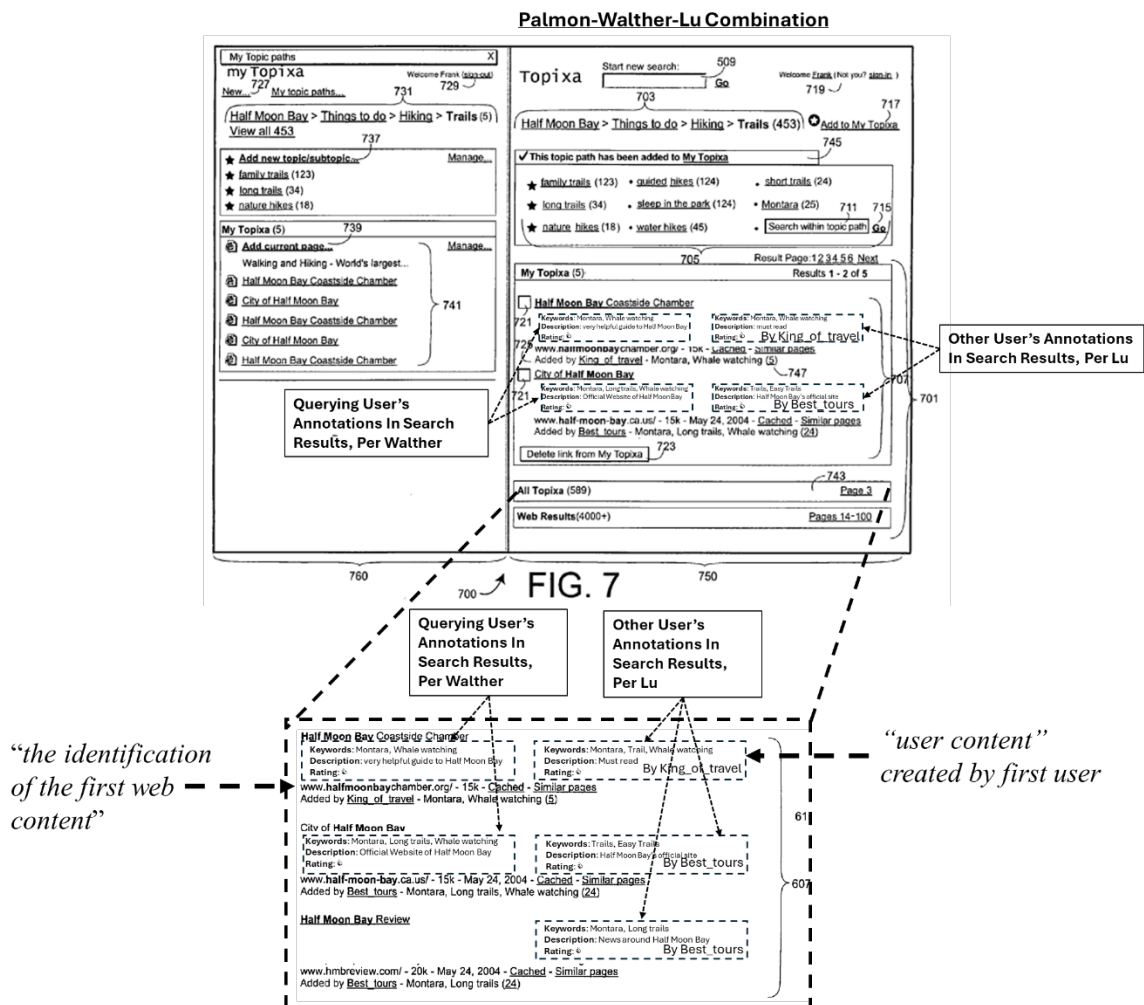
- i. [19D] in response to receiving a search query from a web browser of a second client computer operated by a second user, transmitting, by the server computer, search results to the web browser of the second client computer,

270. In my opinion, Palmon-Walther-Lu Combination discloses the additional limitation of [19D] for the reasons I already explained in Paragraph 187.

- ii. [19E] the search results comprising the identification of the first web content and the user content associated with the first web content.

271. In my opinion, the Palmon-Walther-Lu Combination discloses [19E].

272. I have provided the search-results page produced by the Palmon-Walther-Lu Combination. As depicted, the results include the “URL of a web page (*“the first web content”*)”—“Half Moon Bay Coastside Chamber”—that was previously annotated by King_of_travel (*“first user”*). The same entry is presented together with King_of_travel’s annotations—Keywords, Description, and Rating—shown alongside that URL.



273. Accordingly, in the Palmon-Walther-Lu Combination, the search results present the URL for “Half Moon Bay Coastsides Chamber” (“*the identification of the first web content*”) and also present the corresponding “*user content*”—i.e., the keywords/topics, rating, and description—associated with “Half Moon Bay Coastsides Chamber” (“*the first web content*”) that was supplied by King_of_travel (“*first user*”).

3. Claim 20

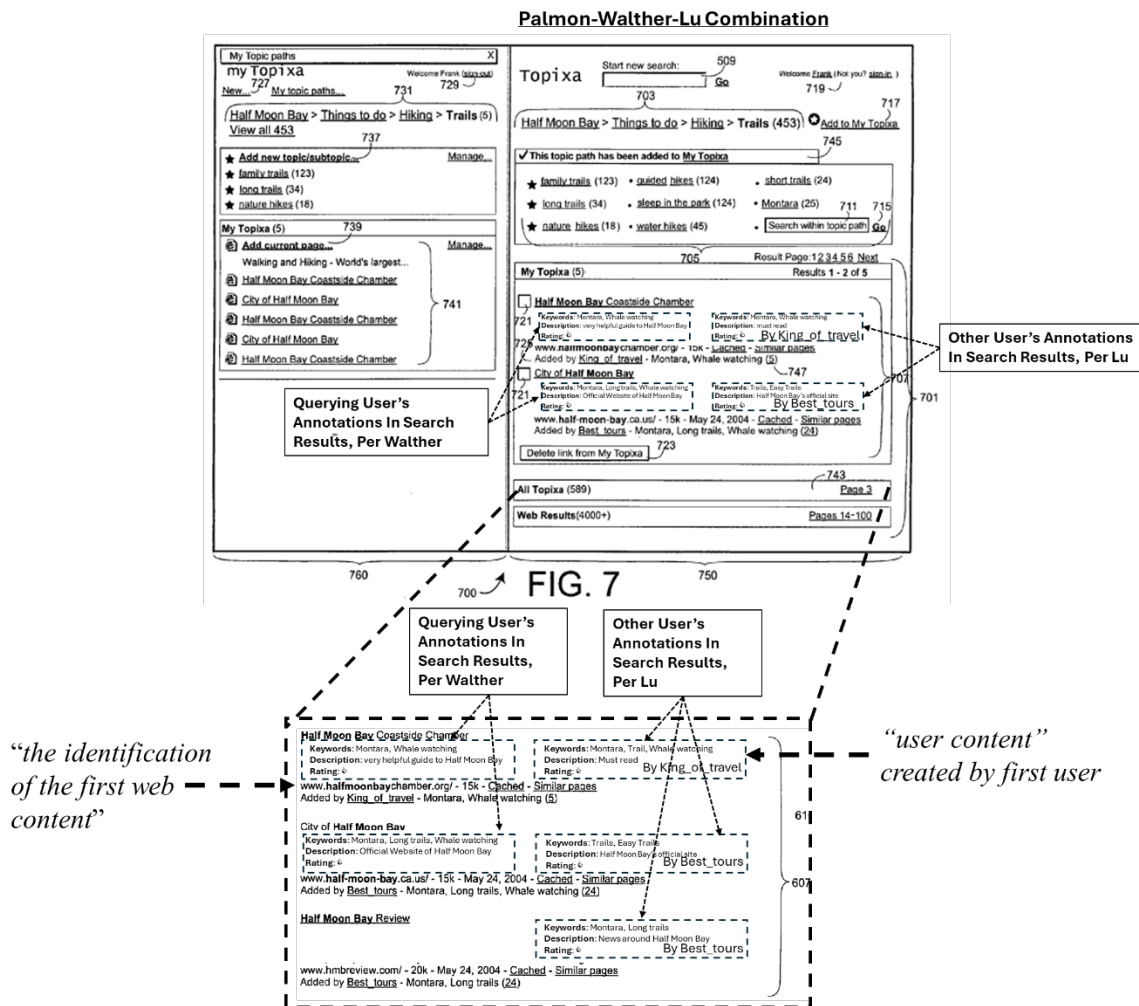
i. [20Pre] The non-transitory computer readable storage medium of claim 19,

274. In my opinion, the Palmon-Walther-Lu Combination discloses [20Pre] for the reasons I already explained in Paragraphs 257-271.

ii. [20A] wherein the user content including a comment on the first web content and a rating of the first web content by the first user; and

275. In my opinion, the Palmon-Walther-Lu Combination discloses [20A].

276. As I already explained in Paragraphs 269-271, the Palmon-Walther-Lu Combination discloses that the “*user content*” includes a “*comment*” and a “*rating*” of the webpage “Half Moon Bay Coastsides Chamber” (“*first web content*”) submitted by a user called King_of_travel (“*first user*”). *See also* Paragraphs 247-256; EX1004, [0018], [0139], [0142]; EX1005, [0162]-[0164].



EX1003, Figures 6, 7.

- iii. [20B] wherein the user content and the identification of the first web content are composed in a user interface separate from the main browser window for transmission to the server computer, while the web content is displayed in the main browser window.

277. In my opinion, the Palmon-Walther-Lu Combination discloses [20B].

278. As I already discussed in Paragraphs 193-200, Palmon in view of Walther discloses a user-specific interface that is separate from the main browser window and that allows the user to transmit the identification of the displayed web

content (the URL) together with associated annotations. EX1004, [0116]-[0117]. By way of example, Walther describes an annotation editing interface implemented as “a *separate window*” that is invoked for a selected page and arranged so the user can view the subject page while entering the annotation. EX1004, [0117], [0119], [0123], Figure 9. Walther also teaches that (as shown in Figure 9 below) this user interface may be populated with the page’s identifying information (e.g., the URL), and that the user supplies keywords, ratings, and a free-text description in that same window for transmission and storage in association with the page. EX1004, [0124], Figure 9.

Save This

URL: http://www.domain.tld/some-page.html

Title: Good Chinese Food? Here? YES! (904)

Save what? (908)

☒ This page only

☐ All URLs beginning with (912): http://www.domain.tld/

Keywords (916):

Description (914, 918):

Rating: (920)

☐ None

☐ [Thumbs Up]

☐ [Thumbs Down]

Save (922) Cancel (924)

FIG. 9

EX1004, Figure 9.

279. Therefore, Palmon-Walther-Lu combination discloses that the “*user content*” (which includes user annotations such as keywords, ratings, and free-text description) and “*the identification of the first web content*” (such as the URL), are composed in the user interface 900, which is “*a user interface separate from the main browser window*” for transmission to the server computer.

280. Furthermore, the Palmon-Walther-Lu Combination teaches that both the “*user content*” (keywords, ratings, and free-text description) and “*the identification of the first web content*” (URL) are composed “*while the web content is displayed in the main browser window.*” Walther, for example, explains that “the editing interface is arranged on the user’s display in such a way that the ***user can look at both the subject page and the annotation.***” EX1004, [0123]. Accordingly, Walther teaches composing the annotation for a webpage while it remains displayed in the “*main browser window,*” as taught by Palmon. EX1003, [0217].

IX. Availability for Cross-Examination

281. In signing this declaration, I recognize that the declaration will be filed as evidence in a case before the Patent Trial and Appeal Board of the United States Patent and Trademark Office. I also recognize that I may be subject to cross examination in the case and that cross examination will take place within the United States. If cross examination is required of me, I will appear for cross examination within the United States during the time allotted for cross examination.

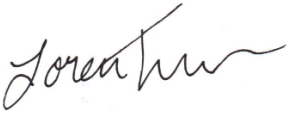
X. Right to Supplement

282. I reserve the right to supplement my opinions in the future to respond to any arguments that the Patent Owner may raise and to take into account new information as it becomes available to me.

XI. Jurat

283. I declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.

February 3, 2026
Date



Dr. Loren G. Terveen

Appendix A

Loren G. Terveen

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Address Department of Computer Science and Engineering
University of Minnesota
Minneapolis, MN 55455

Education

Ph.D. in Computer Sciences	University of Texas	1991
M.S. in Computer Sciences	University of Texas	1988
B.A. in Computer Science, Mathematics, History	University of South Dakota	1984

Affiliations Member of ACM, ACM/SIGCHI

Research Interests Human-Computer Interaction, Social Computing, Artificial Intelligence

Professional Experience

Department Head	Computer Science & Engineering	2025 –
Associate Department Head	Computer Science & Engineering	2019–2025
Professor	University of Minnesota	2002 –
Distinguished McKnight University Professor		2017 –
Principal Member of Technical Staff	AT&T Labs - Research	1996–2002
Member of Technical Staff	AT&T Bell Labs	1991–1996
Graduate Research Intern	Microelectronics and Computer Corporation	1986–1999
Teaching Assistant	University of Texas at Austin	1985

AWARDS AND MAJOR ROLES

ACM Distinguished Scientist (awarded 2009)

ACM SIGCHI Academy (2019)

ACM SIGCHI Lifetime Service Award (2023)

ACM SIGCHI President (2015-2018)

ACM Council, SIG Governing Board Representative (2016 – 2018)

RESEARCH

External Funding

Google: “High Reliability Group Work in a Human-AI Organization: A Case Study of Wikipedia” (**Co-PI**, with Harmanpreet Kaur PI), \$100,000.

NSF:EAGER: Revolutionizing Wikipedia’s Relationship with New and Emerging Knowledge (**Co-PI**, with Stevie Chancellor PI), **\$300,000** for 09/01/2023 to 08/31/2025.

Cisco: Detecting and Reducing Bias in Collaborative Virtual Meetings: Field Deployment (**Co-PI**, with Stevie Chancellor PI). **\$141,714** for 8/1/2023 to 7/31/2024.

Northwestern University: Safe and Compassionate ML Recommendations For People With Mental Illnesses (**Co-PI**, with Stevie Chancellor PI). **\$275,000** for 02/2023 to 01/2025

NSF:CISE: Community-Engaged Design and Implementation of a Framework for Ethical Online Communities Research (**Co-PI**, with Svetlana Yarosh PI, Stevie Chancellor Co-PI, Joseph Konstan Co-PI, Kangjie Lu Co-PI), \$400,000 for 01/01/2023 to 12/31/2025.

Cisco: Detecting and Reducing Bias in Collaborative Virtual Meetings (**Co-PI**, with Stevie Chancellor PI). **\$177,915** for 9/1/2021 to 12/31/2022.

NSF:CHS:Small: Incorporating and Balancing Stakeholder Values in Algorithm Design (UMN **PI**), Award Total \$500,000, UMN Share \$243,941 for 8/1/2019 to 7/31/2022.

NSF: EAGER: AI-DCL: Capture, Explain and Negotiate the Inherent Trade-offs in Machine Learning Algorithms (UMN **co-PI**), Award Total \$295,713, UMN Share \$103,267 for 10/1/2019 to 9/30/2022.

NSF:CHS: Small: Collaborative Research: Structured Data Peer Production: Addressing Challenges and Leveraging Opportunities (**PI**), \$249,738 for 9/1/2018 - 8/31/2021.

National Cancer Institute (NCI): Restore: Improving sexual outcomes of gay and bisexual prostate cancer survivors (R. Simon Rosser **PI**; my role: **Co-PI**); \$2,039,220 (directs) \$3,039,541 (total), 2017-2022.

NSF: “PFI:BIC: Smart Human-Centered Collision Warning System: sensors, intelligent algorithms and human-computer interfaces for safe and minimally intrusive car-bicycle interactions” (Co-PI, with Rajesh Rajamani (PI), Max Donath, and Nichole Morris), \$999,773 for September 1, 2016 to August 31, 2019.

NSF: “Computer-Supported Cooperative Work Doctoral Colloquium” (**PI**), \$25,000 for 03/01/2016 to 02/28/2017.

National Institute on Drug Abuse: “A Technology-Delivered Peer-to-Peer Support ARB Adherence Intervention for HIV+ Adults”, (Co-PI, with Keith Horvath (PI) and Darin Erickson), \$3,302,62 for 07/01-2015 to 05/31/2020.

NSF: “HCC: Tools and Mechanisms to Support Social Participation Efforts”, (PI), \$499,399 for 10/01/2012 to 09/30/2015.

NSF: “SoCS: Collaborative Research: Novel Algorithms and Interaction Mechanisms to Enhance Social Production”, (PI), \$527,140, for 7/01/2012 to 06/30/2015.

NSF: “Collaborative Research: Supporting Newcomer Socialization in Online Production Communities”, (PI), \$301,135.00 for 08/2011 to 08/31/2015.

Minnesota Department of Transportation: “Statewide Cycloplan: A Bicycle Planning Tool with Participatory GIS”, (PI), \$130,000, for 10/01/2011 to 06/30/2013.

Metropolitan Council: “Cycloplan II”, (PI), \$71,350, for 08/15/2011 to 05/31/2012.

NSF: “Wikisym Doctoral Consortium”, (PI), \$13,163, for 05/01/2011 to 04/30/2012.

IBM: “Mobile Crowdsensing”, (PI), \$100,000 awarded 04/01/2011

NSF: “Social-Computational Systems (SoCS) Community Meeting” (PI), \$48,801 for 09/01/2010 to 08/31/2011

NSF: “SoCS: Collaborative Research: Information Framing: Intelligent Interfaces for an Online Production Community”, (PI), \$375,000 for 09/15/2010 to 08/31/2015.

NSF: “Collaborative Research: Guiding Folksonomy Development to Enable Novel Tagging Applications” (PI, with J. Riedl and S. Sen (Macalester College)). \$949, 788 for 04/1/2010 to 03/31/2014 (UMN Share).

Minnesota Department of Transportation: Bike, Bus, and Beyond: Extending Cyclopath to Enable MultiModal Routing (PI), \$60,627, for 07/08/2010 to 01/31/2012

NIH: An Interactive Website to Promote Communication about Sexual Health and Dating Relationships between Parents and Teens (Co-PI, with Sonya Brady (PI), Simon Rosser, and Renee Sieving), \$679,500 for 09/30/2009 to 08/31/2011.

Metropolitan Council: “Cycloplan” (PI), \$185,000, October 2009 – March 2011.

NSF “Collaborative Research: Understanding Online Volunteer Communities: Toward Theory-Based Design” (co-PI, with J. Riedl, J. Konstan, M. Snyder, & Y. Ren; R. Kraut (CMU)) \$2,400,000 for 08/01/2008 to 07/31/2013.

NSF: “Recommender Systems Doctoral Consortium” (PI) \$15,415, 2007-2008.

NSF: “Mining Spatiotemporal Data: From Personal Use to Community Knowledge” (PI) \$449,570 for 12/1/2005 to 11/30/2009.

NSF: “Collaborative Research: Mark This! - Operationalizing the notion of "place" for interactive community systems” (PI, with Q. Jones (NJIT) and S. Whittaker (Univ. of Sheffield)). \$173,411 for 6/1/2003 to 5/31/2007 (UMN share).

NSF: “Being There: Mobile Devices for Community and Commerce” (PI, with J. Konstan, J. Riedl, and S. Shekhar). \$120,000 for 9/1/2002 to 8/31/2005.

NSF: “ITR: Collaborative Research: Designing On-Line Communities to Enhance Participation” (co-PI, with J. Konstan & J. Riedl, R. Kraut & S. Kiesler (CMU), P. Resnick and Y. Chen (Univ. of Michigan)). \$1,246,017 for 9/1/2003 to 8/31/2009 (UMN share).

AT&T: “VURI: Collaborative Filtering and Intelligent Interface Design for Enhanced TV Applications” (PI). \$35,000 for November 1, 2008 to October 31, 2009.

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Internal Funding

Minnesota/China Collaborative Research Grant: "Expertise Oriented Mining for Web Community". \$10,000 for July 1, 2007 to June 30, 2008 (PI, with Jie Tang, Tsinghua University, Beijing China).

University of Minnesota TEL grant: “The Next Generation Online Learning Environment: Designing for Community and Collaboration”. \$10,000 for September 2006 to May 2007. (co-PI, with Joan Hughes, David Ernst, and Ann Ooms, College of Education and Human Development).

University of Minnesota Digital Technology Center: “Indoor Navigation Aids for Visually Impaired People”. \$25,67 for June 2005 to December 2006. (co-PI, with S. Shekhar and G. Legge).

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3. Mo Houtti, Isaac Johnson, Joel Cepeda, Soumya Khandelwal, Aviral Bhatnagar, and Loren Terveen. 2022. “We Need a Woman in Music”: Exploring Wikipedia’s Values on Article Priority. *PACM Human-Computer Interaction 6, CSCW 2* (2022).
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5. C. Estelle Smith, William Lane, Hannah Miller Hillberg, Daniel Kluver, Loren Terveen, and Svetlana Yarosh. Effective Strategies for Crowd-Powered Cognitive Reappraisal Systems: A Field Deployment of the Flip*Dubt Web Application for Mental Health. In *Proceedings of the ACM on Human-Computer Interaction, 5, CSCW 2* (2021). **Best Paper Honorable Mention.**
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117. Terveen, L.G and Hill, W.C. Finding and Visualizing Inter-site Clan Graphs, *Proceedings of CHI 1998*, 448-455. 23% acceptance rate.
118. Terveen, L.G and Hill, W.C. Involving Users in Continuous Design of Web Content, in *Proceedings of DIS 1997*, ACM Press, 137-145. 41% acceptance rate
119. Terveen, L.G., Hill, W.C., Amento, B., McDonald, D., and Creter, J. Building Task-Specific Interfaces to High Volume Conversational Data, *Proceedings of CHI 1997*, 226-233. 23% acceptance rate.
120. Hill, W.C. and Terveen, L.G Using Frequency-of-Mention in Public Conversations for Social Filtering, *Proceedings of CSCW 1996*, 106-112.
121. Terveen, L.G. and Murray, L. Helping Users Program Their Personal Agents, *Proceedings of CHI 1996*, 355-361. 23% acceptance rate.
122. Terveen, L.G. and Tuomenoksa, M.L. DynaDesigner: A Tool for Rapid Creation of Device-Independent, *Proceedings of INTERACT 1995*, 386-389.
123. Terveen, L.G. and Selfridge, P.G. Intelligent Assistance for Software Construction: A Case Study, *Proceedings of Knowledge-Based Software Engineering 1994*, 14-21.
124. Terveen, L.G., Selfridge, P.G., and Long, M.D. From 'Folklore' to 'Living Design Memory', in *Proceedings of INTERCHI 1993*, 15-22. 19% Acceptance Rate.
125. Terveen, L.G. Interface Support for Data Archaeology, *ISMM International Conference on Information and Knowledge Management (CIKM'93)*. (acceptance rate for 1992 unknown; average is 24%).
126. Brachman, R. J., Selfridge, P.G., Terveen, L.G., Altman, B., Borgida, A., Helper, F., Kirk, T., Lazar, A., McGuinness, D.L., and Resnick, L. A., Knowledge Representation Support for Data Archaeology, *ISMM International Conference on Information and Knowledge Management (CIKM'92)*. (acceptance rate for 1992 unknown; average is 24%).
127. Selfridge, P.G., Terveen, L.G., and Long, M.D. Managing Design Knowledge to Provide Assistance to Large-Scale Software Development, *Proceedings of Knowledge-Based Software Engineering 1992*, 154-162.
128. Terveen, L.G. and Wroblewski, D.A. A Tool for Achieving Consensus in Knowledge Editing, *Proceedings of AAAI 1991*, 74-79. 24% acceptance rate.

129. Terveen, L.G., Wroblewski, D.A., and Tighe, S.N. Intelligent Assistance Through Collaborative Manipulation, *Proceedings of IJCAI 1991*, 9-14. (acceptance rate for 1991 unknown; typically in low 20s).
130. Terveen, L.G. and Wroblewski, D.A. A Collaborative Interface for Browsing and Editing Large Knowledge Bases, *Proceedings of AAAI 1990*, 491-496. 18% acceptance rate.

Book Chapters

133. Terveen, L., Riedl, J., Konstan, J., and Lampe, C. (2014) “Study, Build, Repeat: Using Online Communities as a Research Platform”, in *Human Computer Interaction Ways of Knowing*, edited by Judith S. Olson and Wendy Kellogg, New York: Springer.
134. Amento, B., Harrison, C., Nathan, M., and Terveen, L. (2009), Asynchronous Communication – Fostering Social Interaction with CollaboraTV, in Cesar, P., Geerts, D., and Chorianopoulos, K. (ed.), *Social Interactive Television: Immersive Shared Experiences and Perspectives* (2009), Information Science Reference.
135. Amento, B., Terveen, L.G and Hill, W. From PHOAKS to TopicShop: Experiments in Social Data Mining, in Lueg, C. and Fisher, D. (ed.), *From Usenet to CoWebs: Interacting with Social Information Spaces* (2002), Springer.
136. Whittaker, S., Terveen, L.G, Hill, W.C., and Cherny, L. The Dynamics of Mass Interaction, in Lueg, C. and Fisher, D. (ed.), *From Usenet to CoWebs: Interacting with Social Information Spaces* (2002), (this chapter is a reprint of Whittaker et al 1998), Springer.
137. Terveen, L.G and Hill, W. Beyond Recommender Systems: Helping People Help Each Other, in Carroll, J. (ed.), *HCI in the New Millennium* (2001), Addison Wesley.
138. Terveen, L.G. Computer-Mediated Collaboration, in *More than Screen Deep: Toward Every-Citizen Interfaces to the Nation's Information Infrastructure* (1997), National Academy Press.

Other Publications

139. Ajmani, Leah Hope, Ava Bartolome, Isaac Johnson, Stevie Chancellor, and Loren Terveen. Personal or Policy? How Policy is Wielded in Mental Health Discussions. Wiki Workshop 2024
140. Levonian, Zach and Loren Terveen. ORES-Inspect: A technology probe for machine learning audits on enwiki. Wiki Workshop 2024.
141. Zhou, Moyan, Leah Hope Ajmani, Stevie Chancellor, and Loren Terveen. Bringing Talk Pages to The Front: An Interface Design. Wiki Workshop 202
142. Zhou, Moyan, Ruixuan Sun, and Loren Terveen. Investigating Social Interaction Factors for Newcomer Retention in Wikipedia, Wiki Workshop 2024.
143. Chancellor, Stevie, Joseph A. Konstan, Loren Terveen, and Svetlana Yarosh, “Do Know Harm: Considering the Ethics of Online Community Research”. *Communications of the ACM*, May 2024.
144. Bartolome, Ava, Stevie Chancellor, and Loren Terveen. "Policy Deliberations in Wikipedia Talk Pages: How Editors Construct Knowledge About Mental Health." Wiki Workshop 2023.
145. Konstan, J.A., and Terveen, L.G. Human-centered recommender systems: Origins, advances, challenges, and opportunities. *AI Magazine*, 2021.
146. Terveen, L. “Autonomous” agents? What should we worry about? What should we do? *Human-Computer Interaction*.

147. Kaur, A., Smith, C. E., and Terveen, L. Sway Together, Stay Together: Visualizing Spiritual Support Networks Through the SoulGarden Prototype. In *Extended Abstracts of CSCW 2021*.
148. Kaur, H., Johnson, I., Miller, H., Terveen, L., Lampe, C., Hecht, b., and Lasecki, W. Oh The Places You'll Share: An Affordances-Based Model of Social Media Posting Behaviors. In *Extended Abstracts of CHI 2017* (ACM Conference on Human Factors in Computing Systems). 40% acceptance rate.
149. Masli, M. and Terveen, L. Geographical Social Production: Lessons from Cyclopath, in CHI 2013 GeoHCI Workshop.
150. Masli, M., Bouman, L., Owen, A., and Terveen, L. Geowiki + route analysis = improved transportation planning, CSCW 2013 Interactive Poster.
151. Brady, S. S., Sieving, R. E., Terveen, L. G., Rosser, B. R. S., Kodet, A. J., & Rothberg, V. D. (2012, October). *TeensTalkHealth: An interactive website to promote healthy relationships and prevent STIs*. Paper presented at the annual meeting of the American Public Health Association, San Francisco, CA.
152. Society for Personality and Social Psychology, San Antonio, TX. January, 2011. "The role of community orientation in promoting online participation" (with J. S. Kim, P. C. Dwyer, J. Filson Moses, P. T. Fuglestad, C. A. Mannino, R Davies, & M. Snyder)
153. Society for Personality and Social Psychology, San Antonio, TX. January, 2011. "Applying a functional approach to participation in online groups" (with P. T. Fuglestad, P. C. Dwyer, J. Filson Moses, J. S. Kim, C. A. Mannino, R Davies, & M. Snyder)
154. Society for Personality and Social Psychology, San Antonio, TX. January, 2011. "Past volunteerism predicts amount of content contributed in an online community" (with P. C. Dwyer, J. Filson Moses, P. T. Fuglestad, J. S. Kim, C. A. Mannino, R Davies, & M. Snyder)
155. Society for Personality and Social Psychology, San Antonio, TX. January, 2011. "Social motives and personality as predictors of online participation" (with J. Filson Moses, P. C. Dwyer, P. T. Fuglestad, J. S. Kim, C. A. Mannino, R Davies, & M. Snyder)
156. Kapoor, N., Frankowski, D., Konstan, J., and Terveen, L. Lessons Learned in Implementing the CHIplace Online Community, in *Proceedings of Human-Computer Interaction International 2005*.
157. Zhou, C., Ludford, P., Frankowski, D., and Terveen, L. An Experiment in Exploring How People Describe Places, Short Paper in *Proceedings of Pervasive 2005*.
158. Zhou, C., Ludford, P., Frankowski, D., and Terveen, L. An Experiment in Discovering Personally Meaningful Places from Location Data, Short Paper in *Proceedings of CHI 2005*.
159. Kapoor, N., Konstan, J., and Terveen, L. How Peer Photos Influence Member Participation in Online Communities, Short Paper in *Proceedings of CHI 2005*.
160. Amento, B., Hill, W., and Terveen, L. The Sound of One Hand: A Wrist-mounted Bio-acoustic Fingertip Gesture Interface, Short Paper in *Proceedings of CHI 2002*, 724-725. 33% acceptance rate.
161. Terveen, L., Hill, W., and Amento, B. Collaborative Filtering to Locate, Comprehend, and Organize Collections of Websites, in SIGART Bulletin, 9, 3&4 (1998), 10-17.
162. Terveen, L., Hill, W., Amento, B., McDonald, D., and Creter, J. 1997. PHOAKS: a system for sharing recommendations. *Commun. ACM* 40, 3 (Mar. 1997), 59-62.
163. Terveen, L.G., Stolze, M., and Hill, W. From 'Model World' to 'Magic World', in *SIGCHI Bulletin*, 27, 4 (1995), 31-34.

164. Terveen, L.G., Papavero, E., and Tuomenoksa, M. DynaDesigner: A Tool for Rapid Design and Deployment of Device-Independent Interactive Services, Refereed Formal Demonstration in *Adjunct Proceedings of CHI'95*, 29-30.
165. Terveen, L.G. Person-Computer Cooperation through Collaborative Manipulation. Ph.D. Thesis, University of Texas Department of Computer Sciences, 1991.

Invited Presentations

Carnegie Mellon University
Northwestern University
The University of California Irvine
Carleton College
Twin Cities MetroGIS Policy Board
Hennepin County Bicycle Advisory Committee
University of Minnesota Digital Humanities Collaborative
University of Minnesota Advanced Transportation Technologies Seminar Series
Georgia Tech
University of Minnesota Urban Ecosystems Symposium
University of Minnesota New Media
IBM T.J. Watson Research
University of Illinois
University of Maryland
University of Washington
Carnegie-Mellon University
Swedish Institute of Computer Science / Royal Institute of Technology
Uppsala University, Sweden
New Jersey Institute of Technology
Microsoft Research
Vassar University
Rensselaer Polytechnic Institute
University of Colorado
Virginia Tech
University of Nebraska

Conference Presentations

- ACM Conference on Computer-Supported Cooperative Work (CSCW), 2014.
- ACM Conference on Computer-Supported Cooperative Work (CSCW), 2012.
- ACM Conference on Computer-Supported Cooperative Work (CSCW), 2002.
- ACM Conference on Computer-Supported Cooperative Work (CSCW), 1998.

- ACM Conference on Human Factors in Computing Systems (CHI), 1998.
- ACM Conference on Design of Interactive Systems, 1997.
- ACM Conference on Human Factors in Computing Systems (CHI), 1997.
- ACM Conference on Human Factors in Computing Systems (CHI), 1996.
- IFIP TC13 International Conference on Human-Computer Interaction (INTERACT), 1995.
- IEEE Conference on Knowledge-Based Software Engineering, 1994.
- ACM Conference on Human Factors in Computing Systems (CHI), 1993.
- Conference on Information and Knowledge Management, 1993.
- Conference on Information and Knowledge Management, 1992.
- National Conference on Artificial Intelligence (AAAI), 1991.
- International Joint Conference on Artificial Intelligence (IJCAI), 1991.
- National Conference on Artificial Intelligence (AAAI), 1990.

Workshop Presentations

- CHI 2013 GeoHCI Workshop
 - “Geographical Social Production: Lessons from Cyclopath”
- CSCW 2002 Workshop on “The Role of Place in Shaping Virtual Communities”:
 - “Place-Based Community Information Systems”.
- CHI 99 Workshop on “Interacting with Recommender Systems”:
 - “Visualization Interfaces for Recommender Systems”.
- 1999 Human-Computer Interaction Consortium Workshop:
 - “A Reference Task Agenda for Human-Computer Interaction”.
- 1998 AAI Workshop on “Recommender Systems”:
 - “The PHOAKS Recommender System”.
- 1997 Human-Computer Interaction Consortium Workshop:
 - “The PHOAKS Recommender System”.
- 1995 Lifelike Computer Characters Workshop:
 - “Hidden Hands, not Talking Heads: The Magic World Interaction Paradigm”.
- 1995 Lifelike Computer Characters Workshop:
 - “Moving Agent-User Voice Dialogue towards Natural Conversation”.
- CHI 95 Workshop on “‘Model World’ to ‘Magic World’: Making Visual Objects the Medium for Intelligent Design Assistance”:
 - “The ‘Magic World’ Approach to Human-Computer Collaboration”.
- 1993 AAAI Fall Symposium: “Human-Computer Collaboration: Reconciling Theory, Synthesizing Practice”:
 - “A Framework for Human-Computer Collaboration”

- 1993 AI-ED Workshop on “Collaborative Problem Solving: Theoretical Frameworks and Innovative Systems”:
 - “Collaborative Problem Solving in Interactive Systems”.
- 1992 CAIA Workshop on “Applying AI To Software Problems: Assessing Promises and Pitfalls”:
 - “Representing and Disseminating Software Design Knowledge”.
- 1992 AAAI Spring Symposium on “Cognitive Aspects of Knowledge Acquisition”:
 - “In The Footprints of The Masters: Embedding Knowledge Acquisition in Organizational Activity”.
- AAAI 90 Workshop on “Complex Systems, Ethnomethodology, and Interaction Analysis”:
 - “Resources for Person-Computer Collaboration”.
- 1990 AAAI Spring Symposium on “Knowledge-Based Human-Computer Communication”:
 - “Tools for Human-Computer Collaboration”.

Patents

U.S. Patent # 5,388,188. Apparatus and methods for providing design advice. (with P. Selfridge). Issued February 7, 1995.

U.S. Patent #5,659,724. Interactive data analysis apparatus employing a knowledge base. (with A. Borgida, R.J. Brachman, T. Kirk, and P. Selfridge). Issued August 19, 1997.

U.S. Patent #5,680,530. Graphical environment for interactively specifying a target system (with P. Selfridge). Issued October 21, 1997.

U.S. Patent #5,806,060. Interactive data analysis employing a knowledge base. (with A. Borgida, R.J. Brachman, T. Kirk, and P. Selfridge). Issued September 8, 1998.

U.S. Patent # 5,809,492. Apparatus and method for defining rules for personal agents. (with L. Murray). Issued September 15, 1998.

U.S. Patent # 5,953,393. Personal Telephone Agent. (With P. Culbreth, P. Danielsen, R.J. Hall, E. Papavero, and M. Tuomenoksa). Issued September 14, 1999.

U.S. Patent #6,029,192. System and method for locating resources on a network using resource evaluations derived from electronic messages. (with W.C. Hill). Issued February 22, 2000.

U.S. Patent #6,244,873. Wireless myoelectric control apparatus and methods. (with W.C. Hill, F.C. Pereira, and Y. Singer). Issued June 12, 2001.

U.S. Patent #6,256,648. System and method for selecting and displaying hyperlinked information resources. (with W.C. Hill). Issued July 3, 2001.

U.S. Patent #9,430,043. Bioacoustic Control System, Method, and Apparatus. (with B. Amento and W.C. Hill). Issued August 30, 2016.

CONSULTING

I provide an overview of my consulting record, including all matters in which I testified. I have received compensation for the patent litigation cases listed below. I provide details for my role in cases unless the client requested that I do not do so; in that case I provide general descriptions.

- (2025) Retained on behalf of a consumer electronics company. General technology area: graphical user interfaces.
- (2025) Retained on behalf of an e-commerce company. General technology area: graphical user interfaces. World Wide Web information and interface systems.
- (2025) Retained on behalf of a consumer electronics company. General technology area: graphical user interfaces.
- (2025) Retained to offer opinions regarding patent validity. General technology area: multi-user graphical interfaces.
- (2024) Retained to offer opinions regarding patent validity. General technology area: user interfaces for e-commerce applications. Wrote declaration.
- (2024) Retained on behalf of a software company. General technology area: user interfaces for network-based applications. Wrote expert declaration. **Deposed.**
- (2024) Retained on behalf of a software, hardware, and consumer electronics company. General technology area: graphical and touch-based user interfaces. Wrote expert declaration.
- (2024) Retained on behalf of a computer software, hardware, and consumer electronics company. General technology area: graphical and mobile user interfaces. Wrote expert declaration.
- (2024) Retained on behalf of a computer software and hardware company. General technology area: information search. Wrote expert declaration.
- (2024) Retained on behalf of a computer software, hardware, and consumer electronics company. General technology area: email messaging systems. Wrote expert declaration.
- (2024) *Multimedia Technologies Pte. Ltd vs. LG Electronics Inc. and LG Electronics U.S.A., Inc.*, Case No2:22-CV-00494-JRG-RSP. Retained on behalf of defendant LGE. Wrote expert reports. **Deposed. Testified at trial.** All patents were found not infringing and invalid.
- (2024) Retained on behalf of a computer software, hardware, and consumer electronics company. General technology area: gesture-based graphical user interfaces. Wrote expert declarations. **Deposed multiple times.**
- (2023) Retained on behalf of a computer software, hardware, and consumer electronics company. General technology area: gesture-based graphical user interfaces. Wrote expert reports. **Deposed.**

- (2023) Retained on behalf of e-commerce companies. General technology area: graphical-user interface techniques for the World Wide Web. Wrote expert reports. **Deposed.**
- (2023) Retained by Unified Patents. General technology area: online advertising. Writing declaration in support of *ex parte* reexamination petition.
- (2023) Retained on behalf a consumer and information technology company. General technology area: graphical and touch-based user interfaces. Writing declaration in support of *inter partes* review petitions.
- (2023) Retained on behalf of a computer software, hardware, and consumer electronics company. General technology areas: graphical user interfaces for web information access. Writing declaration in support of *inter partes* review petitions.
- (2022) *Lyft v. AGIS Software Development*, Case No. IPR2022-00514 (PTAB) (retained on behalf of AGIS). Writing declarations in *inter partes* review proceedings involving patents owned by the company.
- (2022) *Unified Patents v. AK Meeting IP LLC*, Case No. IPR2022-01142 (PTAB) (retained by Unified Patents). Writing declaration in support of *inter partes* review petitions.
- (2022) Retained as expert witness on behalf of a consumer electronics company. General technology area: graphical user interfaces. Analyzed possible infringements of the company's patents.
- (2022) Retained as expert witness on behalf of a computer software company. General technology areas: Web-based and mobile user interfaces.
- (2022) Retained as expert witness on behalf of a computer software company. General technology areas: Web-based and mobile user interfaces.
- (2021) *Unified Patents v. Callstat Solutions LLC*, Case No. IPR2022-00287 (PTAB) (retained by Unified Patents). Wrote declaration in support of *inter partes* review petitions.
- (2021) *Apple Inc. v. Memory, Web LLC*, Case Nos. IPR2022-00111, PGR2022-00006, IPR2022-00032, IPR2022-00033, IPR2022-00031 (PTAB) (retained on behalf of Apple Inc.) Wrote declaration in support of *inter partes* review petitions. **Deposed.**
- (2021) *Microsoft Corp. v. Parus Holdings, Inc.* Case No. IPR2022-00137 (PTAB) (retained on behalf of Microsoft Corp.). Wrote declaration in support of *inter partes* review petitions.

- (2021) *Phoji, Inc. v. Atlassian, Inc.*, Case No. 6-21-cv-00888 (Western District of Texas) & *Atlassian, Inc. v. PHOJI, LLC*, Case No. IPR2022-00210 (PTAB) (retained on behalf of PHOJI, LLC). Analyzed potential infringement of company's patents and submitted declaration in opposition to inter partes review petitions.
- (2021) *Ex Parte* Reexamination involving Patent of AGIS Software Development (retained on behalf of AGIS Software Development). Wrote declarations in support of patent holder's position in *ex parte* reexaminations.
- (2020) *Apple Inc. v. Blix Inc.*, Case No. IPR2022-01635 (PTAB) (retained on behalf of Apple Inc.) Wrote declaration in support of *inter partes* review petition.
- (2020) *Apple Inc. v. Sentius International, LLC*, Case No. IPR2020-01646 (PTAB) (retained on behalf of Apple Inc.). Wrote declaration in support of *inter partes* review petition.
- (2020) Retained by on behalf of a consumer electronics company. General technology area: graphical user interfaces. Analyzed possible infringements of the company's patents.
- (2020) *Apple Inc. v. Parus Holdings, Inc.*, Case No. IPR202-00686, (retained on behalf of Apple Inc.). Wrote declaration in support of *inter partes* review petition. **Deposed.**
- (2019) *WhereverTV, Inc. v. Comcast Cable Communications, LLC*, Case No. 2-18-cv-00529 (M.D. Fla.) (retained on behalf of Comcast Cable Communications, LLC). Wrote expert reports. **Deposed. Testified.** Judgement as a matter of law no infringement.
- (2019) Retained on behalf of a computer and internet software company. General technology area: information search.
- (2019) Retained by O'Melveny & Myers on behalf of Google. (2019)
- (2018) *Unified Patents, LLC v. S.I.SV.EL. Societa Italiana Per Lo Sviluppo Dell'elettronica S.P.A.*, Case No. IPR2019-00471 (PTAB) (retained on behalf of Unified Patents). Wrote declaration in support of *inter partes* review petition. **Deposed.**
- (2017-2019) *Microsoft Corporation (Inventor Plaintiff) vs. Koninklijke Philips N.V., US Philips Corporation*, Case No.: 4:18-cv-01885-HSG & Case No. IPR-2018-00185 (PTAB) & Case No. IPR-2017-00410 (PTAB) & Case No. IPR2018-00023 (PTAB). Wrote reports. Wrote declaration in support of *inter partes* review petition. **Deposed** in IPR and District Court cases.
- (2018) Retained on behalf of a computer hardware and software company to offer opinions regarding the validity of certain patents.

- (2017-2018) Retained on behalf of a professional networking company to offer opinions regarding the validity of certain patents
- (2017) Retained by Perkins-Coie on behalf of Microsoft (vs. Cypress Lake Software). Wrote a declaration.
- (2016) *TiVo Inc. v. Samsung Electronics*, Case No. 2:15-cv-1503 (E.D. Tex.). Retained on behalf of TiVo by Irell & Manella.
- (2015) *Netflix Inc. v. Rovi*, Case No. 4:11-cv-06591. (Retained on behalf of Netflix) Analyzed validity of patents. Presented **technology tutorial** in court.
- (2013) *Certain Products Containing Interactive Program Guide and Parental Control Technology*, Case No. ITC 337-TA-845 (Retained on behalf of Netflix, LG Electronics, and Roku). **Deposed. Testified.**
- (2011) *Motorola Mobility, Inc. (Plaintiff) vs. Microsoft Corporation (Defendant) and Microsoft Corporation (Counterclaim Plaintiff) vs. Motorola Mobility, Inc. (Counterclaim Defendant)*, Case No. 1:10-CV-24063-MORENO (Retained on behalf of Microsoft). **Deposed.**
- 2010 Microsoft vs. Tivo, Case No. 5:10-cv-00240-RS. Retained on behalf of Microsoft by Perkins Coie.

SELECTED SERVICE

University of Minnesota Committees

- College of Science & Engineering Consultative Committee: 2015-2018
- College of Science & Engineering Honors & Awards Committee, 2017-2020

External Professional Activities

ACM Special Interest Group on Computer Human Interaction

- President: 2015-2018
- Executive Committee: Adjunct Chair for Awards, 2012 – 2015.
- Executive Committee: Vice President for Membership and Communication, 2009 – 2012.

Conference Chair

- CHI 2002: ACM Conference on Human Factors in Computing Systems
- IUI 1998: ACM Conference on Intelligent User Interfaces.

Program Committee Chair

- CSCW 2004: ACM Conference on Computer-Supported Cooperative Work.

- CSCW 2013: ACM Conference on Computer-Supported Cooperative Work.

Computer Supported Cooperative Work (CSCW) Steering Committee

- Chair, 2012-2014 (First elected Chair of the committee that oversees the CSCW Conference and the general CSCW and Social Computing research community.)

Awards Committee Chair

- CSCW 2008: ACM Conference on Computer-Supported Cooperative Work.

Journals Edited

- Special Issue of *Knowledge-Based Systems* on Human-Computer Collaboration, Vol. 8, No. 2-3, 1995.

Proceedings Edited

- Proceedings of the 2002 ACM Conference on Human Factors in Computing Systems (CHI 2002).
- Proceedings of the 1998 ACM Conference on Intelligent User Interfaces (IUI 1998).

Editorial Boards

- Communications of the ACM, 2009-present.
- ACM Transactions on CHI, 2000-2006.
- Knowledge-Based Systems, 1993-2009.
- ACM *intelligence*, 1998-2001.

Program Committees

- ACM Conference on Human Factors in Computing Systems (CHI): 1999-2004, 2006, 2016.
- ACM Conference on Computer-Supported Cooperative Work (CSCW): 2000, 2006, 2008, 2010, 2011, 2012, 2015.
- ACM Conference on Intelligent User Interfaces (IUI): 1997-2000, 2004.
- ACM Recommender Systems Conference: 2007, 2008, 2009, 2010, 2013.
- ACM GROUP Conference: 2007, 2009, 2010.
- ACM SIGIR Conference: 2008.
- AAAI Conference on the Web and Social Media: 2011, 2012, 2016.
- User Modeling, Adaptation, and Personalization: 2011, 2016.
- NordiCHI 2008, 2010.
- Communities and Technology: 2009.
- Computer-Supported Cooperative Learning 2002.
- User Modeling: 2001.

- International Conference on Knowledge Capture 2001.
- Knowledge-Based Software Engineering (KBSE): 1994-1999.
- Intelligent Data Analysis: 1997.
- National Conference on Artificial Intelligence (AAAI): 1996-1997.
- IEEE Conference on Artificial Intelligence for Applications (CAIA): 1994.
- International Workshop on Privacy-Aware Location-based Mobile Services: 2007.
- SIGIR Workshop on Future Challenges in Expertise Retrieval: 2008.

Other conference leadership positions

- ACM Conference on Computer-Supported Cooperative Work Doctoral Consortium Co-Chair, 2016 and 2011.
- The 2nd AAAI Conference on Human Computation and Crowdsourcing (HCOMP 2014) Doctoral Consortium Co-Chair.
- International Symposium on Wikis and Open Collaboration Doctoral Symposium Chair, 2011.
- ACM Conference on Recommender Systems Doctoral Consortium, Co-Chair, 2007.
- International Joint Conference for Artificial Intelligence Doctoral Consortium, Co-Chair, 1997.
- American Association for Artificial Intelligence Doctoral Consortium, Co-Chair, 1997.
- American Association for Artificial Intelligence Doctoral Consortium, Co-Chair, 1996.

Reviewer

Journals

- ACM Computing Surveys.
- IEEE Transactions on Data and Knowledge Engineering.
- IEEE Expert.
- Information Systems.
- International Journal of Human-Computer Studies.
- Journal of Computer-Supported Cooperative Work.

Conferences

- Ninth IFIP International Conference on Human-Computer Interaction (INTERACT): 2003.
- ACM Conference on Human Factors in Computing Systems (CHI): 1995-1998.
- ACM Conference on Computer-Supported Cooperative Work (CSCW): 1998.
- ACM Symposium on User Interface Software and Technology (UIST): 1996.
- ISSM Conference on Information and Knowledge Management: 1993.

National Science Foundations Panels

Served on many panels from 1996 through the present.

Workshops Organized

- ACM Wikis and Open Collaboration Doctoral Symposium, 2011.
- Social Computational Systems Community Workshop, 2011.
- ACM Computer Supported Cooperative Work Doctoral Consortium, 2011.
- International Conference on Ubiquitous Computing (UbiComp): “Multi-device Interfaces for Ubiquitous Peripheral Interaction”, 2003.
- ACM Conference on Human Factors in Computer Systems (CHI): “Interacting with Recommender Systems”, 1999.
- International Joint Conference for Artificial Intelligence Doctoral Consortium, 1997.
- American Association for Artificial Intelligence Doctoral Consortium, 1997.
- American Association for Artificial Intelligence Doctoral Consortium, 1996.
- ACM Conference on Human Factors in Computer Systems (CHI): “’Model World’ to ‘Magic World’: Making Visual Objects the Medium for Intelligent Design Assistance”, 1995.
- ACM Conference on Human Factors in Computer Systems (CHI): “New Uses and Abuses of Interaction History”, 1994.
- AAAI Fall Symposium: “Human-Computer Collaboration: Reconciling Theory, Synthesizing Practice”, 1993.
- World Conference on Artificial Intelligence and Education: “Collaborative Problem Solving: Theoretical Frameworks and Innovative Systems”, 1993.
- Conference on AI for Applications: “Applying AI To Software Problems: Assessing Promises and Pitfalls”, 1992.

Other Professional Service

- Member of SIGCHI Publications Board and Conference Management Committee, 2002-2004.
- ACM Special Interest Group on Artificial Intelligence Conference Chair (1995-1999); originated and co-organized Doctoral Consortia held in conjunction with AAAI and IJCAI.

Internal Service

- Associate Department Head, 2019-
- Chair, Department Head Search Committee, 2015.
- Chair, Strategic Planning Committee, 2013-2014.
- Chair, Social Computing Faculty Search Committee, 2013-2014.
- Curriculum Committee, 2012-2013.
- Chair, Strategic Planning Committee / Faculty Recruiting Committee, 2011-2012.

- Director of Graduate Studies: 2007-2010.
- Communications Committee: 2007
- Newsletter/Brochure Committee (chair): 2006-2007
- Research Opportunities Committee: 2005-2007
- Curriculum Committee: 2003-2005.
- Hosted Robert Kraut, Cray Colloquium speaker: October 2003.
- Participated in recruiting and admission activities.
- Information, Technology, and Everyday Life Initiative: Committee Member.

TEACHING AND ADVISING

Ph.D. Students Advised

- Dan Cosley (co-advised with John Riedl): completed PhD July 2006, currently an Associate Professor at Cornell University; on leave as Program Director at NSF.
- Pamela Ludford: completed PhD September 2007, currently an independent consultant.
- Reid Priedhorksy: completed PhD August 2010, currently employed at Los Alamos National Laboratories.
- Colin Delong: completed PhD October 2013 (co-advised with Jaideep Srivastava)
- Mikhil Masli: completed PhD July 2013, currently employed at IBM.
- Aaron Halfaker (co-advised with John Riedl): completed PhD September 2013, currently employed at Microsoft.
- Katie Panciera: completed PhD August 2014; currently Assistant Professor at Milwaukee School of Engineering.
- Fernando Torre: completed PhD September 2014; founder of a startup.
- Shuo (Steven) Chang: completed PhD August 2016; currently employed at Facebook.
- Tien Nguyen (co-advised with Joe Konstan): completed PhD August 2016; currently employed at Facebook.
- Morten Warncke-Wang (co-advised with Brent Hecht): completed PhD December 2016, currently employed at the Wikimedia Foundation.
- Andrew Sheppard: completed PhD December 2017, currently employed at Houston Engineering.
- Jacob Thebault-Spieker (co-advised with Brent Hecht): completed PhD December 2017; currently Assistant Professor at The University of Wisconsin.
- Hannah Miller (co-advised with Brent Hecht): completed PhD August 2018; currently Assistant Professor at University of Wisconsin Oshkosh.
- Vikas Kumar (co-advised with Joe Konstan), completed PhD August 2018, currently employed at KenSci.
- Andrew Hall: completed PhD August 2019; currently employed at 3M.

- Bowen Yu (co-advised with Haiyi Zhu), completed PhD December 2018, currently employed at Facebook.
- C. Estelle Smith: completed PhD December 2020; currently Assistant Professor at the Colorado School of Mines.
- Zach Levonian (co-advised with Lana Yarosh): completed PhD July 2022.
- Charles Chuankai Zhang (completed PhD 2024).
- Mohammed (Mo) Houtti (entered program Fall 2019)
- Moyan Zhou (entered program Fall 2021)

M.S. Students Advised

- Tyler Danielsen – received degree in 2016
- Jie Kang – received degree in 2016
- Zahra Eslami – received degree in 2015
- Yanjie Liu – received degree in 2013
- Renji Yu – received degree in 2012
- Carol Drysdale – received degree in 2011
- Jingwen Zhang – received degree in 2011
- Jisu Oh – received degree in 2010
- Sara Drenner – received degree in 2008
- Anna Rouben – received degree in 2006
- Arjun Sundararajan – received degree in 2006
- Pamela Ludford – received degree in 2005
- Rahul Akolkar – graduated May 2004

Undergraduate Honors / Senior Thesis Students Advised

- Rijul Mahajan 2023
- Moyan Zhou 2021
- Avleen Kaur 2020
- Harmanpreet Kaur, 2016
- Arlo Siemsen, 2014
- Johnathan Frenz, 2013
- David Pitchford - 2012
- Michael Ludwig - 2010
- Jordan Focht – 2010
- Kurt Wilms - 2005

- John Murphy – 2004

Other Committees

- Logan Stapleton, PhD: Member of final examination committee.
- Hanlin Li, PhD: Member of final examination committee (Northwestern University).
- Matheus Araújo, PhD: Member of preliminary and final examination committees
- Hao-Fei Cheng, PhD: Member of preliminary and final examination committees
- Catherine Grevet, PhD: member of preliminary and final examination committees (Georgia Tech).
- Loxley Wang, PhD: member of preliminary and final examination committees.
- Abigail Bakke, PhD: member of preliminary and final examination committees
- Tahir Sousa, MS: member of final examination committee
- Tony Lam, PhD: member of preliminary examination committee.
- Michael Janseen, PhD: member of preliminary examination committee.
- Haleh Hagh Shenass, PhD: member of preliminary & final examination committees.
- Julie Beilfuss, MS: member of final examination committee.
- Liv Knatterud, MS: member of final examination committee.
- Sean McNee, MS: member of final examination committee.
- Shankar Subrahmanian, MS: member of final examination committee.
- Vamsee Venuturumilli, MS: member of final examination committee.
- Eric Gilbert, Ph.D. Preliminary and Final Examination Committees (UIUC, 2009/2010): member of thesis committee.
- Yi (Jenny) Zhang, Ph.D. (New Jersey Institute of Technology, 2004): member of thesis committee.
- Brian Amento, Ph.D. (Virginia Tech, 2001): member of thesis committee.
- David McDonald, Ph.D. (UC Irvine, 2000): member of thesis committee.

Courses taught

A list of all the classes I have taught, in most cases multiple times.

- CSCI 8115: Human-Computer Interaction and UI Technology
- CSCI 5125: Collaborative and Social Computing
- CSCI 5116: GUI Toolkits and Their Implementation
- CSCI 5115: User Interface Design, Implementation, and Evaluation
- HSEM 2519H: Honors Seminar on Crowdsourcing
- CSCI 1902: Structure of Computer Programming II

- CSCI 1901H: Introduction to Computer Science (Honors)

Tutorials

“Intelligent User Interfaces: Issues, Approaches, Evaluation”, offered at 1993 Conference on Artificial Intelligence for Applications.