

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

GOOGLE LLC,
Petitioner,

v.

METARAIL, INC.,
Patent Owner.

Case No. IPR2024-01272
Patent No. 10,152,734

DECLARATION OF DR. EDWARD A. FOX

Google Exhibit 1003 Google v Metarail
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c. [1B] “determining, by the computer based on dynamic data collected through the user interface while the user is interacting with the user interface of the networked data source, field identifiers of the networked data source stored in the universal variable data database, the dynamic data containing user-specified values pertaining to a product or service;”	51
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e. [1D] “automatically generating, by the computer using the universal variable data database, a deep-linked ad that links the field identifiers of the networked data source and the field identifiers of the networked data target;”	56
f. [1E] “presenting the deep-linked ad through the user interface of the networked data source on the user device; and”	57
g. [1F] “responsive to the user selecting the deep-linked ad through the user interface of the networked data source on the user device, passing the user-specified values pertaining to the product or service to the networked data target using the deep-linked ad that links the field identifiers of the networked data source and the field identifiers of the networked data target such that, without necessitating any pre-existing relationship between the networked data	

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I. INTRODUCTION

I, Dr. Edward A. Fox, declare:

1. I have been retained by Wolf, Greenfield & Sacks, P.C., counsel for Petitioner Google LLC, to assess claims 1-20 (the “challenged claims”) of U.S. Patent No. 10,152,734 (“the ’734 patent”). I am being compensated for my time at a rate of \$725.00 per hour, plus actual expenses. My compensation is not dependent in any way upon the outcome of the *inter partes* review of the ’734 patent.

II. PERSONAL AND PROFESSIONAL BACKGROUND

2. I have been a professor at Virginia Polytechnic Institute & State University (“Virginia Tech”) since September 1983, in the Department of Computer Science. Since February 2016, I also have had a courtesy appointment as Professor in the Department of Electrical and Computer Engineering. Since January 1998, I have been the Director of the Digital Library Research Laboratory at Virginia Tech. From June 1990 to June 2014, I was the Associate Director for Research at Virginia Tech’s Computing Center, a position that evolved to Faculty Advisor to Information Technology.

3. Before that, from August 1982 to April 1983, I was Manager of Information Systems at the International Institute of Tropical Agriculture, in Ibadan, Nigeria. Before that, from September 1978 to August 1982, I was an

Instructor, Research Assistant, and Teaching Assistant at the Department of Computer Science at Cornell University. Before that, from September 1972 to August 1978, in Florence, SC, I was the Data Processing Manager in the Vulcraft Division of NUCOR Corporation. Before that, from September 1971 to June 1972, I was a Data Processing Instructor at Florence Darlington Technical College.

4. From December 2018 through November 2021, I was Chief Technology Officer of Mayfair Group LLC, as well as of its product division, ClaimEdge, aiming to serve the insurance and law industries with collaboration and summarization software.

5. I earned a bachelor's degree in electrical engineering (in the computer science option) from the Massachusetts Institute of Technology (MIT) in 1972, a master's degree in computer science from Cornell University in 1981, and a Ph.D. degree in computer science from Cornell University in 1983. My undergraduate advisor was JCR Licklider, then Director of Project MAC, who in 1960 outlined the need for simpler interaction between computers and computer users, in 1965 published a book calling for what later became digital libraries, and when working at DARPA, managed projects that led to the Internet. My graduate advisor was Gerard Salton, often called the father of information retrieval (IR). Some of my bachelor's work was in the area of information storage and retrieval, and that area has been the focus of my work since 1978. My doctoral dissertation related to all

of the major IR approaches, including Boolean, extended Boolean, vector, and probabilistic handling of queries and documents. It involved studying logs of user sessions, clustering, TF-IDF and other term weighting, similarity measures, weighting different content types, ranking, relevance feedback, and unified vector representations including any number of content types (including words in different document sections, keywords or key phrases, categories or descriptors, in-links, out-links, co-citations, and bibliographic coupling).

6. By the mid-1980s my work in IR connected with the field of human-computer interaction (HCI), and by the late 1980s that broadened into work on multimedia information and systems, including interactive digital video. Since the early 1990s I have taught CS4624, “Multimedia, Hypertext, and Information Access,” a capstone course in the Department of Computer Science, so am familiar with what computer science seniors know about these topics, including the various types of linking. Also, since the early 1990s, my work has included a concentration on digital libraries and related information repositories, including web crawling and archiving. In recent decades especially, my work has connected with artificial intelligence, including with natural language processing (computational linguistics), knowledge bases, ontologies (and mappings), machine learning, and deep learning, especially involving classification, summarization, and clustering.

7. I am a member of the Association for Computing Machinery (ACM) and its Special Interest Group on Information Retrieval (SIGIR), for which I served from 1987-1991 as vice chairman and 1991-1995 as chairman. From 1988-1991, I served on the ACM Publications Board, and again served on that Board as well as co-chair of its Digital Libraries Committee from 2018-2019.

8. ACM has awarded me seven recognition of service awards. I am a Fellow of ACM (cited for contributions in information retrieval and digital libraries) and a Fellow of the Institute of Electrical and Electronics Engineers (IEEE) (cited for leadership in digital libraries and information retrieval), as well as a member of IEEE-CS. I am an inaugural inductee of the ACM SIGIR Academy, class of 2021, “to honor and recognize individuals who have made significant, cumulative contributions to the development of the field of information retrieval (IR). Inductees to the SIGIR Academy are the principal leaders in IR, whose efforts have shaped the discipline and/or industry through significant research, innovation, and/or service.” I served on the Executive Committee of the IEEE Technical Committee on Digital Libraries from 2002-2017 and was its chairman 2004-2008. Since 2021 I have been a Fellow of the Asia-Pacific Artificial Intelligence Association (AAIA). Since January 2024 I have been a Fellow of the International Artificial Intelligence Industry Alliance (AIIA).

9. I have been the recipient of a number of honors and awards relating to my work in information retrieval and other areas. One related honor, at Virginia Tech, is the XCaliber Award 2016 “for extraordinary contributions to technology-enriched learning activities” for the project “Enhanced problem-based learning connecting big data research with classes.” In 2024 I received the W.S. “Pete” White Award for Innovation in Engineering Education, one of the Virginia Tech College of Engineering Dean’s Awards of Excellence. I have taught classes on information retrieval since the early 1980s, and about multimedia since the early 1990s. In 2023 I received the Commercialization Champion award for “making knowledge accessible with improved computational searches and extensible digital libraries and information systems”. In October 2015 I received an award for Research Impact in Human-Computer Interaction, conferred by the Virginia Tech Center for Human-Computer Interaction (CHCI), and have served since 1995 as a Founding Member of CHCI.

10. I have held numerous board positions in various editorial, professional, and industry organizations and groups. For example, I served during 2010-2013 as an elected member of the Computing Research Association Board, broadly representing the U.S. computing research community.

11. I have extensive experience in many of the key areas related to handling information with computers, including information retrieval, digital

libraries (which relate to “specialized search engines” or “vertical search”), Web archiving, and human-computer interaction (HCI). This work involves theory, algorithms, systems, and interfaces/user studies. It also is described currently by buzz words such as search engines, big data, data science, data analytics, machine learning, and natural language processing.

12. In these areas, I have participated in, organized, or presented at hundreds of conferences and workshops, and I have over 958 related keynotes, tutorials, books, book chapters, articles, papers, posters, demonstrations, or reports, as well as 3 issued patents and over 365 other presentations.

13. I am being compensated at my usual consulting rate on this matter. I also am being reimbursed for reasonable and customary expenses associated with my work and testimony in this investigation. My compensation is not dependent upon my opinions or testimony or the outcome of this proceeding.

14. My curriculum vitae is provided as Exhibit 1004.

III. MATERIALS REVIEWED AND CONSIDERED

15. My findings, as explained below, are based on my years of education, research, experience, and background in the field of information retrieval, digital libraries (which relate to “specialized search engines” or “vertical search”), Web archiving, and human-computer interaction (HCI), as well as my investigation and study of relevant materials for this declaration. When developing the opinions set

forth in this declaration, I assumed the perspective of a person having ordinary skill in the art, as set forth in Section V below. In forming my opinions, I have studied and considered the materials identified in the list below.

Exhibit	Description
1001	U.S. Patent No. 10,152,734 (“the ’734 patent”)
1002	Prosecution History of U.S. Patent No. 10,152,734
1004	Curriculum Vitae of Dr. Edward A. Fox
1006	U.S. Pat. App. Pub. No. 2006/0230033 to Halevy et al. (“Halevy”)
1013	Michael Uschold, <i>Ontology and database schema: What’s the difference?</i> , Applied Ontology, vol. 10, no. 3-4, pp. 243-258 (2015) (“Uschold”)
1015	Trip Advisor Press Release, “New Advertising Technology Delivers Results for Travel Marketers” (published Dec. 3, 2001) (“Trip Advisor”)
1020	U.S. Patent No. 8,150,979 to Oldham (“Oldham”)
1021	U.S. Pat. App. Pub. No. 2010/0057556 to Rousso et al. (“Rousso”)

IV. MY UNDERSTANDING OF PATENT LAW

16. In developing my opinions, I discussed various relevant legal principles with Petitioner’s attorneys. Regarding these principles, I understood them when they were explained to me and have relied upon such legal principles, as explained to me, in the course of forming the opinions set forth in this declaration. My understanding in this respect is as follows:

17. I understand that “*inter partes* review” (IPR) is a proceeding before the United States Patent & Trademark Office for evaluating the patentability of an issued patent’s claims based on prior-art patents and printed publications.

18. I understand that, in this proceeding, Petitioner has the burden of proving that the challenged claims of the ’734 patent are unpatentable by a preponderance of the evidence. I understand that “preponderance of the evidence” means that a fact or conclusion is more likely true than not true.

19. I understand that, in IPR proceedings, claim terms in a patent are given their ordinary and customary meaning as understood by a person of ordinary skill in the art (“POSA”) in the context of the entire patent and the prosecution history pertaining to the patent. If the specification provides a special definition for a claim term that differs from the meaning the term would otherwise possess, the specification’s special definition controls. If a claim element is expressed as a “means” for performing a specified function, I understand that it covers the corresponding structure described in the specification and equivalents of the described structure. I have applied these standards in preparing the opinions in this declaration.

20. I understand that determining whether a particular patent or printed publication constitutes prior art to a challenged patent claim can require determining the effective filing date (also known as the priority date) to which the

challenged claim is entitled. I understand that for a patent claim to be entitled to the benefit of the filing date of an earlier application to which the patent claims priority, the earlier application must have described the claimed invention in sufficient detail to convey with reasonable clarity to the POSA that the inventor had possession of the claimed invention as of the earlier application's filing date. I understand that a disclosure that merely renders the claimed invention obvious is not sufficient written description for the claim to be entitled to the benefit of the filing date of the application containing that disclosure.

21. I understand that for an invention claimed in a patent to be patentable, it must be, among other things, new (novel—*i.e.*, not anticipated) and not obvious from the prior art. My understanding of these two legal standards is set forth below.

A. Anticipation

22. I understand that, for a patent claim to be “anticipated” by the prior art (and therefore not novel), each and every limitation of the claim must be found, expressly or inherently, in a single prior-art reference. I understand that a claim limitation is disclosed for the purpose of anticipation if a POSA would have understood the reference to disclose the limitation based on inferences that a POSA would reasonably be expected to draw from the explicit teachings in the reference when read in light of the POSA's knowledge and experience.

23. I understand that a claim limitation is inherent in a prior art reference if that limitation is necessarily present when practicing the teachings of the reference, regardless of whether a person of ordinary skill recognized the presence of that limitation in the prior art.

B. Obviousness

24. I understand that a patent claim may be unpatentable if it would have been obvious in view of a single prior-art reference or a combination of prior-art references.

25. I understand that a patent claim is obvious if the differences between the subject matter of the claim and the prior art are such that the subject matter as a whole would have been obvious to a person of ordinary skill in the relevant field at the time the invention was made. Specifically, I understand that the obviousness question involves a consideration of:

- the scope and content of the prior art;
- the differences between the prior art and the claims at issue;
- the knowledge of a person of ordinary skill in the pertinent art; and
- if present, objective factors indicative of non-obviousness, sometimes referred to as “secondary considerations.” To my knowledge, the Patent Owner has not asserted any such secondary considerations with respect to the ’734 patent.

26. I understand that in order for a claimed invention to be considered obvious, a POSA must have had a reason for combining teachings from multiple prior-art references (or for altering a single prior-art reference, in the case of obviousness in view of a single reference) in the fashion proposed.

27. I further understand that in determining whether a prior-art reference would have been combined with other prior art or with other information within the knowledge of a POSA, the following are examples of approaches and rationales that may be considered:

- combining prior-art elements according to known methods to yield predictable results;
- simple substitution of one known element for another to obtain predictable results;
- use of a known technique to improve similar devices in the same way;
- applying a known technique to a known device ready for improvement to yield predictable results;
- applying a technique or approach that would have been “obvious to try,” *i.e.*, choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success.
- known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design

incentives or other market forces if the variations would have been predictable to one of ordinary skill in the art;

- some teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill to modify the prior-art reference or to combine prior-art reference teachings to arrive at the claimed invention. I understand that this teaching, suggestion or motivation may come from a prior-art reference or from the knowledge or common sense of one of ordinary skill in the art.

28. I understand that for a single reference or a combination of references to render the claimed invention obvious, a POSA must have been able to arrive at the claimed invention by altering or combining the applied references.

V. PERSON OF ORDINARY SKILL IN THE ART (“POSA”)

29. I have been informed and understand that for purposes of assessing whether prior-art references disclose every element of a patent claim (thus “anticipating” the claim) and/or would have rendered the claim obvious, the patent and the prior-art references must be assessed from the perspective of a person having ordinary skill in the art (“POSA”) to which the patent is related, based on the understanding of that person at the time of the patent claim’s priority date. I have been informed and understand that a POSA is presumed to be aware of all

pertinent prior art and the conventional wisdom in the art, and is a person of ordinary creativity. I have applied this standard throughout my declaration.

30. The '734 patent involves technology in the field of online search and advertising systems. I have been asked to provide my opinions as to the state of the art in this field by late 2010. I use this timeframe because the face of the '734 patent indicates an earliest possible claimed priority date of December 6, 2010. Whenever I offer an opinion in this declaration about the knowledge of a POSA, the manner in which a POSA would have understood the claims of the '734 patent or its description, the manner in which a POSA would have understood the prior art, or what a POSA would have been led to do based on the prior art, I am referencing the late-2010 timeframe, even if I do not say so specifically in each case.

31. I understand that the Patent Owner may attempt to prove that the alleged invention recited in the challenged claims was conceived at some time prior to the earliest claimed priority date on the face of the patent. At the time of this declaration, I am unaware of the Patent Owner having alleged any earlier conception date or produced any evidence to establish any earlier conception date.

32. In my opinion, a person of ordinary skill in the art in the late-2010 timeframe ("POSA") would have had a bachelor's degree in computer science or a related field, and at least two years of experience with web-programming and

search engine systems. More education could substitute for experience, and vice versa. This person would have been capable of understanding and applying the teachings of the '734 patent and the prior-art references discussed in this declaration.

33. By 2010, I held a Ph.D. in Computer Science, and I had twenty-seven years of experience with web programming and search systems. Therefore, I was a person of more than ordinary skill in the art during the relevant timeframe.

However, having taught graduate and undergraduate students of Computer Science since 1983, I worked with many people who fit the characteristics of the POSA, and I am familiar with their level of skill. When developing the opinions set forth in this declaration, I assumed the perspective of a person having ordinary skill in the art, as set forth above.

VI. THE '734 PATENT

A. Background

34. The '734 patent is directed to automatically generating deep-linked ads via the use of a so-called “universal variable map.” Ex-1001, Abstract.

According to the '734 patent, the universal variable map is a collection of the “names” of the variables and identifiers of the fields on web forms found by crawling Internet websites and applications. *Id.*, 9:27-34, 12:32-47. These “names” are stored in the universal variable map and associated with “normalized

variables.” *Id.*, 5:48-52, 12:50-55. These normalized variables serve to link corresponding fields of multiple Internet sites that were previously correlated manually to create parameter-value-passing deep-links. *Id.*, 5:48-52.

35. The ’734 patent acknowledges that “deep-linked” or “parameter-based” digital advertising technologies were known at the time of filing. *Id.*, 2:51-65. In these prior art systems, as described in the ’734 patent, search parameters values provided by a user to one site (e.g., travel location and dates) are “passed along with each ad click to the appropriate advertiser.” *Id.*, 2:57-59. Advertisers use these passed-along parameters, for example, to “automatically activate searches” from the advertiser’s homepage, “thereby landing the web user ‘deep’” into a website rather than on the advertiser’s homepage. *Id.*, 2:59-65.

36. The ’734 patent alleges that the problem with such prior art “deep-linked” or “parameter-based” ad systems was that the mapping between the parameter fields in a publisher’s site and the corresponding fields in an advertiser’s site had to be “manually created by developing programmatic integrations between” the fields on the publisher’s site and the fields on the advertiser’s site (e.g., “by manual code”). Ex-1001, 3:5-18. The ’734 patent simply purports to automate these mappings. *Id.*, Abstract, 1:41-51, 3:34-35, 3:51-62, 4:56-58.

37. Figure 11B (annotated below) illustrates the process for using the universal variable map in generating deep-linked ads for a user visiting a search

engine website (e.g., [Search Engine 1](#)). Here, the [universal variable mapper 613](#) is used “to provide to its visitors a deep-linked ad for [Search Site 1](#),” which is a search site for a “Used Car” in the same “vertical” (i.e., website category) as the user’s search query.

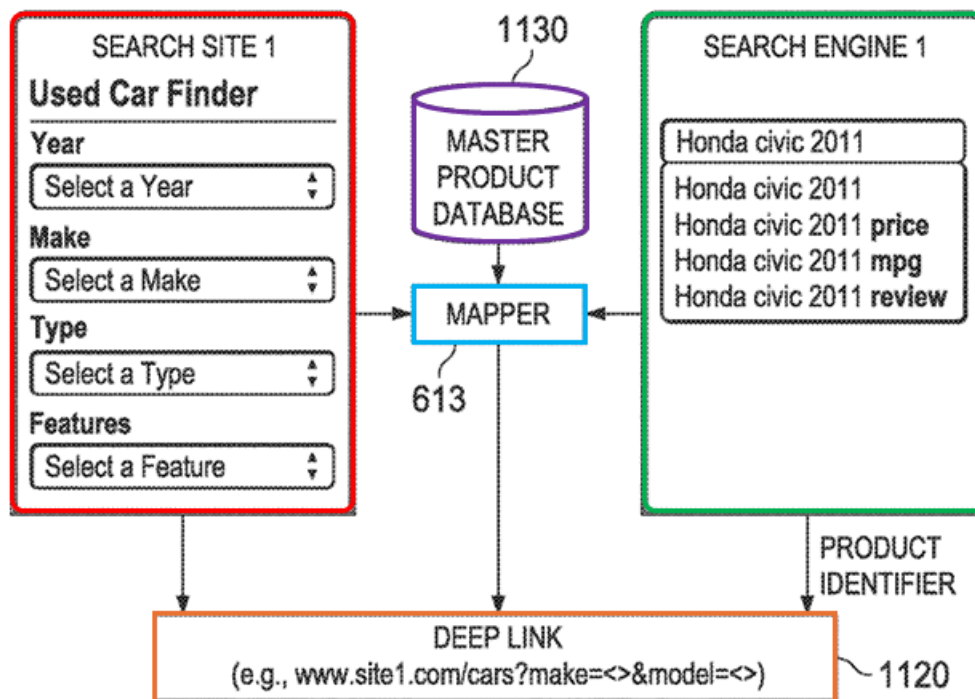


FIG. 11B

Ex-1001, 16:59-60, 17:16-19. To generate the deep-linked ad, [mapper 613](#) accesses the universal variable map of [Master Product Database 1130](#), “cross reference[s] programming variables”¹ determined from the search query on [Search](#)

¹ The '734 patent uses the terms “programming variable,” “variable,” “field identifier,” and “identifier” interchangeably. See Ex-1001, 5:5-8, 12:12-19, 12:32-36, 16:23-27.

Engine 1 “with those used by Search Site 1, and automatically create[s] a deep-linked ad (deep-link 1120 in this example).” Ex-1001, 16:59-17:19; *see, e.g., id.*, 10:51-11:13. The deep-linked ad is placed on Search Engine 1 so that when a user selects the ad, “the user’s browser is automatically directed to a network address indicated by deep-link 1120” to Search Site 1, which provides a landing page with content corresponding to the query string entered on Search Engine 1. *See id.*, 17:2-18, Fig. 11B. For example, in directing the user’s browser to the deep link location, the form at Search Site 1 may “be pre-populated with field identifier values ..., along with any user input provided at Search Engine 1,” for example, user-entered values in the query string “Honda Civic 2011” are mapped to their corresponding fields at Search Site 1 for “Year,” “Make,” and “Model.” *See id.*

38. The purported improvement this process provides over the prior art is automating the manual process of “mapping” values entered by the user on one site to corresponding fields on another site. Ex-1001, 3:24-25. The automation of this previously manual process involves the universal variable map that stores a collection of website data organized by content (i.e., “verticals”). *Id.*, 9:10-23, Figs. 4, 5. As described in Figure 11B above, this data is used to automatically generate a deep-link that maps the data a user entered in a field of a first website to the variables or field identifiers of corresponding fields of the advertiser’s website. *Id.*, 16:59-17:8. The ’734 patent claims a network data source that is embodied on

a computer in which a so-called “universal variable map” is also “maintained” by that same computer.

B. Prosecution History

39. I have reviewed the prosecution history of the '734 Patent (Ex-1002). The Examiner issued one rejection, finding that the claims in the application were not patentably distinct from the claims of its parent patent, U.S. Patent No. 9,633,378. *See* Ex-1002, 45-46, 107-09, 147-48. No substantive prior art rejections were applied.

C. The Challenged Claims

40. My opinion herein addresses how claims 1-20 of the '734 patent are obvious. Claim 1 is copied below and annotated with bracketed letters for purposes of cross reference. The remaining claims, annotated with bracketed letters, are provided in Section X, below.

[1PRE] A method, comprising:

[1A] in response to a user interacting with a user interface of a networked data source on a user device, accessing a universal variable data database, the universal variable data database representing a universal variable map of searchable classes and attributes of products or services on the Internet, the accessing performed by a computer having a processor and a non-transitory computer-readable medium, the universal variable data database maintained by the computer;

[1B] determining, by the computer based on dynamic data collected through the user interface while the user is interacting with the user interface of the networked data source, field identifiers of the networked data source stored in the universal variable data database, the dynamic data containing user-specified values pertaining to a product or service;

[1C] determining, by the computer, field identifiers of a networked data target that are mapped to the field identifiers of the networked data source in the universal variable data database;

[1D] automatically generating, by the computer using the universal variable data database, a deep-linked ad that links the field identifiers of the networked data source and the field identifiers of the networked data target;

[1E] presenting the deep-linked ad through the user interface of the networked data source on the user device; and

[1F] responsive to the user selecting the deep-linked ad through the user interface of the networked data source on the user device, passing the user-specified values pertaining to the product or service to the networked data target using the deep-linked ad that links the field identifiers of the networked data source and the field identifiers of the networked data target such that, without necessitating any pre-existing relationship between the networked data source and the networked data target, an electronic product or service order form at the networked data target is automatically filled in or acted upon with the

user-specified values pertaining to the product or service and presented on the user device

Ex-1001, 25:20-60 (annotated).

VII. CLAIM INTERPRETATION

41. I understand that determining whether a claimed invention is novel and non-obvious requires comparing the prior art to the claims. It is my opinion that none of the claim terms require construction for the application of the prior art discussed herein.

VIII. PRIOR-ART REFERENCES

A. Overview of Prior Art References

42. I briefly introduce in this Section below various prior-art references discussed in this declaration.

1. Oldham – Serving Deep-Link Advertisements

43. U.S. Patent No. 8,150,979 to Oldham (“Oldham”) (Ex-1020), currently assigned to Petitioner Google LLC, entitled “Supporting multiple landing pages,” issued on April 3, 2012. Oldham claims priority to its filing date of June 4, 2007. Accordingly, I understand that Oldham qualifies as prior art to the ’734 Patent under pre-AIA 35 U.S.C. § 102(e).

44. Oldham discloses systems and methods for serving advertisements to a user based on user search queries and user attributes, including the user’s geographic location. Oldham, 6:40-54. Oldham’s system includes an “external

engine 105” connected to a network (e.g., the Internet) that users interact with via a webpage displayed on a computer device’s web browser (e.g., desktop computer, laptop, smartphone, PDA, etc.). *Id.*, 4:35-46. The external engine includes a search engine (SE) 115 and an advertisement engine (ADE) 120 that both return results (e.g., search results and advertisements) based on search query keywords entered by the user. *Id.*, 4:46-48, 4:63-5:2. Figs. 1 (below), 2.

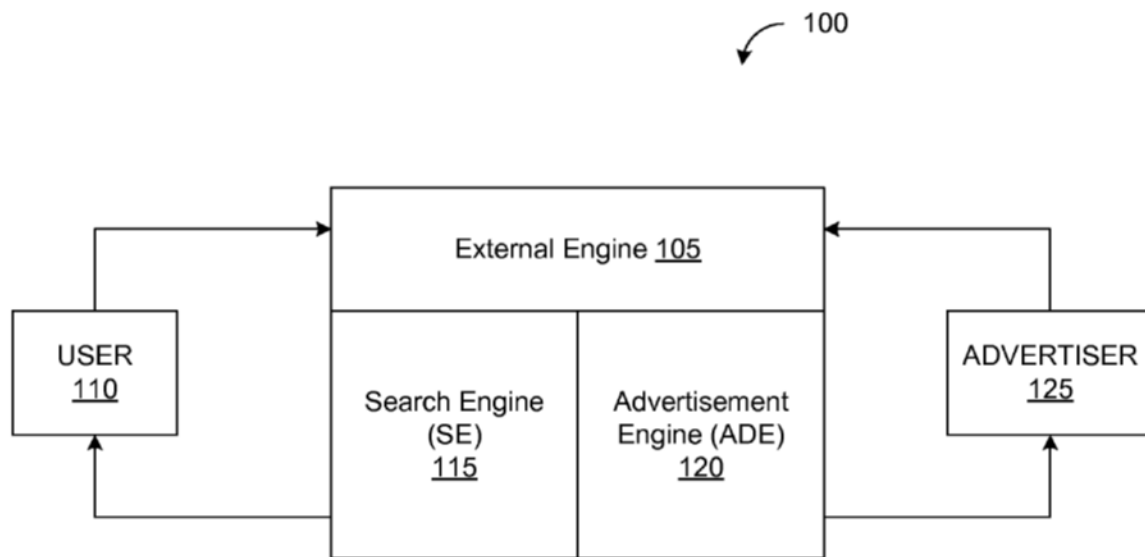


FIG. 1

45. Users interact with the external engine via a web browser displaying “a web page on the web site of the external engine 105.” *Id.*, 5:7-11. This webpage is “designed to allow a user 110 to enter a query string” that is then used by the SE and ADE to search for content and advertisements relevant to the query. *Id.*, 5:15-17, 5:25-28 (“[T]he ADE 120 can be operatively coupled to the SE 115 such that

the ADE 120 can identify advertisements relevant to the user 110 based on the query string that the user 110 provides to the SE 115.”), 5:53-6:16, Fig. 2 (below).

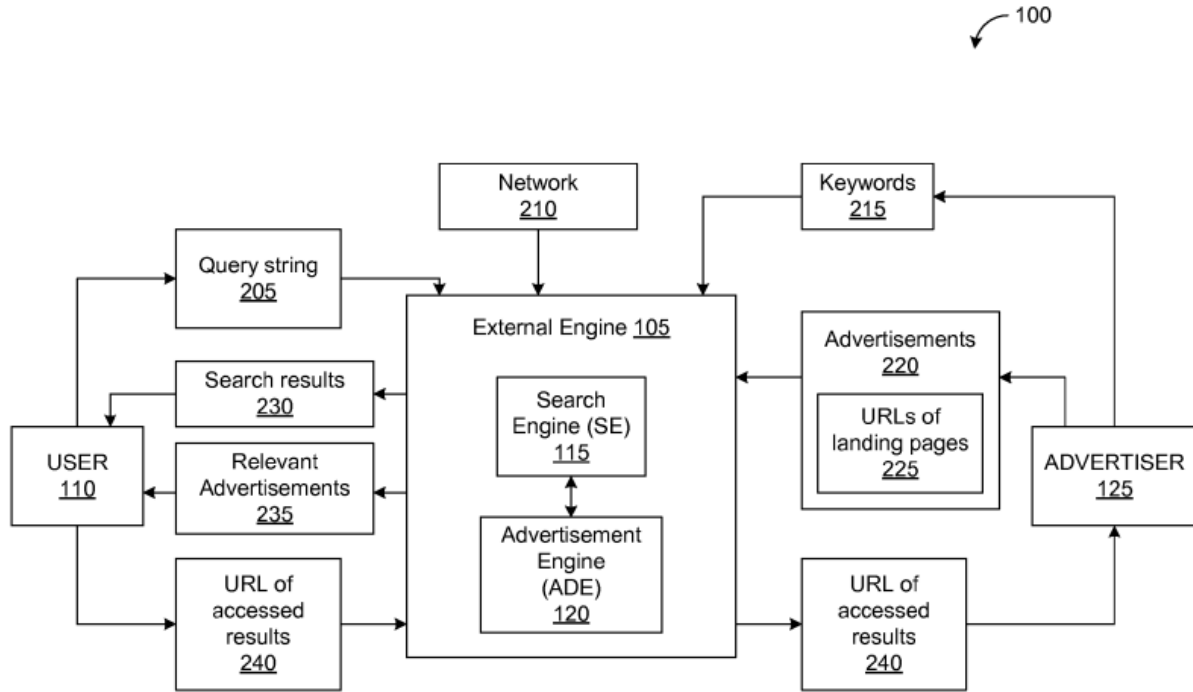


FIG. 2

46. The ADE identifies “relevant advertisements 235” from a user’s query by comparing keywords provided by the advertiser to keywords identified in the user’s query (*id.*, 6:18-25, 9:12-23), and user attributes determined by the external engine, such as the user’s geographic location. *Id.*, 5:41-52, 6:40-54.

47. Advertisements displayed on the external engine’s webpage include URLs to landing pages specific to products or services that advertisers offer at the user’s location. *Id.*, 6:26-39, 9:24-29. These URLs are provided by advertisers and, when modified by the external engine inserting the user’s attributes, become deep-links that direct the user to a landing page at the advertiser’s website that presents

content specific to the advertiser's products and services, and to the user's attributes (e.g., location). *Id.*, 6:55-7:3, 9:24-58. These landing pages include dynamically generated content based on parameter values assigned to field identifiers provided in the URL. *Id.*, 6:59, 9:59-10:8. For example, an advertiser offering products or services in several locations may generate a landing page based on the user's location attribute, by the external engine assigning location values according to the attribute, to corresponding field identifiers in the landing page URL. *Id.*, 6:55-7:3, 9:24-58, 9:59-10:8 (describing examples where location values are assigned to field identifiers in the advertiser's URL using <identifier=value> pairs).

48. POSAs would have recognized that Oldham's generated URLs, with the user location attributes inserted are deep-links because they include parameter values associated with field identifiers on the advertiser's website so that the advertiser's website dynamically generates a landing page specific to the advertiser's products and services, and the user's location. *Compare* Oldham, 10:4-8 (showing a URL with field identifiers having values based on the user's location attributes in an <identifier>=<value> format, e.g., "state=CA"), *with* Ex-1001, 17:3-8 (showing a deep-link with fields and values in the same <identifier>=<value> format). POSAs thus would have understood Oldham to teach an example of "deep-linked" or "parameter-based" digital advertising

acknowledged as prior art in the '734 patent. Ex-1001, 2:51-65 (“These search parameters are then passed along with each ad click to the appropriate advertiser” to “land[] the web user ‘deep’ into” the advertiser’s website.).

a. Oldham Relies on URLs Provided by an Advertiser

49. In Oldham’s system, advertisers provide URLs to their landing pages, to the advertisement engine (ADE). Oldham, 9:24-26. These “received URLs” conform to a syntax both “designed to receive one or more user attribute values” and “designed to comply with pre-determined formats.” *Id.*, 9:48-51. For example, an advertiser may provide a URL in the predefined format “www.advertiser.com/<insert city value here>.html” so that the external engine can insert the user’s city parameter in the URL, *e.g.*, “www.advertiser.com/city=MountainView.html.” *Id.*, 9:39-48. These predetermined formats enforced by the external engine would have been recognized by POSAs as placing the burden on advertisers to manually provide a compliant URL for each advertisement to benefit from the external engine’s generated deep-links with inserted user parameter values. *Id.*, 9:55-58.

50. This burden was known to POSAs to exist with prior art systems that generate deep-linked advertisements, as acknowledged by the '734 patent:

To make deep-linked ads work, dynamic data from the publisher’s site or app needs to be input into the appropriate locations on the advertiser’s site or app, enabling it to “fast-forward” the user click

deep into its conversion funnel.... So far in the industry, these deep-linked ad connections have been manually created by developing programmatic integrations between variables and fields on the publisher web site and the advertiser web site, created by manual code.

Ex-1001, 3:5-18.

51. Like the prior art described in the '734 patent, POSAs would have recognized that Oldham's system placing the burden on advertisers to provide compliant URLs for each advertisement to benefit from Oldham's URL data insertion would have similarly been "a time and resource intensive activity that multiplies as the size of the network grows, limiting the size, scale and market adoption for deep-linked ads." *Id.*, 3:24-27. POSAs thus would have been similarly motivated to improve Oldham's system to automatically generate deep-linked URLs to advertiser websites based on search query keywords and user attributes, thereby alleviating the advertiser of the burden of providing compliant URLs for each advertisement to the external engine. *Id.*, 3:34-40.

52. As the '734 patent admits, POSAs were aware that to make these deep-linked ads work, the parameters entered by the user from the first site needed to be input into the appropriate variables on the second site. *Id.*, 3:5-12. Accordingly, a POSA would have found it obvious to employ such deep-links in Oldham's advertisements to ensure that a user would enjoy a streamlined

experience across other websites by alleviating the user from the burden of entering the same values in various fields on different websites. TripAdvisor, 1; Ex. 1001, 2:51-65.

2. Halevy – Universal Variable Mapper

53. U.S. Patent Application Publication No. 2006/0230033 to Halevy et al. (“Halevy”) (Ex-1006), assigned to Petitioner Google LLC, entitled “Searching Through Content Which Is Accessible Through Web-Based Forms” published on October 12, 2006, and claims priority to Provisional Application No. 60/669,292 filed on April 6, 2005. Accordingly, I understand that Halevy qualifies as prior art to the ’734 patent under pre-AIA 35 U.S.C. § 102(b).

54. Halevy teaches a system for automatically generating deep-links by querying a “form database” with a query string. Halevy, [0009]. Halevy’s form engine and database and form engine that, like the ’734 patent’s universal variable “mapper,” automatically maps fields on forms from different websites to a shared set of identifiers (i.e., “properties”) determined from the form data, thereby mapping corresponding fields across various website forms to each other. *Id.*, [0037], Fig. 2.

a. Halevy Automatically Maps Data Fields of Website Forms for Creating Deep-links

55. To create the form database, Halevy teaches a web crawling process (see Fig. 1 below) executed by a form engine 106 that “accesses a number of forms

121-123 which are hosted on servers located throughout network 110.” *Id.*, [0035].

These forms are “obtained” from “a number of sources” and provide “access to data within underlying databases 131-133.” *Id.*, [0035], [0037], Fig. 1.

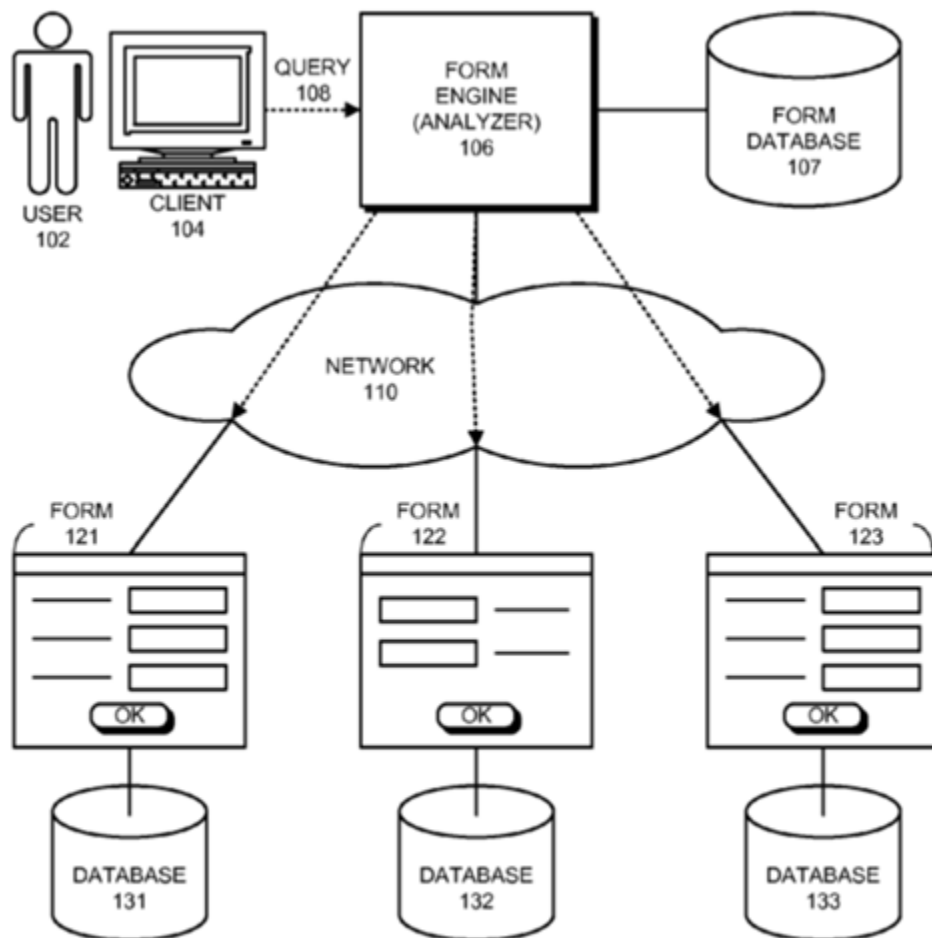


FIG. 1

56. Once forms are identified, Halevy’s crawling process “creates database entries for the identified forms” by “obtaining and storing metadata describing the identified forms into database entries” in the form database 107. *Id.*, [0009], [0015]. The stored “metadata” includes data describing the “input fields”

on the form, such as the field's "parameter name" or field identifier. *Id.*, [0016], [0037], [0044], Fig. 2.

b. Universal Variable Map (Form Database)

57. For each form entered in the form database, Halevy's process computes a "class" for the website the form is found on (e.g., a "university" or "newspaper" website) and a "class" for the form itself. The form's "class" indicates "the types of objects that can be obtained by querying the form," such as "books, hotels, restaurants" and "houses, jobs, and cars for sale." *Id.*, [0039-45], [0057]. Halevy refers to the "classes" as "SO-classes," or "search ontology" classes. *Id.*, [0038], Fig. 6. The classes in turn have "SO-properties" or "search ontology" properties; these properties, which are also referred to as "output properties," represent "the type of information [that is] obtain[ed]" by using the form. *Id.*, [0038], [0048].

58. For example, if a form's "SO-class" is identified as "car," then the fields in the form are mapped to the "SO-properties" (i.e., normalized variables) for the "car" class such as the properties for "make" and "model" of the car. *Id.*, [0095], [0098-101]. Likewise, POSAs would have understood that if the form's "SO-class" is identified as "hotel," then the fields in the form may be mapped to the "SO-properties" for the "hotel" class such as "arrival date," "departure date," and "location." POSAs also would have understood that other classes of forms

such as “amusement park,” “car rental,” “airline,” etc., or more generally, “reservations” would similarly map relevant fields to that class’s SO-properties. *Id.* Halevy also computes a “schema mapping,” which is a “mapping between the fields in the form and the SO-properties.” *Id.*, [0049], [0062-67].

59. As shown in Figure 3 (annotated below), for each form, Halevy’s form database stores the identified class of the form, data for each field (including the parameter name), and the mapping between the fields on the form and the corresponding properties of the form’s class. *Id.*, [0044-49] (“For each form in the source [i.e., website] the following information can be captured ... [f]ields in the form ... include[ing] its parameter name ... [t]he class of the form ... [s]chema mapping – [t]his is the mapping between the fields in the form and the SO-properties.”), [0067], [0125].

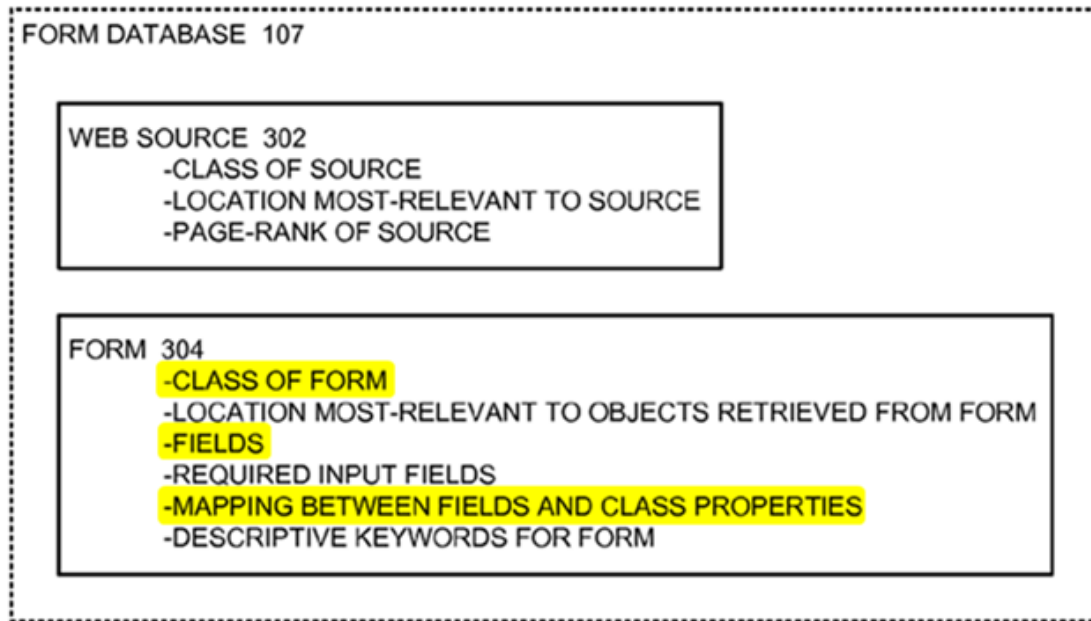


FIG. 3

60. The class and properties identified for the various forms are then used to “facilitate subsequent searches through content which is accessible through” the forms. *Id.*, [0009], [0136-38], Fig. 2. This search process, explained in detail directly below, accepts a query string and via the form database’s hierarchy of classes and their properties, returns a list of deep-links to various identified forms in the database with the keywords of the query assigned to fields in the deep-link based on mapping the keywords and the form’s fields to the same SO-properties. *Id.*, [0018], [0136-38], [0125] (describing mapping query keywords to form fields using the SO-properties).

61. This use of the form database shows that Halevy maps corresponding form fields from different websites to the same SO-property to provide search

capabilities on multiple forms that return similar data, despite the fields on each form having different parameter names. *Id.*, [0062-66] (describing mapping fields to SO-properties), [0125] (describing identifying forms by mapping query keywords to fields based on mapping the keywords to the same SO-properties). A POSA—familiar with ontologies, classes, properties, forms, fields, parameters, and mapping—would have understood that Halevy teaches “*determining ... field identifiers of a networked data target that are mapped to the field identifiers of the networked data source in the universal variable data database*” as claimed (as is further explained below in my analysis for claim 1).

c. Retrieving Deep-Links from the Form Database

62. Halevy teaches querying its form database to return a list of relevant “query-through links.” *Id.*, [0136-38]. Each of the query-through links automatically directs the user to either a results webpage or a partially filled form at the website identified in the link (*id.*, [0138], [0143]), with the keywords in the query associated with corresponding parameter names of the form’s fields. *Id.*, [0123-28] (describing generating deep-links with query keywords associated with corresponding field parameters based on the SO-properties determined for the keywords and fields).

63. This query process is diagrammed in Halevy’s Fig. 6 (below) where the system “receives a query containing keywords (step 602)” and “predicts a

search-ontology class for the query based on the keywords (step 604).” *Id.*, [0136]. The system then “constructs a structured query” by “mapping keywords to [SO-] properties” of the predicted class (step 606). *Id.* For example, Halevy describes converting an example user query “Telephone David Ko 98102” to a structured query in the “Person” SO-class, with the “FirstName” SO-property assigned the value “David,” the “LastName” SO-property assigned the value “Ko,” and the “ZipCode” SO-property assigned the value “98102.” *Id.*, [0112].

64. Using this structured query, Halevy’s system “performs a lookup” in the form database “to identify forms of interest (step 608),” which are “rank[ed]” and then “present[ed] the user” as “query-through links” (step 612). *Id.*, [0114], [0137-38]. Each query-through link, when clicked by the user, “submit[s] a query to the associated form of interest (step 614)” by prepopulating the form’s fields with their associated keywords, as determined by the SO-property mapping. *Id.*, [0136-38], [0127].

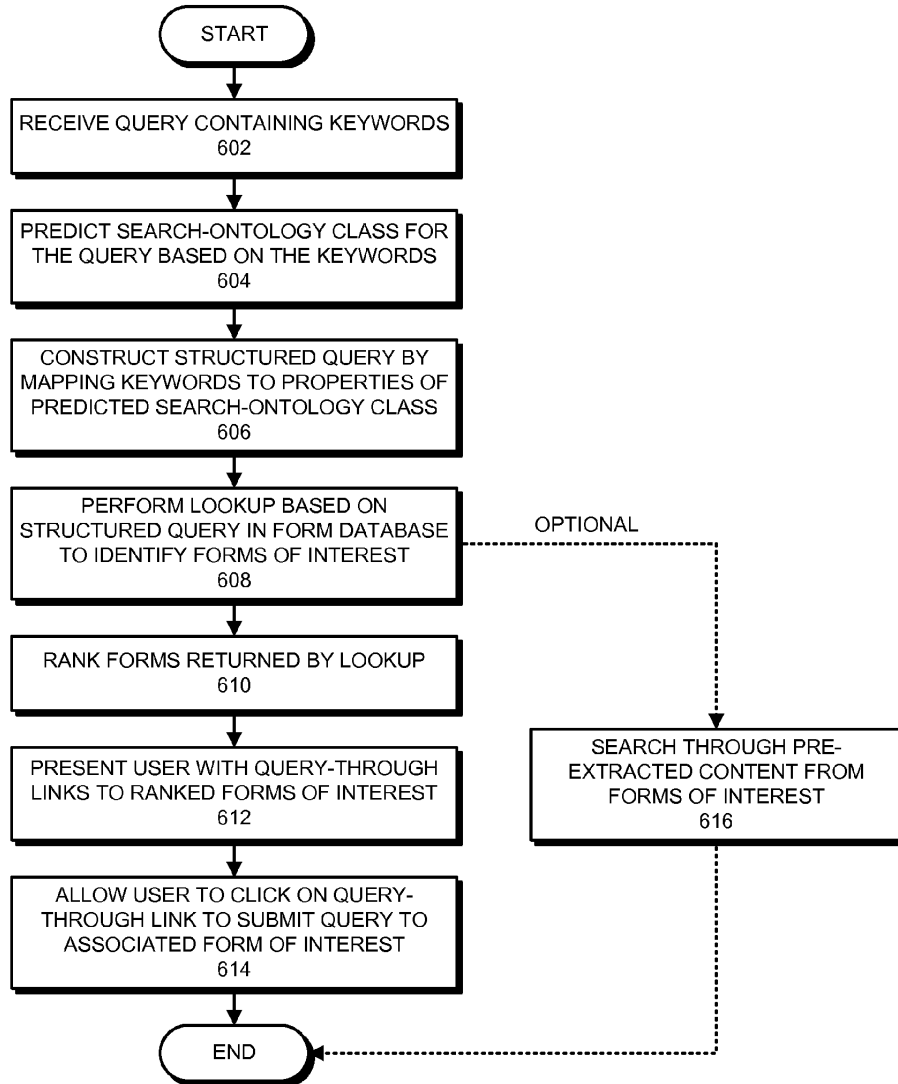


FIG. 6

65. Because Halevy’s query-through links (each to a “form of interest”) include an association of query keywords to corresponding field parameter names to automatically generate search results from the linked form using the keywords as values in the form’s fields, POSAs would have recognized the query-through links to be deep-links that repurpose the query keyword values. *Id.*, [0123-28], [0136-38], [0143]. Furthermore, because Halevy discloses that a single structured

query (with keywords of the query mapped to SO-properties) returns *multiple* query-through links (with keywords mapped to corresponding fields based on the SO-property mapping), POSAs would have understood Halevy's system to map corresponding form fields from different websites to the same SO-properties (i.e., obviously, because otherwise returning multiple deep-link results from a single query would not be possible).

66. Since Halevy describes its search system functionality in one example as an enhancement to conventional network-based search engines (Halevy, [0007-08]), POSAs would have found it obvious to modify Oldham with the teachings of Halevy such that Oldham's external engine (i.e., a search engine as discussed above in VIII.A.1) would benefit from Halevy's automated solution for generating deep-links, as discussed below in section VIII.B.

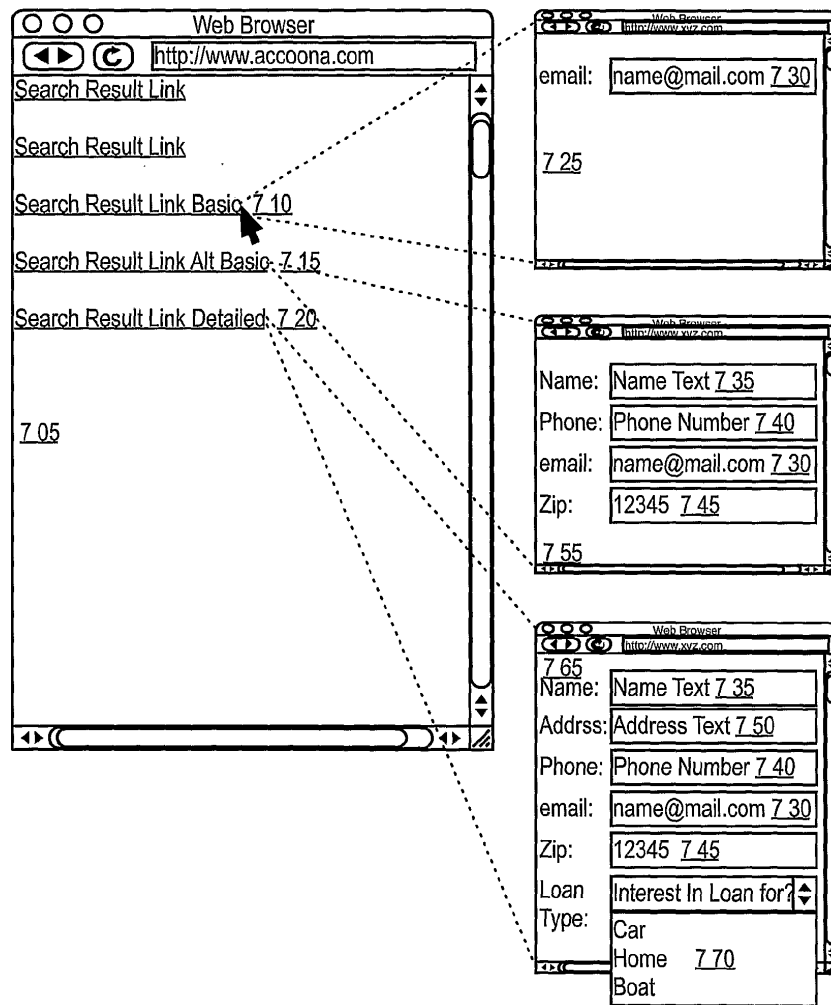
3. Rousso

67. U.S. Patent Application Publication No. 2010/0057556 to Rousso et al. ("Rousso") (Ex-1021), entitled "Apparatuses, Methods and Systems to Identify, Generate, and Aggregate Qualified Sales and Marketing Leads for Distribution via an Online Competitive Bidding System" published on March 4, 2010, and claims priority to PCT No. PCT/US06/13873 filed on April 12, 2006, having a § 371(c)(1) date of March 6, 2009. Accordingly, I understand that Rousso qualifies as prior art to the '734 patent under pre-AIA 35 U.S.C. § 102(e).

68. Rousso (Ex-1021) discloses a Lead Bidding System (“LBS”) that “takes bids on consumer leads and allows the winning bidder to advertise to the consumers.” Rousso, [0035]. Rousso’s LBS generates leads from consumer-entered information and delivers the lead data to the winning bidder. *Id.* For example, Rousso teaches generating lead data from a user’s search query. *Id.*, [0043]. Here, consumers interact with a “home page” via a web browser to “provide search requests” to a “search facility” that then “provides the consumer with search results.” *Id.*, [0043], [0062], [0066]. The search results include “a qualified lead form” where “consumers may enter identifying information.” *Id.*, [0043], [0066], [0085-87], Fig. 7. According to Rousso, “[t]he user does not necessarily have to fill out a qualified lead form,” but rather a lead may be generated based on “responses indicative of their interest in a particular kind of good or service” such as “providing a search for a type of product.” *Id.*

69. As shown in Fig. 7, Rousso’s qualified lead forms are presented to users via clicking on a search result. *Id.*, [0066], [0085-86] (“an HTML web page is used to present the user with a web form”), Fig. 7 (below).

Figure 7



These forms “may vary based on the nature of goods, services and/or topics being viewed by the consumer.” *Id.*, [0086]. Additionally, the forms include a unique identifier, for example, “an IP address (e.g., prepopulating a text field).” From the IP address, the user’s location can be determined for targeting the lead data to customers in a specific region. *Id.*, [0086], [0161], [0379-80]. The forms may also be prepopulated based on stored user profile data or this information may be “provided to the LBS without user interaction.” *Id.*, [0086].

70. Once a lead is generated, the LBS provides it to a “bid and bill facility.” *Id.*, [0046], [0087] (“The information entered by the user into the lead data form may be sent to the LBS via an http post command” using, *e.g.*, “field, value pair notation.”). Through the bid and bill facility, customers of the LBS (*e.g.*, “purveyors of goods and/or service ... interested in finding leads to consumers”) compete via a bidding process for access to the lead data (*i.e.*, the data entered by the consumer). *Id.*, [0046], [0055]. The winning customers of the bidding process are notified of the lead and given access to the lead data by, *e.g.*, “manually self retriev[ing] the lead by logging into their account.” *Id.*, [0185], [0372]. Customers log into their accounts on the LBS using a web browser as the LBS provides “a web-based administration system for monitoring and controlling all aspects of users accounts including ... reporting.” *Id.*, [0054], [0056].

B. POSA’s Motivations to Modify Oldham In View of Halevy

71. As discussed above, Oldham teaches an external engine that displays search results and advertisements to users based on the user’s search query and the user’s attributes (*e.g.*, location). Oldham, 4:34-56, 5:39-45, 5:53-56, 6:17-25. A POSA would have been motivated to improve Oldham’s system so that the deep-links provided in the displayed advertisements reuse the values from the user-entered query string, as it was known that advertisers would benefit from repurposing these values. TripAdvisor, 1.

72. Oldham's advertisements rely on the advertiser manually providing a landing page URLs for each advertisement that complies with the format and syntax dictated by the external engine. Oldham, 9:24-28; 9:50-58. Rather than requiring a person associated with the advertiser to manually enter these URLs, POSAs would have been motivated to look to an automated solution for Oldham's system to generate deep-links for advertisements that reuse values (e.g., keywords) already in the user's search query to leverage at other websites. TripAdvisor, 1.

73. Halevy teaches one such system for automatically generating deep-links to other websites with the keywords from a query string assigned to corresponding field identifiers in the deep-link. A POSA would have been motivated to modify Oldham's system with Halevy's teachings as detailed below.

74. Halevy discloses an improvement to search systems like Oldham by providing the ability to search behind web-based forms. Halevy, [0007-09]. Halevy's system includes a "form engine" that "exist[s] on any computing device which is accessible through [a] network" using "any type of ... communication channel capable of coupling together computing nodes." *Id.*, [0034]. Halevy's system also includes a "form database" used by the form engine to "facilitate searches through content which is accessible through the web-based forms which are cataloged within form database 107." *Id.*, [0036].

75. As discussed above in section VIII.A.2.c, Halevy teaches allowing end-users to query the form database to retrieve deep-links. Halevy's system generates deep-links by determining keywords from the query to identify a "search class" for the query, "mapping the individual words in the query to properties of the chosen search class," and performing a look-up in the database with the class and property mapping. *Id.*, [0089-92], [0112], [0137-38]. Halevy describes using various types of "prediction" to perform its identification and mapping process. *Id.*, [0090-111].

76. To automatically generate deep-links for advertisements that repurpose user-entered search queries, as discussed above, a POSA would have been motivated to modify Oldham's external engine to retrieve deep-links for advertisements automatically by providing the user's search query and the user's attributes to Halevy's form engine. A POSA would have found it obvious to use Halevy's form engine to automatically generate these deep-links because Halevy's system returns one or more deep-links relevant to a query's keywords, with some of the keywords mapped to corresponding field identifier names in the deep-link. POSAs would have recognized that Halevy's form engine and database would have been implemented in Oldham's external engine.

77. This is because Oldham teaches that the external engine is an Internet search engine that returns search results and advertisement based on a query string

(Oldham, 4:34-56, 5:63-6:2), and Halevy teaches that its form engine and database functionality is an improvement on search engines by providing for searching of content behind web-based forms based on a query string (Halevy, [0007-09], [0018]). This would have allowed Oldham's external engine to benefit from Halevy's improvement of generating deep-links based on a query string by the external engine passing the user-entered query string and user attributes to Halevy's form engine (*see, e.g.*, Oldham, 9:6-8) when determining an advertisement to display.

78. POSAs would have recognized that Oldham benefiting from using Halevy's deep-link generation in this way would have allowed the external engine to present deep-linked advertisements that pass query keywords and user attributes to the advertiser's website using Halevy's deep-link, rather than relying on the advertiser to provide a compliant URL for each advertisement to receive user attributes in a URL. *See* Oldham, 11:22-34. POSAs would have recognized that using Halevy's deep-links in Oldham's advertisement would have provided advertiser websites with keywords of the user's query and the attributes, so that advertisers would continue to "display landing pages based on each attribute or combinations of attributes" in addition to the user's query. *Id.*, 11:28-33.

79. Accordingly, POSAs would have recognized that Oldham's system would benefit from using Halevy's mapping of user query keywords to the

advertiser's website field identifiers in selecting advertisements for display, as this would have been a more robust and automatic way to generate advertisements based on Halevy's deep-links; as it was known to be desirable to yield better results while alleviating advertisers of the burden of manually providing compliant URLs to its website for each advertisement. Ex-1001, 2:66-3:4; TripAdvisor, 1.

80. Likewise, POSAs would have reasonably expected success in implementing Halevy's form engine and database functionality with Oldham's system using conventional programming techniques known to POSAs.

C. POSAs Motivations to Modify Oldham and Halevy In View of Rousso

81. As explained directly above in section VIII.B, Oldham/Halevy discloses a search engine website accessed via a webpage displayed on a user's device, where the user enters search queries and is presented with advertisements having deep-links generated by querying Halevy's form database, which maps keywords of the user's query and the user's attributes (e.g., location data) to corresponding fields in an identified form. As discussed above in section VIII.A.3, Rousso teaches a Lead Billing System ("LBS") for generating leads, where users click on keyword-based search results and are shown a qualified lead form to enter data that is then provided by the LBS to a winning bidder. Rousso, [0043], [0066], [0085-87], [0185].

82. POSAs would have found it obvious to include Rousso's qualified lead forms in Halevy's form database because Rousso teaches that its LBS can be utilized by other website publishers to "support[] distribution of the advertiser system to maximize advertiser acquisitions via 3rd party sales teams or partners with existing advertiser bases." *Id.*, [0295]. POSAs would have recognized that including Rousso's forms would have benefited Oldham's system with revenue from advertisements for Rousso's LBS and would have benefited Rousso's LBS as deep-links with keywords from the user's search query and the user's location data prepopulating corresponding fields in the forms would have improved lead data acquisition from users. POSAs thus would have been motivated to include Rousso's forms in Oldham/Halevy as a way for the LBS to interact with other search providers like Oldham that advertise to users, thereby utilizing another way of generating revenue by maximizing advertiser acquisition of user-generated lead data.

83. POSAs would have reasonably expected success in implementing Rousso's qualified lead forms with Oldham/Halevy, thereby allowing Rousso's LBS to receive lead data via Halevy's generation of deep-links with query keywords and the user's location mapped to corresponding fields in the form. Rousso teaches that its forms are written using, *e.g.*, HTML. Rousso, [0085-86]. Halevy teaches adding HTML forms to its form database and determining an SO-

class for the form and SO-properties for each field. Halevy, [0142]. Halevy also teaches that forms can be “manually provided” to its system. *Id.*, [0035]. It would have thus been within a POSA’s skill to provide Rousso’s qualified lead forms to Halevy’s system since Rousso’s forms are of the type that Halevy is designed to operate with. POSAs would have recognized that Halevy generating deep-links to Rousso’s forms would have absolved the user of reentering data, thereby streamlining the user’s experience and improving the rate at which users submit lead data to the LBS. POSAs also would have recognized that Rousso’s lead generation would have been improved by including Rousso’s qualified lead forms into Halevy’s form database, as this would have provided the LBS another way of generating leads from users.

84. In such an implementation, POSAs would have understood that the user selecting a deep-link from Halevy’s system (as advertised on Oldham’s search results page) to one of Rousso’s qualified lead forms would have submitted the linked form and the data in the deep-link to Rousso’s LBS automatically, thereby providing keywords of the user’s query and the user’s attributes, such as location data, as lead data to the LBS. As Rousso teaches that its lead forms include unique identifiers like the user’s IP address, and automatically prepopulating forms with user identification data (Rousso, [0086]), POSAs would have understood that the LBS processing the form submission as a result of the user selecting a deep-link

would have allowed the LBS to tag the lead data with the user's IP address and prepopulate any identifying data missing from the deep-link to the form for lead generation. As explained by Rouso, the LBS would have then provided the lead data submitted by selecting the deep-link to a winning bidder to view via their account on the LBS. Rouso, [0185].

IX. THE CHALLENGED CLAIMS ARE UNPATENTABLE IN LIGHT OF THE PRIOR ART IDENTIFIED IN THE PETITION

85. I have been asked to provide my opinion concerning whether claims 1-20 of the '734 patent are anticipated or would have been obvious to a POSA in light of the prior-art references identified in the Petition. For the reasons explained below, it is my opinion that each of claims 1-20 would have been obvious to a POSA.

A. Ground 1: Claims 1-5, 8-12, and 15-19 are Obvious Over Oldham In View of Halevy

86. After reviewing Oldham, Halevy, and claims 1-5, 8-12, and 15-19 of the '734 patent, it is my opinion that each of these claims would have been obvious to a POSA in view of the combination of these prior art references. To the extent there are any limitations in these claims that these prior art references do not expressly or inherently disclose, a POSA would have had reasons to implement the teachings of these prior art references in a typical, conventional, and obvious way that meets all limitations of each of these claims. The basis for my opinion and the

details of my analysis are below. As referenced below, “Oldham/Halevy” refers to the combination of Oldham in view of Halevy as discussed in section VIII.B, and “Oldham” or “Halevy” refer to their respective disclosures as discussed in section VIII.A.

1. Claim 1

a. [1PRE] “A method, comprising:”

87. Oldham teaches a method implemented in a search engine for serving advertisements on a webpage with “dynamically generat[ed] uniform resource locators (URLs) based on specific attributes of a user and providing the generated URLs to an advertiser.” Oldham, 1:32-35. An example of performing Oldham’s method—when Oldham utilizes Halevy’s form engine to dynamically generate URLs with user search query value and user attributes—includes serving advertisements on webpages with deep-links that reuse the values entered by the user in search queries entered on the webpage. As detailed below, this method *comprises* the remaining limitations of claim 1.

- b. [1A] “in response to a user interacting with a user interface of a networked data source on a user device, accessing a universal variable data database, the universal variable data database representing a universal variable map of searchable classes and attributes of products or services on the Internet, the accessing performed by a computer having a processor and a non-transitory computer-readable medium, the universal variable data database maintained by the computer;”

88. Oldham teaches an external engine 105 that “present[s] a first web page on a website to a user 110.” Oldham, 5:3-5. The webpage (e.g., “landing page”) is presented in a web browser operating on the user’s computing device (e.g., a desktop computer, laptop computer, smart phone, PDA, etc.) connected to the Internet. *Id.*, 4:34-46, 5:2-15. POSAs would have recognized that Oldham’s webpage presented by the external engine to the user’s device via the Internet is “*a user interface of a networked data source on a user device.*” Oldham’s webpage is “designed to allow” the user “to interact with the external engine 105” by, for example, “enter[ing] a query string.” Oldham, 5:11-15. Thus, the user entering a query string into Oldham’s webpage is “*a user interacting with*” the “*user interface of a networked data source.*”

89. In Oldham/Halevy, Oldham’s external engine 105 receives the query string from the webpage and submits it to Halevy’s form engine, which serves advertisements on the webpage with deep-links generated by querying Halevy’s form database. Thus, in Oldham/Halevy, Halevy’s form engine *accesses* the form

database “*in response to the user interacting with the user interface of the networked data source.*” POSAs would have recognized that Halevy’s form database is a “*universal variable data database representing a universal variable map of searchable classes and attributes of products or services on the Internet*” as follows.

90. Halevy’s form engine executes a crawling process that categorizes webpages and forms according to a “schema” (i.e., a model/structure) consisting of a “search ontology” (SO) of “classes and properties.” Halevy, [0038]; *see* Uschold (Ex-1013), p.1 (defining and explaining “ontology” and “database schema”). The “SO-classes” are identified for each form and used to map the fields in the form to “SO-properties,” as shown below in annotated Figure 3. Halevy, [0039-41], [0045], [0049], [0062], [0067].

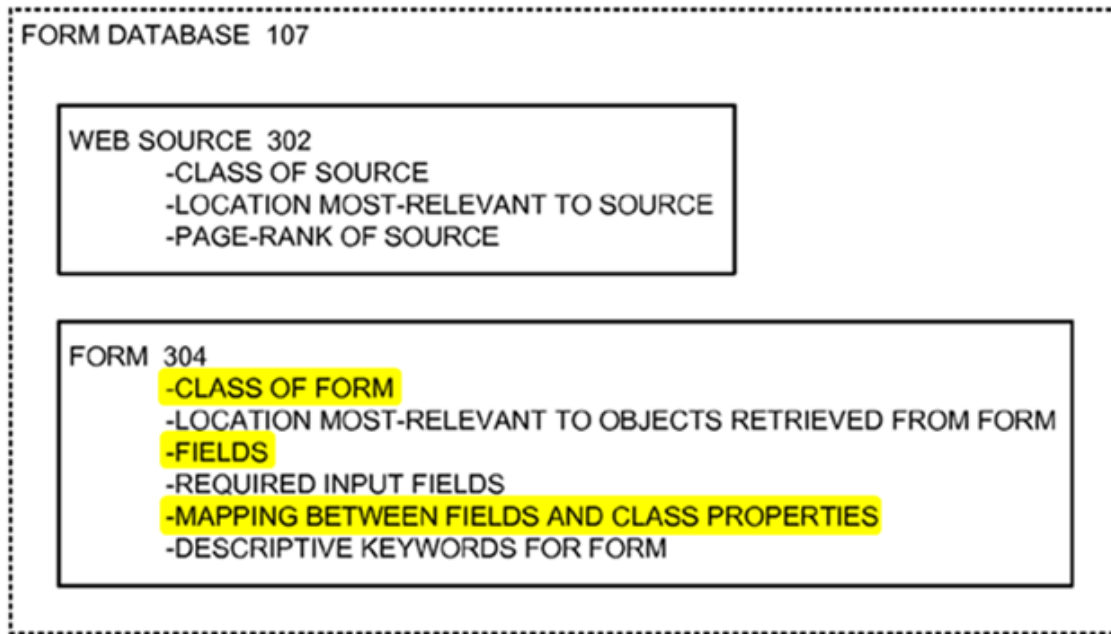


FIG. 3

91. The SO-properties (i.e., normalized variables) are associated with SO-classes and are derived from the “output properties,” described as “the type of information ... obtain[ed]” from querying the form. *Id.*, [0048], [0062], [0067]. Multiple different forms on different websites (i.e., universal) can map to the same SO-classes, and likewise, fields from different forms can map to the same SO-properties. *Id.*, [0035], [0037], [0067], [0095], Fig. 2. For example, for forms that identify in the SO-class “car,” the fields are mapped to their corresponding SO-properties, such as “make” and “model” associated with the “car” SO-class. *Id.*, [0095], [0098-111].

92. Since Halevy’s crawling process maps the fields of various web forms to a set of SO-properties associated with the form’s identified SO-class, POSAs

would have recognized the SO-properties to be “universal variable data” and the form database’s collection of SO-properties to be “*universal variable data database*.” See Ex-1001, 5:9-14 (describing a “*universal variable map*” as a collection of “handshakes between each gathered variable and the corresponding normalized variable”).

93. Halevy’s disclosure of the form database in which corresponding fields from different forms on different websites map to the same SO-properties based on the SO-class identified for the form would have been recognized by a POSA as what the ’734 patent refers to as a *universal variable map*. See *id.*, 20:44-48 (“Variations of linking data variables and fields may include a source form, a destination form, **a single source to many destination form**, many sources to one destination form”) (emphasis added). Halevy’s form database thus “*represent[s] a universal variable map*” that is “*searchable*” because in Oldham/Halevy, Oldham’s external engine receives a search query from the user and submits the query to Halevy’s form engine to *search* the collection of SO-classes and SO-properties to retrieve a list of deep-links from the form database, each to a “form of interest.” Halevy, Abstract, [0137-38].

94. As also discussed in Oldham/Halevy, the query submitted to Halevy’s form database maps the keywords to “properties of the chosen search[-ontology] class” identified for the query. *Id.*, [0089], [0136]. POSAs would have thus

recognized that Halevy's SO-classes are "*searchable classes ... of products or services on the Internet*" because they are determined for each form based on the "types of objects that can be obtained by querying the form" (e.g., books, hotels, restaurants, houses, jobs, cars, etc.). *Id.*, [0045]. POSAs also would have recognized that Halevy's SO-properties are "*searchable ... attributes of products or services on the Internet*" because they "specify the type of information" obtained from querying the form, such as SO-properties of "make" and "model" for the SO-class of "cars." *Id.*, [0095], [0098-101].

95. As also discussed in Oldham/Halevy, POSAs would have recognized that Halevy's form engine and database would have been obvious modifications to Oldham's external engine 105 since its external engine 105 "includes a search engine (SE) 115" (Oldham, 4:46-48), and Halevy teaches its form mapping functionality as an improvement to search engines. *See* Halevy, [0007-09]. Oldham's external engine 105 is "connected to a network" like the Internet and is "configured to receive input from" a user's computer device via a website providing a webpage to the user's device. Oldham, 4:34-42, 5:3-15.

96. POSAs thus would have recognized that Oldham's external engine is "*a computer having a processor and a non-transitory computer-readable medium,*" otherwise it would not be able to serve a persistent website via the Internet that receives and processes user search queries from multiple user

computers. Halevy, [0130]. POSAs also would have recognized that Oldham's external engine may include multiple processors operating in parallel (e.g., a mainframe) in order to serve a larger number of users. *See, e.g., id.*, [0034] (describing computing devices that support search services such as "a mainframe computer.").

97. Moreover, as modified, Halevy's form engine and form database are included together with Oldham's external engine, and POSAs would have recognized that the form database (i.e., a "*universal variable data database*") is "*maintained by the computer*" since the form engine included in the external engine of system 100 (i.e., "*the computer*") both builds and provides access to the form database. *Id.*, [0037] (describing a query engine 202 that queries the form database and a web crawler 206 that builds the form database, both included in the form engine), Fig. 2.

- c. **[1B] "determining, by the computer based on dynamic data collected through the user interface while the user is interacting with the user interface of the networked data source, field identifiers of the networked data source stored in the universal variable data database, the dynamic data containing user-specified values pertaining to a product or service;"**

98. As discussed for Limitation [1A], Oldham's external engine (i.e., "*the networked data source*") running on its system (i.e., "*the computer*") receives a search query (i.e., "*dynamic data*") from a user via a webpage served by the

external engine (i.e., “*the user interface of the networked data source*”). Oldham, 5:11-15; see Ex-1001, 5:48-52 (describing *dynamic data* as data retrieved from a “text field on a publisher site”). POSAs would have thus recognized the search query to be “*dynamic data collected through the user interface while the user is interacting with the user interface of the networked data source.*”

99. In Oldham, the user’s search query “*contain[s] user-specified values pertaining to a product or service*” because users of Oldham’s system “may be searching for products and services” and advertisements for related products or services are displayed to the user via the webpage based on the search query. Oldham, 6:1-16.

100. In Oldham/Halevy, the user’s search query is submitted to Halevy’s form engine (via Oldham’s modified external engine) to retrieve deep-links from the form database (i.e., “*the universal variable data database*”), with keywords in the user’s query mapped to corresponding field parameter names in each deep-link. Halevy, [0036], [0136-38]. Thus, in Oldham/Halevy, the form engine executed by Oldham’s system (i.e., “*the computer*”) *determines* the deep-links *based on* the user’s search query (i.e., “*the dynamic data*”).

101. Halevy’s form engine *determines* “*field identifiers of the networked data source stored in the universal variable data database*” based on the user’s search query (i.e., “*the dynamic data*”) by mapping keywords in the query to SO-

properties (i.e., normalized variables) of various forms in an identified SO-class. Specifically, in Halevy's form query process (e.g., Fig. 6), the form engine "predicts a search-ontology class for the query based on the keywords (step 604)" and then "constructs a structured query" by "mapping keywords to [SO-] properties" of the predicted class (step 606). *Id.*, [0136]. For example, Halevy describes converting an example user query "Telephone David Ko 98102" to a structured query in the "Person" SO-class, with the "FirstName" SO-property assigned the value "David," the "LastName" SO-property assigned the value "Ko," and the "ZipCode" SO-property assigned the value "98102." *Id.*, [0112]. Using this structured query, Halevy's system "performs a lookup" in the form database "to identify forms of interest (step 608)," which are "rank[ed]" and then "present[ed] the user" as "query-through links" (step 612). *Id.*, [0112], [0137-38].

102. POSAs would have recognized that the SO-properties mapped to the keywords are *determined "field identifiers of the networked data source stored in the universal variable data database" based on the dynamic data* because the SO-properties for each class are defined by the form engine and mapped to corresponding fields from various forms stored in the form database. *Id.*, [0048-49], [0062], [0067]. The '734 patent similarly determines field identifiers from a user-input text string. Ex-1001, 10:60-11:7 (describing an example where "the

user's description ... may be captured in a text string and parsed ... to obtain keywords" that are "associated with various field identifiers").

103. Thus, POSAs would have recognized Halevy's mapping of the keywords in a query to SO-properties that are also mapped to various corresponding fields in the form database to be "*determining ... based on dynamic data collected through the user interface ..., field identifiers of the networked data source stored in the universal variable data database.*"

- d. **[1C] "determining, by the computer, field identifiers of a networked data target that are mapped to the field identifiers of the networked data source in the universal variable data database;"**

104. Halevy's crawling process maps corresponding fields on multiple website forms (i.e., *field identifiers of networked data targets*) to SO-properties (i.e., normalized variables) of the SO-classes identified for the forms. Halevy, [0067].

105. In Oldham/Halevy, Halevy's query process maps the keywords of a user query to the SO-properties (i.e., "*field identifiers of the networked data source in the universal variable database*") in order to return deep-links to the forms with the keywords in the query mapped to corresponding fields of the linked form. *Id.*, [0136-38].

106. In Halevy's form query process (executed by the form engine), after keywords of the query are mapped to SO-properties of an identified SO-class, the

form engine then obtains forms based on the identified SO-class, and via the class's SO-properties, *maps* the keywords of the query to the fields of the identified web forms. *Id.*, [0125]. Halevy then returns these mappings to each form as “query-through” links in response to the query. *Id.*, [0137-38]. Because Halevy's query-through links (each to a “form of interest”) include a mapping of query keywords to corresponding field parameter names to automatically generate search results from the linked form using the keywords as values in the form's fields, POSAs would have recognized the query-through links to be deep-links that repurpose the query keywords. *Id.*, [0123-28], [0136-38]; [0143]. Furthermore, because Halevy discloses that a single structured query (with keywords of the query mapped to SO-properties) returns ***multiple*** query-through links (with keywords mapped to corresponding fields based on the SO-property mapping), POSAs would have understood Halevy's system to map corresponding form fields from different websites to the same SO-properties (because otherwise returning multiple deep-link results from a single query would not be possible).

107. In Oldham/Halevy, and as explained for Limitation [1A], POSAs would have recognized that Oldham's external engine, as modified by Halevy and executed by Oldham's system, is “*the computer*” performing Halevy's form query process that *determines* the *mapping* between corresponding fields of forms in the form database (i.e., “*field identifiers of a networked data target*”) and the SO-

properties identified for the keywords (i.e., “*field identifiers of the networked data source in the universal variable data database*”).

- e. **[1D] “automatically generating, by the computer using the universal variable data database, a deep-linked ad that links the field identifiers of the networked data source and the field identifiers of the networked data target;”**

108. In Oldham/Halevy, Oldham teaches that its advertisement engine (ADE) included in the external engine executed by its system (i.e., “*the computer*”) *automatically generates* advertisements in response to user search queries.

Oldham, 9:6-8 (“The ADE 120 can be operatively coupled to the SE 115 to identify advertisements 220 relevant to the user’s interest based on the query string 205 received from the user 110.”), Fig. 2 (showing the ADE and SE included in the external engine). The advertisements generated by Oldham’s ADE include advertiser-provided links to advertiser landing pages specific to “products and services offered by the advertiser” that can be dynamically generated based on data passed to the advertiser’s website by the external engine via the link URL. *Id.*, 9:24-32, 9:42-50, 12:53-62 (describing dynamically generating custom web pages based on data provided in the landing page URL).

109. As explained for Limitations [1B] and [1C], rather than requiring advertisers to provide compliant URLs for each generated advertisement in Oldham/Halevy, Oldham’s generation of an advertisement would have instead

included querying Halevy’s form engine with the user’s query string and the user’s attributes to retrieve one or more deep-links to advertiser landing pages from the form database (i.e., “*the universal variable data database*”), with keywords of the query string and attributes mapped to corresponding fields in the deep-link via the SO-properties. POSAs thus would have understood that Oldham’s generated advertisement with Halevy’s retrieved deep-links to be *deep-linked ads*.

110. Further, because Halevy’s SO-properties (i.e., “*field identifiers of the networked data source*”) are used in Oldham/Halevy to map the keywords of the query string to corresponding field parameter names (i.e., “*field identifiers of the networked data target*”) in each returned deep-link, POSAs would have recognized that each generated *deep-linked ad* in Oldham/Halevy “*links the field identifiers of the networked data source and the field identifiers of the networked data target*” by associating keywords with their corresponding field parameter names in the deep-link via the SO-properties.

f. [1E] “presenting the deep-linked ad through the user interface of the networked data source on the user device; and”

111. As explained for Limitation [1A], in Oldham/Halevy, “*the user interface of the networked data source on the user device*” is a webpage presented in a web browser on the user’s device that is generated by a website executed by Oldham’s external engine. Oldham, 4:34-46, 5:2-15, Fig. 2. Oldham also teaches

displaying its generated advertisements on the webpages served to its users in response to the user entering a query string. *Id.*, 6:47-54 (“[I]n response to the query string 205, the user 110 can be presented with search results 230 that can include ... URLs 225 that point to landing pages of relevant advertisements 235 created by the advertiser 125.”).

112. Accordingly, in Oldham/Halevy, POSAs would have recognized that Oldham’s webpages displaying advertisements with Halevy’s deep-links would have been Oldham’s external engine “*presenting the deep-linked ad through the user interface of the networked data source on the user device*” in response to the user-entered query.

- g. [1F] “responsive to the user selecting the deep-linked ad through the user interface of the networked data source on the user device, passing the user-specified values pertaining to the product or service to the networked data target using the deep-linked ad that links the field identifiers of the networked data source and the field identifiers of the networked data target such that, without necessitating any pre-existing relationship between the networked data source and the networked data target, an electronic product or service order form at the networked data target is automatically filled in or acted upon with the user-specified values pertaining to the product or service and presented on the user device”**

113. As explained for Limitation [1E], in Oldham/Halevy, Oldham’s generated advertisements with Halevy’s deep-links displayed on Oldham’s webpages are *deep-linked ads* presented “*through the user interface of the*

networked data source on the user device.” Oldham teaches that users can “click[] on” (i.e., *select*) these advertisements to access the advertiser’s landing page indicated by the link. Oldham, 6:48-54. POSAs would have thus recognized that in Oldham/Halevy, the user is directed to the advertiser’s landing page “*responsive to the user selecting the deep-linked ad through the user interface of the networked data source on the user device.*”

114. As explained for Limitations [1C] and [1D], in Oldham/Halevy, the link included in Oldham’s advertisement is a deep-link generated by submitting a query string to Halevy’s form engine. The deep-link includes keywords of the query string (i.e., “*the user-specified values pertaining to the product or service*”) associated with corresponding field parameter names of the advertiser’s landing page in the deep-link (i.e., “*the field identifiers of the networked data target*”) based on the form engine’s SO-property-mapping process (i.e., the “*link[ing of] the field identifiers of the networked data source and the field identifiers of the networked data target*”). Thus, POSAs would have recognized that in Oldham/Halevy, the deep-link in an advertisement *passes* the keywords of the query to the advertiser’s field identifiers *responsive to the user selecting an advertisement*.

115. Further, Halevy teaches that its form database is created via crawling that categorizes webpages and forms from various unrelated websites found on the

Internet (Halevy, [0039-50], [0057-58], [0095]), POSAs would have understood the form database's creation, and thus the *linking* between fields on various forms and the SO-properties, to occur “*without necessitating any pre-existing relationship between the networked data source and the networked data target.*”

116. Moreover, Halevy teaches that a web form at a website (i.e., “*an electronic product or service order form at the networked data target*”) can be automatically invoked (i.e., “*automatically filled in or acted upon*”) using its “query-through link” (i.e., *deep-link*) by providing the web browser with an “invocation string” containing field names (i.e., “*field identifiers of the networked data target*”) set to values determined from the keywords submitted in a query string (i.e., “*the user-specified values pertaining to the product or service*”). *Id.*, [0022-23], [0123], [0127-28].

117. In Oldham/Halevy, where the advertisement displayed on Oldham's webpage includes Halevy's deep-link to an advertiser's landing page having an order form (with corresponding field names in the order form at the deep-link set to query keyword values via the SO-property-mapping process), POSAs would have understood that the browser's processing of the invocation string for the deep-link displays (i.e., *presents on the user device*) the linked webpage with the page's order form “*automatically filled in or acted upon*” because the browser

displays the advertiser's landing page showing the results from invoking the form with the values in the deep-link. *Id.*, [0123], [0127-28], [0138].

2. Claim 2: "The method according to claim 1, wherein the dynamic data includes location information of the networked data source or the networked data target."

118. As explained for Limitation [1A], in Oldham/Halevy, Oldham's webpage allows the user to submit a query string (i.e., "*dynamic data*") to the external engine. Oldham, 4:34-46, 5:2-15. Oldham's external engine includes a "determination engine 310" that "determines values for user attributes based on the query" including the user's geographic location. *Id.*, 7:56-58, 7:63-64, 8:10-16 (describing an example where the user's location is determined from the search string "Coffee shop 21220" based on the "postal code value of '21220'"). The user's determined location is included in the data provided to the advertiser via a URL so that the advertiser's landing page at the URL (i.e., "*the networked data target*") can be dynamically generated based on the advertiser's "products and services" "specific to the user's location" included in the URL. *Id.*, 6:55-7:3, 12:45-13:1. Additionally, a "network address" of the user device (such as an IP address) may be utilized to determine a real-time geographic location of the user's device. *Id.*, 8:16-25.

119. Alternatively, as admitted by the '734 patent, it was known to select ads for display by a user location, explaining "filtering conditions might include

current information, such as the location of the user Advertisers and publishers are finding that the better the targeting of an ad, the better its performance for all parties. Ex-1001, 2:15-22. As such, to the extent it is argued that Oldham does not teach a user location, POSAs would have understood that it was nevertheless an obvious modification for its known performance benefits.

120. In Oldham/Halevy where an advertisement includes Halevy's deep-link with user query keywords and user attributes (e.g., user location values) mapped to corresponding field names at the advertiser's landing page, POSAs would have recognized that the landing page dynamically generated by the advertiser would likewise have been customized to the advertiser's products and services based on the user's location attribute by the query to Halevy's form database being mapped to the corresponding location fields at the advertiser's website in the deep-link. Thus, POSAs would have understood that in Oldham/Halevy the search query (i.e., "*the dynamic data*") submitted to Halevy's form engine "*includes location information of ... the networked data target*" so that the advertiser's website would generate a landing page offering products and service specific to the user's location included in Halevy's deep-link.

3. Claim 3: “The method according to claim 1, wherein the networked data source or the networked data target is embodied on a mobile device and wherein the dynamic data comprises location information of the mobile device.”

121. As explained for Limitation [1A], Oldham’s external engine (i.e., “*the networked data source*”) serves a webpage, displayed in a user device’s web browser, that allows a user to submit a query string. Oldham, 4:34-46, 5:2-15. POSAs would have recognized that the webpage served by Oldham’s external engine is *the networked data source embodied on a* user device because the webpage provides a visual instance of the external engine’s functionality to the user via the device.

122. Likewise, as explained for claim 2, POSAs would have recognized that the advertiser’s landing page served by the advertiser’s website is *the networked data target embodied on a* user device for the same reason. Oldham teaches that user devices presenting its webpages and advertiser landing pages include a *mobile device* such as a “laptop computer, smartphone, personal digital assistant (PDA), ..., and the like.” *Id.*, 4:43-46. Thus, POSAs would have recognized Oldham/Halevy to teach that Oldham’s external engine and the advertiser’s website are “*embodied on a mobile device*” via their respective webpages served to the user.

123. As explained for Limitation [1A] and claim 2, in Oldham/Halevy, Oldham’s webpage allows the user to submit a query string (i.e., “*dynamic data*”)

to the external engine that is processed by a “determination engine 310” to “associate values to one or more attributes that can define a user’s geographic location.” *Id.*, 7:56-58, 7:63-64, 8:10-16 (describing an example where the user’s location is determined from the search string “Coffee shop 21220” based on the “postal code value of ‘21220’”). In the case of the user in Oldham/Halevy interfacing with Oldham’s external engine via a webpage served to a *mobile device* as discussed above (*see id.*, 4:34-46, 5:2-15), POSAs would have recognized that Oldham’s determining of the user’s geographic location from the query string discloses “*the dynamic data comprises location information of the mobile device.*” Additionally, a “network address” of the user device (such as an IP address) may be utilized to determine a real-time geographic location of the user’s device. *Id.*, 8:16-25.

124. Alternatively, as admitted by the ’734 patent, it was known to select ads for display by a user location, explaining “filtering conditions might include current information, such as the location of the user Advertisers and publishers are finding that the better the targeting of an ad, the better its performance for all parties. Ex-1001, 2:15-22. As such, to the extent it is argued that Oldham does not teach a user location, POSAs would have understood that it was nevertheless an obvious modification for its known performance benefits.

4. Claim 4: “The method according to claim 3, wherein, in addition to the user-specified values pertaining to the

product or service, the electronic product or service order form at the networked data target is automatically filled in or acted upon with the location information of the mobile device embodying the networked data source.”

125. As explained for Limitation [1F], Oldham/Halevy discloses that the form at the advertiser’s landing page (i.e., “*the electronic product or service order form at the networked data target*”) is *automatically filled in or acted upon* with *the user-specified values pertaining to the product or service* included in the search query by the user clicking on Halevy’s deep-link that maps keywords in the query to corresponding field names at the landing page form via the SO-properties.

126. As explained for claim 3, in Oldham/Halevy, the user’s geographic location may be included in the search query submitted to the external engine, which is the location of the user’s mobile device because the user is interacting with the external engine’s webpage displayed on the device (i.e., “*location information of the mobile device embodying the networked data source*”) or an IP address of the user’s device is communicated. Oldham, 7:56-58, 7:63-64, 8:10-25, 14:21-40. Thus, POSAs would have recognized that for deep-links returned from Halevy’s form engine to webpage forms that include a location field (e.g., hotel, airline, or other travel related sites that provide products and services based on location) mapped to an SO-property, the location of the user (and thereby the location of the mobile device) included in the search query would have been

mapped to the corresponding location field name in the form at the deep-link based on the SO-property-mapping process. *See Halevy, [0100], [0125].*

127. POSAs thus would have recognized that in Oldham/Halevy, the user clicking on the deep-linked advertisement would have caused device's web browser to *automatically fill in or act upon* the landing page form *with the location information of the mobile device in addition to the user-specified values pertaining to the product or service* included in the search query.

5. Claim 5: “The method according to claim 1, wherein the networked data target is embodied on a mobile device and wherein the field identifiers of the networked data target include a field identifier for a location of the networked data target.”

128. As explained for claim 2, Oldham's external engine is embodied on a user's mobile device web browser via a webpage that accepts a user query. The external engine includes a “determination engine 310” that “determines values for user attributes based on the query” including the user's geographic location. Oldham, 7:56-58, 7:63-64, 8:10-25 (describing an example where the user's location is determined from the search string “Coffee shop 21220” based on the “postal code value of ‘21220’”) or based on an IP address of the user device. The user's determined location is included in the data provided to the advertiser via a URL so that an advertiser's landing page (i.e., “*the networked data target*”) “specific to the user's location” can be dynamically generated based on the

advertiser’s “products and services” at that location. *Id.*, 6:55-7:3. Because the advertiser’s landing page can be dynamically generated and customized to the user’s location, and Halevy’s deep-links would have been recognized to map the user’s location attributes in the query to the advertiser’s location fields in the deep-link, POSAs would have recognized that the advertiser’s landing page (i.e., “*the network data target*”) includes “*field identifier for a location of the networked data target.*” See, e.g., *id.*, 9:32-48, 9:59-10:8.

129. As explained for Limitation [1F], in Oldham/Halevy, the advertiser’s landing page generated by Halevy’s deep-link is displayed to the user via the mobile device’s web browser by the user clicking on the advertisement. POSAs would have thus recognized that the landing page generated for and displayed on the mobile device’s web browser is the networked data target embodied on a mobile device,” because the landing page provides a visual instance of the advertiser’s website functionality to the user via the device.

6. Claim 8-12 and 15-19

130. Independent claim 8 recites in limitation [8PRE] a “*system comprising: a processor; a non-transitory computer-readable medium; and stored instructions translatable by the processor to perform*” the same method recited in claim 1. This method is performed in Oldham/Halevy by Oldham’s external engine (i.e., “*stored instructions translatable by the processor to perform*” the method).

131. As explained for Limitation [1A], Oldham’s external engine is executed by a system that includes *a processor and a non-transitory computer-readable medium*. See Oldham, 15:51-55. Thus, POSAs would have recognized Oldham/Halevy to teach the system of [8PRE] that performs the steps in limitations [8A]-[8H] for the same reasons discussed above.

132. Independent claim 15 recites in limitation [15PRE] a “*computer program product*” identical to the *system* in claim 8. POSAs would have recognized that Oldham’s external engine that implements its searching website functionality is a *computer program product*, and the remainder of claim 15 is met by Oldham/Halevy for the same reasons discussed above for claim 8.

133. Claims 8 and 15 are otherwise identical to claim 1 and are met by Oldham/Halevy for the same reasons summarized in the following table and explained in the sections indicated.

Claim 8 Element	Claim 15 Element	Corresponding Claim 1 Element & Section
[8A]	[15A]	[1A] – IX.A.1.b
[8B]	[15B]	[1B] – IX.A.1.c
[8C]	[15C]	[1C] – IX.A.1.d
[8D]	[15D]	[1D] – IX.A.1.e
[8E]	[15E]	[1E] – IX.A.1.f
[8F]	[15F]	[1F] – IX.A.1.g

134. The dependent claims from claims 8 and 15 recite identical limitations to the corresponding claim 1 dependents listed below, and are met for the reasons summarized in the following table and explained in the sections indicated.

Claim 8 Dependent	Claim 15 Dependent	Corresponding Claim 1 Dependent & Section
9	16	2 – IX.A.2
10	17	3 – IX.A.3
11	18	4 – IX.A.4
12	19	5 – IX.A.5

B. Ground 2: Claims 1-5, 8-12, and 15-19 are Obvious Over Oldham and APA In View of Halevy

135. Oldham in view of Halevy (Ground 1) renders claims 1-5, 8-12, and 15-19 obvious.

136. To the extent that more detailed disclosure is required regarding utilizing deep-link advertising based on the user’s location (*see, e.g.*, claims 2-5), as evidence of the knowledge of the art, the Applicant Admitted Prior Art (“APA”) states that at the time of the ’734 patent, such sites were known. Ex-1001, 2:9-42, 2:51-57, 3:5-23. Specifically, Applicants admitted that deep-linked-based advertising targeted to the user’s location was known and in use for “search and E-commerce sites where the user is searching for a product or service,” like Oldham’s search website, and was known to “provide ... better targeting” resulting in “greater value to end-users” and “better return-on-investment for advertisers.” *Id.*, 2:3-8, 2:15-17, 2:51-57. With these sites, advertisements were filtered based on

a user's location and user-entered search parameters (e.g., "where s/he is traveling from, where to, travel dates, how many people in the party, class of travel, etc."), and the parameters were "passed along with each ad click to the appropriate advertiser" to "automatically activate searches from their home page," thereby deep-linking the user "into their booking process." *Id.*, 2:15-17, 2:52-65.

137. These ads worked by mapping the "fields or variables on the publisher site or mobile app" to the "corresponding fields or variables on the advertiser site or mobile apps." *Id.*, 3:9-14. This mapping was done via manual coding "by developing programmatic integrations between variables and fields" on the publisher's and advertiser's websites. *Id.*, 3:14-18. Manual coding was necessary because each website was known to use "its own field descriptors and variable names." *Id.*, 3:18-23.

138. POSAs would have recognized the websites described in Oldham to be examples of publisher and advertiser websites and applications described in the APA, having fields that require manual coding to map the user's location and search parameters provided in Oldham's search query to the advertiser-provided links so that search parameter values would have been passed along in the resulting deep-linked URLs generated for the advertisements by Oldham's server.

139. POSAs would have known that automating this mapping process would have been more efficient, as the APA states that mapping via manual

programming was “a time and resource intensive activity that multiplies as the size of the network grows, limiting the size, scale and market adoption for deep-linked ads.” *Id.*, 3:24-27. POSAs would have thus looked to Halevy to automate this manual mapping process, as Halevy’s form database maps the forms and fields on various websites to a hierarchy of SO-classes and SO-properties that can be queried with keywords to retrieve deep-links that map the keywords to parameter names of the form at each deep-link to invoke a search on the linked website’s form. Halevy, [0038]; [0136-38].

C. Ground 3: Claims 6-7, 13-14, and 20 are Obvious Over Oldham and Halevy In View of Rousso

140. After reviewing Rousso in addition to Oldham and Halevy (as discussed in Ground 1), and claims 6-7, 13-14, and 20 of the ’734 patent, it is my opinion that each of these claims would have been obvious to a POSA in view of the combination of these prior art references. To the extent there are any limitations in these claims that these prior art references do not expressly or inherently disclose, a POSA would have had reasons to implement the teachings of these prior art references in a typical, conventional, and obvious way that meets all limitations of each of these claims. The basis for my opinion and the details of my analysis are below. As referenced below, “Oldham/Halevy” refers to the combination of Oldham in view of Halevy as discussed in section VIII.B, “Oldham/Halevy/Rousso” refers to the combination of Oldham and Halevy in view

of Rousso as discussed in section VIII.C, and “Oldham,” “Halevy,” or “Rousso” refer to their respective disclosures as discussed in section VIII.A.

1. Claim 6: “The method according to claim 1, wherein the networked data source is embodied on a first mobile device, wherein the networked data target is embodied on a second mobile device.”

141. As explained for Limitation [1A], Oldham’s external engine (i.e., “*the networked data source*”) serves a webpage, displayed in a user device’s web browser, that allows a user to submit a query string used to generate a deep-link via Halevy’s system. Oldham, 4:34-46, 5:2-15. POSAs would have recognized that the webpage served by Oldham’s external engine is *the networked data source embodied on a first* user device because the webpage provides a visual instance of the external engine’s functionality to the user via the user’s device.

142. In Oldham/Halevy/Rousso, the user selecting a deep-link generated by Halevy’s form database to a qualified lead form provided by Rousso’s LBS, would have been recognized by POSAs as submitting the data in the deep-link as lead data for the LBS to provide to a winning bidder. Rousso, [0049], [0185], [0372]. The winning bidder accesses the lead data by logging into an account at the LBS via a web browser operating on the bidder’s device, and thus would have been recognized by POSAs as *the networked data target embodied on a second* user device. *Id.*, [0185]. POSAs also would have recognized that another application

may also be utilized on the user's device in place of the web browser. *See id.*, [0316-17], [0435].

143. Oldham teaches that user devices presenting webpages include a *mobile device* such as a “laptop computer, smartphone, personal digital assistant (PDA), ..., and the like.” Oldham, 4:43-46. Thus, POSAs would have recognized Oldham/Halevy/Rousso to teach that Oldham's external engine and Rousso's LBS websites are “*embodied on a mobile device*” via their respective webpages served to the user's *first mobile device* and the winning bidder's *second mobile device*.

2. **Claim 7: “The method according to claim 6, wherein, in addition to the user-specified values pertaining to the product or service, the electronic product or service order form at the networked data target is automatically filled in or acted upon with the location information of the first mobile device embodying the networked data source, the second mobile device embodying the networked data target, or both.”**

144. As explained for Limitation [1F], the user selecting a deep-link on Oldham's webpage that was derived from querying Halevy's system with user-query keywords and user attributes (e.g., location data) passes the data mapped in the deep-link to the advertiser's website, such that “*an electronic product or service order form at the networked data target is automatically filled in or acted upon with the user-specified values pertaining to the product or service and presented on the user device.*”

145. As explained for claim 6, in Oldham/Halevy/Rousso, POSAs would have recognized that user attributes including the user's location data derived by Oldham's external engine (e.g., via the user's IP address) would have been mapped via Halevy's system to corresponding location fields in Rousso's qualified lead forms. *See, e.g.,* Rousso, [0086], Fig. 7. POSAs thus would have recognized that the user selecting a deep-link to Rousso's qualified lead form with user location data mapped to the form's corresponding location fields would have been *the electronic product or service order form at the networked data target* being *automatically filled in or acted upon with the location information of the first mobile device embodying the networked data source*.

3. Claims 13, 14, and 20

146. Claims 13 and 14 depend from claim 8 and claim 20 depends from claim 15. These claims recite identical limitations to claims 6 and 7 that depend from claim 1, and are met for the reasons summarized in the following table and explained in the sections indicated.

Claim 8 Dependent	Claim 15 Dependent	Corresponding Claim 1 Dependent & Section
13	20	6 – IX.C.1
14		7 – IX.C.2

D. Ground 4: Claims 6-7, 13-14, and 20 are Obvious Over Oldham, APA, and Halevy In View of Rousso

147. This ground incorporates the analysis of Oldham and APA in view of Halevy over claims 1, 8, and 15 as set forth in Ground 2 (Section IX.B), and the analysis of Oldham/Halevy in view of Rousso as set forth in Ground 3 (Section IX.C). This ground additionally renders claims 6-7, 13-14, and 20 obvious for the same reasons as Ground 3, but adds the APA to the extent more detailed disclosure is required regarding utilizing deep-link advertising based on the user's location (*see, e.g.*, claim 7), as evidenced of the knowledge of the art acknowledged in the '734 patent as discussed in Ground 2.

X. CLAIM LISTING

The following claim listing assigns element labels (e.g., [1A], [1B], etc.) to certain claims for clarity.

Claim 1
[1PRE] A method, comprising:
[1A] in response to a user interacting with a user interface of a networked data source on a user device, accessing a universal variable data database, the universal variable data database representing a universal variable map of searchable classes and attributes of products or services on the Internet the accessing performed by a computer having a processor and a non-transitory computer-readable medium, the universal variable data database maintained by the computer;
[1B] determining, by the computer based on dynamic data collected through the user interface while the user is interacting with the user interface of the networked data source, field identifiers of the networked data source stored in the universal variable data database, the dynamic data containing user-specified values pertaining to a product or service;
[1C] determining, by the computer, field identifiers of a networked data target that are mapped to the field identifiers of the networked data source in the universal variable data database;
[1D] automatically generating, by the computer using the universal variable data database, a deep-linked ad that links the field identifiers of the networked data source and the field identifiers of the networked data target;
[1E] presenting the deep-linked ad through the user interface of the networked data source on the user device; and
[1F] responsive to the user selecting the deep-linked ad through the user interface of the networked data source on the user device, passing the user-specified values pertaining to the product or service to the networked data target using the deep-linked ad that links the field identifiers of the networked data source and the field identifiers of the networked data target such that, without necessitating any pre-existing relationship between the networked data source and the networked data target, an electronic product or service order form at the networked data target is automatically filled in or acted upon with the user-specified values pertaining to the product or service and presented on the user device.
Claim 2
The method according to claim 1, wherein the dynamic data includes location

information of the networked data source or the networked data target.
Claim 3
The method according to claim 1, wherein the networked data source or the networked data target is embodied on a mobile device and wherein the dynamic data comprises location information of the mobile device.
Claim 4
The method according to claim 3, wherein, in addition to the user-specified values pertaining to the product or service, the electronic product or service order form at the networked data target is automatically filled in or acted upon with the location information of the mobile device embodying the networked data source.
Claim 5
The method according to claim 1, wherein the networked data target is embodied on a mobile device and wherein the field identifiers of the networked data target include a field identifier for a location of the networked data target.
Claim 6
The method according to claim 1, wherein the networked data source is embodied on a first mobile device, wherein the networked data target is embodied on a second mobile device.
Claim 7
The method according to claim 6, wherein, in addition to the user-specified values pertaining to the product or service, the electronic product or service order form at the networked data target is automatically filled in or acted upon with the location information of the first mobile device embodying the networked data source, the second mobile device embodying the networked data target, or both.

Claim 8
[8PRE] A system, comprising: a processor; a non-transitory computer-readable medium; and stored instructions translatable by the processor to perform:
[8A] in response to a user interacting with a user interface of a networked data source on a user device, accessing a universal variable data database, the universal variable data database representing a universal variable map of searchable classes and attributes of products or services on the Internet, the universal variable data database maintained by the system;
[8B] determining, based on dynamic data collected through the user interface while the user is interacting with the user interface of the networked data source, field identifiers of the networked data source stored in the universal variable data database, the dynamic data containing user-specified values pertaining to a product or service;
[8C] determining field identifiers of a networked data target that are mapped to the field identifiers of the networked data source in the universal variable data database;
[8D] automatically generating, using the universal variable data database, a deep-linked ad that links the field identifiers of the networked data source and the field identifiers of the networked data target;
[8E] presenting the deep-linked ad through the user interface of the networked data source on the user device; and
[8F] responsive to the user selecting the deep-linked ad through the user interface of the networked data source on the user device, passing the user-specified values pertaining to the product or service to the networked data target using the deep-linked ad that links the field identifiers of the networked data source and the field identifiers of the networked data target such that, without necessitating any pre-existing relationship between the networked data source and the networked data target, an electronic product or service order form at the networked data target is automatically filled in or acted upon with the user-specified values pertaining to the product or service and presented on the user device.
Claim 9
The system of claim 8, wherein the dynamic data includes location information of the networked data source or the networked data target.
Claim 10
The system of claim 8, wherein the networked data source or the networked data target is embodied on a mobile device and wherein the dynamic data comprises location information of the mobile device.
Claim 11

The system of claim 10, wherein, in addition to the user-specified values pertaining to the product or service, the electronic product or service order form at the networked data target is automatically filled in or acted upon with the location information of the mobile device embodying the networked data source.
Claim 12
The system of claim 8, wherein the networked data target is embodied on a mobile device and wherein the field identifiers of the networked data target include a field identifier for a location of the networked data target.
Claim 13
The system of claim 8, wherein the networked data source is embodied on a first mobile device, wherein the networked data target is embodied on a second mobile device.
Claim 14
The system of claim 13, wherein, in addition to the user-specified values pertaining to the product or service, the electronic product or service order form at the networked data target is automatically filled in or acted upon with the location information of the first mobile device embodying the networked data source, the second mobile device embodying the networked data target, or both.
Claim 15
[15PRE] A computer program product comprising a non-transitory computer-readable medium storing instructions translatable by a processor of a computer system to perform:
[15A] in response to a user interacting with a user interface of a networked data source on a user device, accessing a universal variable data database, the universal variable data database representing a universal variable map of searchable classes and attributes of products or services on the Internet, the universal variable data database maintained by the system;
[15B] determining, based on dynamic data collected through the user interface while the user is interacting with the user interface of the networked data source, field identifiers of the networked data source stored in the universal variable data database, the dynamic data containing user-specified values pertaining to a product or service;
[15C] determining field identifiers of a networked data target that are mapped to the field identifiers of the networked data source in the universal variable data database;
[15D] automatically generating, using the universal variable data database, a deep-linked ad that links the field identifiers of the networked data source and the field identifiers of the networked data target;
[15E] presenting the deep-linked ad through the user interface of the networked

data source on the user device; and
[15F] responsive to the user selecting the deep-linked ad through the user interface of the networked data source on the user device, passing the user-specified values pertaining to the product or service to the networked data target using the deep-linked ad that links the field identifiers of the networked data source and the field identifiers of the networked data target such that, without necessitating any pre-existing relationship between the networked data source and the networked data target, an electronic product or service order form at the networked data target is automatically filled in or acted upon with the user-specified values pertaining to the product or service and presented on the user device.
Claim 16
The computer program product of claim 15, wherein the dynamic data includes location information of the networked data source or the networked data target.
Claim 17
The computer program product of claim 15, wherein the networked data source or the networked data target is embodied on a mobile device and wherein the dynamic data comprises location information of the mobile device.
Claim 18
The computer program product of claim 17, wherein, in addition to the user-specified values pertaining to the product or service, the electronic product or service order form at the networked data target is automatically filled in or acted upon with the location information of the mobile device embodying the networked data source.
Claim 19
The computer program product of claim 15, wherein the networked data target is embodied on a mobile device and wherein the field identifiers of the networked data target include a field identifier for a location of the networked data target.
Claim 20
The computer program product of claim 15, wherein the networked data source is embodied on a first mobile device, wherein the networked data target is embodied on a second mobile device, and wherein, in addition to the user-specified values pertaining to the product or service, the electronic product or service order form at the networked data target is automatically filled in or acted upon with the location information of the first mobile device embodying the networked data source, the second mobile device embodying the networked data target, or both.

XI. DECLARATION

I declare that all statements made herein of my own 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 are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.

I declare under penalty of perjury that the foregoing is true and correct.

Dated: October 1, 2024

Edward Allen Fox