

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

**AMERICAN AIRLINES, INC., AND HILTON DOMESTIC OPERATING
COMPANY, INC.,
Petitioners**

v.

**R2 SOLUTIONS LLC
Patent Owner**

U.S. Patent No. 8,341,157

**DECLARATION OF JIMMY LIN, PH.D.
IN SUPPORT OF PETITION FOR *INTER PARTES* REVIEW OF
U.S. PATENT NO. 8,341,157**

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DECLARATION OF DR. JIMMY LIN

I. INTRODUCTION

1. I, Dr. Jimmy Lin, submit this declaration to state my opinions on the matters described below.

2. I have been retained by Petitioners American Airlines, Inc. (“American”) and Hilton Domestic Operating Company, Inc. (“Hilton”) (collectively, “Petitioners”), as an independent expert in this proceeding before the United States Patent and Trademark Office. Although I am being compensated at my usual and customary rate of \$1,100 USD per hour, no part of my compensation depends on the outcome of this proceeding, and I have no other interest in this proceeding.

3. I understand that this proceeding involves U.S. Patent No. 8,341,157 (“the ’157 patent”), and I have been asked to provide my opinions as to the patentability of the claims of the ’157 patent.

4. I have been asked to consider the validity of certain claims of the ’157 patent based on certain prior art references. I have also been asked to consider the state of the art and prior art available as of July 31, 2009, which is the earliest claimed priority date on the face of the ’157 patent. Based on the combination of prior art references discussed in this declaration, it is my opinion that claims 1–23 of the ’157 patent are invalid for the reasons provided below.

II. QUALIFICATIONS AND BACKGROUND

5. I believe that I am well qualified to serve as a technical expert in this matter based upon by educational and work experience, which I summarize below. I understand that my curriculum vitae, which includes a more detailed summary of my background, experience, and publications, is being submitted as Ex-1011.

A. Education and Qualifications

6. I am currently a Professor and the David R. Cheriton Chair in the David R. Cheriton School of Computer Science at the University of Waterloo, Ontario, Canada. I have held this position since 2015. Mclean's ranks the David R. Cheriton School of Computer Science as the top-ranked computer science program in Canada in 2022. I am also a Fellow of the Association for Computing Machinery, recognized for contributions to question answering, information retrieval, and natural language processing since 2023.

7. From 2004 to 2015, I held the positions of Assistant Professor, Associate Professor, and Professor at the University of Maryland, College Park, Maryland, USA. My primary appointments were with the College of Information Studies and the Institute of Advanced Computer Studies, with additional appointments in the Department of Computer Science.

8. I received a Ph.D. in Electrical Engineering and Computer Science from the Massachusetts Institute of Technology in 2004. I received a Master of

Engineering and Bachelor of Science, also from the Massachusetts Institute of Technology, in 2001 and 2000, respectively.

9. I currently serve as the Chief Technology Officer for Primal Fusion, Inc., a startup based in Waterloo, Ontario, Canada. From 2018 to 2021, I served as the Chief Scientist of RSVP.ai, another startup based in Waterloo, Ontario, Canada. From 2010 to 2015, I was a research scientist at Twitter. From 2005 to 2009, I held various visiting positions at the National Library of Medicine, the National Institutes of Health.

10. I am presently the co-director of the Waterloo Artificial Intelligence (AI) Institute, which has the mission to cohere, advance, promote, and exploit cross-disciplinary research at the frontiers of artificial intelligence and its applications at the University of Waterloo. The Institute spans all six Faculties across campus and encompasses a large, vibrant, multidisciplinary community comprising over 230+ faculty. Today, the University of Waterloo is the second-ranked institution for AI in Canada and the top institution for applied AI, according to CSRankings, a widely respected and cited ranking of computer science institutions around the world.

11. For nearly twenty-five years, my research has been driven by the quest to develop techniques and build tools that connect users to relevant information—technologies including search, recommendation, and question answering. Beyond text, I have explored speech, images, graphs, relational data, semi-structured logs,

and more, targeting diverse groups of users, ranging from casual information seekers to data scientists, historians, legal scholars, medical doctors, and other domain experts. My work mostly lies at the intersection of information retrieval and natural language processing, with a focus on two fundamental challenges: those of understanding and scale. As of December 2022, I have had an *h*-index of 85 and my papers collectively have been cited over 26,000 times, according to Google Scholar. I have received research funding from a multitude of sources, including governmental agencies such as the U.S. National Science Foundation and Natural Sciences and Engineering Research Council of Canada, as well as corporations, including Amazon, Yahoo!, IBM, and Google.

12. I have co-authored two textbooks, entitled “Data-Intensive Text Processing with MapReduce” and “Pretrained Transformers for Text Ranking: BERT and Beyond”, published in 2010 and 2021, respectively. These textbooks have been used for graduate and undergraduate courses around the world in big data and search, respectively.

13. In addition to these textbooks, from 1998 to present I have authored or co-authored hundreds of peer-reviewed publications on numerous topics that appeared in various scholarly venues in computer science and related academic disciplines. These publications, which are listed in my CV, relate to the fields of search, information retrieval, information filtering, document summarization,

natural language processing, computational linguistics, data management, data analytics, and more.

14. In my capacity as a research scientist at Twitter, I worked on “big data” infrastructure for data analytics and data science. The infrastructure that I helped build during that time managed tens of petabytes of data across tens of thousands of servers in multiple datacenters. In addition, I have contributed to many user-facing products and services at Twitter, including real-time search, real-time query suggestion, expert search, and graph-based recommendations. These products and services are used by hundreds of millions of people around the world.

15. My research group develops and maintains Pyserini, an open-source Python toolkit for search built on the open-source Lucene search library. This toolkit is widely used in the academic research community to support work in natural language processing and information retrieval using traditional lexical techniques as well as the latest approaches using neural networks.

III. MATERIALS CONSIDERED

16. In forming my opinions, I have reviewed the following documents:

Exhibit	Description
1001	U.S. Patent No. 8,341,157 (the “’157 patent”)
1002	Prosecution History of the ’157 patent
1003	U.S. Patent No. 8,375,048 to Wad (“Wad”)
1004	U.S. Publication No. 2007/0294240 to Steele (“Steele”)

1005	U.S. Publication No. 2004/0199496 to Liu (“Liu”)
1006	U.S. Publication No. 2008/0082518 to Loftesness (“Loftesness”)
1007	U.S. Publication No. 2003/0208473 to Lennon (“Lennon”)
1008	U.S. Publication No. 2006/0173985 to Moore (“Moore”)
1009	Claim Construction Memorandum Opinion and Order, R2 Solutions LLC v. Deezer S.A., No. 4:21-CV-90 (E.D. Tex. Jan. 04, 2022), ECF No. 45
1016	Declaration of Bill Davis in Support of Plaintiff’s First Amended Complaint for Patent Infringement, <i>R2 Solutions LLC v. FedEx Corporate Services, Inc.</i> , No. 4:21-cv-00940 (E.D. Tex. Apr. 15, 2022), ECF No. 18-7.

IV. LEGAL STANDARDS

17. In forming my opinions and considering the subject matter of the ’157 patent and its claims in light of the prior art, I am relying on certain legal principles that counsel in this case explained to me. My understanding of these concepts is summarized below.

18. I understand that the claims define the invention. I also understand that an unpatentability analysis is a two-step process. First, the claims of the patent are construed to determine their meaning and scope. Second, after the claims are construed, the content of the prior art is compared to the construed claims.

19. I understand that a claimed invention is only patentable when it is new, useful, and non-obvious in light of the “prior art.” That is, the invention, as defined by the claims of the patent, must not be anticipated by or rendered obvious by the prior art.

A. Claim Construction

20. I understand that the United States Patent and Trademark Office interprets claim terms in an *inter partes* review proceeding under the same claim construction standard that is used in a United States federal court. I understand that under this standard, the meaning of claim terms is considered from the viewpoint of one of ordinary skill in the art at the time of the alleged invention.

21. I have been informed that claim terms are generally given their ordinary and customary meaning as understood by one of ordinary skill in the art in light of the specification and the prosecution history pertaining to the patent. I understand, however, that claim terms are generally not limited by the embodiments described in the specification.

22. I understand that in addition to the claims, specification, and prosecution history, other evidence may be considered to ascertain the meaning of claim terms, including textbooks, encyclopedias, articles, and dictionaries. I have been informed that this other evidence is often less significant and less reliable than the claims, specification, and prosecution history.

B. Obviousness Under 35 U.S.C. § 103

23. I understand that a patent claim is invalid as obvious if the claimed invention would have been obvious to a person of ordinary skill in the art (“POSITA”) at the time the claimed invention was made. This means that even if all

of the elements of the claim cannot be found in a single prior art reference that would anticipate the claim, a person of ordinary skill in the field who knows about all the prior art would have come up with the claimed invention. I understand that in an obviousness determination, the POSITA is presumed to have knowledge of all material prior art. I understand that whether a claim is obvious is based upon the determination of several factual issues.

24. In considering obviousness, I understand that one must determine the scope and content of the prior art. I understand that, in order to be considered as prior art to a patent being considered, a prior art reference must be reasonably related to the claimed invention of that patent. A reference is reasonably related if it is in the same field as the claimed invention or is from another field to which a POSITA would look to solve a known problem.

25. I understand that one must determine what differences, if any, existed between the claimed invention and the prior art.

26. I understand that a patent claim composed of several elements is not proved obvious merely by demonstrating that each of its elements was independently known in the prior art. In evaluating whether such a claim would have been obvious, one may consider whether a reason has been identified that would have prompted a POSITA to combine the elements or concepts from the prior art in the same way as in the claimed invention. There is no single way to define the line between true

inventiveness on the one hand (which is patentable) and the application of common sense and ordinary skill to solve a problem on the other hand (which is not patentable). For example, market forces or other design incentives may be what produced a change, rather than true inventiveness.

27. I understand that one may consider whether (1) the change was merely the predictable result of using prior art elements according to their known functions, or whether it was the result of true inventiveness; (2) there is some teaching or suggestion in the prior art to make the modification or combination of elements claimed in the patent; (3) the innovation applies a known technique that had been used to improve a similar device or method in a similar way; (4) the claimed invention would have been obvious to try, meaning that the claimed innovation was one of a relatively small number of possible approaches to the problem with a reasonable expectation of success by those of ordinary skill in the art; (5) the invention merely substituted one known element for another known element in order to obtain predictable results; (6) the invention merely applies a known technique to a known device, method, or product to yield predictable results, or (7) known work in the field may have prompted variations of use of the same inventions in the same or different fields due to market forces or design incentives that would have been predictable to a POSITA.

28. I understand that one must be careful not to determine obviousness

using the benefit of hindsight; many true inventions might seem obvious after the fact. I understand that the determination should be based on the position of a person of ordinary skill in the field at the time the claimed invention was made and should not consider what is known today or what is learned from the teaching of the patent.

C. Secondary Considerations of Non-Obviousness

29. I understand that certain secondary considerations may be considered in evaluating obviousness in order to prevent hindsight bias. These secondary considerations include the commercial success of products that practice the patent, long-felt need for the patented technology, failure by others to solve the problem addressed by the patent, initial skepticism by others in the industry, industry recognition and praise of the patented products, and efforts by others to copy the patented technology.

30. I have been informed that these secondary considerations of non-obviousness must be balanced against the strength of the *prima facie* case of obviousness. Where the invention represents no more than the predictable use of prior art elements according to their established functions, secondary considerations are inadequate to establish non-obviousness.

31. I have also been informed that the patentee must establish a nexus between any secondary consideration factors and the claimed invention. Where a secondary consideration factor results from something other than what is both

claimed and novel in the patent, there is no nexus to the merits of the claimed invention.

32. I have been informed that, for example, the nexus requirement as it applies to the evidence of commercial success requires that the patentee must show that the sales of a product that allegedly practices the claimed invention must be a direct result of the unique characteristics of the claimed invention, as opposed to other economic and commercial factors that are unrelated to the patented invention. I understand that this means if the commercial success is due to an element that existed in the prior art or that is not claimed by the patent, then no nexus exists.

33. I have been further informed that, for example, the nexus requirement as it applies to the long-felt need element must likewise be supported by evidence. Where the differences between the prior art and the claimed invention are minimal, it cannot be said that any long-felt need was met by the patented invention or that the patent solved any technological problems that were unaddressed by others.

34. I have been informed that evidence of industry praise must also show a nexus with the claimed invention, and that self-serving statements by the patentee regarding the merits of the claimed invention are generally not given weight.

V. THE '157 PATENT

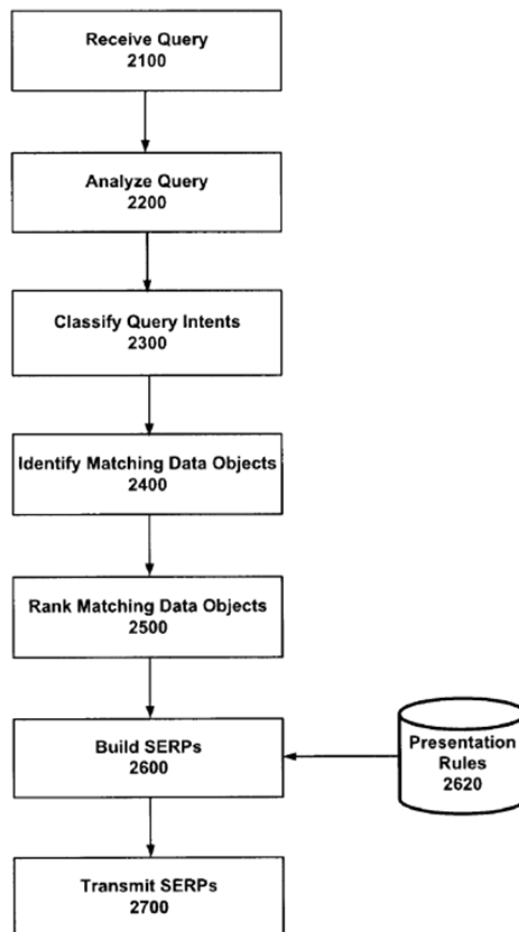
A. Overview of the '157 Patent

35. The '157 patent describes a “system and method for intent driven search

presentation.” ’157 patent, Abstract. The method includes, for example, receiving a query and classifying it into at least one intent, identifying and ranking data objects that match a query keyword and assigning at least one intent to some of the data objects, and building a result using the ranked data objects and the assigned intent. *Id.*, Abstract.

36. The ’157 patent explains that “[a]n intent is a mapping from many combinations of keywords to a relatively small set of common goals that users pursue in a search query.” *Id.*, 9:44-47, *see also id.*, 3:46-57. The ’157 patent provides two examples of such intents. In one example, the user enters the single word query “rainforests” and may have an intent to “obtain information on traveling to a rainforest,” to purchase “CDs or books having rainforests as a subject,” or to purchase “rainforest themed merchandise such as clothing or accessories.” 3:46-57. The patent explains, however, that the user may also “simply wish to browse web sites relating to ‘rainforests’ without having any specific purpose in mind.” *Id.* In another example, a user enters the query “Nikon D60” and may intend to find information on “purchasing,” “reading reviews,” or “obtaining service,” or “reading a user manual” for a Nikon D60 camera, or may wish to “find[] and contact[] other owners of Nikon D60 cameras.” ’157 patent, 3:58-67, 13:11-22.

37. Figure 2 of the ’157 patent depicts an exemplary process for intent driven search presentation:



'157 patent, Fig. 2.

38. At step 2100, a query is received from a user over a network, such as the Internet. *Id.*, 9:26-35. The user submits a query using any suitable device such as a computer or a mobile phone having a web browser or other application. *Id.* Queries are made up of “query tokens,” which “comprise words, phrases or symbols.” *Id.*

39. At step 2200, the query is analyzed and “keywords within the query are identified.” *Id.*, 9:36-37. The '157 patent explains that the analysis step involves parsing the query “into tokens, and the tokens can be analyzed to identify common

entities, phrases, spelling errors, synonyms, variants of stems, and noisewords.” *Id.*, 9:36-41.

40. At step 2300, the query is classified into one or more likely intents, and may be classified into an unclassified intent “when no defined intents match the query.” *Id.*, 9:42-44. The patent explains that the user’s intent “can be inferred using a number of techniques,” including through “linguistic analysis of the query itself,” *Id.*, 4:27-36, 11:53-63, but it does not specify any particular linguistic analysis techniques. The patent identifies other techniques for determining a user intent that are not based on a query keyword including “previous queries in the same user session,” “user profile information,” “a set of all queries from all users,” and “click data from previous sessions for the current user [or] all users.” *Id.*, 4:27- 36, 9:55-61, 11:53-63.

41. At step 2400, a plurality of data objects that match the query are identified. *Id.*, 9:62-10:3. Data objects include “documents such as web pages.” *Id.*, 9:63-67. Though the patent purports that “[s]earch results could be significantly enhanced if the likely intent of the query is known,” the patent explains that the “data objects could be matched to the query keywords using any conventional search engine technology known in the art such as a bag of words type match.” *Id.*, 9:67-10:3, 12:3-5.

42. The data objects are then ranked at step 2500. *Id.*, 10:4-22. The ’157

patent explains that ranking may be performed “using any ranking algorithm known in the art.” *Id.*, 10:5-9. Intent may also be used to rank the data objects. *Id.*, 10:9-22.

43. Finally, one or more search engine results pages are built (step 2600) and then transmitted over a network to the user (step 2700). *Id.*, 10:38-41. The ’157 patent purports to improve the displayed search results by “customiz[ing] the display and behavior of a search result to be narrowly targeted to a user’s intent.” *Id.*, 4:17-27. For example, “customizations could include a customized title or abstract for the result.” *Id.*, 4:22-26.

44. The ’157 patent explains that “presentation rules” are applied to “tailor the display of search results for a webpage.” *Id.*, 4:37-41, 10:49-57. Presentation rules contain “one or more presentation attribute rules that can include all of the standard elements of a search engine result page, such as title, URL, images, related links, and structured information applicable to the associated document.” *Id.*, 10:49-57, 12:34-41. Presentation rules can be supplied from a feed or file and may be provided in an XML schema. *Id.*, 6:7-9. The ’157 patent lists several example presentation attribute rules for modifying the display of search results. For example, there may be a media rule, which displays the URI to a media object such as an image, video, or audio file. *Id.*, 5:25-51. In another example, a structured-data rule based on key-value pairs displays information such as price, reviews, or ratings. *Id.*

45. The ’157 patent has 23 claims, of which claims 1 and 2 are independent.

Independent claim 1 recites a method that generally corresponds to the process of Figure 2. Independent claim 2 recites a computer-readable medium with instructions for a method similar to that of claim 1. Dependent claims 3–11 are directed to various techniques for classifying a query and determining a user’s intent. Dependent claims 12–23 are directed to various methods of how presentation rules are used to customize the display of data objects.

B. Summary of the Prosecution History of the ’157 Patent

46. I have reviewed the prosecution history of the application that led to the ’157 patent. Ex-1002. During prosecution of the ’157 patent, the Examiner twice rejected the claims in view of U.S. Patent No. 7,689,585 to Zeng (“Zeng”). Ex-1002, 68, 74, 94, and 101.

47. In response to these rejections, the applicant amended the claims and argued the following claim elements to overcome the Examiner’s rejections:

determining, using the at least one computing device, a plurality of intents from the at least one keyword, each of the plurality of intents indicates a type of information regarding the query keyword that is likely to be desired by a user submitting the query; . . .

assigning, using the at least one computing device, at least one of the plurality of intents to at least some of the plurality of data objects; . . .

[and]

at least one display entry customized to a respective assigned intent is constructed for each of the ranked plurality of data objects.

Ex-1002, 111, 119-121. Specifically, the applicant argued that Zeng, by “suggesting

related search terms based on similarity attributes of associated data objects, (e.g., user queries, web pages retrieved in response to the queries etc.) and their inter/intra object relationships” failed to “disclose or suggest deriving a user intent or type of information that is likely to be desired by a user from the search queries/keywords or assigning intents to the data objects obtained as search results.” *Id.*, 120. The applicant also argued that the prior art’s disclosure of a “reinforced clustering algorithm that iteratively clusters the multi-type data objects” did not teach “at least one display entry customized to a respective assigned intent is constructed for each of the ranked plurality of data objects.” *Id.* The examiner subsequently withdrew the anticipation rejection and allowed the claims. *Id.*, 127-129.

C. Claim Construction of Terms in the ’157 Patent

48. As discussed above, I have been informed that for the purposes of *inter partes* review, the standard for claim construction of terms within the claims of the patent is the same as that applied in federal district court litigation. I understand that a district court has previously construed terms of this patent, and I have been informed of those constructions. Specifically, I understand the district court to have issued the following constructions:

Claim Term	District Court’s Construction
“intent(s)” (Claims 1, 2)	plain meaning

“determining, at least the one computing device, a plurality of intents from the at least one keyword, each of the plurality of intents indicates a type of information regarding the query keyword that is likely to be desired by a user submitting the query” (Claim 1)	“determining, using the at least one computing device, a plurality of intents from the at least one keyword, wherein each of the plurality of intents indicates a type of information regarding the query keyword that is likely to be desired by a user submitting the query”
“the query is classified by linguistic analysis of the at least one query keyword” (Claim 5)	plain meaning

EX-1009, 34, 40, 42.

49. I have applied these constructions in my analysis. For terms that the district court did not previously construe, I have applied the ordinary and customary meaning as understood by a POSITA in light of the specification and the prosecution history.

VI. PERSON OF ORDINARY SKILL IN THE ART

50. I am informed that patentability must be analyzed from the perspective of a “person of ordinary skill in the art” (“POSITA”) in the same field as the patent-in-suit at the time of the invention. I am also informed that several factors are considered in assessing the level of ordinary skill in the art, including (1) the types of problems encountered in the art; (2) the prior art solutions to those problems; (3) the rapidity with which innovations are made; (4) the sophistication of the technology; and (5) the education level of active workers in the field.

51. In my opinion, a POSITA pertinent to the ’157 patent as of its earliest

priority date would have had at least a four-year degree in computer science, computer engineering, or a closely related field and have at least one year of experience in researching, designing, or developing systems and methods for information search, retrieval, and presentation. *See, e.g., '157 patent, 1:14-18.* Additional education could substitute for professional experience and significant work experience could substitute for formal education. I meet this definition of a POSITA now and I did so at the priority date of the '157 patent.

52. I am also familiar with the knowledge of the POSITA as of the priority date of the '157 patent. I am able to opine on how the POSITA would have understood the disclosure and claims of the '157 patent, the disclosures of the prior art, the motivation to combine the prior art, and what combinations would have been obvious to a POSITA.

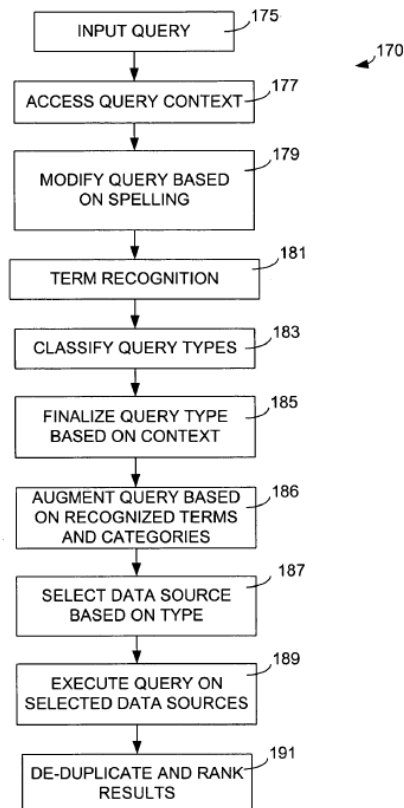
VII. THE PRIOR ART

A. Overview of Wad

53. Wad discloses systems and techniques to analyze and process queries “to better match query results with a user intent.” Wad, 1:5-8. Wad identifies a problem that two users may have different search intents even if they enter the same search query. For example, when entering the query “jaguar belize,” one user may be looking for a jaguar car dealership in Belize and another may be looking for information about jaguar cats in Belize. *Id.*, 1:17-25. Wad discloses one or more

analyzers to “examine the query and deduce a query intent.” *Id.*, 1:44-48. Wad then augments the query with “query augmentation terms based on the deduced query intent” and uses the augmented query to run a search to return more relevant results to the user. *Id.*, 1:48-57. Wad discloses various techniques to augment a search query with “terms that relate to the identified type or intent of the query.” *Id.*, 3:10-17.

Figure 3 explains one such method:



Wad, Fig. 3.

54. Wad discloses multiple techniques for determining the intent using the words in a query. *Id.*, 4:14-58. One example is an algorithmic intent recognizer, which “uses heuristic rules to ascribe a likely meaning to the words that the user

typed.” *Id.*, 4:26-36. The heuristic rules may employ certain pattern recognition techniques to assign an intent to the user’s words. Wad employs heuristic rule intent matching techniques to recognize query intents like “Zip codes, email address, URLs, and UPS tracking numbers.” *Id.*, 4:34-36. Another example is the list-match recognizer. *Id.*, 4:24-27, 4:37-58. The list-match recognizer “uses a dictionary lookup list” which contains a “word or phrase by itself, the candidate category, and the probability of that match.” *Id.*, 4:38-41. Wad offers an example where the word “Paris” in the search query “Paris Hotel in Las Vegas” may have multiple intents including the city in France, or a hotel in Las Vegas. *Id.*, 4:42-58. The list-match recognizer may identify multiple intents of the query as seeking information about a hotel, a city, or travel. *Id.*, 4:42-53.

55. Like the ’157 patent, Wad also discloses various techniques for determining a user’s intent based on information other than query keywords. For example, Wad teaches a query context builder that “gathers information about the origin of a query that may be helpful in determining the query’s intent.” *Id.*, 3:60-65. The query context builder may consider information such as previous queries executed by the user, user data or profile information such as age or zip code of the user, browser settings, user preferences, and the like. *Id.*, 4:6-13.

56. Wad also teaches performing various query analysis techniques like those found in the ’157 patent. For example, Wad teaches that “[t]he query processor

124 parses the query on its individual elements by identifying the individual words of the query and any query language keywords that are embedded in a query.” *Id.*, 3:49-52. Wad also corrects spellings of query terms and identifies terms that should be grouped as phrases in the query analysis. *See id.*, 5:3-11.

57. After preprocessing the query and determining a query intent, Wad augments the query with query augmentation terms “that attempt to characterize the intent of a term included in the original query.” *Id.*, 1:65-67. Wad then runs the augmented query in various search engines to locate relevant search results for the user. *See id.*, 5:56-6:46. In one embodiment, Wad gathers search results using federation engines. *See id.*, 5:56-6:10, Figs. 2, 4. Federation engines access data objects and content from providers. *See id.*, 5:60-65, Figs 2, 4. Providers serve specific types of content, like “encyclopedic, news, travel, document serving, or phone director[ies].” *Id.* The system selects a federation engine based on the augmented query, which has been supplemented with terms to better match a user’s intent. *See id.*, 5:19-40, 5:55-6:10, Fig. 3. For example, “the travel federation engine may call the travel provider if the query contains a city, a hotel, or a travel term in it, but would not call the travel provider otherwise.” *Id.*, 6:2-4.

58. Once the data objects are located, Wad ranks the data objects in various ways, including using “query intent information.” *Id.*, 6:53-63. Wad generates a presentation to a user that customizes the display of the search results by applying

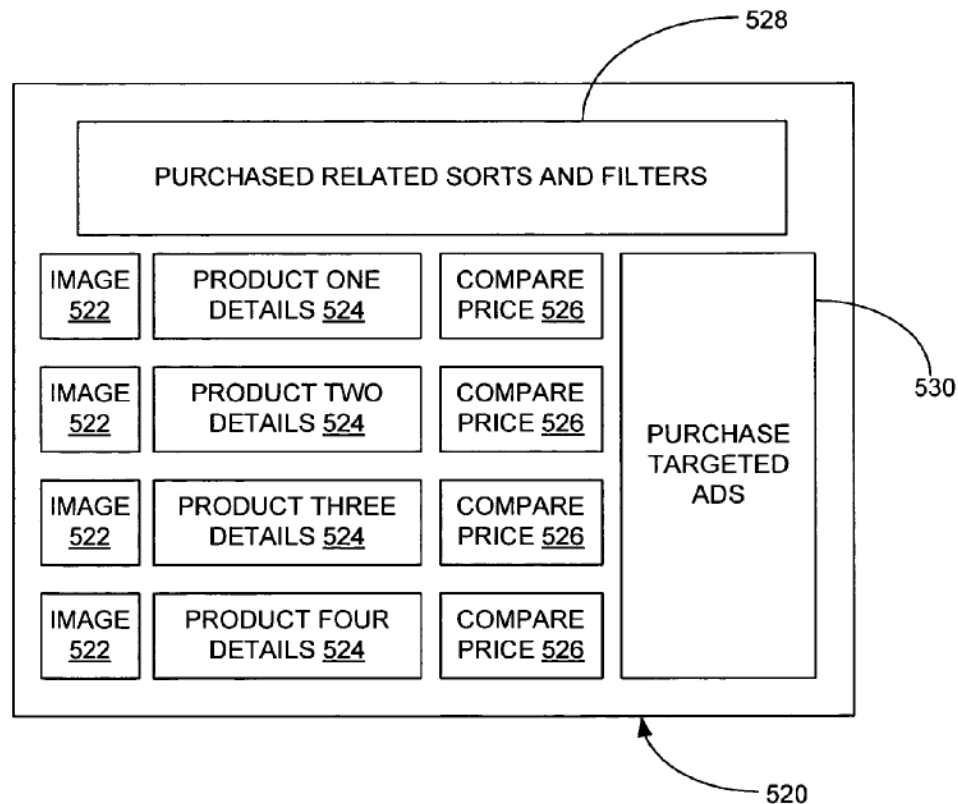
highlighting to “[w]ords and phrases on the title and description of a result that are similar or identical to those in the query.” *Id.*, 7:15-19.

B. Overview of Steele

59. Like Wad and the ’157 patent, Steele recognizes that “the search terms themselves may not indicate a user’s intent when making [a] query.” Steele, ¶ 0004. Steele seeks to improve the art by generating a presentation to a user that is “formatted in accordance with a format associated with [an] assigned intent.” *Id.*, Abstract. Steele explains that conventional search engines rank search results by a relevance score and display search results according to their relevance ranking. *Id.*, ¶ 0003. Steele purports to improve the state of the art by applying “classification tags” to electronic documents. *Id.*, ¶ 0005. Though a wide variety of classification tags may be used to categorize pages by type, Steele explains that classification tags may also correspond to certain user intents, such as a “research” intent or a “shopping” intent. *Id.*, ¶¶ 0005, 0021, 0024.

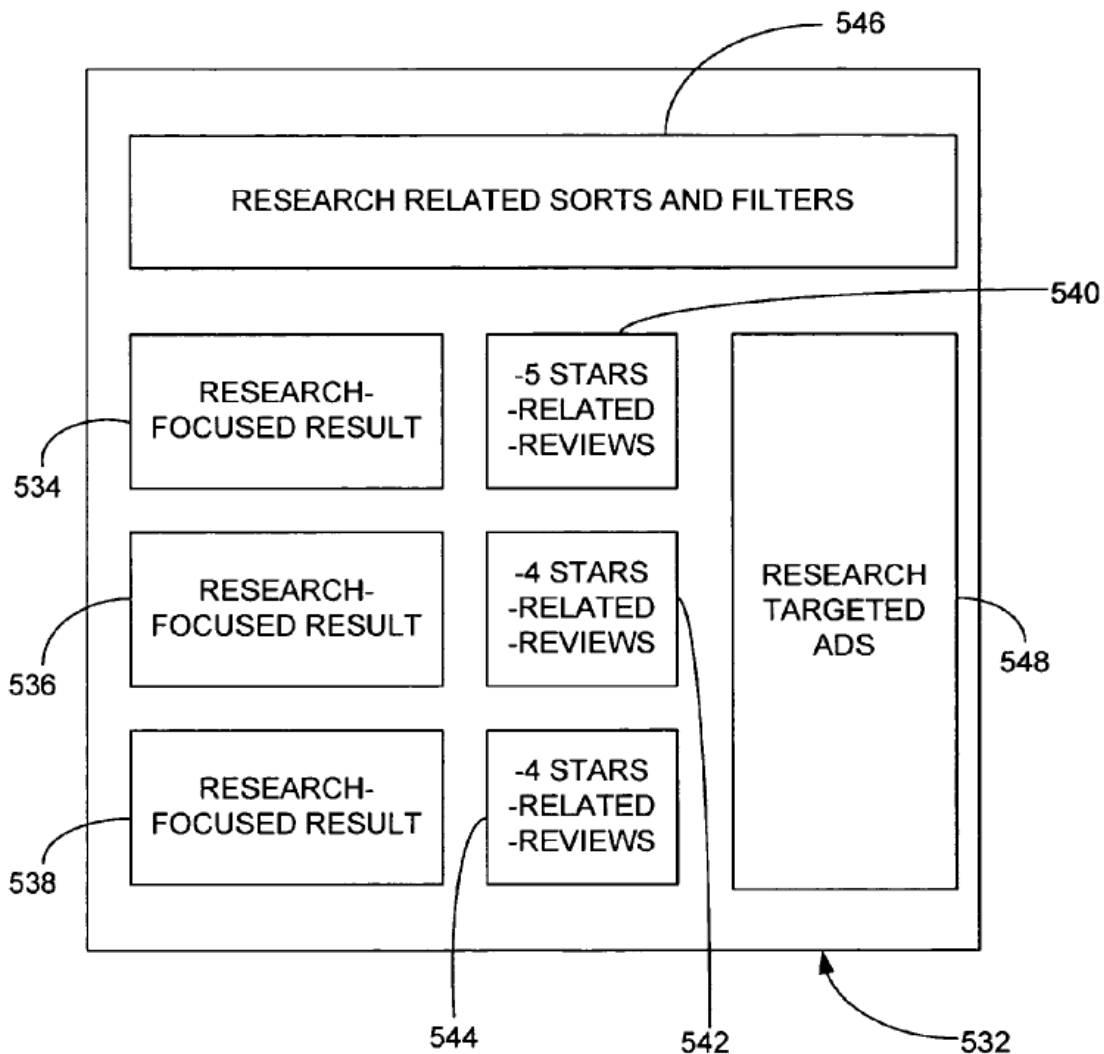
60. Steele further teaches a database structure that associates classification tags from data objects with data and metadata connected to the data objects. *Id.*, ¶ 0022, Fig. 2. For example, Steele may extract metadata for a product page that includes a “product price, product name, image” or other attributes. *Id.*, ¶ 0022. In another example, Steele extracts ratings or a review summary from a “reviews” page. *Id.*

61. Steele generates and refines results for presentation to a user based on identified intents. *Id.*, ¶¶ 0005, 0036. In addition to ranking results by a user’s intent, Steele customizes the display of the search results by displaying certain metadata or controls based on the user’s intent. *Id.*, 0036. Figure 5B illustrates Steele’s teaching:



Steele, Fig. 5B. Fig. 5B depicts an example presentation of search results targeted to a user’s “purchase intent.” *Id.*, ¶ 0038. For example, the presentation includes various data objects in the form of product details 524. *Id.* The presentation displays extracted metadata associated with the data objects based on the identified intent. Because the identified intent is “shopping,” Steele displays images 522 and pricing 526 information with the data objects. *Id.*

62. In another example, Steele identifies a “Research” intent and displays research-focused results alongside reviews and review summaries of each result, as shown in Figure 5C:



Steele, Fig. 5C. For example, when Steele detects a research intent, Steele customizes the presentation of search results by displaying reviews 540, 542, and 544 along with the data objects 534, 536, and 538 because displaying rankings or reviews “strongly satisfies a research intent.” *Id.*, ¶ 0039.

C. Overview of Liu

63. Liu describes a system that handles retrieving and displaying presentations of data to a user. Liu, Abstract. Liu stores objects for display in a database referenced by keywords. *Id.* By associating keywords with presentation items in a database, Liu allows for the identification and selection of certain objects based on keywords in response to a search query. *Id.* Liu seeks to simplify and streamline the process of arranging possible keywords that a user might use with the large number of possible objects or presentation items. *Id.*, ¶ 0013. Liu streamlines the arrangement of keywords and presentation items through “canonicalization[,] so that, under certain conditions, different keywords are treated as the same keyword.” *Id.*, ¶ 0014. Liu explains that canonicalization “allows for improved keyword-based presentation selection, so that one presentation that is to be shown when a searcher indicates a particular intent can be shown over distinct searches.” *Id.*, ¶ 0045.

64. Canonicalization involves examining the words of a search query and identifying canonical forms of the query terms. Canonicalization includes correcting for “plural/singular forms, gender forms, stem word forms, suffix forms, prefix forms, typographical error forms, word order, pattern ignoring, acronyms, stop word elimination,” or other corrections. *Id.*, ¶ 0014. Liu illustrates various canonicalization types in Table 1 below:

TABLE 1

Canonicalization Type	Original Form	Canonical Form
Capitalization	"dallas cowboys"	"Dallas Cowboys"
Singular/Plural (possibly driven by a dictionary)	"dallas cowboy"	"Dallas Cowboys"
Word Order	"washington, george"	"George Washington"
Typographical Error	"washintong"	"Washington"
Typographical Error and Word Order	"washintong, george"	"George Washington"
Acronym	"AOL"	"America On Line"
Abbreviation	"cell phone"	"cellular phone"
Punctuation	"Bonnie & Clyde"	"Bonnie and Clyde"
Dictionary (This might be a demographic-specific canonicalization)	"automobile"	"car" and "auto"
Stop Words (remove protocol words)	"http:", "https:", ".html", "www.", etc.	""
Stop Words (remove articles)	"the", "an", "a"	""
Stop Words (remove propositions)	"of", "to", etc.	""
Stop Words (remove conjunctions)	"and", "or", "nor", etc.	""

Liu, TABLE 1.

D. Overview of Loftesness

65. Loftesness teaches a strategy for providing query results based on a consideration of the user's intent in entering a query. Loftesness, Abstract. Loftesness determines the intent of a user by "detect[ing] patterns pertaining to queries entered by users." *Id.*, ¶ 0035. Loftesness analyzes previous queries by the user or other users and creates a "query classification table" that stores "a set of queries that users have entered, along with information regarding the users' probable intent in entering these queries." *Id.* After a user enters a search query, Loftesness

accesses the query classification table “to determine the probable intent of the user.” *Id.*, ¶ 0036. Loftesness ultimately generates search results “according to a particular intent-based paradigm.” *Id.*, ¶ 0071.

66. Loftesness describes multiple techniques for determining the intent of a user’s query. In one example, Loftesness tracks past click data and whether a user previously “clicked on a hypertext link” included in past search results. *Id.*, ¶¶ 0052, 0055, 0096-0099, Fig. 7. Using tracked user data, Loftesness identifies the “user’s probable intent” and “appl[ies] a result-generating function that is best suited to the identified intent.” *Id.*, ¶ 0006. Loftesness determines intent on a “user-by-user basis or a region-by-region basis.” *Id.*, ¶ 0058. “By forming user- specific classifications, the query module 116 can potentially present more relevant results to a user who has idiosyncratic search habits.” *Id.*

67. Loftesness also analyzes the actions of other users to determine intent. In an example, “the probable intent is formed based on the collective behavior of a population of users who have previously entered this same query.” *Id.*, ¶ 0036. A detected “pattern may reflect the mindset or intent of most of the users when entering that query.” *Id.*, ¶¶ 0055-0056.

E. Overview of Lennon

68. Lennon describes a process for defining descriptors for different resources located online and using “presentation rules” for displaying different

aspects of these resources. Lennon, ¶¶ 0079, 0316, 0370, 0397-0406, 0481. Lennon explains these descriptors and representation rules are available to a variety of content types including a web page. *Id.*, ¶¶ 0079, 0481. Lennon’s resources refer to particular units of content. *Id.*, ¶¶ 0081. Lennon defines “descriptors” for this content using an XML document to allow for “fast and efficient searching.” *Id.*, ¶¶ 0109, 0316, 0385-0386, 0390, 0392. Lennon explains that a “descriptor associates a representation value to a feature.” *Id.*, ¶ 0085. An example “Feature” may be “Author” and a corresponding “Representation Value” may be “John Smith.” *Id.*, ¶¶ 0086-0087, 0089, 0101-0102. Lennon also describes “presentation rules” specifying how a particular descriptor is presented, such as in a “graphical or pictorial manner” or with icons. *Id.*, ¶¶ 0370, 0395-0406.

69. Lennon describes other examples of the use of descriptors. In one example, when a user searches for a cat, which is a type of animal, “a search engine searching for occurrences of animal descriptors should also select descriptions which contain ‘cat’ descriptors.” *Id.*, ¶ 0101. Lennon further provides that association relationships are defined to provide “contextual information for a given descriptor and are necessary in order to provide a context in which a particular descriptor can be interpreted by an application.” *Id.*, ¶ 0102.

70. Lennon’s “descriptors and description schemes can be used to describe various types of multimedia information. Using the descriptors and description

schemes, descriptions that allow fast and efficient searching can be created and associated with multimedia content.” *Id.*, ¶ 0316. This content includes web pages. *Id.*, ¶ 0079. Lennon describes a “method of searching electronically- accessible resources using descriptions of said resources, wherein said descriptions of said resources have descriptor components;” “specifying a query in terms of index descriptors;” and “searching said descriptions of the resources using said query.” *Id.*, ¶ 0010.

71. Lennon also describes using “presentation rules” to generate displays. *See id.*, ¶¶ 0395-0406. “Presentation rules [] are typically targeted at element definitions as their associated actions specify how a particular descriptor type is to be presented in an application.” *Id.*, ¶ 0370. Lennon groups presentation rules in a rule set “that can be serialized, transported with and used in conjunction with the description scheme so that other applications can, if they choose to, use a similar set of presentation rules.” *Id.*, ¶ 0397. Further, “these applications will invariably need to represent description schemes and/or descriptors in a graphical or pictorial manner. For example, many descriptors could be graphically represented by icons and a user’s interaction with either a description or description scheme could be mediated by icon selection.” *Id.*, ¶ 0395.

72. Lennon describes applying presentation rules based on descriptors to determine whether and how to display elements of a resource. *Id.*, ¶¶ 0402-0404.

Lennon provides example applications of presentation rules. In one example, presentation rules are used to “classify descriptors as being structural (hence belonging in a Table of Contents) or of an index nature (hence belonging to an index).” *Id.*, ¶ 0402. In another example, presentation rules “assign icons to descriptors where the icons are assigned on a description scheme basis (ie., by the addition of attribute definitions having default values to descriptor definitions).” *Id.*, ¶ 0403. In yet another example, presentation rules “add ‘selected’ attributes to all selectable descriptor definitions so that selection rules can interact with the presentation of the descriptions (eg., so the application can differentiate visually between selected and non-selected descriptors).” *Id.*, ¶ 0404. Lennon’s presentation rules have “associated actions [that] specify how a particular descriptor type is to be presented in an application.” *Id.*, ¶ 0370. In this way, “Presentation rules could then be used to specify the spatial layout and colour arrangement of the printed presentation, and also the association of icons or key frames to particular descriptors in the description.” *Id.*, ¶ 0473.

73. Like the ’157 patent, Lennon’s “presentation rule sets” can be specified with an “XML document.” *Id.*, ¶¶ 0398, 0405. Presentation rules may be provided by resources themselves or “alternatively, they could be stored with the application.” *Id.*, ¶¶ 0398-0399. Lennon’s presentation rules have “associated actions [that] specify how a particular descriptor type is to be presented.” *Id.*, ¶¶

0370, 0402-0405, 0473. This may include “spatial layout and colour arrangement” or “icons or key frames.” *Id.*, ¶ 0473. Multiple presentation rules or rule sets may be applied in a sequence to generate a presentation of a resource. *Id.*, ¶¶ 0386, 0395-0399, 0405. Therefore, Lennon describes using presentation rules corresponding to resource descriptions to generate displays of those resources. *Id.*, ¶¶ 0316, 0370, 0395-0406.

F. Overview of Moore

74. Moore describes “RSS data feeds” and a feed-based search engine. Moore, Abstract. “RSS” stands for “Really Simple Syndication” and describes a process for “direct production and manipulation of text and multimedia by end users.” *Id.*, ¶ 0030. “RSS is an XML format for syndicating Web content” and Web documents. *Id.*, ¶¶ 0102, 0113, 0115. XML is a “widely accepted standard of the Internet community” and can define a security framework for web content. *Id.*, ¶¶ 0046, 0211, 0225, 0265, 0310-0321.

75. Moore manages secure and insecure feeds using this framework. *Id.*, ¶¶ 0292, 0301. Moore displays “both secure and insecure feeds within a single interface” and may “visually distinguish between these feeds.” *Id.* Further, a “user certificate may be embedded into a user RSS post” to signify trustworthiness. *Id.* Moore further describes security management for RSS feeds. *Id.*, ¶ 0198.

76. These “RSS data feeds” describe how to present content items. *Id.*, ¶¶

0102, 0115, 0138, 0167. “[T]ags from an RSS feed” may feed an “XML-enabled template.” *Id.*, ¶¶ 0167. For example, an RSS feed may deliver “the first sentence of [an] abstract” or display “sub-segments” with a link accessible by a user. *Id.* Using “XML grammar,” an “RSS-enabled server may include an RSS file with a title and description of items to be syndicated.” *Id.*, ¶ 0115.

VIII. OPINIONS ON UNPATENTABILITY

77. In the analysis that follows, I identify the following prior art and combinations of prior art that, in my opinion, render obvious the ’157 patent claims:

No.	Combination of Prior Art References
1	Wad in view of Steele renders obvious claims 1-3, 6, 7, and 11 under 35 U.S.C. § 103.
2	Wad in view of Steele and Liu renders obvious claims 4 and 5 under 35 U.S.C. § 103.
3	Wad in view of Steele and Loftesness renders obvious claims 6, 8-10 under 35 U.S.C. § 103.
4	Wad in view of Steele and Lennon renders obvious claims 12, 15, 16, and 19-23 under 35 U.S.C. § 103.
5	Wad in view of Steele, Lennon and Moore renders obvious claims 13, 14, 17, and 18 under 35 U.S.C. § 103.

A. Ground 1: Wad and Steele Render Obvious Claims 1-3, 6, 7, and 11

78. As I explain below, in my opinion, the combination of Wad and Steele (“Wad-Steele”) renders obvious claims 1-3, 6, 7, and 11.

1. Introduction to Motivation to Combine Wad and Steele

79. In my opinion, a POSITA would have recognized the substantial

overlap between the intent-based search methods of both Wad and Steele and would have been motivated to combine their teachings with a reasonable expectation of success.¹

80. Wad recognizes that query terms alone may not accurately reflect a user's intent. Wad, 1:5-34. Wad seeks to return relevant results to a user by determining an intent of a user that submits a query through various preprocessing techniques and keyword analysis techniques and augments the query with "terms that attempt to characterize the intent of a term included in the original query." *Id.*, 1:65-67. Wad uses the augmented query to search external data resources through a federation broker or to search an index of webpages supplied by a web crawler that accesses the Internet. *Id.*, 3:11-33, Fig. 2. Wad's augmented query returns results that are more relevant to the user because the augmented query is used to access certain data sources that contain information that better reflects the user's intent. *Id.*, 1:38-43. Wad describes presenting the search results to the user with highlighting applied to words and phrases of data object titles and descriptions that are like those in the query, *Id.*, 7:15-19, but does not provide visual examples of the presentation.

81. Steele also recognizes that "search terms themselves may not indicate a user's intent when making the query." Steele, ¶ 0004. Steele seeks to improve the

¹ As used herein, the phrases "found it obvious" and "motivated to combine" are used as shorthand to refer to a POSITA's motivation to combine with a reasonable expectation of success.

relevance of the presentation of search results to the user by identifying a user's intent when making a search query and formatting a presentation for search results according to the assigned intent. *See id.*, ¶ 0005. Identifying a user's intent allows Steele's system to "provide a search experience with content, tools and ads targeted to that intent." *Id.*, ¶ 0029. Steele identifies a user's intent through actions performed by the user, including user inputs to the display presentation. *Id.*, ¶ 0028. Steele provides several example screen displays that display search results to the user in accordance with one or more user intents. *Id.*, ¶¶ 0037-0039, Figs. 5A-5C.

82. In my opinion, it would have been obvious to combine Steele's teachings of displaying customized intent-based search presentations with Wad's teachings of determining a query intent through preprocessing the query and determining an intent from keywords and other contexts. Doing so would have been nothing more than the simple combination of known elements to obtain a predictable result. For example, the combined system would use Wad's teachings of receiving a query from a user, analyzing the query to determine at least one query keyword, determining a plurality of intents from the query keyword, classifying the query into an intent, and obtaining search results based on a query keyword, and Steele's teaching of classifying the data objects into the assigned intent and creating a presentation of data objects customized to the user's intent.

83. One of ordinary skill in the art would have found it obvious and would

have been motivated to combine Steele and Wad for several reasons. First, Wad discloses applying intent-based search to an index of data objects gathered by a web crawler accessing the Internet, Wad, 3:19-33, Fig. 2, and while Wad discloses an index creation module 156, Wad does not provide details regarding how the index creation module 156 categorizes data objects by intent. Steele discloses these implementation details because Steele discloses an index builder and a web crawler that applies classification tags that capture the potential intents of a user to data objects located on the Internet. Steele, ¶¶ 0020-0024, 0033, Figs. 2-3. As I explain in greater detail below in Section VIII.A.2.g, one skilled in the art would have looked to Steele's teachings of building an index by classifying data objects with intent-based classification tags to supplement Wad's disclosure of an index creation module. Doing so would fully explain how Wad's intent-based search could be applied for use on a general-purpose search engine that crawls the Internet, as already disclosed in Wad. *See infra* Section VIII.A.2.g.

84. Second, one skilled in the art would have found it obvious to incorporate Steele's intent-based results display techniques into Wad's system. As explained in more detail below in Section VIII.A.2.j, one skilled in the art would have recognized that doing so would improve the usefulness of the combined system by ensuring that the search results or data objects displayed to the user were customized to the user's intent, as specifically taught by Steele and contemplated by

Wad.

2. Claim 1

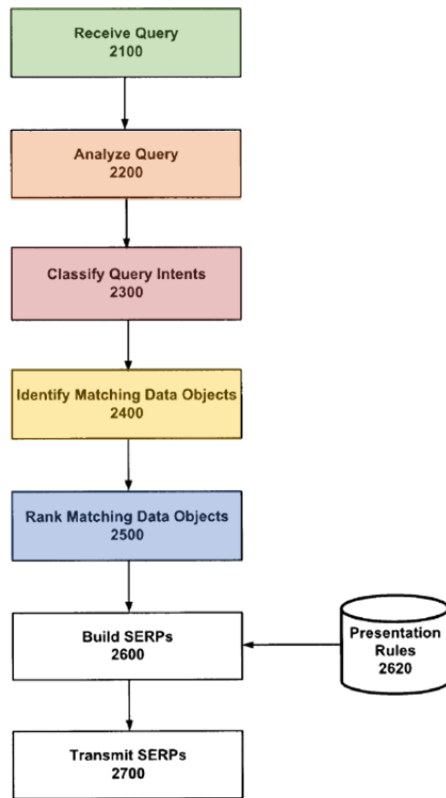
a. [1p] A method comprising the steps of:

85. Wad describes “**a method** and apparatus for query preprocessing and pipelining over a set of data sources to better match query results with a user intent.”²

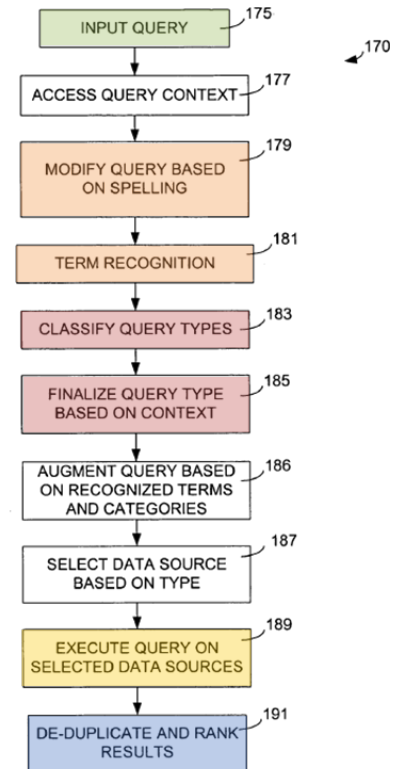
Wad, 1:5-8, *see also id.*, 1:44-2:3. In connection with Figure 3, Wad describes a query preprocessing method 170, the steps of which are performed by the query processor 124. Wad, 4:59-60.

86. Wad’s method for preprocessing queries to better match query results with a user intent recites similar steps to those in the ’157 patent’s disclosures. This can be seen by comparing Figure 2 of the ’157 patent, which discloses steps that are similar to those recited in independent claim 1, with Figure 3 from Wad:

² All emphases added except where otherwise indicated.



'157 Patent, Figure 2 (annotated)



Wad, Figure 3 (annotated)

b. [1a] receiving, over a network, a query from a user, the query comprising at least one query token;

87. Wad describes receiving a query from a user over a network. Wad, 4:59-5:2. For example, Wad explains that a user “enters the query at a computer station 116 that is routed to a front end processor 10.” Wad, 3:19-20, 3:41-45. Wad teaches “[t]he front end processor 10 begins its analysis when it **receives a query from a user 116**. Most typically, the processor is constructed in software executing on a computer system 20 (Fig. 1) such as a server computer which in turn is coupled by means of communications connections to other servers or computers by means of a **network**.” Wad, 2:31-36, *see also, id.*, 2:37-49, 3:19-21, 8:26-52, Figs. 1, 2.

88. Wad further teaches queries that comprise **at least one query token**.

For example, Wad teaches “[t]he query processor 124 parses the query on its individual elements by **identifying the individual words** of the query and any query language keywords that are embedded in a query.” *Id.*, 3:49-52. Wad’s **identification of individual words of the query** is similar to the ’157 patent’s disclosure that the “query is parsed into tokens” and that the “[q]uery tokens can **comprise words**, phrases or symbols” ’157 patent, 9:33-41, *see also id.*, 11:49-52.

89. Steele also teaches receiving a query from a user. For example, Steele teaches “the user 112 uses the client 102 to **input a search request** including **one or more terms** concerning a particular topic of interest for which the user 112 would like to identify relevant electronic documents (e.g., Web pages).” Steele, ¶ 0017.

90. Steele also teaches receiving the query over a network by teaching “[r]eferring now to Fig. 1, a client 102 is coupled to a **data communication network** 104, such as the Internet (or the World Wide Web).” *Id.* ¶ 0016, Fig. 1. “One or more servers communicate with the client 102 via the network 104 using a protocol such as Hypertext Transfer Protocol (HTTP), a protocol commonly used on the Internet to exchange information.” *Id.* Steele discloses a front-end server that communicates with the client 102 to receive the user’s search request. *Id.*, ¶ 0017, Fig. 1. In some embodiments, the front-end server is combined with a back- end server into a single server. *Id.*, ¶ 0018, Fig. 1.

c. [1b] analyzing the query, using at least one computing device, to identify at least one query keyword;

91. Wad teaches analyzing the query to identify at least one query keyword. For example, Wad discloses “[t]he query processor 124 parses the query on its individual elements by identifying the individual words of the query and any query language keywords that are embedded in a query.” Wad, 3:49-52.

92. Wad explains various query analysis techniques. For example, Wad teaches:

“[i]n step 179 (Fig. 3) the query processor performs a spell check on the query and changes the spelling of terms in the query that are misspelled. In another embodiment, spell checking is performed during execution of the query by executing the query on a spell check provider. The query processor scans the spell-corrected query for terms that should be grouped as phrases in step 181. The query processor may use information about commonly executed queries to determine which terms should be grouped as phrases.

Id., 5:3-11.

93. Wad’s disclosure of query analysis techniques is similar to the ’157 patent’s disclosure which explains that “[t]he query is then analyzed 2200 using at least one computing device and keywords within the query are identified. The query is parsed into tokens, and the tokens can be analyzed to identify common entities, phrases, spelling errors, synonyms, variants of stems, and noisewords (e.g. ‘the’, ‘a’, ‘in’).” ’157 patent, 9:36-41.

94. Wad further explains that the query processor 124, which receives and analyzes the query to identify the keywords, is part of the front end processor 10. Wad, 3:19-52. The front end processor 10 is in turn “most typically” implemented in computer system 20, which may be a server computer with which a user can communicate over the Internet. *Id.*, 2:29-3:17, *see also id.*, Figs. 1, 2. The front end query processor 10 is typically “constructed in software executing on a computer system 20 (Fig. 1) such as a server computer.” *Id.*, 2:29-35, Figs. 1 and 2. Computer system 20 is an exemplary system for implementing the invention that includes “a general purpose computing device.” Wad, 7:41-46, Fig. 1.

- d. [1c] **determining, at least the one computing device, a plurality of intents from the at least one keyword, each of the plurality of intents indicates a type of information regarding the query keyword that is likely to be desired by a user submitting the query;**

95. I understand that the district court previously construed this element to be “determining, **using the** at least one computing device, a plurality of intents from the at least one keyword, **wherein** each of the plurality of intents indicates a type of information regarding the query keyword that is likely to be desired by a user submitting the query.” EX-1009 at 40. I have applied this construction in my analysis.

96. Wad teaches determining, using the at least one computing device, a plurality of intents from the at least one keyword. For example, Wad discloses:

[a] query personalization or intent recognition module 212 determines a probable intent or categorization of terms in the query based on information about the given user and information about typical users that have previously accessed the system. To determine the likely intent of the query, the intent recognition module calls a query analyzer broker 250 that presents the query to several query analyzers 255, 256, 257 that perform intent recognition.

Wad, 4:14-21. Wad discloses that the intent recognition module 212 is part of the query processor 124, which is in turn part of the front end processor 10. Wad, Fig. 4, 3:47-4:13. The front end query processor 10 is typically “constructed in software executing on a computer system 20 (Fig. 1) such as a server computer.” *Id.*, 2:29-35, Figs. 1 and 2. Computer system 20 is an exemplary system for implementing the invention that includes “a general purpose computing device.” Wad, 7:41-46, Fig. 1.

97. Wad discloses multiple techniques to recognize intents from keywords in a search query. For example, Wad teaches that

[t]wo . . . types of intent recognition are algorithmic or list-match. An algorithmic intent recognizer uses heuristic rules to ascribe a likely meaning to the words that the user typed. A simple example is phone numbers. The rule to detect if a phone number was typed could be: three digits followed by a separator followed by seven digits or three digits followed by a separator followed by four more digits. If a phone number is recognized, the federation broker might use this information to decide to route the query to a phone book provider or other localized data source. Other patterns that might be recognized using

an algorithmic recognizer are Zip codes, email address, URLs, and UPS tracking numbers.

Id., 4:21-36.

98. Wad also discloses determining a plurality of intents from a keyword using a list-match technique. For example, Wad teaches determining two intents for the word “**Paris**,” one intent related to the city and another intent related to the Paris Hotel in Las Vegas. *See id.*, 4:37-58. As Wad explains:

[t]he list-match recognizer uses a dictionary lookup list 260. Each entry in this dictionary contains **a word or phrase by itself**, the **candidate category**, and the probability of that match. For example, the dictionary list 260 may include the entry ‘**Paris—city** (80%); **hotel** (40%).’ So, if a user types a query like ‘**Paris** Hotel in Las Vegas,’ the list-match recognizer will indicate that specific parts of that query contain **city** (Paris, Las Vegas), **hotel** (Paris) and **travel** (hotel).

Id. Wad refers to the **plurality of intents** for each keyword as “query category terms,” and it maps **query category terms** to **keywords in the query**. *Id.*, 4:54-58, 5:15-18.

99. Each of the plurality of intents identified in Wad indicate a type of information regarding the query keyword that is likely to be desired by a user submitting the query. For example, Wad explains that the query augmentation terms that it generates “attempt to characterize the intent of a term included in the original query.” *Id.*, 1:65-67. The previous example of the keyword “**Paris**” illustrates the point. A user may desire information on the “**city**” **Paris** or the “**hotel**” **Paris**, each of

which is a type of information regarding the query keyword “Paris” that is likely to be desired to the user. For the entire query “Paris Hotel in Las Vegas,” Wad identifies intents for information about hotels, cities, and travel. *Id.*, 4:37-53. In another example, Wad explains that the term “jaguar” may refer to information about “jaguar car dealerships” or “information about the population of jungle cats.” *Id.*, 1:19-22.

100. Once Wad determines an intent of a query keyword, it augments the query with query category terms “that relate to the identified type or intent of the query.” *Id.*, 3:13-15. Wad uses the augmented query to access data sources of specialized information, although a web crawler accessing the Internet may also be used. *See id.*, 3:29-33, 5:56-6:10, Figs. 2, 3, and 4. These data sources contain information that is likely to be desired by the user, like “data about airfares [or] hotels,” “a list of churches in a country,” or “news, local, sports, encyclopedia, history, books, movies, entertainment etc.” *Id.*, 2:50-62. The specialized content provided in these data sources are a type of information that is likely to be desired by a user submitting a query. Because Wad generates augmented queries **based on an intent from a keyword** and because the data sources containing different types of information are selected based on the augmented query, Wad’s intents “indicate[] a type of information regarding the query keyword that is likely to be desired by a user submitting the query” as recited in claim 1.

101. Wad’s disclosures are similar to how intent is used in the ’157 patent.

For example, like Wad, the '157 patent identifies information about “travel” as a type of intent by explaining as follows:

[t]he user’s intent may simply be to explore information available on the web relating to one or more topics, for example, a user may simply wish to browse web sites relating to ‘rainforests’ without having any specific purpose in mind. Commonly, however, a user has a more focused purpose in mind. By entering a ‘rainforest’ query, *a user may wish to obtain information on traveling to a rainforest*, or on purchasing CDs or books having rainforests as a subject or purchasing rainforest themed merchandise such as clothing or accessories.

'157 patent, 3:48-58.

- e. [1d] **classifying the query, using the at least one computing device, into at least one of the plurality of intents;**

102. Wad discloses classifying the query into at least one of the plurality of intents by teaching that “[b]ased on the presence of query terms that are mapped to corresponding query category terms, **the query type can be classified.**” Wad, 5:16-18. Wad performs classifying the query at step 185 of the method outlined in Figure 3, where “the **user’s likely intent is determined** based on query context.” *Id.*, 5:16-23, Fig. 3. Wad classifies the query into at least one of the plurality of intents using query context. *Id.*, 1:38-43, 3:60-4:13, 4:59-66, 5:15-23. In the above example of the search term “jaguar,” Wad may consider contextual information like “if the user has

recently been entering numerous queries searching for cars or if the query has been entered in a web search box on a car seller's web page." *Id.*, 5:20-23. If so, "the 'car meaning' of the term jaguar will be used." *Id.*

103. Wad discloses that the query processor [124] accesses the query analyzer broker 250 to gather intent information and uses subcomponents context builder 210 and intent recognizer 212. *Id.*, 3:60-63, 5:11-13, Figs 2, 4. Query processor 124 is part of the front end processor 10. Wad, Fig. 2, 3:47-4:18. The front end query processor 10 is typically "constructed in software executing on a computer system 20 (Fig. 1) such as a server computer." *Id.*, 2:29-36, Figs. 1 and 2. Computer system 20 is an exemplary system for implementing the invention that includes "a general purpose computing device." Wad, 7:41-46, Fig. 1.

104. Wad describes various types of contextual information useful to classify a query into one of the plurality of intents. For example, Wad may determine that the user previously visited a "cars" website and may use this information to classify the "jaguar" search query as a "cars" type query and not a "jungle cats" type query. *Id.*, 3:63-4:1, 5:19-23. Wad may also consider previous queries executed by the user, age of the user, zip code information, referring web sites, browser and operating system information, browser settings, or user preferences as contextual information used to classify a query. *Id.*, 4:6-13.

105. In my opinion, Wad's selection of particular data sources of specialized

information through its federation engine clearly illustrates that Wad classifies the query into at least one of the plurality of intents. Wad explains that federation engines are selected based on the identified query category terms. *Id.*, 5:56-6:10. For example, Wad may access a “travel federation engine” that calls a “travel provider if the query contains a city, a hotel, or a travel term in it, but would not call a travel provider otherwise.” *Id.*, 6:2-8. In the above example query of “Paris Hotel in Las Vegas” where Wad identifies intents of city, hotel, or travel, Wad classifies this query into at least a “travel” intent when it selects the travel federation engine to find search results from a travel provider. *Id.*

f. **[1e] identifying, using the at least one computing device, a plurality of data objects available over the network that match the at least one query keyword;**

106. The ’157 patent admits that identifying data objects that match a keyword is conventional, and it does not describe these conventional techniques in its specification. *See* ’157 patent, 9:67-10:3, 12:3-5 (“The data objects could be matched to the query keywords using any conventional search engine technology known in the art such as a bag of words type match.”). Both Wad and Steele teach this conventional limitation.

107. Wad teaches identifying, using the at least one computing device, a plurality of data objects available over the network that match the at least one keyword. For example, Wad teaches that query processor 124 identifies one or more

data sources and **executes a query**. See Wad, 5:56-58, 6:33-40. (“Based on the augmented query, the query processor selects a set of data sources upon which to execute the query in step 187 ... [I]n step 189 the query may be executed ...”). After executing the query, a “response is provided to the user in the form of search results.” *Id.*, 2:40-48, 2:63-3:10, 3:52-4:13. Wad’s search results include “web sites”, Wad, 2:50-63, which are “data objects” as described in the ’157 patent. See ’157 patent, 4:1-5, 11:64-12:5 (describing data objects as documents such as web pages images, audio files, or text files).

108. Wad’s query processor 124, is part of the front end processor 10. Wad, Fig. 2, 3:47-4:13. The front end query processor 10 is typically “constructed in software executing on a computer system 20 (Fig. 1) such as a server computer.” *Id.*, 2:29-36, Figs. 1 and 2. Computer system 20 is an exemplary system for implementing the invention that includes “a general purpose computing device.” Wad, 7:41-46, Fig. 1.

109. Though in some embodiments Wad teaches that an augmented query is used to identify data objects, Wad also identifies data objects with the original query keywords. For example, Wad explains that

the query category terms have an identifier (such as a prefix consisting of a combination of characters that are not part of any search term) built into them so that they can be recognized as being added by the augmentation module. **The original query is thus preserved and**

the augmented category terms may be disregarded by the data source if desired.

Wad, 5:34-40.

110. Furthermore, in the process of aggregating results, Wad applies highlighting to “[w]ords and phrases on the title and description of a result that are similar or **identical to those in the query.**” *Id.*, 7:15-18. Because Wad applies highlighting to data objects with words and phrases that **are identical to those in the query**, Wad necessarily teaches this element even if it searches for data objects with an augmented query.

111. Steele also teaches identifying a plurality of data objects available over the network by teaching that “the back-end server 108 may retrieve data for electronic documents (i.e., search results) that may be relevant to the user. The index 110 contains information regarding electronic documents such as Web pages available via the Internet.” Steele, ¶ 0018.

112. Steele identifies the plurality of data objects available over the network by matching the at least one keyword. For example, Steele discloses that:

[the] search engine application (application) 114 is executed by the back-end server 108 to identify web pages and the like (i.e., electronic documents) in response to the search request received from the client 102. More specifically, the application 114 identifies relevant documents from the index **110 that correspond to the one or more**

terms included in the search request and selects the most relevant web pages to be displayed to the user 112 via the client 102.

Id., ¶ 0019.

- g. [1f] assigning, using the at least one computing device, at least one of the plurality of intents to at least some of the plurality of data objects;**

113. The combination of Wad and Steele teaches this element. Wad teaches augmenting the initial search query based on the intent and then relying on specialized search engines known as “federation engines” that search certain categories of data objects from specialized providers. For example, Wad searches travel web sites for airfares and hotels, or religious web sites for information about churches. *See* Wad, 2:54-62, 6:23-32. Furthermore, Wad teaches searching an index of webpages (156) with a categorizer that is supplied by a web crawler that browses the Internet, *Id.*, 3:11-33, Fig. 2, but does not provide express details on how the index is categorized.

114. Steele teaches assigning, using the at least one computing device, at least one of the plurality of intents to at least some of the plurality of data objects. Steele assigns tags to data objects such as webpages using a page classifier 208. Steele, ¶¶ 0018-0024. Some tags may indicate “how useful a page is to one or more respective user intents.” *Id.*, ¶ 0024. Steele explains that some tags “may represent the potential intents of the user” and may indicate, for example, a webpage is highly relevant to “a user that intends to purchase a certain product.” *Id.*, ¶ 0033.

115. To generate intent-based tags, Steele employs an index builder 206 that receives information from a web crawler 202 and feeds 204. Steele, ¶ 0020, Fig. 3. The web crawler 202 is a program that browses the Internet and gathers “specific types of information from Web pages.” *Id.*, ¶ 0020. Information gathered by the web crawler 202 and received by the feeds 204 is submitted to the index builder 206. *Id.*, ¶ 0021. The index builder includes a page classifier 208, which assigns “classification tags to the various documents received from the web crawler 202 and the feeds 204.” *Id.* The index builder also includes an entity extractor 210 which extracts metadata from tagged documents that is dependent upon the page’s type. *Id.*, ¶ 0024. For example, the entity extractor 210 may extract price, product name, or image metadata from a page tagged with a “product” classification tag, or the entity extractor may extract ratings or review summaries of products or content from a page tagged with a “reviews” classification tag. *Id.*, ¶ 0022.

116. Tags corresponding to a user’s intent “may be the classification tags generated by the page classifier 208 and/or may be generated with reference to the classification tags and the metadata.” *Id.*, ¶ 0024. In one example, “a document containing a product’s review and metadata associated with this review” is assigned a “research” intent. *Id.* In another example, “a document having a ‘buy’ button and metadata indicating pricing information” is assigned a “shopping” intent. *Id.* Steele explains that “intent tags generally relate to how a document is likely to be used by

a user.” *Id.*

117. Steele assigns at least one of the plurality of intents to the at least some of the data objects using a computing device. Steele explains that page classifier 208 assigns classification tags to various documents. *Id.*, ¶ 0021. Page classifier 208 is a component of index builder 206, which is part of system 200. *Id.*, ¶ 0021, Fig. 2. Steele teaches that the system configurations include “general- purpose computers, specialty computing devices, [and] servers.” *Id.*, ¶ 0015.

118. To the extent that the Patent Owner argues that the ’157 patent requires first “identifying . . . a plurality of data objects available over the network that match the at least one query keyword” and only then “assigning . . . at least one of the plurality of intents to at least some of the plurality of data objects”, I disagree, and even then, Steele teaches this too. Figure 2 of the ’157 patent does not include an “assigning” step. *See* ’157 patent, Fig. 2. Indeed, the specification of the ’157 patent provides almost no details regarding the assigning step recited in the claims, instead asserting passively that it is performed, using a “wherein” clause. *See, e.g.*, ’157 patent, Abstract (“wherein at least one intent is assigned to at least some of the data objects” and “wherein if a data object has been assigned at least one intent . . .”), 1:43-49 (same), 2:5-14 (same). Nothing in the specification or the claims requires the assigning step to occur in a particular order, let alone after the “identifying” step.

119. In fact, the ’157 specification and Patent Owner’s previous

interpretations of the '157 patent support the interpretation that the assigning step may occur before the identifying step. For example, the '157 patent states that “an intent is a mapping from many combinations of keywords to a relatively small set of common goals that users pursue in a search query.” '157 patent, 9:44-47. A POSITA would have understood that the set intents used by a working system would have been finite and the list of all intents used by the system would have been predetermined in advance of a particular query. The '157 patent gives example intents for “product queries” (official-site, research, purchase, dealer, support, or reviews) and local/map queries (directions, reviews, phone, hours-of- operation). *Id.*, 9:50-53. Because these example intents would have been pre-programmed items within the system, a POSITA would have recognized that they could be assigned to data objects based on the content of the data object independently of whether the data objects had been identified for a particular query. In fact, I understand that Mr. Bill Davis, Patent Owner’s expert in a related litigation, has opined that, in the '157 patent, intents “exist as pre-programmed items within and/or accessible to the [system] architecture.” EX-1016, ¶ 78. Mr. Davis’s testimony here is consistent with the understanding that the “assigning” step may occur before a query or query results.

120. Moreover, even if it is determined that the claims require that the assigning step must be performed after the identifying step, Steele teaches this too. Under Steele’s teachings, the index builder 206, using page classifier 208, assigns

intent tags to the various data objects and stores them in the index. Steele, ¶¶ 0021-0024. The search component 214 then receives a user's search query and leverages the intent tags in the index to "determine how well various results serve user intent in different situations." *Id.*, ¶ 0025. A POSITA would understand that determining how well certain results satisfy a user's intent is a form of assigning an intent to the data objects that have been identified in the particular search. Furthermore, while Steele describes its invention as a series of steps, Steele also discloses that those steps do not need to be performed in "any particular order" and that "different steps or combinations of steps" may be used to practice its disclosures. Steele, ¶ 0013. Thus, one skilled in the art would have understood that Steele contemplated performing classification (e.g., assigning intents) at different stages in Steele's process, including after the search results were returned.

121. As explained above in Section VIII.A.1, one skilled in the art would have been motivated to combine Steele with Wad with a reasonable expectation of success. As discussed, Wad discloses applying intent-based search to an index of data objects gathered by a web crawler accessing the Internet. Wad, 3:19-33, Fig. 2. However, Wad does not provide details regarding how the index creation module 156 categorizes data objects retrieved from the Internet by intent. Steele provides these implementation details because Steele discloses an index builder and a web crawler that applies intent-based classification tags to data objects located on the

Internet. Steele, ¶¶ 0020-0024, Figs. 2-3. One skilled in the art would have looked to Steele's teachings of building an index by classifying data objects with intent-based classification tags to supplement Wad's disclosure of an index creation module, especially in view of the similarities in Wad's and Steele's disclosures. *See* Section VIII.A.1. Doing so would fully explain how to apply Wad's intent-based search for use on a general-purpose search engine that accesses the Internet, as already disclosed in Wad.

122. In my opinion, it would have been straightforward for one skilled in the art to incorporate Steele's index builder 206, which assigns at least one of the plurality of intents to data objects, into Wad. Wad already discloses an index creation module 156 with a web crawler 136 that accesses the Internet. One skilled in the art would have combined the functionality of Steele's index builder 206 with Wad's index creation module 156 to achieve the desired and predictable result of enabling Wad's index creation module 156 to categorize data objects crawled from the Internet by intent. This would ensure that Wad's intent-based search can be used with a general purpose search engine, as Wad expressly contemplates.

**h. [1g] ranking, using the at least one computing device,
the plurality of data objects;**

123. Claim 1 of the '157 patent does not require data objects to be ranked in any particular way; nor does it require ranking data objects by intent. *See* '157 patent, 10:5-9, 12:7-12 ("In one embodiment, the data objects can be ranked using any

ranking algorithm known in the art, such as, for example, term counts, frequency within the corpus of documents, and quality of the site/page based on link analysis.”). Thus, the ’157 patent admits that this element is conventional because “any ranking algorithm known in the art” teaches it.

124. Wad teaches ranking, using the at least one computing device, the plurality of data objects. For example, Wad teaches that “[t]he query processing module 124 performs post processing operations 224 on the returned results. Wad, 6:47-62. Wad explains:

The post processing aggregates the results into a single sequence of results. This can be done using [business rules or ranking merging](#). Business rules mean that results from certain providers must come in specific order due to contractual obligations or user experience. [Ranking merging implies that each federation engine returned a rank score](#) for each result to the query and a normalization formula is applied on the rank score to merge the scores. The rank merge can be based on rank score distribution, rank score range, bucket distribution of rank score, trust factor for each federation engine provider, or query intent information.

Id., 6:51-62.

125. Steele also teaches this element by teaching “[b]ased on the identified intent, the method 400, at 412, generates or refines targeted results for presentation to the user. In one embodiment, the presented results and/or their [ranking depend on](#)

the identified intent.” Steele, ¶ 0036. The presentation of results to the user is generated by search component 214 and is presented via the Internet as a webpage by presentation component 218. *Id.*, ¶ 0026. Both search component 214 and presentation component 218 are components of computer system 200. *Id.*, ¶¶ 0025-0026, Figs. 1, 2.

126. Furthermore, Steele teaches “[b]ecause the index 212 provides metadata and tags indicating an association between documents and potential user intents derived from the documents, the search component 214 may leverage this intent-based information. For example, the search component 214 may aggregate (i.e., group) the various documents by their related intents.” *Id.*, ¶ 0025.

i. [1h] building a result, using the at least one computing device, using the ranked plurality of data objects, the result comprises a plurality of display entries,

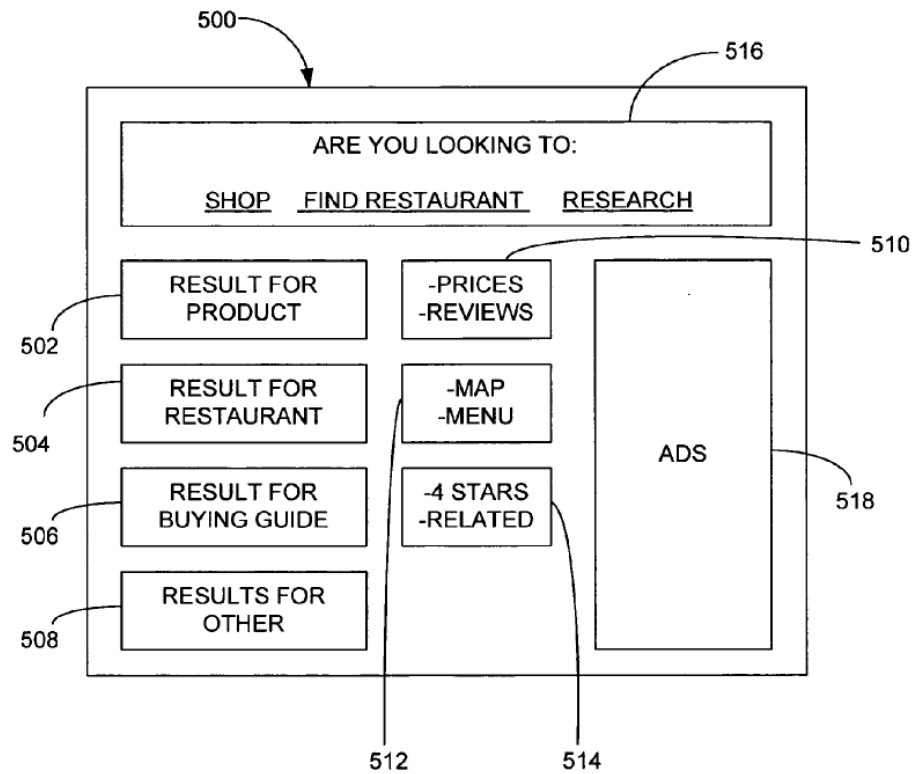
127. Wad teaches building a result, using the at least one computing device, using the ranked plurality of data objects. For example, Wad teaches “[t]he query processing module 124 also performs post processing operations 224 on the returned results. The returned results are aggregated, de-duplicated, re-federated if not enough results are returned, and highlighted to build a response based on context information and query type.” Wad, 6:47-51. Query processor 124, is part of the front end processor 10. Wad, Fig. 2, 3:47-4:13. The front end query processor 10 is typically “constructed in software executing on a computer system 20 (Fig. 1) such

as a server computer.” *Id.*, 2:29-35, Figs. 1 and 2.

128. Wad’s result comprises a plurality of display entries. For example, Wad discloses generating a presentation containing multiple responsive items, or “results.” *Id.*, 6:63-7:19. Wad also discloses removing duplicate data entries or obtaining additional results if there is no longer a sufficient number of results from the de-duplication process. *Id.*

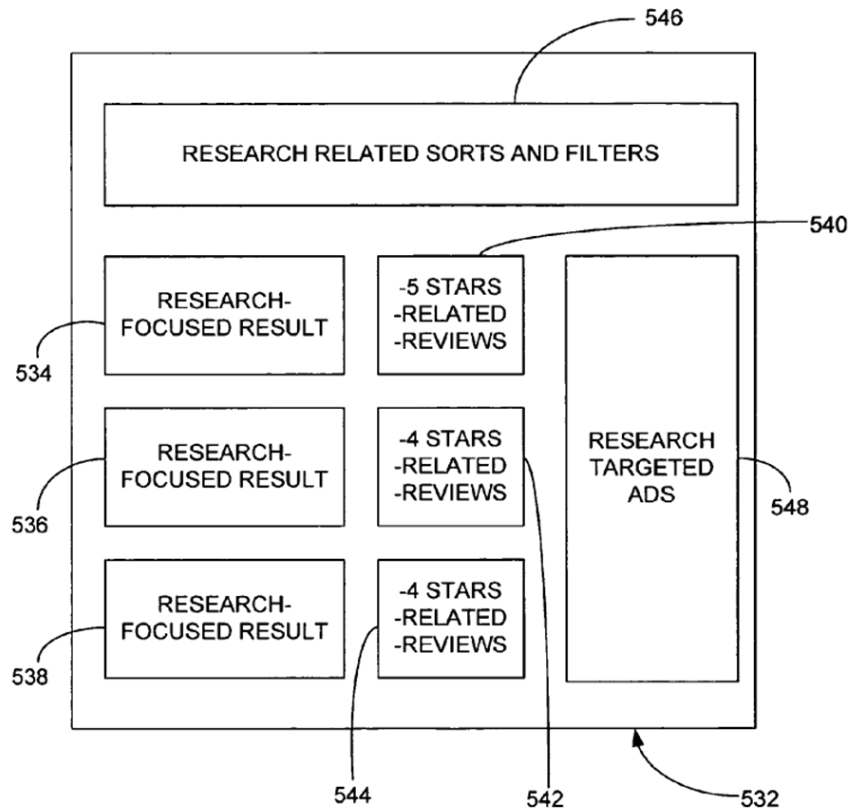
129. Steele also teaches this element. For example, Steele teaches “a user may input the query to a client-based search utility or to an Internet search engine. In this example, the search engine’s front-end server may receive this query. The search engine may then search an index of electronic documents and return the most relevant results.” Steele, ¶ 0032. Steele generates the targeted results for presentation to the user based on the identified intent. *Id.*, ¶¶ 0034, 0036, Figs. 5A, 5B, 5C. The presentation may include presented results as well as “exposed metadata, controls and advertisements” targeted to the identified intent. *Id.* Steele’s presentation is generated by presentation component 218. *Id.*, ¶ 0026, Fig. 2. Presentation component 218 is part of system 200. *Id.*, ¶¶ 0025-0026, Fig. 2. Steele teaches that the system configurations include “general-purpose computers, specialty computing devices, [and] servers.” *Id.*, ¶ 0015.

130. Fig. 5A of Steele, reproduced below, shows an exemplary display with a plurality of display entries (search results 502, 504, 506, and 508):



Id., Fig. 5A, ¶ 0037.

131. Steele teaches building a result of display entries once the user has specified an intent of the query. For example, Figure 5C, reproduced below, depicts results 534, 536, and 538 alongside metadata 540, 542, and 544:



Id., Fig. 5C, ¶ 0039.

132. In another example corresponding to a shopping intent, Steele depicts building a result of four products alongside image data and pricing data for each product. *Id.*, Fig. 5B, ¶ 0038.

- j. [1i] at least one display entry **customized to a respective assigned intent** is constructed for each of the ranked plurality of data objects; and

133. Steele teaches presenting a display entry customized to a respective assigned intent for each of the ranked plurality of data objects. For example, Steele teaches this element by presenting customized screen views of certain data objects with corresponding metadata customized for display based on the intent. Steele, ¶¶

0033-0039, Figs 5A, 5B, 5C.

134. For example, a search for “steak grill” may have three possible user intents: “to make a purchase, to conduct research or to find a location.” Steele, ¶ 0037. Steele’s Figure 5A depicts a result containing display entries customized for each of these potential intents. *Id.*, ¶ 0037, Fig. 5A. The display entry of search result 502 is customized with adjacent metadata 510 of prices and reviews, which corresponds to a “purchase” intent. *Id.* The display entry of search result 504 is customized with metadata 512 displaying a map, which corresponds with a “find a location” intent. And the display entry of search result 506 is customized with metadata containing reviews, which corresponds to a “research intent.” *Id.*

135. Steele also teaches a result with display entries customized to a single intent. *See id.*, ¶¶ 0038-0039, Figs. 5B, 5C. For example, Steele customizes a display entries of data objects of websites to a “purchase” intent of a grill. *Id.*, ¶ 0038, Fig. 5B. Each display entry includes a customized display of metadata such as images, product details, or prices based on the identified “shop” intent. *Id.* Fig. 5B illustrates the teaching:

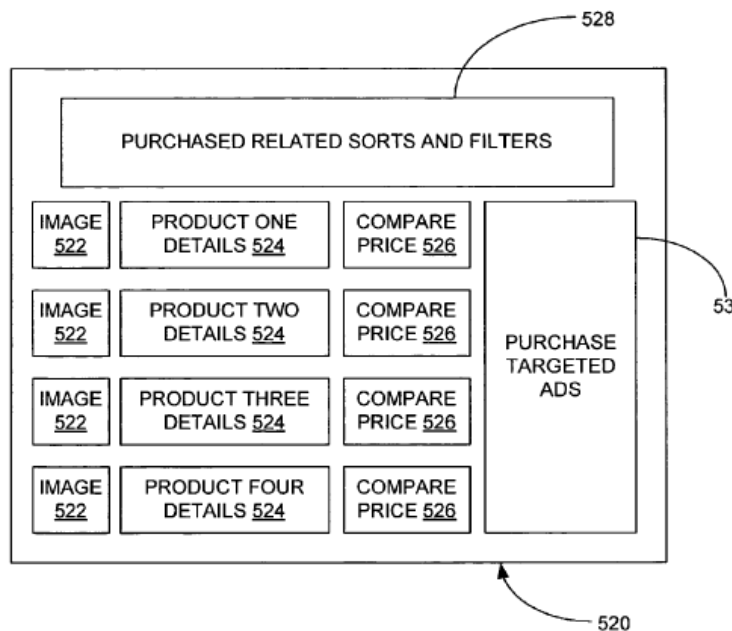


FIG. 5B

Id., Fig. 5B. Steele explains that “screen display 520 provides results targeted to such a purchase intent.” *Id.*, ¶ 0038. Steele customizes at least one display entry to a respective assigned intent by displaying metadata related to the intent in the presentation. *Id.*, ¶¶ 0027, 0028, 0031, 0034, 0037-0039. In Figure 5B, “[t]he screen display 520 includes images 522, product details 524 and product prices 526 for each of four different grills. These results have been ranked to emphasize product pages, and the exposed metadata is related to purchasing as well.” *Id.*, ¶ 0037.

136. Steele gives another example of a display entries customized to a research intent in Figure 5C. Figure 5C contains display entries of results 534, 536, and 538 each of which is customized with the display of metadata 540, 542, and 544 containing review information that “strongly satisfies a research intent.” *Id.*, ¶ 0039,

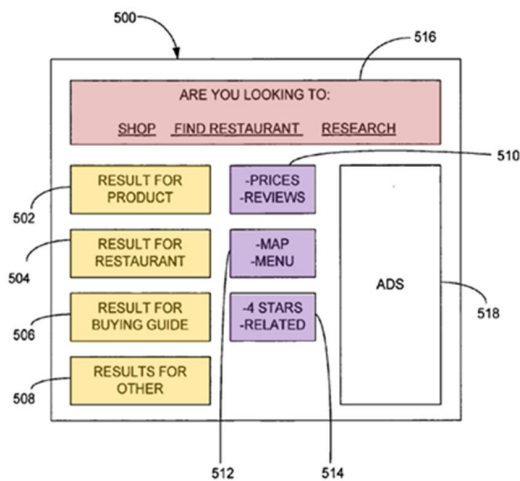
Fig. 5C.

137. Steele further explains the displayed metadata relates to user intents:

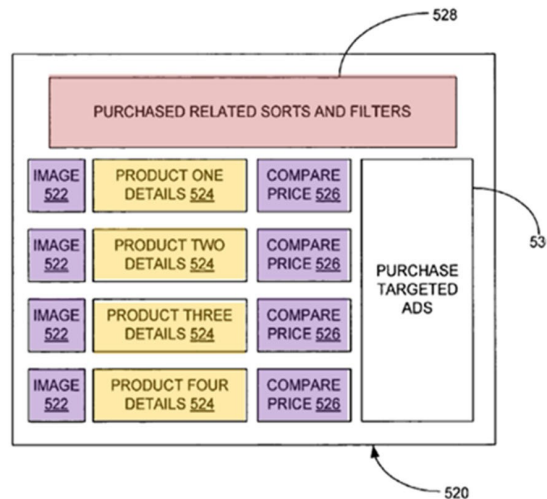
In one embodiment, the user may be presented with metadata from documents associated with various intents. Further, the user may be presented actions that may be performed with regard to the presented results. These actions may be a function of a page's type and available metadata. For example, "Get directions to this business" may be an available action for a page identified as a "local business."

Id. ¶ 0027. "Further, the exposed metadata, controls and advertisements may also be targeted to the identified intent." *Id.* ¶ 0036. When considering an example of a search for an apple, "the user may be presented a variety of search results relating to fruit apples, and/or advertisements for fruit apples might be presented. The various visual elements in this presentation may be designed to further refine the user's intent. For example, various results may address the health benefits of eating apples, while other results may provide retailers selling apples." *Id.*

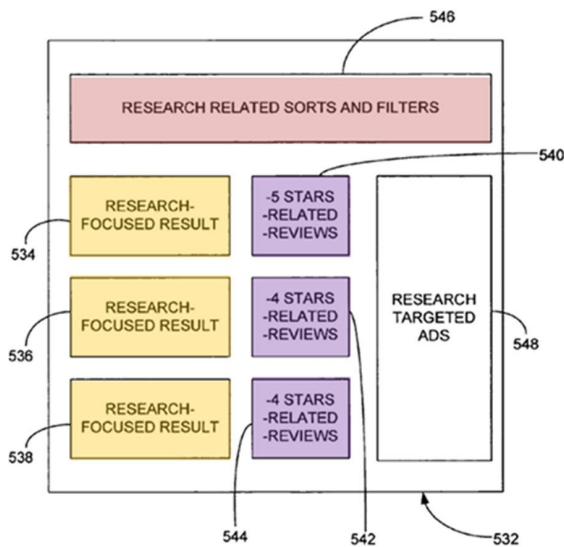
138. Steele's teaching is further illustrated in the Figures 5A, 5B, and 5C which I have annotated below:



Steele, Fig. 5A (annotated)



Steele, Fig. 5B (annotated)



Steele, Fig. 5C (annotated)

139. As can be seen in the annotated figures, customized display entries are constructed containing data objects shown in yellow adjacent to metadata reflecting the assigned intent of the data object. *Id.*, Figs. 5A-5C. Figure 5A depicts display entries customized to an assigned intent for three different data objects, 502, 504, and 506. *Id.*, Fig. 5A, ¶ 0037. A display entry is constructed depicting data object 502

adjacent to pricing and reviews metadata item 510 which customizes the display entry to a “purchase” intent. *Id.* A display entry is constructed depicting data object 504 adjacent to map data 512 which customizes the display entry for a “find a restaurant” intent. *Id.* Similarly, a display entry is constructed depicting data object 506 adjacent to metadata summarizing reviews 514 which customizes the display entry for a “research” intent. *Id.*

140. Steele also teaches building a result customized to the intent of the user’s query. For example, Figure 5B depicts a series of display entries that are customized to an assigned purchase-related intent by displaying images of the products and a comparison of pricing for each product adjacent to the data object or the product result. *Id.*, Fig. 5B, ¶ 0038. Similarly, Figure 5C depicts a series of display entries that are customized to an assigned research related intent by displaying review information adjacent to data objects of the research-focused result. *Id.*, Fig. 5C, ¶ 0039.

141. Customizing a display by including a picture, research data, prices, or a map as taught by Steele comports with the ’157 patent’s teaching of customizing a display based on an intent. The ’157 patent discusses “presentation attribute rules” used to customize a display based on an intent. The listed rules include “URI to a media object, such as an image, video or audio file” and “[s]imilar to media, show a map if available (generated by the search engine using the location provided in the

presentation rule).” ’157 patent, 5:30-45. The ’157 patent also lists “structured data” type presentation attribute rules, which include “key-value pairs” with example keys of “price, review, [or] ratings.” *Id.*, 5:33-36. Therefore, under the examples listed in the ’157 patent, displaying images, maps, review data, or pricing information adjacent to a data object is an example of a display entry customized to an assigned intent.

142. In my opinion, it would have been both obvious and straightforward for a POSITA to incorporate Steele’s intent-based presentations into Wad’s system. For example, a POSITA would have had a reasonable expectation of success in incorporating the functionality of Steele’s presentation component 218 in Wad’s result processing component 224 to provide intent-based search results as taught by Steele. Wad already discloses a results processing component 224 as part of query processing module 124. Wad, 6:47-7:18, Fig. 4. The query processing module 124 applies hit highlighting and performs “personalized” ranked results based on user preferences. *Id.*, 7:2-18. “The response is then built and submitted back to the front end” meaning the user’s computer. *Id.* Incorporating the functionality of Steele’s presentation component 218 into Wad’s query processing module 124 would simply be applying a known technique (Steele’s intent-based display of search results) to a known device (Wad’s query processing module) to achieve predictable results (displaying search results to the user based on the user’s intent).

143. A POSITA would have recognized that this combination would have improved the functionality of the overall system by ensuring that the results presented to the user were presented in a way that corresponded to the user's intent. Wad contemplates this advantage when discussing highlighting search results based on the query. Wad, 7:15-19. And Steele expressly touts this advantage by explaining that displaying search results in accordance with the user's intent increases the relevance of the search results and allows the user to more easily find the desired information. Steele, ¶¶ 0004, 0005, 0036-0039.

k. [1j] transmitting the result, over the network, to the user.

144. Wad teaches this element by teaching “[r]egardless of whether the computer system 20 searches for query results or transmits the search request to another computer, a result is formatted by the server 20 and transmitted back to the user.” Wad, 3:3-10.

145. Steele also teaches this element. *See, e.g.,* Steele, Fig. 1 (“communication network 104”), ¶ 0016, ¶¶ 0036-0039 (describing sending the display results to a user). For example, Steele discusses “One or more *servers* communicate with the client 102 *via the network 104*.” *Id.*, ¶ 0016. “The client 102 *employs the network 104*, the front-end server 106 and the back-end server 108 to access Web page data stored, for example, in a central data index (index) 110.” *Id.* “[T]he user 112 uses the client 102 to input a search request,” *Id.*, ¶ 0017, and “the

back-end server 108 may retrieve data for electronic documents (i.e., search results) that may be relevant to the user.” *Id.*, ¶ 0018. Additionally, Steele explains that “[t]he search component 214 may further be configured to generate a presentation for display to the user. This presentation may be presented by a presentation component 218. In one embodiment, *the presentation is presented via the Internet as a Web page.*” *Id.*, ¶ 0026. In my opinion, Steele teaches transmitting the result over the network, to the user.

3. Claim 2

146. Independent claim 2 recites a similar method to claim 1, but now invokes a “computer-readable medium having computer-executable instructions” to execute the method. ’157 patent, 16:31-32. Wad-Steele discloses all of the elements of claim 2.

a. [2p] A computer-readable medium having computer-executable instructions for a method comprising the steps of:

147. To the extent the preamble of claim 2 is limiting, Wad discloses a computer-readable medium having computer-executable instructions for a method. *See* Section VIII.A.2.a. For example, Wad explains that the query preprocessing method of Figure 3 is “performed by the query processor 124 on an incoming query.” Wad, 4:59-60, Figs 2, 3, and 4. The query processor 124 is a component of front end query processor 10. *Id.*, 3:47-48, Figs 3, 4. Wad explains that the front end query

processor 10 is typically “constructed in software executing on a computer system 20 (Fig. 1) such as a server computer which in turn is coupled by means of communications connections to other servers or computers by means of a network.” *Id.*, 2:29-36, Figs. 1 and 2. Computer system 20 is a general purpose computing device with conventional components including “a processing unit 21, a system memory 22, and a system bus 23 that couples various system components including system memory 22 to processing unit 21.” *Id.*, 7:41-46, Fig. 1. Moreover, Wad discloses that its disclosed systems operate “in the general context of computer-executable instructions, such as program modules, being executed by a personal computer” and that may be “located in both local and remote memory storage devices.” *Id.*, 7:21-40, *see also id.*, 7:41-8:52.

- b. [2a] receiving, over a network, a query from a user, wherein the query comprising at least one query token;**

148. Wad and Steele both disclose this limitation. *See* Section VIII.A.2.b.

- c. [2b] analyzing the query, using at least one computing device, to identify at least one query keyword;**

149. Wad discloses this limitation. *See* Section VIII.A.2.c.

- d. [2c] determining a plurality of intents, by the computing device, from the at least one keyword, each of the plurality of intents indicates a type of information regarding the query keyword that is likely to be desired by a user submitting the query;**

150. Wad discloses this limitation. *See* Section VIII.A.2.d.

- e. **[2d] classifying the query, using the at least one computing device, into at least a subset of the plurality of intents;**

151. While the language of element [2d] (“at least a subset of”) varies slightly from [1d] (“at least one of”), Wad discloses both limitations. In my opinion, classifying the query into “at least one of” a plurality of intents necessarily teaches classifying the query into “at least a subset of” the plurality of intents because one intent is a subset of the plurality of intents. Therefore, Wad discloses this limitation. *See* Section VIII.A.2.e.

- f. **[2e] identifying, using the at least one computing device, a plurality of data objects available over the network that match the at least one query keyword;**

152. Wad and Steele both disclose this limitation. *See* Section VIII.A.2.f.

- g. **[2f] assigning, using the at least one computing device, at least one of the plurality of intents to at least some of the plurality of data objects;**

153. Steele discloses this limitation. *See* Section VIII.A.2.g. Further, it would have been obvious to combine Steele with Wad to render obvious this limitation. *See* Sections VIII.A.1 and VIII.A.2.g.

- h. **[2g] ranking, using the at least one computing device, the plurality of data objects;**

154. Wad and Steele both disclose this limitation. *See* Section VIII.A.2.h.

- i. **[2h] building a result, using the at least one computing device, using the ranked plurality of data objects, the result comprises a plurality of display entries,**

155. Wad and Steele both disclose this limitation. *See* Section VIII.A.2.i.

- j. **[2i] wherein at least one display entry customized to a respective assigned intent is constructed for each of the ranked plurality of data objects;**

156. Steele discloses this limitation. *See* Section VIII.A.2.j. Further, it would have been obvious to combine Steele with Wad to render obvious this limitation. *See* Sections VIII.A.1 and VIII.A.2.j.

- k. **[2j] transmitting the result, over the network, to the user.**

157. Wad and Steele both disclose this limitation. *See* Section VIII.A.2.k.

4. Claim 3

- a. **The method of claim 1 wherein the at least one intent comprises an unclassified intent.**

158. In my opinion, Wad discloses wherein the at least one intent comprises an unclassified intent. The '157 patent explains that an "unclassified intent [is] when no defined intents match the query." '157 patent, 9:42-44. Wad teaches this limitation or renders it obvious.

159. As discussed above in section VIII.A.2.e, Wad classifies a query into one of the plurality intents. For example, Wad may determine a user's intent by (a) determining if a query is a "local query" or (b) mapping query terms to corresponding category terms. Wad, 5:9-27, Fig. 3. Wad then augments the query with supplemental terms used to align the query with the user's intent. *Id.*, 1:65-67, 5:19-55. However, Wad expressly discloses that a particular query may not have

either “local patterns” or “category terms” but may still return an augmented query. For example, Figure 5 depicts the query augmentation process in detail, and Figure 5 expressly contemplates augmenting the query when the query neither has local patterns (step 330, NO) nor category terms (step 350, NO.) *Id.*, 5:41-55, Fig. 5. This corresponds to the ’157 patent’s teaching that a query may not match any defined intent. ’157 patent, 9:42-44.

160. To the extent that Wad does not expressly teach classifying the query into an unclassified intent, it would have been obvious to modify Wad to do so. A POSITA would have understood that a user’s query cannot always be categorized into a previously classified intent. *See* ¶120 (discussing finite, predetermined intents). A POSITA would further understand that a user would be interested nonetheless in receiving search results based on such queries, as was the case with conventional systems that returned results regardless of intents. *See, e.g.*, Wad, 1:12-34. A POSITA therefore, would have been motivated to modify Wad’s system to classify the query into an unclassified intent and to return a search result accordingly.

161. A POSITA would have had a reasonable expectation of success with this modification as searching databases without first classifying was a conventional technique at the time the ’157 patent was filed, *see, e.g.*, Wad, 1:12-34. Moreover, Wad expressly contemplates that its system is compatible with executing searches on multiple federation engines without any weighting from the intent recognizer.

See, e.g., Wad, 5:41-6:4.

5. Claim 6

- a. The method of claim 1 wherein, in the classifying step, profile information for the user is additionally used to classify the query.**

162. Wad teaches using profile information for the user to classify the query.

For example, Wad teaches:

[s]ome types of information that may be used by the context builder to construct a query context include: previous queries executed by this user, age of this user, zip code of this user that may be accessed from an IP reverse lookup, the referring web site, browser and operating system information, browser settings, such as current language, and user entered preferences such as the number of results or display preferences.

Wad, 4:6-13.

163. Wad's disclosures are similar to those of the '157 patent. '157 patent, 9:56-57 ("user profile information such as preferences"), *see also id.*, 4:31-32 (same), 11:58-59 (same).

6. Claim 7

- a. The method of claim 1 wherein, in the classifying step, previous queries submitted by the user during a user session are additionally used to classify the query.**

164. Wad teaches additionally using previous queries submitted by the user during a user session to classify the query. For example, Wad teaches:

[s]ome types of information that may be used by the context builder to construct a query context include: *previous queries executed by this user*, age of this user, zip code of this user that may be accessed from an IP reverse lookup, the referring web site, browser and operating system information, browser settings, such as current language, and user entered preferences such as the number of results or display preferences.

Wad, 4:6-13.

165. Wad discloses that queries made by the user *during a user session* are additionally used to classify the query. For example, in addition to noting “previous queries executed by this user,” Wad also discloses that “queries recently entered by the user” and “the results that were selected by the user” in recent sessions are used as query context information to classify the query. *Id.*, 4:62-5:2, Fig. 3. In my opinion, a POSITA would have understood “queries recently entered by the user” as queries submitted by the user within the same user session.

7. Claim 11

a. The method of claim 1 wherein the plurality of data objects are ranked by intent.

166. Wad teaches ranking the plurality of data objects by intent. For example, Wad discusses applying “weighting values” or “confidence values” to the augmented query. Wad, 1:56-61, 4:1-5, 4:54-58, 5:19-40, 6:63-7:8. The weighting value or confidence value reflects a “percentage indicator that indicates the amount

of confidence that the augmented term [] reflects the true intent of the query.” *Id.*, 4:1-5. The confidence values associated with augmented terms are used to rank a result higher than a result that contains a lower confidence level. *Id.*, 7:63-67. Because the confidence values reflect a measure of the “true intent of the query, and because the results are ranked by the confidence values, Wad discloses ranking the data objects by intent. Wad’s disclosure is similar to the ’157 patent, which discloses that its ranking module 3500 ranks documents by assigning “a score . . . for each candidate result against multiple intents.” ’157 patent, 10:9-22, 12:19-22.

167. Steele also teaches ranking the plurality of data objects by intent. For example, Steele teaches “[b]ased on the identified intent, the method 400, at 412, generates or refines targeted results for presentation to the user. **In one embodiment, the presented results and/or their ranking depend on the identified intent.**”) *See* Steele, ¶ 0036.

B. Ground 2: Wad, Steele, and Liu Render Obvious Claims 4 and 5

168. In my opinion, the combination of Wad-Steele in view of Liu renders obvious claims 4 and 5.

1. Claim 4

- a. **The method of claim 1 wherein the analysis step identifies query keywords by parsing the tokens and identifying common entities, phrases, spelling errors, synonyms, variants of stems, and noisewords.**

169. Claim 4 recites identifying keywords in a query using a series of well-

known methods. Each of these methods were known to a POSITA long before the '157 patent and were common in the field of search. As such, a POSITA easily would have been able to implement each of these methods in a search algorithm. This is likely why the inventors of the '157 patent did not describe these methods in any detail. Instead, the inventors simply stated that the methods could be used, without explaining how they would be implemented. '157 patent, 9:36-41.

170. Wad expressly discloses that the analysis step (e.g., Wad steps 179, 180) identifies query keywords by parsing the tokens and identifying spelling errors and phrases. Wad, 5:3-11 (discussing “*spell checking*” the query and “scan[ning] the spell-corrected query for *terms that should be grouped as phrases*”). Wad, 5:9-11. *See also* Section VIII.A.2.c.

171. To the extent that Wad-Steele does not expressly disclose that the analysis step identifies query keywords by identifying each of the groups listed in claim 4, Liu does. Specifically, Liu teaches an analysis step that identifies query keywords by parsing the tokens and identifying common entities, phrases, spelling errors, synonyms, variants of stems, and noisewords through the concept of canonicalization. As discussed, this concept was well known long before the '157 patent's earliest priority date.

172. For example, Liu teaches “[t]he association of keywords can be done using canonicalization so that, under certain conditions, different keywords are

treated as the same keyword. Canonicalizations might include plural/singular forms, gender forms, stem word forms, suffix forms, prefix forms, typo graphical error forms, word order, pattern ignoring, acronyms, stop word elimination, etc.” Liu, ¶ 0014.

173. In another example, Liu explains that “[w]ith canonicalization, ‘phone’ is reformed to its canonical form ‘telephone’ (one word usage to another), ‘calling’ to its canonical form ‘call’ (suffix removal) and ‘rates’ to its canonical form ‘rate’ (plurals to Singular), and spelling errors can also be eliminated using canonical forms.” *Id.*, ¶ 0045.

174. For example, Liu’s disclosure substituting “washingtong, george” with “George Washington” is an example of identifying common entities. *Id.*, ¶ 0048 Table 1. Additionally, substituting “washingtong, george” with “George Washington” is also an example of identifying phrases. *Id.* Liu’s disclosure of correcting “washintong” to “Washington” is an example of identifying spelling errors. *Id.* Liu’s disclosure of substituting “automobile” for “car” and “auto” is an example of identifying synonyms. *Id.*, ¶ 0048 Table 1. Liu’s disclosure of converting “calling” to the form “call” is an example of identifying variants of stems. *Id.*, ¶ 0045. Liu’s disclosure of removing protocol words, articles, propositions, or conjunctions is an example of identifying noisewords. *Id.*, ¶ 0048, Table 1.

175. See also, *id.*, Table 1 ¶ 0048:

TABLE 1

Canonicalization Type	Original Form	Canonical Form
Capitalization	"dallas cowboys"	"Dallas Cowboys"
Singular/Plural (possibly driven by a dictionary)	"dallas cowboy"	"Dallas Cowboys"
Word Order	"washington, george"	"George Washington"
Typographical Error	"washintong"	"Washington"
Typographical Error and Word Order	"washintong, george"	"George Washington"
Acronym	"AOL"	"America On Line"
Abbreviation	"cell phone"	"cellular phone"
Punctuation	"Bonnie & Clyde"	"Bonnie and Clyde"
Dictionary (This might be a demographic-specific canonicalization)	"automobile"	"car" and "auto"
Stop Words (remove protocol words)	"http:", "https:", ".html", "www.", etc.	""
Stop Words (remove articles)	"the", "an", "a"	""
Stop Words (remove propositions)	"of", "to", etc.	""
Stop Words (remove conjunctions)	"and", "or", "nor", etc.	""

TABLE 1-continued

Canonicalization Type	Original Form	Canonical Form
Punctuation Removal	any character in the set: () < > [] { } \ _ . \$ % # ! ' ? ~ * (unless these characters have meaning in and of themselves, such as "*" used to indicate a wildcard).	""
Replace with Whitespace	any character in the set: & _ + = @ / : ; or " / "	(space)
Multiple adjacent spaces	(space)(space). . .	(space)

176. A POSITA would have been motivated to combine Liu's teaching of canonicalization with Wad's teaching of query augmentation to improve the quality of the keywords used in Wad's augmentation to identify user intent. Both Wad and Liu involve analyzing queries and determining search keywords through analysis and correction of search terms. For example, Wad recognizes that "[s]pelling mistakes and failure to group words into phrases can cause the search engine to

search for records that are unrelated to the user's intended query.” Wad, 1:27-29. Liu recognizes the same problem and discloses correcting the spelling of keywords and identifying phrases in query terms to streamline and simplify the “large number of possible keywords that a user might use.” Liu, ¶ 0013. Liu discloses additional techniques to streamline and refine the query with its teachings of canonicalization. A person of ordinary skill would have been motivated to supplement Wad's existing query refinement techniques of spell correction and phrase grouping with Liu's additional canonicalization techniques to further narrow and refine the keywords identified in the query. Doing so would have been nothing more than the simple combination of known elements (Wad's correction of query spelling and grouping into phrases with Liu's additional identification of common entities, synonyms, variants of stems, and noisewords) to obtain a predictable result (improved query analysis and search accuracy).

177. It is my opinion, therefore, that Wad-Steele in view of Liu renders obvious the claimed “method of claim 1 wherein the analysis step identifies query keywords by parsing the tokens and identifying common entities, phrases, spelling errors, synonyms, variants of stems, and noisewords.”

2. Claim 5

- a. The method of claim 1 wherein, in the classifying step, the query is classified by linguistic analysis of the at least one query keyword.**

178. Wad-Steele in view of Liu discloses this element. The '157 patent does not define any specific type of “linguistic analysis” that is used, nor does it provide any implementation details; it simply says that “linguistic analysis” is used. *See* '157 patent, 4:29-30, 9:53-55, 11:55-57, 16:65-67.

179. In my opinion, A POSITA would have understood Liu’s disclosure of “canonicalization” to be a form of linguistic analysis. For example, Liu explains that “canonicalization” employs a series of underlying rules to transform original forms of query terms into their canonical forms. *See* Liu, ¶¶ 0045, 0048. Liu’s canonicalization “allows for improved key word-based presentation selection, so that one presentation that is to be shown when a searcher indicates a particular intent can be shown over distinct searches.” *Id.*, ¶ 0045. The transformations include analyzing acronyms to determine underlying key words; removing protocol words, articles, prepositions, or conjunctions; determining synonyms such as “car” and “auto” for the term “automobile,” or determining singular or plural forms of a term *Id.*, ¶ 0048. A POSITA would understand that language analysis techniques like analyzing acronyms, analyzing unessential terms like articles, prepositions, or conjunctions, determining synonyms, or analyzing singular and plural forms to be a form of linguistic analysis.

180. As I explained above, it would have been obvious to combine Liu with Wad-Steele to teach this element. *See* Section VIII.B.1.

C. Ground 3: Wad, Steele, and Loftesness Render Obvious Claims 6, 8-10

181. In my opinion, the combination of Wad-Steele in view of Loftesness renders obvious claims 6, and 8-10.

1. Claim 6

a. The method of claim 1 wherein, in the classifying step, profile information for the user is additionally used to classify the query.

182. It is my opinion that Wad teaches claim 6. *See* Section VIII.A.5.

183. Loftesness also describes using “user profile information” to classify a query into an intent. Loftesness, ¶¶ 0058-0059, *see also id.*, ¶¶ 0036, 0055-0056. Loftesness requires a user to enter “identifying information (Email addresses, passwords, etc.)” to form idiosyncratic “user-specific classifications” and to classify a query on a “user-by-user basis.” *Id.*, ¶ 0058. For example, “a particular user may always purchase a particular type of jeans when she enters the query ‘hip hugger.’” *Id.*

184. Furthermore, for the reasons I explain below in Section VIII.C.2, it would have been obvious to combine Loftesness with Wad-Steele.

185. A POSITA would have been motivated to combine Loftesness’s use of “user profile information” with Wad’s context builder to generate more accurate intent predictions for a user’s query. Loftesness explains that user profile information allows for “user-specific classifications.” Loftesness, ¶0058. A

POSITA would have understood that user-specific classifications would allow Wad's context builder to better identify a user's likely intent and to return more tailored search results. Wad's context builder already analyzes "previous queries executed by this user, age of this user, zip code of this user ... and user entered preferences such as the number of results or display preferences." Wad, 4:6-13.

186. A POSITA would have understood that combining Loftesness with Wad-Steele would have been the simple combination of known elements to obtain a predictable result: Loftesness's recording of profile information using a query transaction log incorporated into Wad's context builder 210.

2. Claim 8

a. The method of claim 1 wherein, in the classifying step, previous queries submitted by a subset of all users are additionally used to classify the query.

187. To the extent Wad-Steele does not expressly disclose using previously submitted queries from a subset of all users to classify a query, Loftesness does. *See* Section VIII.C.1. Loftesness describes tracking these previous queries submitted by groups of users to aid in classifying future queries. Loftesness, ¶¶ 0035-0036, 0057-0059. These tracked queries "collectively reveal a pattern" that reflects "a common search strategy being applied by the users." *Id.* The predicted intent is based on the "collective behavior of a population of users." *Id.*, *see also id.*, Abstract, ¶¶ 0040-0041, 0096. Loftesness "can consider the time at which actions occurred in

performing its analysis” and can “apply weighting factors which attach greater significance to recent user behavior (compared to less recent behavior). *Id.*, ¶ 0057. Loftesness further performs an intent analysis on a “user-by-user basis, [or] a region-by-region basis.” Loftesness, ¶ 0058. Thus, Loftesness discloses identifying queries submitted by a group or subset of all users to classify future queries.

188. In my opinion, a POSITA would have been motivated to combine Wad-Steele and Loftesness. Both Wad and Loftesness employ strategies to determine an intent of a user. For example, Wad recognizes that using “past queries and user context to form a resultant query that better reflects the intent of the query, [] can return more relevant results.” Wad, 1:38-43. Similarly, Loftesness teaches a data-mining operation that “involves identifying, for each user query, a pattern which evinces a predominate intent of the users in entering the query.” Loftesness, ¶ 0005. A POSITA would have been motivated to substitute Wad’s disclosure of using previous queries submitted by a single user with Loftesness’s teaching of using previous queries submitted by a subset of all users to improve the accuracy of classifying the query. Doing so would have been nothing more than the simple combination of known elements to obtain a predictable result. Furthermore, a POSITA would have been motivated to substitute Loftesness’s teaching for Wad’s teaching because comparing query terms based on the “collective behavior of a population of users” would have been more accurate than examining a single user’s

query in isolation, as Loftesness expressly teaches. Loftesness, ¶ 0036. Specifically, Loftesness discloses that actions taken by a group of users can be mined to determine whether these actions “collectively reveal a pattern.” *Id.*, ¶ 0035. Loftesness uses data mined from these collective actions to determine the intent of the population of users who submit the query. *Id.*, ¶¶ 0035-0036. Such a technique is “more likely to generate results that properly emphasize the information being sought by the user.” *Id.*, ¶ 0036.

3. Claim 9

- a. **The method of claim 1 wherein, in the classifying step, click data from at least one previous user session for the user are additionally used to classify the query.**

189. In my opinion, Wad discloses or renders obvious using click data from at least one previous user session to classify the query because Wad analyzes previous websites visited by the user, which would require clicks by the user to access those sites. For example, Wad teaches “[t]he context builder 210 gathers information about the origin of a query that may be helpful in determining the query’s intent.” Wad, 3:63-65. Wad explains that the content of a user’s previous website, such as a “cars” website, may be used to inform the augmentation module to determine a user’s intent. *Id.*, 3:63-4:5. In my opinion, tracking a user’s activity from a previous site to a new query includes tracking “click data.” Furthermore, a POSITA would have recognized Wad’s disclosure of using “previous queries

executed by this user” to inform the context builder 210 query context would include activity from previous user sessions, including click data. *Id.*, 4:6-13.

190. To the extent the patent owner argues that Wad does not fully disclose wherein, in the classifying step, click data from at least one previous user session for the user are additionally used to classify the query, then Loftesness does. Loftesness discloses using click data from at least one previous user session to classify a query. For example, Loftesness discloses that “the logging module 126 **can record various actions taken by a user**, such as, but not limited to, the actions of purchasing an item; pre-ordering an item; adding an item to a shopping cart; **merely clicking on an item** to discover more information about an item, and so forth.” Loftesness, ¶ 0052.

191. A POSITA would have been motivated to combine Wad-Steele with Loftesness. *See* Section VIII.C.2. Furthermore, a POSITA would have been motivated to combine Loftesness’s disclosure of logging click data from previous user sessions with Wad’s context builder to generate more accurate intent predictions for a user’s query. Loftesness explains that logging click data of hypertext links or other actions can “help determine if there is a significant nexus between a user’s receipt of search results and an action that a user may subsequently take.” Loftesness, ¶ 0052. Understanding a user’s click data actions on previous searches would better inform Wad’s context builder in determining a likely intent

for the user's query. Wad's context builder already analyzes "previous queries executed by this user" and adding user click data to the analysis of previous queries would validate the query user query history analyzed by Wad with hyperlink click data that affirms that a user intended a certain result as disclosed in Loftesness. Combining Loftesness with Wad-Steele would have been nothing more than the simple combination of known elements to obtain a predictable result: Loftesness's recording of click data using logging module 126 incorporated into Wad's context builder 210.

4. Claim 10

- a. The method of claim 1 wherein, in the classifying step, click data from at least one previous user session for a subset of all users are additionally used to classify the query.**

192. To the extent Wad does not expressly teach using click data from a subset of all users to classify the query, Loftesness teaches this element.

193. For example, Loftesness discloses using previously submitted queries from multiple users to classify a query. *See* Sections VIII.C.1, VIII.C.2, and VIII.C.3. Loftesness predicts an intent using the "collective behavior of a population of users who have previously entered this same query." Loftesness, ¶ 0036. Part of this logged behavior includes click data. *See id.*, ¶¶ 0052, 0099. Loftesness correlates this click data with "user profile information" and allows subsequent query classification on a "user-by-user basis" or a "region-by-region basis." *Id.*, ¶¶ 0058-

0059.

194. Furthermore, a POSITA would have been motivated to combine Wad-Steele with Loftesness. A POSITA would have been motivated to incorporate Loftesness's teachings of analyzing the collective behavior of a population of users and its teachings on the value of click data actions in determining user intent with Wad's context builder and intent recognizer to improve the accuracy of classifying the query from a single user as disclosed in Wad. Doing so would have improved the accuracy of Wad's intent determination by incorporating the analysis of collective user patterns and the analysis of the nexus of previous user click actions in determining the relevancy of results. *See* Sections VIII.C.2

D. Ground 4: Wad, Steele, and Lennon Render Obvious Claims 12, 15, 16, and 19-23

195. In my opinion, the combination of Wad-Steele in view of Lennon renders obvious claims 12, 15, 16, and 19-23.

1. Claim 12

- a. The method of claim 1 wherein, in the building step, each of the ranked plurality of data objects to which at least one intent has been assigned are matched against at least one presentation rule associated with the respective data object and matching presentation rules are used to construct the at least one display entry for the respective data object.**

196. The '157 patent describes presentation rules that map the intent of a query to presentation elements to customize the display of search results. '157

patent, 4:20-26, 4:36-40, 12:34-41. Presentation rules can be defined using an “XML schema.” *Id.*, 6:8-12

197. Steele teaches extracting metadata from certain documents and building a visual document object model tree to format or structure the metadata for various document types in an index. *See* Steele, ¶¶ 0022-0024. For example, Steele’s “index builder 206 also includes an entity extractor 210, which is configured to generate metadata from information extracted from the tagged documents.” *Id.*, ¶ 0022. The extracted metadata is dependent upon the pages type or classification tags assigned to the page, which reflects a user’s desired intent. *Id.*, ¶¶ 0022-0024. “For example, a page may describe a particular product and be tagged as a ‘product’ page. The extracted metadata for such a product page may include the price, product name, image and other salient attributes present on the page.” *Id.*, ¶ 0022. Similarly, for a reviews page, the system extracts metadata including a rating or summary of various reviewed products. *Id.*

198. Steele clusters the extracted metadata by each type of document, or intent, with “a visual DOM (Document Object Model) tree that can identify records on a page and cluster across these records to identify and extract common fields.” *Id.* Steele’s clustering of extracted metadata, classification tags, and documents by type is “a format (or structure) for the metadata” generated to “the various document types.” *Id.* Steele further uses the extracted page metadata to customize the display

of the ranked plurality of data objects based on an assigned intent. *See* Sections VIII.A.2.i and VIII.A.2.j. The “intent-based tags and formatted metadata may reside along with the documents in the index 212.” *Id.*, ¶¶ 0023- 0024.

199. To the extent that Steele does not expressly teach using a presentation rule associated with the data object to construct the at least one display entry, Lennon does. Lennon discloses presentation rules similar to the ’157 patent, explaining that “presentation rules [] are typically targeted at element definitions as their associated actions specify how a particular descriptor type is to be presented in an application. A set of rules can be serialized in an XML document.” Lennon, ¶¶ 0370, 0395-0406. The presentation rules “specify characteristics of the style of [a] generated presentation” of content. *Id.*, ¶ 0026. The presentation rules “provide presentation behaviour for the instances of the descriptors defined in the description scheme,” and “some applications might benefit from an ability to define presentation rules based on individual descriptors in descriptions.” *Id.*, ¶ 0399. More specifically, Lennon explains descriptors for content such as web pages include a “feature” value as well as a corresponding “representation value.” *Id.*, ¶¶ 0086-0087, 0089. Example descriptors include:

- Feature = Author; Representation Value (string) = “John Smith”;
- Feature = DateCreated; Representation Value (date) = “1998-08-08”.
- Feature = Colour; Representation Value = ColourHistogramDescriptor.

Id. Based on this combination of Lennon with Wad-Steele, a POSITA would know to assign “intent” as a “feature.” Descriptors corresponding to the identified search results would include a “Feature” of “Intent” as well as a “Representation Value” corresponding to the particular intent assigned to the data object or search result.

Id.

200. Under Lennon’s teachings, presentation rules would then be applied to these descriptors to indicate how to generate and display the retrieved web results. “Presentation rules [] are typically targeted at element definitions as their associated actions specify how a particular descriptor type is to be presented in an application.” *Id.*, ¶¶ 0370, 0395-0406. The presentation rules “specify characteristics of the style of [a] generated presentation.” *Id.*, ¶ 0026. The presentation rules “provide presentation behavior for the instances of the descriptors defined in the description scheme,” and “some applications might benefit from an ability to define presentation rules based on individual descriptors in descriptions.” *Id.*, ¶ 0399. Under Lennon’s conditional presentation rules, the display functionality described in Steele would be applied to the particular resource when the resource has the matching assigned intent.

201. Lennon also describes an “action element” corresponding to a particular display action. *Id.*, ¶ 0400. The action element may relate to a particular function for displaying the search results based on the identified descriptor. *Id.*, ¶¶ 0370, 0400. Lennon’s examples of functions includes “assign[ing] icons to

descriptors” and selection rules for interactivity with the presentation “so the application can differentiate visually between selected and non-selected descriptors.” *Id.*, ¶¶ 0403-0404. In this way, Lennon describes displaying items corresponding to different descriptors of a resource. *See, e.g., id.*, ¶¶ 0009-0012, 0025-0027.

202. A POSITA would have been motivated to combine Steele’s teaching of customizing the display of data entries based on an intent with Lennon’s disclosure of presentation rules because Lennon’s XML data structures would have provided a useful format for Steele’s document object model tree to assign different display rules based on the assigned intents to the data objects. Lennon explains that “[p]resentation rules, however are typically targeted at element definitions as their associated actions specify how a particular descriptor type is to be presented in an application. A set of rules can be serialised in an XML document.” Lennon, ¶ 0370. A POSITA would have applied Lennon’s well-known XML framework and presentation rules to provide a mechanism for organizing the classification tags and metadata stored in the index 212 of Steele that is used to generate Steele’s intent-based presentations.

203. XML was well known in the art and using XML to define presentation parameters would have amounted to merely applying a known technique to Wad and Steele. Furthermore, a POSITA would have known how to combine Wad and Steele

with Lennon and would have expected success in forming the combination. The combination would apply Lennon's formatting and presentation rules to generate a structure for displaying results based on the "classification tags" described in Steele, which are "stored along with the copies of the documents in an index 212." *See* Steele, ¶ 0023. Such a combination would have been nothing more than the simple combination of known elements to obtain a predictable result. Furthermore, a POSITA would have expected the combination to work as intended because XML was a well-known language for specifying web resources at the time of the '157 patent was filed.

2. Claim 15

- a. **The method of claim 12 wherein the at least one presentation rules comprise an object matching pattern and at least one set of attribute rules, wherein each of sets of attribute rules is associated with an intent matching pattern, and wherein the at least one presentation rules matches one of the plurality of data objects if a name of the respective object matches the object matching pattern and the at least one intent assigned to the respective data object matches the intent matching pattern associated with the at least one set of attribute rules, wherein the at least one set of attribute rules are used to construct the at least one display entry for the respective data object.**

204. The '157 patent explains that a presentation rule can be defined schematically as:

```

<rule pattern= "object matching pattern">
  <intent type="intent matching pattern">
    <attribute rule>...</attribute rule>
    <attribute rule>...</attribute rule>
    ...
  </intent>
  <intent type="intent matching pattern">
    <attribute rule>...</attribute rule>
    <attribute rule>...</attribute rule>
    ...
  </intent>
  ...
</rule>

```

'157 patent, 4:40-55. The '157 patent further describes an "object matching pattern" as "a pattern which can, in one embodiment, be used to match the rule to URLs in search results." *Id.*, 4:56-58. Presentation attribute rules can be used to enhance the display and functionality of search result pages. *Id.*, 5:11-52.

205. In my opinion, Lennon discloses similar presentation rule patterns. *See* Lennon, ¶¶ 0365-0383. For example, Lennon provides code examples that directly map to the rule pattern and attribute rules provided in the '157 patent sample:

```

<Rule pattern = "VideoClipDescription/scene/Shot">
  <Action> etc. . . </Action>
</Rule>

```

```

<Rule pattern = "KeyFrame/Object[OnlyOfType()]">
  <Action> etc. . . </Action>
</Rule>

```

Id., ¶¶ 0365-0383.

206. Lennon's "rule pattern" discloses the "object matching pattern."

Lennon explains that resources may be identified using a “URI.” *See* Lennon, ¶¶ 0150, 0208, 0331. For example, when defining a descriptor for a resource, Lennon discloses that the “base Descriptor class includes an attribute that allows the URI of a handler that implements the descriptor’s procedures to be stored.” *Id.*, ¶ 0331. This “base Descriptor class” defines all other descriptors and descriptions for that resource. *Id.*, ¶ 0331. In this example, the URI or location entry would be the entry in the “Rule pattern” portion of the sample code provided above. *Id.*, ¶¶ 0372, 0378. This URI would be applied to a “Rule pattern” as described in Lennon to disclose the claimed “object matching pattern.” A POSITA would have found it obvious to implement a URL in this same way to similarly identify a web page. *Id.*, ¶¶ 0003, 0079, 0263.

207. In addition, Lennon’s URI/URL entry acts as the basis for matching the URI/URL “name” as recited in the claims and then subsequently processing the associated attribute rules of the presentation. *See id.*, ¶ 0021 (“descriptor component in the descriptions of the set of descriptions matches the predetermined pattern”), ¶ 0375 “[a]n element within the pattern hierarchy may have qualifiers applied to it, which further constrain which elements match the term.... A pattern matches only if all of the qualifiers are satisfied.), ¶ 0407 (“a check is made whether a pattern associated with the selected rule can be found”), *see also id.*, ¶¶ 0150, 0208, 0331.

208. Lennon explains that different rule patterns may be defined for different

descriptions. “Each pattern-action association can be represented by a rule and a set of related rules can be collected into a rule set.” *Id.*, ¶ 0365. Lennon explains that processing descriptions “can be achieved by locating patterns” and “performing specified actions in response to the located patterns.” *Id.*, *see also id.*, ¶ 0160. In terms of pattern structure, the “role of the pattern character data string is to identify the particular elements (or element definitions) to which the action is applied. This character string can identify more than one element and can include element ancestry and attribute qualifiers.” *Id.*, ¶ 0371. Lennon further describes the same “parent operator” described in the ’157 patent via the use of the “/” symbol: “Element ancestry is represented within a pattern by using the parent operator ‘/’. Two patterns separated by a parent operator match an element if the right hand side matches the element and the left hand side matches the parent of the element.” *Id.*, ¶ 0372. In this manner, Lennon discloses similar “object matching pattern” disclosed in the ’157 patent. As I explained with reference to claim 12, this object matching pattern is also applicable and used to define the presentation rules described in Lennon. *See* Section VIII.D.1.

209. Lennon also discloses attribute patterns and attribute values which disclose the claimed “intent matching pattern.”

ElementPattern	::= ElementTypePattern ElementQualification
ElementTypePattern	::= OneElementTypePattern '*'
OneElementTypePattern	::= ElementTypeName
ElementQualification	::= '['Qualifiers?']'
Qualifiers	::= Qualifier (','Qualifier)*
Qualifier	::= ChildQualifier AttributeQualifier PositionalQualifier
AttributeQualifier	::= AttributePattern ('='AttributeValue)?
AttributePattern	::= 'attribute' '('AttributeName')
AttributeValue	::= '""['^"']*"" '""['^"]*""
PositionalQualifier	::= Position '('^')
Position	::= 'FirstOfType' 'NotFirstOfType' 'FirstOfAny' 'NotFirstOfAny' 'LastOfType' 'NotLastOfType' 'LastOfAny' 'NotLastOfAny' 'OnlyOfType' 'NotOnlyOfType' 'OnlyOfAny' 'NotOnlyOfAny'

Lennon, ¶ 0374.

210. The combination of Wad-Steele and Lennon further describes the attribute rules corresponding to an intent matching pattern. For example, Lennon describes a hierarchy of descriptors and rule patterns. *See id.*, ¶ 0375 (“An element within the pattern hierarchy may have qualifiers applied to it, which further constrain which elements match the term. These qualifiers may constrain the element to have certain attributes or sub-elements or may constrain its position with respect to its siblings.”), *see also id.*, ¶ 0021. In view of this description, Lennon describes a sub-attribute that may also apply as a rule. The combination of Wad-Steele with Lennon would apply Lennon’s “pattern hierarchy” of descriptors within the presentation rule

to apply sub-attributes or sub-elements, such as intent-based attribute rules. Lennon, ¶¶ 0021, 0375. This would allow Steele to store rules for displaying certain metadata based on the data object's classified intent, and the assigned "intent" would be the attribute pattern. Steele, ¶¶ 0023, 0024, 0027.

211. Like my analysis with respect to claim 12, a POSITA would have understood that when implementing the intent-based presentation described in Steele, object-based and intent-based rules such as those described in Lennon would also be used. *See* Section VIII.D.1. For example, when building the visual DOM tree and generating the structure for document metadata in Steele, a POSITA would have known to implement a "pattern hierarchy" such as the one described in Lennon when displaying this metadata in Steele's presentation. Steele ¶ 0022, Lennon, ¶ 0375. This combination would apply the same "rule pattern" described in Lennon and the '157 patent to teach the claimed "object matching pattern." A POSITA would then define another rule for the "intent matching pattern" to achieve the intent-based results described in Steele. An intent matching pattern would be defined using the general "attribute patterns" described in Lennon.

212. As explained above in my analysis of claim 12, a POSITA would have known that "intent" is a "feature" of a data object's description. In applying the presentation rules described in this combination, the rule would check to determine that a rule pattern corresponding to the name of a resource matches and would also

check that an intent also matches. Like the '157 patent, Lennon also describes that resources may be identified using a "URI." *See* Lennon, ¶¶ 0150, 0208, 0331; '157 patent, 5:37-39, 11:14-16, 12:48-50. By matching the descriptor using the URI, Lennon discloses identifying a match with the object matching pattern just like the '157 patent. Lennon, ¶¶ 0021, 0375, 0407. Thus, the combination of Wad-Steele with Lennon discloses matching the intent matching pattern based on an attribute string corresponding to an identified intent. Based on these matching values, the claimed display entries are constructed using the presentation rules. *See* Section VIII.D.1. Thus Lennon in view of Wad-Steele renders claim 15 obvious. A POSITA would have been motivated to combine the references, would have known how to combine the references, and would have expected the combination to operate successfully for the reasons I explained above in Section VIII.D.1.

3. Claim 16

- a. **The method of claim 12 wherein at least one of the ranked plurality of data objects matches at least two presentation rules and each of the at least two presentation rules are used to construct the at least one display entry for the respective data object.**

213. Lennon describes the application of multiple rule sets to a particular resource to construct a display entry: "if more than one rule set is specified then it is assumed that both rule sets can be applied... the individual rule sets are simply combined and treated as a single rule set." Lennon, ¶ 0386. Lennon further describes

iterating through multiple presentation rules so that all applicable presentation rules are processed. *Id.*, ¶¶ 0406-0407, Fig. 13. In this manner, Lennon describes multiple presentation rules which may be applied to present the resource. *Id.*

214. Thus, Lennon in view of Wad-Steele renders claim 16 obvious. A POSITA would have been motivated to combine the references, would have known how to combine the references, and would have expected the combination to operate successfully for the reasons I explained above in Section VIII.D.1.

4. Claim 19

- a. **The method of claim 15 wherein the at least one intent associated with at least one of the ranked plurality of data objects comprises at least two intents and one of the at least two intents which is most likely is used to match the respective data.**

215. Steele discloses assigning at least two intents to a data object. *See* Steele, ¶¶ 0021, 0024 (“As will be appreciated by those skilled in the art, a variety of intent-based tags and formatted metadata may reside along with the documents in the index 212.”)

216. Wad-Steele further discloses determining a user’s most likely intent from a plurality of intents. *See* Section VIII.A.2.d.

217. Lennon discloses presentation rules to modify the display of data objects. *See* Section VIII.D.1.

218. It would have been obvious for a POSITA to select the intent most

likely corresponding to the user query to choose between multiple presentation rules to apply to the respective data object. Such a combination would resolve a conflict between the display of multiple presentation rules when a data object has multiple intents as disclosed by Steele.

5. Claim 20

- a. The method of claim 16 wherein the at least two presentation rules are used in the most specific order first to construct the at least one display entry for the respective data object.**

219. Lennon discloses applying a “most specific order first” for multiple presentation rules based on its “tree-based processing model.” Lennon, ¶¶ 0154-0156, 0160, 0440-0442. Lennon’s tree-structure “makes it amenable to rule-based processing where rules consist of a pattern and an associated action.” *Id.*, ¶ 0160.

220. Lennon’s tree structure first begins with a “root” that “specif[ies] the resource to which the description refers.” *Id.*, ¶ 0155, *see also id.*, ¶¶ 0154-0155, 0160. A presentation rule applied to this root discloses the “most specific order first” because the root specifies the particular resource being displayed. *Id.*, ¶ 0155. Subsequently, other leaf nodes are processed. *Id.*, ¶¶ 0154, 0156. In the XML document defining the presentation rules, “the content of an element is represented as child nodes of the element.” *Id.*, ¶ 0156. When examining a rule set for a resource, “[r]esolution of rules is performed on the basis of rule order” and is serialized. *Id.*, ¶¶ 0396-0398. The “set of rules that is applicable for a given description scheme can

be serialised (stored) in an XML document.” *Id.*, ¶ 0386. These rules would then be applied to a resource as described above with reference to claim 15. *See* Section VIII.D.2.

221. Lennon further discusses resolving an order of presentation rules through its tree-based processing model when discussing its selection of description schemes. For example, Lennon describes “[t]he classification of descriptors as Index or TOC descriptors is achieved using presentation rules.” Lennon, ¶ 0440. “In general, a descriptor that is classified as a TOC descriptor represents a structural element of the resource (i.e., a component that would normally appear in the TOC of a book),” *id.*, ¶ 0441, and “[t]he Index descriptors are the leaf nodes of the internal tree structure used to represent the description.” *Id.*, ¶ 0442. “In [an embodiment], explicit differentiation between Index and TOC Descriptors is achieved using presentation rules.” *Id.*

222. To the extent Lennon does not explicitly disclose this limitation, it would have been obvious to modify the presentation rules of Lennon, as implemented in Wad-Steele, to process the presentation rules in the “most specific order first.” Specifically, a POSITA would have understood that Lennon’s “serialized” rules could be ordered such that the most specific rule (e.g., the rule applying to the most specific portion of the data object) would be processed first. A POSITA would have been motivated to make this combination because this ordering

of rules would efficiently customize the display according to the specific content desired.

6. Claim 21

- a. The method of claim 16 wherein the at least two presentation rules each additionally comprise a rule precedence and the at least two presentation rules are used in precedence order to construct the at least one display entry for the respective data object.**

223. As explained with reference to claim 20, Lennon describes applying multiple presentation rules according to a rule precedence order. *See* Section VIII.D.5. Lennon describes presentation rule sets for a particular resource. When resolving a rule set, “resolution of rules is performed on the basis of rule order,” which is serialized. Lennon, ¶¶ 0386, 0397-0398. The “set of rules that is applicable for a given description scheme can be serialised (stored) in an XML document.” *Id.*, ¶ 0386. Additionally, Lennon discloses:

if more than one rule Set is specified then it is assumed that both rule sets can be applied (ie., the individual rule sets do not contain unresolvable rules). In other words, the individual rule sets are simply combined and treated as a single rule set, in which the order of rules to be processed is provided by the order of the listing of the individual rule sets and the order of the individual rules within each given rule set.

Id.

224. This discloses applying multiple rules according to a rules precedence

order to generate a display entry.

7. Claim 22

- a. The computer-readable medium of claim 2 wherein, in the building step, each of the ranked plurality of data objects to which at least one intent has been assigned are matched against at least one presentation rule associated with the respective data object and matching presentation rules are used to construct the at least one display entry for the respective data object.**

225. Wad-Steele and Lennon discloses this element. *See* Section VIII.D.1.

8. Claim 23

- a. The computer-readable medium of claim 22 wherein the at least one presentation rules comprise an object matching pattern and at least one set of attribute rules, wherein each of sets of attribute rules is associated with an intent matching pattern, and wherein the at least one presentation rules matches one of the plurality of data objects if a name of the respective object matches the object matching pattern and the at least one intent assigned to the respective data object matches the intent matching pattern associated with the at least one set of attribute rules, wherein the at least one set of attribute rules are used to construct the at least one display entry for the respective data object.**

226. Wad-Steele and Lennon discloses this element. *See* Section VIII.D.2.

E. Ground 5: Wad, Steele, Lennon, and Moore Render Obvious Claims 13, 14, 17, and 18

227. In my opinion, the combination of Wad-Steele in view of Lennon and

Moore renders obvious claims 13, 14, 17, and 18.

1. Claim 13

a. The method of claim 12 wherein the at least one presentation rules are supplied via a feed.

228. The '157 patent describes an example feed as an XML-based file that maps a presentation rule to a URL or URI. '157 patent, 6:7-9, 12:48-56.

229. Steele discloses receiving data from merchants or third parties associated with certain data objects through a feed. For example, Steele teaches feeds when it describes “[t]he system 200 includes two sources of information, a web crawler 202 and content feeds 204.” Steele, ¶ 0020. Steele receives content from a web crawler and the content feeds. *Id.* Steele explains that while the web crawler seeks information from the network, “*the feeds 204 receive information provided by a merchant or other third party.*” For example, the feeds 204 may include commercial offers having a known format provided by a merchant.” *Id.* Steele explains that feeds are well known and that a “variety of techniques exist in the art for a party to communicate their content in a feed of structured data.” *See id.*, ¶ 0020.

230. To the extent that Steele does not expressly disclose receiving presentation rules via a feed, Lennon does. Lennon describes a data structure for receiving presentation rules through the same configuration as the '157 patent and also teaches an XML file containing URI descriptors and presentation rules. Lennon, ¶¶ 0150, 0208, 0331, 0370, 0395-0406. Lennon also describes separately “specifying the XML document containing the presentation rule set” from the

content itself. *Id.*, ¶ 0398. Lennon therefore supplies the presentation rules via a feed.

231. Moore also explicitly describes “RSS data feeds” which provide presentation rules. Moore, ¶¶ 0102, 0115, 0138, 0167. Moore states that “RSS data feed 202 may be presented to a client 102 as an RSS file (in XML format).” *Id.*, ¶ 0138. Additionally, “tags from an RSS feed can be used to feed a template, such as an XML-enabled template.” *Id.*, ¶ 0167. An “RSS-enabled server” may provide an RSS feed using “XML grammar” to provide a “title and description of items to be syndicated.” *Id.*, ¶ 0115.

232. It would have been obvious to combine Moore’s teaching of RSS data feeds and Lennon’s teaching of presentation rules with Wad-Steele. Steele admits there are a “variety of techniques exist in the art for a party to communicate their content in a feed of structured data”, Steele, ¶ 0020, and Moore’s RSS data feeds are one such example.

233. Combining Moore with Wad-Steele, and Lennon would simply be combining prior art elements to yield predictable results. A POSITA would have applied Moore’s well-known feed management techniques to provide increased security and aid a user when evaluating search results to improve the combination of Wad-Steele and Lennon. For example, Moore describes RSS feed functionality as well as the management of trusted and untrusted feed sources. *See* Moore, ¶¶ 0198, 0292, 0295, 0301, and 0304. A POSITA would have combined Moore with Wad,

Steele, and Lennon to provide data streams to a user and to manage trusted and untrusted sources for additional security.

234. Furthermore, a POSITA would have known how to combine Moore with Wad-Steele and Lennon. Steele already discloses feeds, and Moore merely identifies specific types of feeds. Furthermore, a POSITA would have known how to implement the same feed and XML-based functionality described in Moore with the XML framework described in Lennon.

2. Claim 14

a. The method of claim 12 wherein the at least one presentation rules are embedded in the respective data object.

235. In my opinion, Lennon and Moore teach this limitation.

236. Lennon explains presentation rules are typically stored as part of a resource's description scheme which may be an "XML document containing the presentation rule set." Lennon, ¶ 0398.

237. Moore explains that a "Web document" can be written using XML. Moore, ¶ 0113. "[S]emantic content of an item, including the body and metadata" may be used to generate a display. *Id.*, ¶ 0160, *see also id.*, ¶¶ 0044, 0114, 0157. A user interface "interprets semantic content to determine one or more display characteristics." *Id.*, ¶ 0157. Moore therefore describes content within a web page defining display parameters.

3. Claim 17

- a. **The method of claim 12 wherein at least one of the ranked plurality of data objects matches a first at least one presentation rule originating from a trusted feed and a second at least one presentation rule originating from an untrusted feed, wherein the first at least one presentation rule is used before the second at least one presentation rule.**

238. Lennon describes the resolution of presentation rules “performed on the basis of rule order.” Lennon, ¶ 0398. Lennon applies multiple rule sets “by the order of the listing of the individual rule sets and the order of the individual rules within each given rule set.” *Id.*

239. To the extent that Lennon does not expressly disclose a first presentation rule originating from a trusted feed and a second presentation rule originating from an untrusted feed, Moore does.

240. Moore describes presentation rules received via an “aggregation of one or more data feeds” which “may specify one or more display parameters.” Moore, ¶ 0039. Moore also describes displaying trusted and untrusted feeds and may “visually distinguish between these feeds.” *Id.*, ¶¶ 0198, 0301, 0304. A “user certificate” may be used to determine whether a source is trusted or untrusted. *Id.*, ¶ 0292. Moore also describes “ranking, selecting, or filtering feeds and/or posts” based on trustworthiness. *Id.*, ¶ 0295. Further, Moore ranks trusted feeds and posts using presentation rules. *Id.*, ¶¶ 0198, 0295.

241. It would have been obvious to combine Wad-Steele Lennon, and Moore. See Section VIII.E.1.

4. Claim 18

- a. The method of claim 12 wherein at least one of the ranked plurality of data objects matches a first at least one presentation rule originating from a trusted feed and a second at least one presentation rule embedded in the respective data object, wherein the first at least one presentation rule is used before the second at least one presentation rule.**

242. Lennon and Moore disclose applying multiple presentation rules based on a rules-based order, with at least one rule originating from a trusted feed. *See* Sections VIII.D.3 and VIII.E.3. Lennon and Moore also disclose identifying a presentation rule embedded in a data object. See Section VIII.E.2. A POSITA would have understood these disclosures together to teach a data object matching at least two presentation rules, one from a trusted feed and one embedded in a data object.

243. A POSITA would have found it obvious to prioritize a presentation rule originating from a trusted feed in a situation where the resource itself may be provided by an untrusted feed. This would provide additional security and prioritize secure feeds as described in Moore. Moore, ¶ 0301.

IX. CONCLUSION

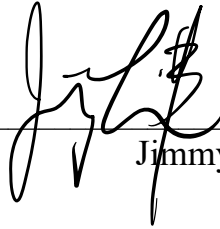
244. For the reasons set forth above, I believe claims 1-23 of the '157 patent are invalid in view of the prior art. In signing this declaration, I understand that the declaration will be filed as evidence in a contested case before the Patent Trial and

Appeal Board of the United States Patent and Trademark Office. I acknowledge that I may be subject to cross-examination in this 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.

245. I declare that all statements made herein of my knowledge are true, that all statements made on information and belief are believed to be true, and 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.

Dated: February 24, 2023

By: _____

A handwritten signature in black ink, appearing to read 'Jimmy Lin', written over a horizontal line.

Jimmy Lin, Ph.D.