

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

GOOGLE LLC,
Petitioner,

v.

METARAIL, INC.,
Patent Owner.

Case No. IPR2024-01270
Patent No. 9,633,378

DECLARATION OF DR. EDWARD A. FOX

Google Exhibit 1003 Google v Metarail
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TABLE OF CONTENTS

I.	INTRODUCTION	1
II.	PERSONAL AND PROFESSIONAL BACKGROUND	1
III.	MATERIALS REVIEWED AND CONSIDERED	6
IV.	MY UNDERSTANDING OF PATENT LAW	7
	A. Anticipation	9
	B. Obviousness	10
V.	PERSON OF ORDINARY SKILL IN THE ART (“POSA”).....	12
VI.	THE ’378 PATENT	15
	A. Background.....	15
	B. Prosecution History	18
	C. The Challenged Claims	19
VII.	CLAIM INTERPRETATION	21
VIII.	PRIOR-ART REFERENCES	21
	A. Overview of Prior Art References	21
	1. Belanger – Parameter-Based Deep Linking	21
	a. Belanger’s Creation and Serving of Deep-Links	28
	2. Halevy – Universal Variable Mapper	30
	a. Halevy Automatically Maps Data Fields of Website Forms for Creating Deep-links.....	30
	b. Universal Variable Map (Form Database).....	32
	c. Retrieving Deep-Links from the Form Database.....	35
	3. Haveliwala.....	38
	B. Motivation to Combine.....	40
	1. POSA’s Motivations to Modify Belanger In View of Halevy.....	40
	2. POSA’s Motivations to Modify Belanger and Halevy in view of Haveliwala.....	47
IX.	THE CHALLENGED CLAIMS ARE UNPATENTABLE IN LIGHT OF THE PRIOR ART IDENTIFIED IN THE PETITION	49

A. Ground 1: Claims 1-6, 9-16, 19-24, and 26 are Obvious Over Belanger In View of Halevy	49
1. Claim 1	50
a. [1PRE] “A method, comprising: at and by a server computer operating in a network environment and having at least one processor and non-transitory computer memory:”	50
b. [1A] “obtaining, utilizing a set of obtaining rules, a plurality of explicit or implicit computer-readable field identifiers from a plurality of sites or applications on the Internet;”	51
c. [1B] “applying via programming code a set of enhancing rules to enhance results of the obtaining of the plurality of computer-readable field identifiers;”	53
d. [1C] “mapping the plurality of computer-readable field identifiers to one another using a set of normalized variables stored in a normalized variable data database, the normalized variable data database representing a universal variable map of searchable classes and attributes of products or services on the Internet, the mapping linking computer-readable field identifiers of the plurality of sites or applications;”	55
e. [1D] “automatically programmatically generating a deep- linked ad utilizing the universal variable map, the deep- linked ad linking one or more of a set of computer- readable field identifiers used by a first site or application with one or more of a set of computer-readable field identifiers used by a second site or application;”	59
f. [1E] “placing the deep-linked ad on a page of the first site or application;”	63
g. [1F] “and in response to user interaction with the deep- linked ad on the page of the first site or application on a user device:”	64
h. [1G] “extracting, from the user interaction with the deep linked ad on the page of the first site or application, values corresponding to the one or more of the set of computer-	

readable field identifiers used by the first site or application;”	64
i. [1H] “automatically directing the user device to display a page of the second site or application; and”	66
j. [1I] “passing the values corresponding to the one or more of the set of computer-readable field identifiers used by the first site or application to the correspondingly linked one or more of the set of computer-readable field identifiers used by the second site or application such that the correspondingly linked one or more of the set of computer-readable field identifiers used by the second site or application are determined using the universal variable map and such that one or more fields on the page of the second set or application are explicitly or implicitly pre-populated with the values extracted from the user interaction with the deep linked ad on the page of the first site or application without necessitating any pre-existing relationship between the pages.”	67
2. Claim 2: “The method according to claim 1, wherein the plurality of sites or applications is categorized by a plurality of verticals, sub-verticals or product or service categories, and wherein generating the deep-linked ad comprises selecting one or more verticals, sub-verticals or product or service categories of the plurality of verticals, sub-verticals or product or service categories.”	70
a. [2A] “wherein the plurality of sites or applications is categorized by a plurality of verticals, sub-verticals or product or service categories, ...”	70
b. [2B] “... and wherein generating the deep-linked ad comprises selecting one or more verticals, sub-verticals or product or service categories of the plurality of verticals, sub-verticals or product or service categories.”	71
3. Claim 3: “The method according to claim 2, wherein selecting a vertical, sub-vertical or product or service category of the plurality of verticals, sub-verticals or product or service categories comprises examining meta tags associated with a site or application.”	71

4. Claim 4: “The method according to claim 1, wherein field identifiers are programmatically searched or scanned or received or gathered or inferred by content and mapped to normalized variables in the universal variable map.”	73
5. Claim 5: “The method according to claim 4, wherein the programmatic mapping of field identifiers to normalized variables in the universal variable map is based on heuristic patterns of typical forms and field identifiers on the Internet, the heuristic patterns being adaptable based on the accuracy of mapping.”	74
6. Claim 6: “The method according to claim 1, wherein the universal variable map comprises a database containing classes and instances of products and services searchable on the Internet.”	75
7. Claim 9: “The method according to claim 1, wherein the user interaction with the deep-linked ad comprises the user explicitly or implicitly selecting the deep-linked ad.”	76
8. Claim 10: “The method according to claim 1, wherein the deep-linked ad is displayed on the page of the first site or application as a product ad, a banner, an icon, an animated ad, a text ad, a check box, a link, a form, a video clip, or any element of interest.”	76
9. Claim 11: “The method according to claim 1, wherein the user interaction with the deep-linked ad provides a query string, wherein the extracting or inferring includes parsing the query string, and wherein the values extracted or inferred from the query string are used to identify normalized product attributes in the universal variable map.”	77
10. Claim 12: “The method according to claim 11, further comprising: identifying a product or service category using the normalized product attributes in the universal variable map; identifying at least one form associated with the product or service category, the at least one form associated with the second site or application; and populating the at least one form associated with the second site or application with the values extracted or inferred from the query string.”	79
11. Claims 13-16, 19-22	80

12. Claims 23-24, 26	82
B. Ground 2: Claims 1-6, 9-16, 19-24, and 26 are Obvious Over Belanger and APA In View of Halevy	83
C. Ground 3: Claims 7-8, 17-18, and 25 are Obvious Over Belanger and Halevy In View of Haveliwala.	85
1. Claim 7: “The method according to claim 1, wherein the deep- linked ad is generated or refined based on information provided by a user's implicit action on the page of the first site or application.”	86
2. Claims 17 and 25	87
3. Claims 8 and 18: “The method according to claim 7/17, wherein the user's implicit action comprises the user hovering over a target of interest on the page of the first site or application.”	87
D. Ground 4: Claims 7-8, 17-18, and 25 are Obvious Over Belanger, APA, and Halevy In View of Haveliwala	88
X. CLAIM LISTING	89
XI. DECLARATION	96

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 1-26 (the “challenged claims”) of U.S. Patent No. 9,633,378 (“the ’378 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 ’378 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. 9,633,378 (“the ’378 patent”)
1002	Prosecution History of U.S. Patent No. 9,633,378
1004	Curriculum Vitae of Dr. Edward A. Fox
1005	U.S. Pat. App. Pub. No. 2005/0033641 to Jha et al. (“Jha”)
1006	U.S. Pat. App. Pub. No. 2006/0230033 to Halevy et al. (“Halevy”)
1007	Hila Becker et al., <i>What Happens after an Ad Click? Quantifying the Impact of Landing Pages in Web Advertising</i> , Conference on Information and Knowledge Management 2009 (Nov. 2, 2009) (“Becker”).
1008	U.S. Pat. App. Pub. No. 2005/0144048 to Belanger et al. (“Belanger”)
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”)
1014	U.S. Pat. App. Pub. No. 2005/0119921 to Fitzgerald et al. (“Fitzgerald”)
1015	Trip Advisor Press Release, “New Advertising Technology Delivers Results for Travel Marketers” (published Dec. 3, 2001) (“Trip Advisor”)
1018	Doug Tidwell, et al., <i>Programming Web Services with SOAP</i> (1st ed. 2001) (“Tidwell”)
1019	U.S. Pat. No. 7,756,887 to Haveliwala (“Haveliwala”)

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 ’378 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 ’378 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 ’378 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 ’378 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 ’378 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 ’378 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 '378 PATENT

A. Background

34. The '378 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 '378 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.*, 8:43-56; 9:41-54. These “names” are stored in the universal variable map and associated with “normalized variables.” *Id.*, 5:11-15, 9:60-65. These normalized variables serve to link the fields of a first site with corresponding fields of a second site that were previously correlated manually to create parameter-value-passing deep-links. *Id.*, 5:11-15.

35. The '378 patent acknowledges that “deep-linked” or “parameter-based” digital advertising technologies were known at the time of filing. *Id.*, 2:43-57. In such prior art systems, as described by the '378 patent, parameters 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.*, 2:49-51. 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.*, 2:51-57.

36. The '378 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”). *Id.*, 3:1-15. The '378 patent simply purports to automate these mappings. *Id.*, Abstract, 1:31-35, 3:26-27, 3:38-45, 4:8-10.

37. Figure 11A (annotated below) illustrates the process for using the universal variable map in generating deep-linked ads for a user visiting a car search website (e.g., [Search Site 2](#)). 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).

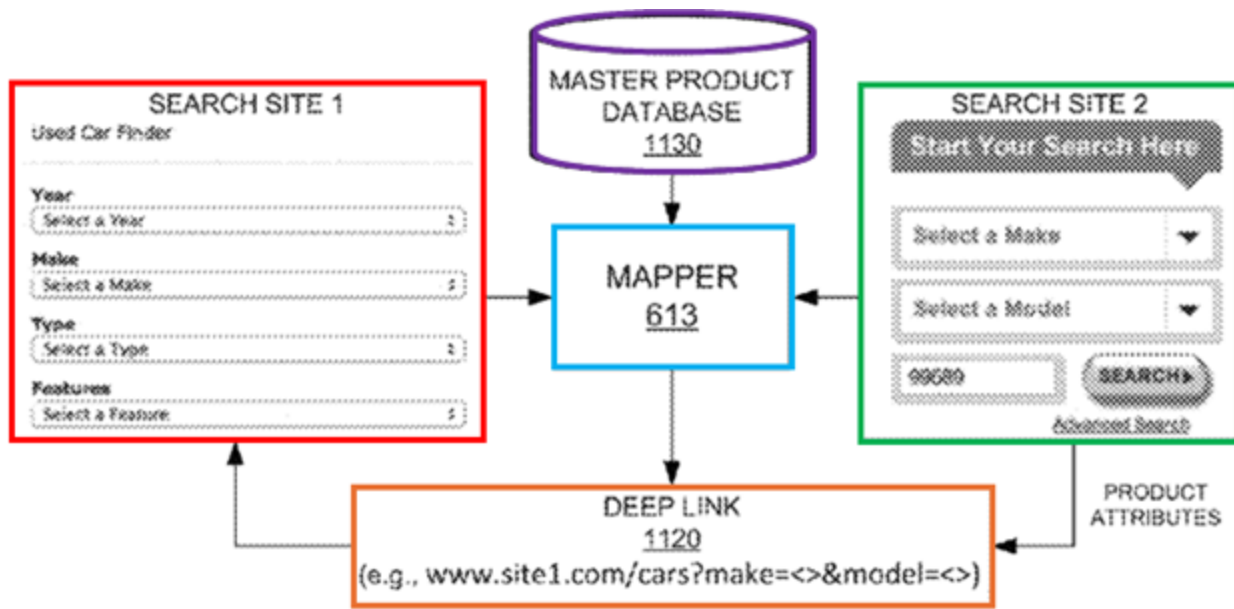


FIG. 11A

Id., 13:61-62. To generate the deep-linked ad, [mapper 613](#) accesses the universal variable map of [Master Product Database 1130](#), “cross reference[s] programming variables¹ entered into [Search Site 2](#) with those used by [Search Site 1](#), and automatically create[s] a deep-linked ad ([deep-link 1120](#) in this example).” *Id.*, 13:59-14:7. The [deep-linked ad](#) is placed on [Search Site 2](#) so that when a user selects the ad, “the user’s browser is automatically directed to a network address indicated by” the [deep-link 1120](#) to [Search Site 1](#), which provides content corresponding to the parameter data entered on [Search Site 2](#), for example, in

¹ The ’378 patent uses the terms “programming variable,” “variable,” “field identifier,” and “identifier” interchangeably. *See* Ex-1001, 4:21-22, 9:20-27, 9:41-45, 13:25-31.

directing the user's browser to the deep link location, the form at [Search Site 1](#) may "be pre-populated with . . . any user input provided at [Search Site 2](#)," for example, user entries of "Toyota" and "Prius" in the field selectors. *See id.*, 14:4-9.

38. The purported improvement that this process provides over the prior art is the automating of the manual process of "mapping" programming variables (i.e., field identifiers) used by one site to corresponding programming variables on another site. *Id.*, 3:16-17. 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.*, 8:26-39, Figs. 4, 5. As described in Figure 11A above, this data is used to automatically generate a deep-link that maps the data a user entered in form fields of a first website to the variables or field identifiers of corresponding fields of a second website. *Id.*, 13:59-14:7.

B. Prosecution History

39. I have reviewed the prosecution history of the '378 patent (Ex-1002). The '378 patent issued after several rejections under §101 and §103. Ex-1002, 145, 201, 283, 323. Nevertheless, the Notice of Allowance states that none of the cited references disclose the claimed *universal variable map*. *See* Ex-1002, 50. My analysis below references Halevy's teachings for the claimed *universal variable map*.

C. The Challenged Claims

40. My opinion herein addresses how claims 1-26 of the '378 patent are obvious. Claim 1 of the '378 patent 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: at and by a server computer operating in a network environment and having at least one processor and non-transitory computer memory:

[1A] obtaining, utilizing a set of obtaining rules, a plurality of explicit or implicit computer-readable field identifiers from a plurality of sites or applications on the Internet;

[1B] applying via programming code a set of enhancing rules to enhance results of the obtaining of the plurality of computer-readable field identifiers;

[1C] mapping the plurality of computer-readable field identifiers to one another using a set of normalized variables stored in a normalized variable data database, the normalized variable data database representing a universal variable map of searchable classes and attributes of products or services on the Internet, the mapping linking computer-readable field identifiers of the plurality of sites or applications;

[1D] automatically programmatically generating a deep-linked ad utilizing the universal variable map, the deep-linked ad linking one or

more of a set of computer-readable field identifiers used by a first site or application with one or more of a set of computer-readable field identifiers used by a second site or application;

[1E] placing the deep-linked ad on a page of the first site or application;

[1F] and in response to user interaction with the deep-linked ad on the page of the first site or application on a user device:

[1G] extracting, from the user interaction with the deep linked ad on the page of the first site or application, values corresponding to the one or more of the set of computer-readable field identifiers used by the first site or application;

[1H] automatically directing the user device to display a page of the second site or application; and

[1I] passing the values corresponding to the one or more of the set of computer-readable field identifiers used by the first site or application to the correspondingly linked one or more of the set of computer-readable field identifiers used by the second site or application such that the correspondingly linked one or more of the set of computer-readable field identifiers used by the second site or application are determined using the universal variable map and such that one or more fields on the page of the second set or application are explicitly or implicitly pre-populated with the values extracted from the user interaction with the deep linked ad on the page of the first site or

application without necessitating any pre-existing relationship between the pages.

Ex-1001, 22:11-60 (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. Belanger – Parameter-Based Deep Linking

43. U.S. Patent Application Publication No. 2005/0144048 to Belanger et al. (“Belanger”) (Ex-1008) entitled “Method and Apparatus for Improved Customer Direct On-line Reservation of Rental Vehicles” (Ex-1008) published on June 30, 2005. *Id.*, 1. Accordingly, I understand that Belanger qualifies as prior art to the ’378 patent under pre-AIA 35 U.S.C. § 102(b).

44. Belanger discloses “a reservation booking website” that uses “promotional deep-links” to assist users in booking car reservations. *Id.*, [0019], [0128], [0168-69], Fig. 37 (showing promotional deep-links 318). The website’s

booking page includes various fields into which the user can enter data related to the reservation, such as pickup and return dates, pickup location, and requested vehicle type. *Id.*, [0165], Fig. 37 (below, annotated).

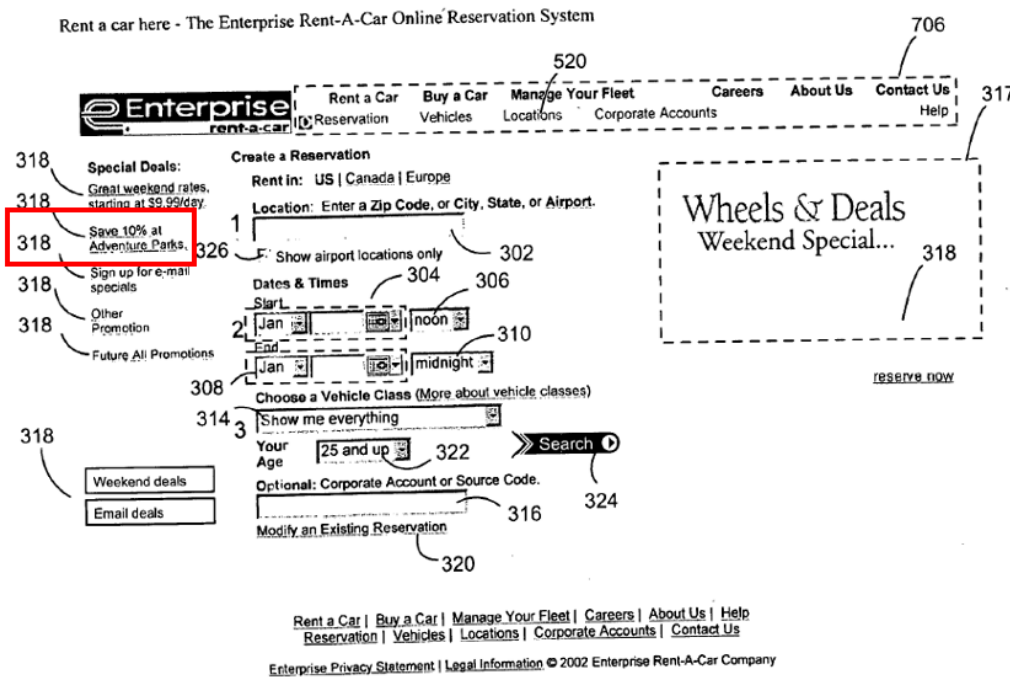


Fig. 37

45. Belanger explains that a “promotional deep-link” corresponds to a promotion with “one or more promotion conditions,” where each condition “correspond[s] to a particular data value or range of data values that the customer must choose for a particular reservation data type.” *Id.*, [0019]; [0168-69]. The promotional deep-link directs the user to a webpage where “any reservation data types corresponding to promotional conditions ... have their data values set equal to those conditions/parameters.” *Id.*, [0019]; *compare with* Ex-1001, 4: 4-7, 14:3-9

(deep-links can take the user to a page with a “form” that is “pre-populated with field identifier values”).

46. These promotional deep-links may be used in various ways, including being advertised on other websites. Belanger, [0168]. These deep-links beneficially “provide[s] single click deep-link access to the reservation booking website.” *Id.*, [0178]; *see also* Fitzgerald (Ex-1014) (parent of Belanger, incorporated by reference, and Titled: “Method and Apparatus for Customer Direct On-Line Reservation of Rental Vehicles Including Deep-Linking.”).

47. Belanger teaches creating deep-links by using parameter values stored in a “corporate account.” Belanger, [0019-21], [0180-81] (describing using a customer account to access user data in conjunction with deep-linking).

48. Belanger’s Figure 53 (below, annotated) shows an example of “promotional link 318” on a confirmation web page that is presented upon completion of the booking process. This link 318 offers a discount at an amusement park attraction. *Id.*, [0128], Fig. 53.

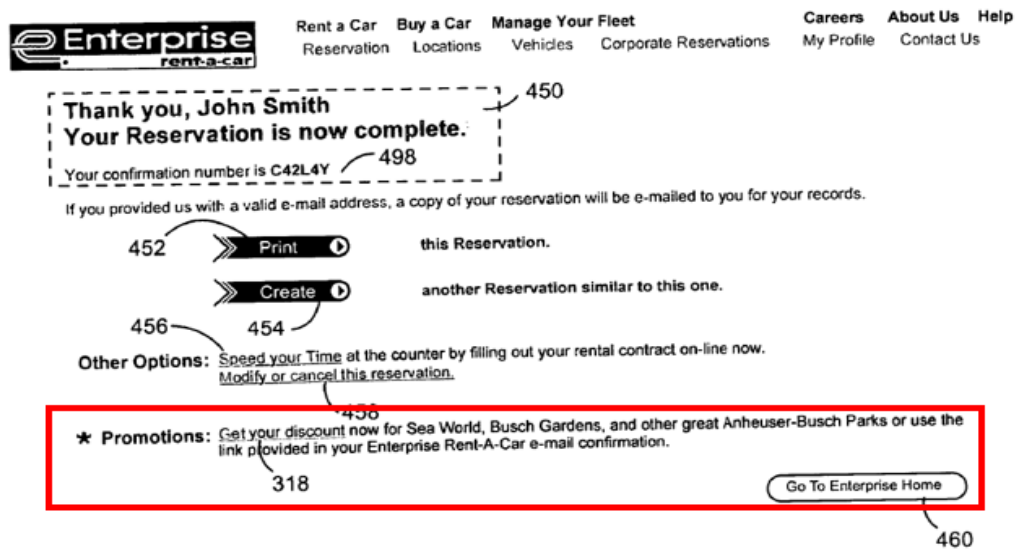


Fig. 53

49. POSAs would have understood links 318 of Fig. 53 to be deep-links given the common descriptor “promotional links 318” used by Belanger to describe these confirmation page links. *Id.*, [0128] (describing links 318 that appear on various webpages and are “selectable to initiate a reservation transaction according to the conditions of the promotion”), Fig. 37. Additionally, given the value of deep-linking to yield “a large degree of user-friendliness in that the user is alleviated of the need to remember,” a POSA would have nevertheless been motivated to provide this same accustomed benefit of deep-linking to its customers for any outgoing links of booking sites having similar date and location fields. *See, e.g., id.*, [0179], [00168-69], [0020]. By providing outgoing deep-links that repurpose form data such as the date and location of a car rental, a user could be

likewise advanced to a particular “stage” in the booking process of an amusement park, airline, hotel, etc. website.

50. For example, POSAs would have recognized that when a customer is renting a car in a specific geographic location, and/or on specific dates, a geographically local promotion with a date/time condition within the user’s rental period would have provided effective cross-promotion by repurposing user-entered trip parameters to prepopulate some of the same parameter values (e.g., repurposing car rental pick-up date/time and location in airline reservation travel dates and destination, hotel reservation check-in dates and location, local attraction tickets, etc.).

51. Indeed the ’378 patent itself admits that:

A recent advancement in Digital Advertising has been “deep-linked” or “parameter-based” advertising. This form of advertising *today* applies to search and E-commerce sites where the user is searching for a product or service, *like a travel site, and types in search parameters, such as where s/he is traveling from, where to, travel dates, how many people in the party, class of travel, etc. These search parameters are then passed* along with each ad click to the appropriate advertiser.

Ex-1001, 2:43-51 (emphasis added); *see also* TripAdvisor (Ex-1015), 1 (describing deep-links for travel sites that repurpose user-entered reservation data); Becker

(Ex-1007), 2, 4 (describing search-transfer landing pages that re-execute the user's query ("sometimes with slight modification") at an advertiser's site).

52. Moreover, it was known in the art that the reuse of a travel location parameter was particularly effective for increasing traffic conversion (sales), customer engagement, and customer experience. *See* TripAdvisor, 1 (announcing that "contextual-linking technology" providing travel location specific "deep-link[s]" "correlate[d] to search terms ... used by travelers" led to "response rates of over 8% for online travel advertising (a 32X improvement over the usual .25% response rate of most online advertisements)."

53. Additionally, as the '378 patent admits, POSAs were aware that to make these deep-linked promotions work, the parameters entered by the user from the first site needed to be input into the appropriate variables on the second site. Ex-1001, 2:64-67. Accordingly, a POSA would have found it obvious to employ such deep-links in the "promotions" section of, for example, Belanger's Figure 53 to ensure that car rental customers would enjoy a similarly streamlined booking experience across other travel websites (e.g., hotels, airlines, amusement parks, etc.) as an additional value in booking their car rental with a particular company (e.g., Enterprise Rent-a-Car). Belanger, [0168], [0179], [0206]; TripAdvisor, 1.

54. In addition to providing value for customers, a POSA would have recognized that travel booking sites would benefit from the increased traffic of

committed travelers who have booked a car rental for linking to their hotel, airline, or attraction site. TripAdvisor, 1. Likewise, Belanger’s reservation website would also benefit from similar traffic and seek to facilitate business relationships with other travel sites for preferential ranking or placement of its own deep links on such booking pages. *Id.* Indeed, Belanger teaches advertising its own deep-links on “other websites” (Belanger, [0168]) and a POSA would have recognized that the reciprocal exchange of traveler booking information would benefit all travel partner sites. TripAdvisor, 1; Ex-1001, 2:53-3:6.

55. Regarding placement of promotional links 318, while Belanger’s Figure 53 shows a single promotion link 318 after the bolded label “Promotions,” POSAs would have recognized that the label “Promotions” may also refer to multiple promotion deep-links or a link to a page with multiple promotion links (e.g., as in Fig. 37, left column), and that this confirmation page would beneficially display multiple promotion links in a desired order or placement. Belanger, Fig. 37 (showing promotions 318 including a link to “All Promotions”). POSAs thus would have been motivated to also implement the confirmation page in Figure 53 to include multiple promotion deep-links to different categories of travel services to provide more cross-promotional opportunities once a booking is confirmed. TripAdvisor, 1.

a. Belanger's Creation and Serving of Deep-Links

56. To serve the promotional deep-links, Belanger describes an exemplary “[a]utomated reservation transaction processor 150” including one or more “application servers” that interact with the “customer/promotional database.” Belanger, [0106], Fig. 6. These application servers are in turn hosted on “web servers” to which customers’ browsers connect to access the reservation website. *Id.*, [0106].

57. The application servers run a “servlet” that “performs the major decision-making tasks for the reservation booking process,” including generating a webpage by “interact[ing] with the databases to gather necessary information” to “determine[e] which page should be constructed” and “the particular data that should appear on the page.” *Id.*, [0107-09]. POSAs thus would have understood that with the promotional deep-links being part of the “data that should appear on the page,” the servlet generates the advertised promotions and their deep-links for a webpage using the promotional settings in the promotional database. *Id.*, [0019], [0107-08], [0168].

58. The provided promotional conditions (i.e., parameter values) used in the promotional deep-links on Belanger’s reservation website are associated with the field parameter names included in the deep-link manually (i.e., via human interaction). This manual process is facilitated through a user interface (*see, e.g.*,

GUI 700 in Fig. 73) where an “administrator” (e.g., an employee of the reservation site or business partner (*id.*, [0212])) controls “a plurality of settings for the ... rules of a promotion.” *Id.*, [0081], [0209]. The promotion settings are stored in a “customer/promotional” database (e.g., database 208 in Fig. 2) “for subsequent retrieval and processing” (*id.*, [0209]) and used to control the display of promotional deep-links shown on the reservation webpage (e.g., via marketing tile 317 where promotions 318 are displayed). *Id.*, [0128], [0209-10]. Belanger also describes data exchanges with other servers (e.g., business partners) implemented as web services to exchange data used for promotional linking operations, such as through well-known “Simple Object Access Protocol (SOAP)” and XML formatted messaging. *Id.*, [0024], [0110-13]; Tidwell (Ex-1018), 10-12, 19 (describing web services using SOAP).

59. As can be appreciated, POSAs would have understood that manually creating the promotion settings for deep-links is time and resource intensive and multiplies along with the scale of desired promotions. This not only impacts Belanger’s offered promotions, but also the ability to implement outgoing links to travel partners. *See* Ex-1001, 3:26-29. In other words, this manual bottleneck would have likewise hampered Belanger’s website operators’ abilities to expand outgoing promotions to follow the industry trend towards reusing user-entered data across partner websites in the travel industry. *See* TripAdvisor, 1. Accordingly,

POSAs would have looked to solutions for automating the programmatic association of web form parameters between websites to generate more and better deep-linked promotions that repurpose user-entered data, as discussed below in Section VIII.B.1.

2. Halevy – Universal Variable Mapper

60. 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 ’378 patent under pre-AIA 35 U.S.C. § 102(b).

61. Halevy teaches one such system for automatically generating deep-links, by querying a “form database.” *Id.*, [0009]. Halevy’s form engine and database, like the ’378 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

62. 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.

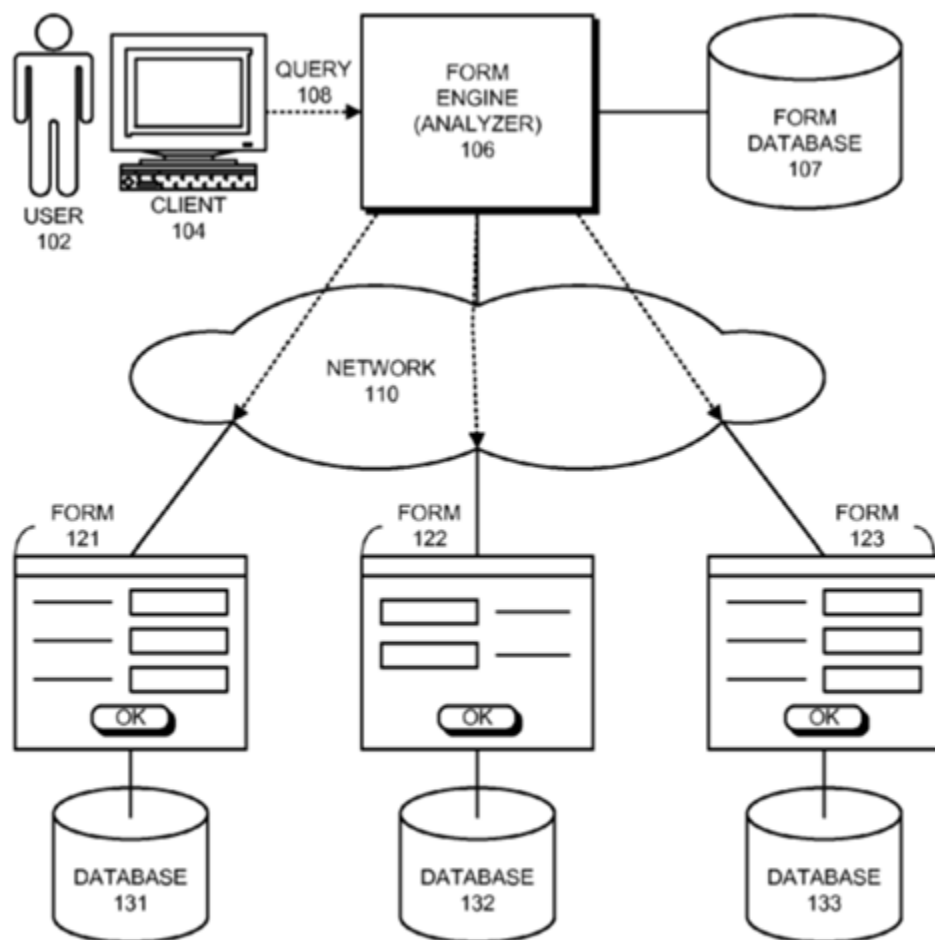


FIG. 1

63. 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)

64. 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].

65. 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].

66. 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].

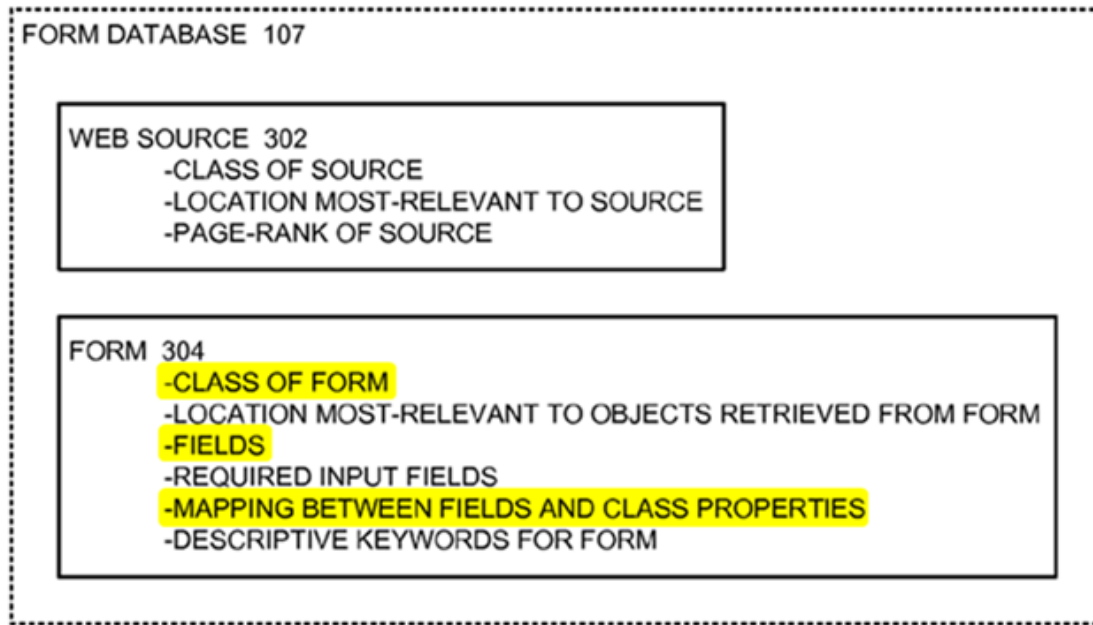


FIG. 3

67. 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).

68. 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 “*mapping the plurality of computer-readable field identifiers to one another using a set of normalized variables stored in a normalized variable data database*” that is “*representing a universal variable map of searchable classes and attributes of products or services on the Internet*” as claimed (as is further explained below in my analysis for claim 1).

c. Retrieving Deep-Links from the Form Database

69. 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).

70. 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].

71. 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].

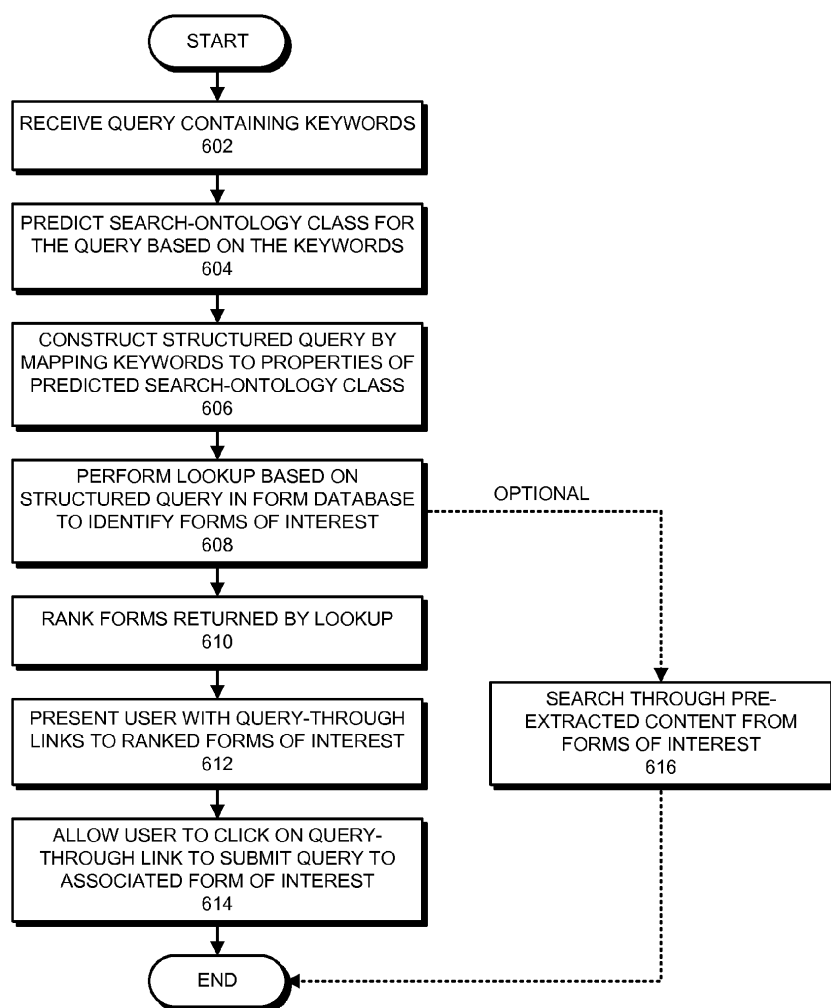


FIG. 6

72. 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).

73. Since Halevy describes its search system functionality as an enhancement to conventional network-based search engines (*id.*, [0007-08]) and the system uses "any type" of "communication channel capable of coupling together computing nodes" (*id.*, [0034]), POSAs would have found it obvious for Halevy's system to use SOAP (which is used by Belanger) as a communication channel to receive queries and return resultant deep-links. Belanger, [0110], Tidwell, 10-12, 19. Likewise, POSAs would have found it obvious for Halevy's system to use XML (which is used by Belanger) for data representations (e.g., of queries and resultant deep-links) that are communicated using SOAP. Belanger, [0024], [0110-0120]; Tidwell, 2, 6, 11, 12, 15-38.

3. Haveliwala

74. U.S. Patent No. 7,756,887 to Haveliwala et al. ("Haveliwala") (Ex-1019) entitled "System and method for modulating search relevancy using pointer activity monitoring," assigned to Petitioner Google LLC, was filed on February 16, 2005, and issued on July 13, 2010. *Id.*, 1. Accordingly, I understand that

Haveliwala qualifies as prior art to the '378 patent under pre-AIA 35 U.S.C. §§ 102(a), (e).

75. Haveliwala discloses a search engine that accepts user queries and returns a “set of informational items,” including advertisements, relevant to the queries. Haveliwala, 2:47-55. Haveliwala also discloses “client assistant” software, e.g., “Javascript which may be included in the page” (*id.*, 4:46-48) that “monitor[s] user browsing activities in connection with the search results” and provides “such information back to the search engine.” *Id.*, 3:6-11.

76. Haveliwala’s server analyzes the information regarding user pointer activity to determine relevancy values for targeted items; for example, a “longer pointer hover” over an informational item may “suggest a more positive opinion from the user about the relevance between the informational item and the user’s interest.” *Id.*, 4:16-19. This value is then used along with the same or similar search query “from any client” to “identify a new set of informational items and/or provide them in a different order in accordance with their updated relevancy values.” *Id.*, 3:13-24. These newly generated or refined items are returned to the user’s browser for display. *Id.*, 3:2-7. Thus, POSAs would have understood Haveliwala to teach the monitoring of user pointer activity to detect, for example, a hover action, and then generating or refining search results based on the user’s hover activity.

B. Motivation to Combine

1. POSA's Motivations to Modify Belanger In View of Halevy

77. Belanger teaches a reservation website implementation where an “application server” determines the content that is shown on the website, where this content includes promotional deep-links selected for display by the servlet when generating a promotion for a webpage. Belanger, [0019], [0106-09], Fig. 53 (element 318). POSAs would have been motivated to implement Belanger’s reservation website so that the promotional deep-links displayed during or at the close of booking (e.g., Fig. 53) advertise related travel websites that are known to use similar user-entered parameters, and would benefit from repurposing these parameters. TripAdvisor, 1.

78. Belanger’s promotions rely on manual creation of deep-links. Belanger, [0207], [0209]. Rather than requiring a person (e.g., administrator or vendor employee) to manually enter promotional conditions for each vendor website deep-link promoted on Belanger’s website (*see id.*, [0209-12]), POSAs would have been motivated to look to solutions that generate deep-links with promotional conditions automatically, such as reusing parameters already entered by the user during the booking process to leverage at other travel websites. TripAdvisor, 1. Halevy teaches one such system for automatically generating deep-links to other websites with the keywords from a query repurposed as parameter

values in the deep-link. A POSA would have been motivated to modify Belanger with Halevy's teachings, as detailed below.

79. 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." Halevy, [0034]. Belanger discloses using the well-known "Simple Object Access Protocol (SOAP)" to exchange data between computers (Belanger, [0110]), which a POSA would have found obvious to utilize as a "communication channel" to Halevy's system. Halevy, [0007-08]; Tidwell, 19 (describing using SOAP to submit a query to a search engine).

80. To automatically generate deep-links for promotions that repurpose user-entered travel data, as discussed above, a POSA would have been motivated to modify Belanger's application server to retrieve deep-links for desired promotions automatically. A POSA would have found it obvious to use Halevy's system 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 parameter names in the deep-link. A POSA would have recognized that such a web service data exchange is taught by Belanger for similar purposes (Belanger, [0110]), and leveraging this existing communication feature would have automated the sending of queries and retrieval of deep-links from

Halevy's system for presentation as related travel promotions (as already provided by Belanger, *e.g.*, at the close of booking via Figure 53) by submitting queries to Halevy's "form engine" via SOAP-based communications.

81. 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. Halevy, [0089-92], [0112], [0137-38]. Halevy describes using various types of "prediction" to perform its identification and mapping process. *Id.*, [0090-111].

82. In the combination with Belanger, where Belanger's application server generates deep-links for promotions by sending queries to Halevy's form engine, a POSA would have understood that the queries would have been constructed to yield a desired deep-link. For example, should Belanger's application server display a promotion for hotels or even a specific hotel partner, POSAs would have found it obvious for the application server to construct a query for Halevy's system specifying the keyword "hotel" or the name of the branding partner, along with the user-entered values for date and location, to generate a list of deep-links—to hotel websites or to the specified brand website—that display search results using the user-entered date and location as parameter values.

Likewise, a POSA would have found it obvious for the application server to construct a query using just the user-entered date and location values of the car rental reservation of Belanger for a list of deep-links to any type of website that also uses date and location values to generate a results page. Such an implementation would have been within a POSA's skill, as it would have involved basic programming techniques to communicate values entered by the user in the fields on Belanger's reservation website along with any pre-defined keywords (e.g., such as "hotel"), and to construct a query string so that Halevy's system would return one or more deep-links relevant to the query string.

83. A POSA would have recognized that implementing Belanger's and Halevy's teachings discussed above, where Belanger's application server sends a query string to Halevy's system to retrieve deep-links, was an obvious way to leverage Halevy's already existing form database via Belanger's existing data exchange mechanism (i.e., SOAP) for using customer-entered parameters to automatically generate deep-links. *See* Tidwell, 10-12, 19 (describing using SOAP for submitting queries to a search engine). For example, when generating Belanger's Figure 53 UI (or another webpage where promotions are displayed) in view of Halevy, POSAs would have used Belanger's existing SOAP/XML messaging to send Halevy's system query strings, using relevant data entered by the customer such as date and location along with any other optional keywords,

and to search Halevy's form database for one or more relevant "query-through" deep-links for the promotions displayed on Belanger's webpages.

84. To retrieve deep-links for presentation, a POSA would have modified Belanger's application server, which already runs the "servlet" responsible for selecting promotions for display to query Halevy's system (using SOAP) with the user-entered data and any other keywords during the booking process to repurpose the user-entered data on Belanger's reservation website in the deep-links. Such would enable a more robust and automatic presentation of promotion deep-links (e.g., Fig. 53) as was known to be desirable in the travel industry to yield better results. TripAdvisor, 1.

85. For example, Belanger's Figure 53 UI is a "confirmation" page. Belanger, [0063]. Thus, a POSA would have understood that at the point in the reservation process where Figure 53 (below) is displayed, the user has already entered data relevant to the reservation on previous pages, *e.g.*, on the "home" page shown in Figure 37. *Id.*, [0056], [0122].

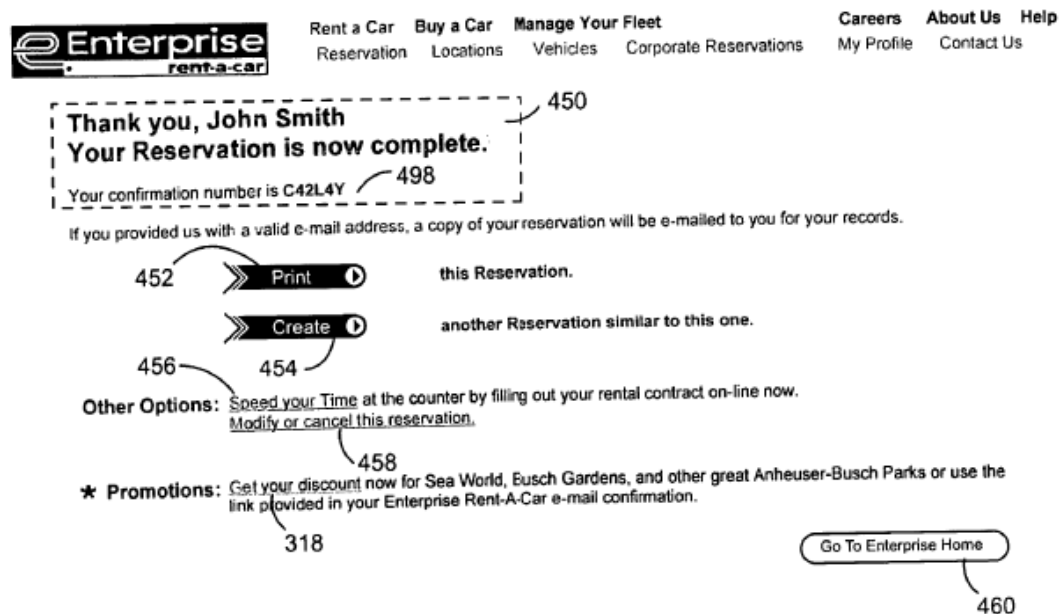


Fig. 53

86. Figure 53 in Belanger teaches displaying promotions (promotional link 318) upon reaching confirmation. A POSA would have been motivated to implement Figure 53 so that this promotional link is a deep-link to a website offering reservations for travel-related products/services such as hotels, restaurants, attractions, or airlines, where the deep-link includes parameter values corresponding to values entered by the user during the reservation process. *See* TripAdvisor, 1. Further, as discussed in this section above, a POSA would have leveraged Halevy's teachings to automate the process of serving deep-links to avoid the well-recognized limitations and drawbacks of manual coding. A POSA would have recognized that the presentation of the promotions on, *e.g.*, Fig. 53, is

an interface design consideration that may vary based on the website's presentation style and the desired promotion to be displayed, and that the query submitted to Halevy's system via SOAP/XML would be adjusted accordingly to return a desired deep-link.

87. For example, Fig. 53 may include a list of different types of promotions, in which case the query for each promotion would be restricted to only return deep-links to specific products or services. In this case, Belanger's application server would submit to Halevy's system a query string specific to each promotion, as discussed above, that returns one or more deep-links to forms in specific "class[es]" of interest (e.g., airline booking, hotel booking, restaurant booking, etc.), where the date and location values submitted by the user on Belanger's reservation website are populated as the date and location values in each deep-link. Halevy, [0123-28], [0136-38].

88. Furthermore, Halevy teaches "ranking" search results based on relevance of the pages that the links point to and "proximity to the location mentioned in the query and associated with the web source." Thus, POSAs would have been motivated to implement Belanger's webpage to only show a certain number of the top-ranked promotions using the deep-links, or would have selected a single deep-link to promote, to avoid visually cluttering the page. *Id.*, [0145].

89. As another example, Fig. 53 could be implemented to show separate links to promotions for different categories, *e.g.*, airline booking, hotel booking, and restaurant booking. In this case, each link would take the user to lists of promotions in that category. Each list would be generated by submitting a relevant query string to Halevy's system and then ranking and limiting the resultant deep-links in the same manner discussed above, except that separate queries would be submitted for each category.

2. POSA's Motivations to Modify Belanger and Halevy in view of Haveliwala.

90. As explained above in Section VIII.B.1, Belanger/Halevy discloses an application server that selects for display promotional deep-links going to websites of other vendors by querying Halevy's form database with Belanger's user-entered values for relevant deep-links.

91. Halevy discloses a desire to rank results including feedback-based prediction on a predominant class but does not specifically disclose generating or refining specific ads of a class based upon user feedback mechanisms. Halevy, [0025], [0143], [0145]. POSAs would have recognized the benefits of further refining individual ad selections of a class to better deliver desired links such as based on user browsing activity relative to actual delivered link. In this regard, Haveliwala teaches a JavaScript solution where hovering time of a mouse pointer over an advertisement was known to provide such feedback to systems such as

Halevy, and this solution was known to be beneficial to refine the selection of more relevant advertisements to users. *See* Haveliwala, 3:12-29. For example, according to Haveliwala, POSAs knew that “when displaying a set of informational items,” items “having high click through rates should be ranked higher, and displayed more prominently” because these items “are more likely to be of interest to the user(s).” *Id.*, 1:41-46. Haveliwala thus explains that “there is a need for collecting user feedback with respect to informational items presented in response to a search query and adjusting the relevancy values of the items in accordance with the user feedback.” *Id.*, 1:55-60. POSAs would have been motivated by Haveliwala to implement such feedback-based adjustments in Belanger/Halevy to better target ads to users based on the ad’s relevance determined from user interaction for the same reasons explained above in Section VIII.B.1, by including Haveliwala’s user-generated relevance information to rank the deep-links retrieved by Halevy’s system. *See* Halevy, [0145]; Haveliwala, 7:39-45.

92. POSAs would have reasonably expected success in such an implementation. As explained above in VIII.A.3, Haveliwala discloses generating or reordering advertisements obtained from a search query based on the user’s pointing activity, where the pointing activity is monitored via software, *e.g.*, JavaScript included in the delivered webpage. It would have been within a POSA’s

skill to implement such monitoring capability as JavaScript in the webpages generated by Belanger's server because JavaScript was a well-known scripting language used in webpages. Similarly, it would have been within a POSA's skill to include Haveliwala's ranking feature based on user pointing activity in Halevy to improve Halevy's return of deep-links based on both the query submitted to Halevy's system and the relevance of the promotional deep-link determined from pointing activity, since Halevy teaches ranking its deep-links. Halevy, [0145].

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

93. I have been asked to provide my opinion concerning whether claims 1-26 of the '378 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 1-26 would have been obvious to a POSA.

A. Ground 1: Claims 1-6, 9-16, 19-24, and 26 are Obvious Over Belanger In View of Halevy

94. After reviewing Belanger, Halevy, and claims 1-6, 9-16, 19-24, and 26 of the '378 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, “Belanger/Halevy” refers to the combination of Belanger in view of Halevy, and “Belanger” or “Halevy” refer to their respective disclosures. As referenced below, “Belanger/Halevy” refers to Belanger in view of Halevy as discussed in Section VIII.B.1, and “Belanger” or “Halevy” refer to their respective disclosures as discussed in Section VIII.A.

1. Claim 1

- a. [1PRE] “A method, comprising: at and by a server computer operating in a network environment and having at least one processor and non-transitory computer memory:”**

95. Belanger teaches a “method of processing a reservation transaction” performed via “a reservation booking website hosted by automated reservation transaction processor” that “can be any computer that is network connectable.” Belanger, [0014], [0106]. This transaction computer includes “an application server” interacting with various databases. *Id.*, [0106-07]. POSAs would have recognized Belanger’s application server processing a reservation transaction to be “a server computer operating in a network environment and having at least one processor and non-transitory memory.” *Id.*, [0106-07].

96. In Belanger/Halevy, an example of performing Belanger’s method—when Belanger’s website is implemented to query Halevy’s form database—

includes displaying promotions on Belanger's webpages with deep-links that reuse values entered by the user on Belanger's website (e.g., via the webpage in Fig. 37). As explained below for Limitations [1A] to [1I], this method *comprises* the remaining limitations of claim 1.

b. [1A] “obtaining, utilizing a set of obtaining rules, a plurality of explicit or implicit computer-readable field identifiers from a plurality of sites or applications on the Internet;”

97. Belanger/Halevy discloses this limitation via Halevy's form crawling process. Specifically, Halevy teaches a process that “crawl[s] through web sites to identify web-based forms.” Halevy, [0035]. As Halevy's Figure 1 (below) shows, this process “*obtain[s]*” form data from “*a plurality of sites or applications on the Internet*” because it “accesses a number of forms 121-123 which are hosted on servers located throughout network 110 ... to access to data within underlying databases 131-133.” *Id.*, Fig. 1. During this crawling process, Halevy's form engine 106 “obtains web-based forms of interest,” and “creates corresponding database entries for the identified forms” in the “form database 107.” *Id.*, [0035], [0037], Fig. 1.

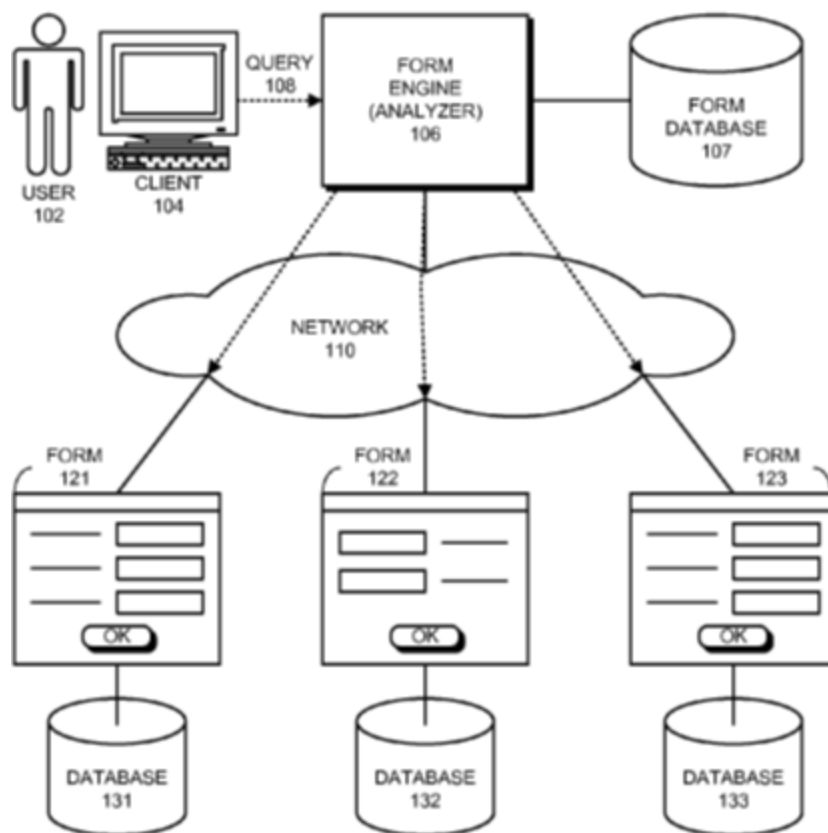


FIG. 1

Halevy’s crawling process includes “*obtaining ... a plurality of explicit or implicit computer-readable field identifiers*” because for each form, the process captures “each field” including “its *parameter name (used to invoke some server side-script)*.” Halevy, [0043-44] (emphasis added).

98. Halevy discloses that forms are written in “HTML,” which POSAs would have understood was a standard language for webpages. Halevy, [0142]; Belanger, [0012]; Jha (Ex-1005), [0063], [0098]. POSAs would have understood that in HTML, the “parameter names” for fields are the same as what the ’378 patent describes as the “names of programming variables and identifiers” (Ex-

1001, 13:25-29). Thus, the “parameter name” is a “*computer-readable field identifier*.”

99. Halevy’s crawling process uses “*a set of obtaining rules*” to obtain each form and its field data (e.g., parameter names or *computer-readable field identifier*); these rules include “pursu[ing] hyperlinks recursively starting from a seed page (e.g., the main page of the web site),” “determin[ing] whether the web forms on the page ... are interesting and worth recording,” and “reconcile[ing] duplicate web forms.” Halevy, [0081-85].

c. [1B] “applying via programming code a set of enhancing rules to enhance results of the obtaining of the plurality of computer-readable field identifiers;”

100. Belanger/Halevy, discloses this limitation via Halevy’s crawling process. Specifically, Halevy teaches that its crawling process (explained in Sections VIII.A.1 and Limitation [1A]) analyzes each form and its fields to create a searchable hierarchy of SO-classes and SO-properties in the form database. Halevy, [0036], [0037-38].

101. POSAs would have understood Halevy’s crawling process to use “*a set of enhancing rules to enhance the results of the obtaining*” of form fields (i.e., *computer-readable field identifiers*) because for each form, the crawling process determines “[t]he class of the form” (i.e., “the types of objects that can be obtained by querying the form” such as “books, hotels, restaurants” also referred to as SO-

class), the geographic locations relevant to the form, any “required fields,” “[o]utput properties” for the fields (e.g., SO-properties), and any “additional keywords that describe the form.” Halevy, [0045-49]. This information for each form and field, enhanced with SO-classes, is stored in the form database as shown in Figure 3, annotated below:

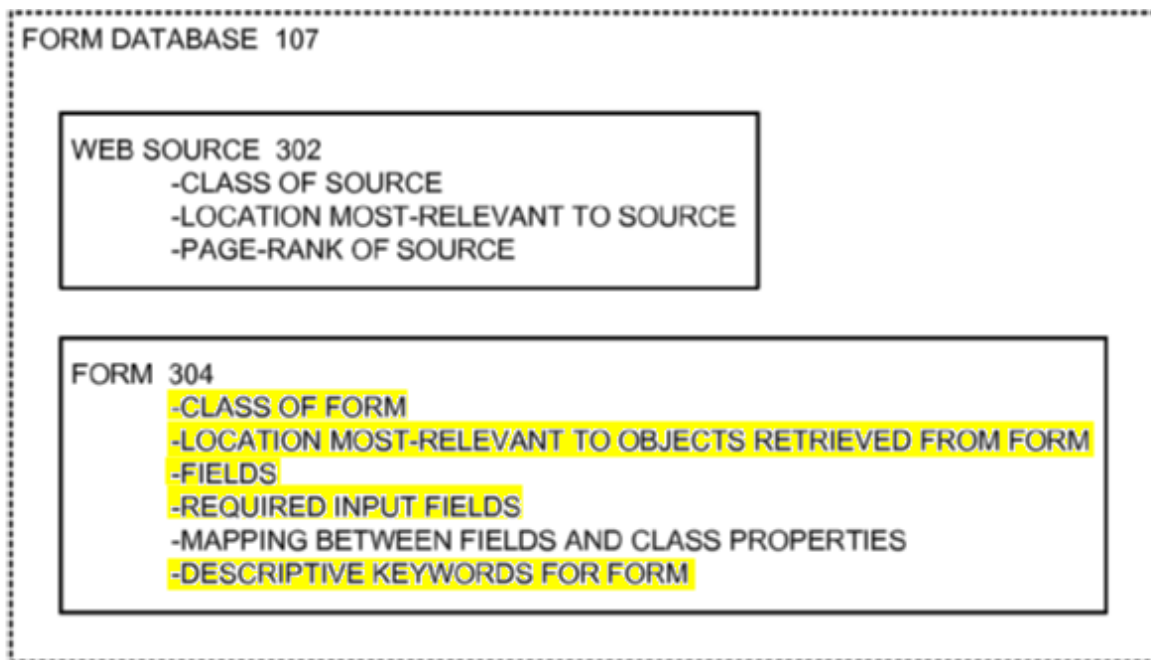


FIG. 3

102. POSAs would have understood that determining this information for each form “enhance[s] the results of the obtaining” because this information is used to “facilitate subsequent searching operations through content which is accessible through the web-based forms.” Halevy, [0036-37].

103. POSAs would have recognized that this analysis performed by the crawling process (i.e., the “*enhancing rules*”) is “*appl[ied] via programming code*”

because it is performed by Halevy's form engine that "generally exists on any computer device." Halevy, [0034-35], [0037].

- d. **[1C] "mapping the plurality of computer-readable field identifiers to one another using a set of normalized variables stored in a normalized variable data database, the normalized variable data database representing a universal variable map of searchable classes and attributes of products or services on the Internet, the mapping linking computer-readable field identifiers of the plurality of sites or applications;"**
- i. **"mapping the plurality of computer-readable field identifiers to one another using a set of normalized variables stored in a normalized variable data database, ..."**

104. As explained for Limitation [1A], Halevy's form engine executes a crawling process. Halevy's crawling process categorizes webpages and forms into 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 (i.e., "the plurality of computer-readable field identifiers") *to one another using* "SO-properties," as shown below in annotated Figure 3. Halevy, [0039-41], [0045], [0049], [0062], [0067].

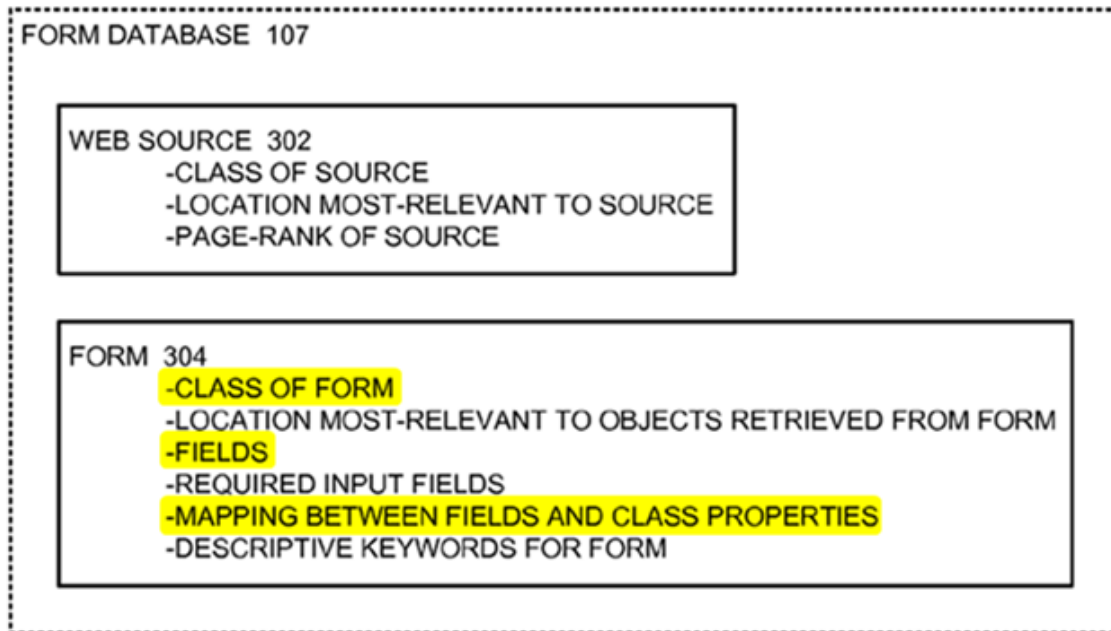


FIG. 3

105. The SO-properties are associated with SO-classes and are derived from the “output properties,” described as “the type of information ... obtain[ed]” from querying a form. Halevy, [0048], [0062], [0067]. As discussed *supra* § VI.B.3, multiple different forms on different websites can map to the same SO-classes, and likewise, fields from different forms can map to the same SO-properties. Halevy, [0035], [0037], [0067], [0095], Fig. 2. For example, for forms that identify in the SO-class “car,” the fields (i.e., “*the plurality of computer-readable field identifiers*”) are *mapped* to their corresponding SO-properties (i.e., “*a set of normalized variables*”), such as “make” and “model” associated with the “car” SO-class. Halevy, [0095], [0098-101].

106. Since Halevy’s crawling process maps the fields of various forms to a set of SO-properties associated with the form’s SO-class, POSAs would have recognized the SO-properties to be “*a set of normalized variables*” that are *used to “map[] the plurality of computer-readable field identifiers to one another.”* Further, since the mapping of fields to SO-properties is stored in the form database (as shown in Figure 3), POSAs would have recognized that the SO-properties (i.e., “*set of normalized variables*”) are “*stored in*” the form database, thus making the form database “*a normalized variable data database.*”

- ii. **“the normalized variable data database representing a universal variable map of searchable classes and attributes of products or services on the Internet, the mapping linking computer-readable field identifiers of the plurality of sites or applications;”**

107. As explained in the section directly above, POSAs would have recognized Halevy’s form database to be a “*normalized variable data database*” that stores a mapping of SO-properties associated with SO-classes (i.e., “*set of normalized variables*”) to fields (i.e., “*computer-readable field identifiers*”) found on various website forms (i.e., “*plurality of sites or applications*”) analyzed by the crawling process. Halevy, [0043-49], [0067].

108. Halevy’s disclosure of a form database in which corresponding fields from different forms on different websites map to the same SO-properties would have been recognized by a POSA as what the ’378 patent refers to as a *universal*

variable map. See Ex-1001, 17:42-46 (“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)). Thus, Halevy’s form database is a “*universal variable map*” that “*link[s] computer-readable field identifiers of the plurality of sites or applications*” because form fields (including parameter names) from multiple different websites are linked to each other in the form database by being mapped to the same SO-properties associated with an SO-class.

109. Halevy further teaches that the form database “*represent[s] a universal variable map of searchable classes and attributes of products or services on the Internet*” because in Belanger/Halevy, Belanger’s “application server” (Belanger, [0106-07]) reads data entered by the user in a form on Belanger’s website and uses that data to query Halevy’s form database to retrieve a list of deep-links, each to a “form of interest.” Halevy, Abstract, [0137-38]. As explained for Belanger/Halevy, the query submitted to Halevy’s form database (including user-entered data from Belanger’s website as query keywords) maps the keywords to “properties of the chosen search[-ontology] class” identified for the query. Halevy, [0089], [0136-38]. POSAs would have recognized that Halevy’s SO-classes are “*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.).

Halevy, [0045]. POSAs also would have recognized that Halevy’s SO-properties are “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.” Halevy, [0095], [0098-101].

110. POSAs would have recognized that this same process is applicable to “applications” because it was known in the art (as acknowledged by the ’378 patent) that “fields or variables on the publisher site or mobile app” would have been obtained and processed in the same manner using known communication protocols like SOAP. Ex-1001, 1:48-53, 2:63-3:15, 3:64-66; *see also* Tidwell, 10-12 (describing using SOAP to provide web services to web-based applications including from “an Application Service Provider’s vast server farm to a PDA”).

- e. **[1D] “automatically programmatically generating a deep-linked ad utilizing the universal variable map, the deep-linked ad linking one or more of a set of computer-readable field identifiers used by a first site or application with one or more of a set of computer-readable field identifiers used by a second site or application;”**
 - i. **“automatically programmatically generating a deep-linked ad utilizing the universal variable map, ...”**

111. In Belanger/Halevy, promotions displayed on Belanger’s webpages (e.g., in Fig. 53 or another page) are *deep-linked ads*, and Belanger/Halevy

discloses “*automatically programmatically generating*” these ads, as explained below.

112. Specifically, in Belanger/Halevy, Belanger’s “application server” determines the content displayed on its webpages, including promotions having deep-links *generated* by querying Halevy’s system with values in the query mapped to corresponding parameter names in each returned deep-link. POSAs would have recognized Belanger’s promotions with Halevy-generated deep-links to be *deep-linked ads*. POSAs would have understood that these ads are *automatically programmatically generated* by Belanger’s application server because the “servlet” running on the application server “interacts with the databases to gather necessary information for ... the particular data that should appear on the page” (Belanger, [0108]), which in combination with Halevy, would have included querying Halevy’s system for deep-links. Thus, Belanger/Halevy discloses “*automatically programmatically generating a deep-linked ad.*”

113. Further, in Belanger/Halevy, Belanger queries Halevy’s form engine via a web service protocol (SOAP/XML) during the booking process. Belanger, [0024], [0110]. Halevy’s form engine then accesses its form database. Halevy, 4:18-20. The form database meets the claimed “*universal variable map*” and as discussed below, Belanger/Halevy generates the deep-linked ads *utilizing* the “form database.”

114. Specifically, in Belanger/Halevy, Belanger’s “application server” *utilizes* the form database because Belanger’s “servlet” on the “application server” (Belanger, [0106-07]) communicates reservation data (e.g., date and location) as keywords in a query using SOAP/XML to Halevy’s form database to perform a “lookup” to retrieve a one or more deep-links, each pointing to a “form of interest” (Halevy, Abstract, [0137-38]). Thus, POSAs would have recognized that Belanger’s server in the combination *utilizes* Halevy’s “form database” in *generating* deep-linked ads.

- ii. **“the deep-linked ad linking one or more of a set of computer-readable field identifiers used by a first site or application with one or more of a set of computer-readable field identifiers used by a second site or application;”**

115. As explained for Limitation [1A], Halevy’s process for creating the form database “obtains web-based forms to be searched ... from a number of sources,” including “crawl[ing] through web sites to identify web-based forms, ... receiv[ing] manually provided web-based forms,” and “find[ing] web-based forms through methods other than crawling.” Halevy, [0009].

116. POSAs would have recognized that Belanger’s own website (*i.e.*, “*a first site or application*”) would have been included in Halevy’s form database because each of Belanger’s forms on its website (*i.e.*, “*a set of computer-readable field identifiers used by a first site*”) is one of “a number of sources” for

“identif[ying] web-based forms.” Halevy, [0035]; Belanger, [0122]. Likewise, to the extent that one of Belanger’s form webpages (e.g., Fig. 37) was not previously crawled by Halevy’s system, a POSA would have found it obvious (prior to utilizing Halevy as a web service) to provide Belanger’s form webpage to Halevy’s system (*see* Halevy, [0035]) to provide Belanger’s reservation website with the ability to submit queries for deep-links for its own promotions.

117. An advertised promotion generated using Belanger/Halevy for presentation at the end of or during the booking process contains a deep-link to another vendor’s website (e.g., an amusement park, hotel, or airline website) and as such, maps fields from Belanger’s reservation form (e.g., Fig. 37) to corresponding fields in a form on a vendor’s website. For instance, in the exemplary use of Belanger/Halevy, the promotion served on Belanger’s webpages (e.g., promotional deep-link 318 in Fig. 53), which is a *deep-linked ad* (as explained in the section directly above), includes a deep-link retrieved by querying Halevy’s form database with keywords including user-entered data (e.g., the date and location values from the fields on Belanger’s reservation web form), which returns a deep-link to a “form of interest” with the keywords mapped (via the SO-properties identified for the keywords and form fields) to corresponding parameter names of the form at the deep-link. Halevy, [0136-38].

118. POSAs would have recognized Belanger’s promotions with Halevy’s deep-links to be a “*deep-linked ad linking one or more of a set of computer-readable field identifiers used by a first site or application with one or more of a set of computer-readable field identifiers used by a second site or application*” because the deep-link in the promotion includes the date and location values entered by the user in the fields on Belanger’s reservation web form (e.g., Fig. 37) and, via the deep-link, the user would have been directed to a vendor website with corresponding fields (e.g., date and location) in the vendor’s form set to those values.

f. [1E] “placing the deep-linked ad on a page of the first site or application;”

119. Belanger’s “website” discloses a first site or application. Belanger, Abstract, [0020].

120. As explained for Limitation [1D], Belanger’s “servlet” on the “application server” generates the *deep-linked ad* as part of deciding “data that should appear on the page,” which includes the “promotion[s]” with deep-links. Belanger, [0107-08], [0128], Fig. 53 (showing an example webpage with promotional deep-link 318). POSAs would have understood that Belanger/Halevy would have displayed one or more deep-linked ads on Belanger’s webpages resulting from Belanger’s application server generating a promotion that includes a

deep-link queried from Halevy's form database. Thus, Belanger/Halevy discloses "*placing the deep-linked ad on a page of the first site or application.*"

- g. [1F] "and in response to user interaction with the deep-linked ad on the page of the first site or application on a user device:"**

121. As explained above for Limitation [1D], the claimed *deep-linked ad* is the "promotion" shown on Belanger's webpages or application (e.g., Fig. 53 or another webpage) with a deep-link generated by querying Halevy's system. Belanger discloses that a "customer[]" or "*user*" of its website may "select" deep-links in the promotions, *i.e., interact with* them. Belanger, Abstract, [0019]. This interaction happens *with the deep-linked ad on the page of the first site or application on a user device*, since it happens on a webpage generated by Belanger's reservation website, which is the claimed *first site*, as explained for Limitation [1E]. POSAs familiar with web browsers would have understood that ads are displayed on *a user device* because Belanger discloses that users access its website through "customer computers" or "user computer[s]." Belanger, [0106], claim 1.

122. As explained below for Limitations [1G] to [1I], the steps that happen *in response to* the user selecting the deep-link in Belanger's promotions meet the remaining limitations of claim 1.

- h. [1G] "extracting, from the user interaction with the deep linked ad on the page of the first site or**

application, values corresponding to the one or more of the set of computer-readable field identifiers used by the first site or application;”

123. As discussed in Limitations [1D] and [1E], placing an ad on Belanger’s reservation website (e.g., Fig. 53 or another page) would have resulted in one or more promotions, each having a deep-link to a vendor’s website (generated by querying Halevy’s form database) with user-entered values (e.g., the date and location) entered on Belanger’s website (e.g., the Fig. 37 webpage) mapped to corresponding parameter names in each deep-link. These date and location values are “*values corresponding to one or more of the first set of computer-readable field identifiers*” because they are the values entered into the fields in the Fig. 37 webpage (i.e., associated with each field’s parameter name), which are the “*set of computer-readable field identifiers used by the first site,*” as explained for Limitation [1D].

124. POSAs would have understood that Halevy’s deep-links include Belanger’s date and location values (as would have been used by Belanger’s application server to query Halevy’s form database), and that these values would have been *extracted from* Belanger’s website, for two alternative reasons. First, POSAs would have recognized that these values would have been *extracted from* Belanger’s website *in response* to selecting the deep-linked ad because Halevy teaches that for deep-links to websites that use JavaScript, selecting the deep-link

directs a server to construct an “invocation string” that “submit[s] the form automatically on behalf of the user” by concatenating the deep-link’s parameters “and their mapped words or internal value” to the invocation string and passing the completed string back to the browser to invoke the form. Halevy, [0127-28].

125. Alternatively, the browser loading the deep-link in the browser to invoke the form to pass the parameter values from the deep-link to the form constitutes *extracting* the values *from the website in response to the user selecting the deep-link ad*.

i. [1H] “automatically directing the user device to display a page of the second site or application; and”

126. As explained for Limitation [1F], the user’s browser in Belanger/Halevy is taken to the vendor website, *i.e.*, the *page of the second site or application, in response to the user interacting with the deep-linked ad* by clicking a promotional deep-link. POSAs would have understood that taking the user to the vendor website indicated by the URL in the deep-link in response to the user clicking the promotion constitutes *automatically directing the user device to display* the vendor website or application.

127. As explained for Limitation 1[F], the user accesses Belanger’s reservation website via a computer. Furthermore, POSAs would have understood that the user uses a “browser” application on the computer to access Belanger’s website, and thus would have recognized that a standard feature of a browser is

that when a user clicks on a link anchor, the browser automatically directs the user to the website at that link without the need for further user intervention. Jha, [0168]; Becker, 1.

- j. **[1I] “passing the values corresponding to the one or more of the set of computer-readable field identifiers used by the first site or application to the correspondingly linked one or more of the set of computer-readable field identifiers used by the second site or application such that the correspondingly linked one or more of the set of computer-readable field identifiers used by the second site or application are determined using the universal variable map and such that one or more fields on the page of the second set or application are explicitly or implicitly pre-populated with the values extracted from the user interaction with the deep linked ad on the page of the first site or application without necessitating any pre-existing relationship between the pages.”**

128. As explained for Limitation [1G], POSAs would have understood Halevy to teach that a web form at a website can be automatically invoked using a “query-through link” including an “invocation string” containing field names (i.e., *computer-readable field identifiers*) set to certain values. Halevy, [0022-23], [0123]. In the case of the ad served on Belanger’s webpages (e.g., Fig. 53) including a vendor deep-link with corresponding field names (i.e., *computer-readable field identifiers*) set to the date and location values (i.e., *values corresponding to the one or more of the set of computer-readable field identifiers*), POSAs would have understood that the process of creating an invocation string

that invokes the form in the deep-link includes *passing* the date and location values that had previously been entered by the user in the fields on Belanger’s website (e.g., Fig. 37) via the deep-link to corresponding fields on a form at the vendor’s website.

129. In Belanger/Halevy, the invocation string constructed for the deep-links includes values provided on the Figure 37 webpage (e.g., the date and location values), and each deep-link is used to invoke the form on the vendor website with the values prepopulated in their corresponding fields to return a results page. Halevy, [0138], [0143]. In view of Halevy’s teachings discussed above regarding how form invocation works to display a results page by prepopulating a form’s fields with the values in the deep-link (*see* Halevy, [0138], [0143]), POSAs would have understood this process to involve “*passing the values corresponding to one or more of the set of computer-readable field identifiers used by the first site or application*” (e.g., date and location values of the corresponding fields from Belanger’s reservation website) “*to the correspondingly linked one or more of the set of computer-readable field identifiers used by the second site or application*” (e.g., date and location fields on the form at the vendor’s website) in order to display the results from automatically searching the form at the vendor’s website. Because the user in this case does not see the form, POSAs would have recognized that “*one or more fields on the page of the second set or application*”

(e.g., the form invoked on the vendor’s website) are “*implicitly pre-populated with the values extracted from the user interaction with the deep linked ad on the page of the first site or application*” (e.g., as discussed above for Limitation [1G]) in order to return the results of querying the form.

130. Halevy also teaches that fields on the form at the vendor’s site (e.g., the vendor’s web form) can be “*explicitly*” prepopulated since the invocation string can direct the user to “*a partially filled form and therefore expedite the query answering process (or correct the inputs to the form, if necessary).*” Halevy, [0143] (emphasis added). In this case, POSAs would have understood the values in the deep-link to be *explicitly* prepopulated in corresponding fields of the partially filled form displayed to the user.

131. As explained for Limitations [1C] and [1D], Belanger/Halevy teaches that deep-linked ads *link* the sets of computer-readable field identifiers used by the first and second sites via the form database, which is a *universal variable map*. POSAs thus would have understood Belanger/Halevy to disclose that “*the correspondingly linked one or more of the set of computer-readable field identifiers used by the second site or application are determined using the universal variable map.*” Further, since Halevy teaches that its form database is created via crawling webpages and forms from various unrelated websites (Halevy, [0039-49], [0057-58], [0095]), POSAs also would have understood the form

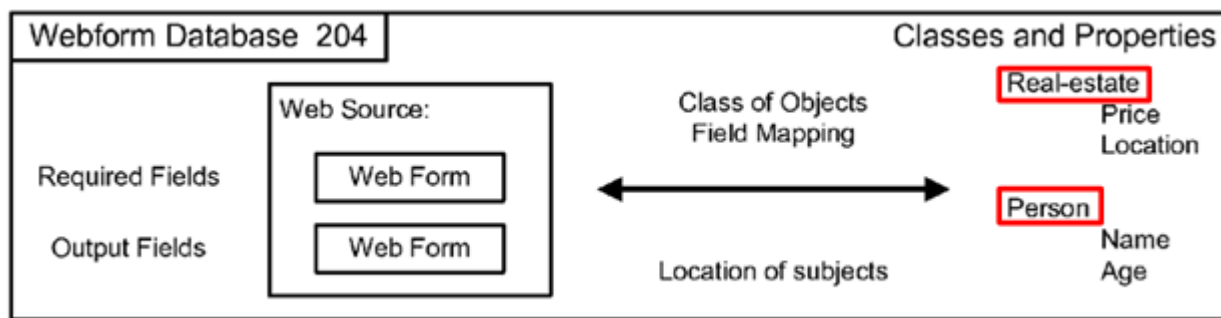
database's creation, and thus the linking between fields on various forms, to occur
“without necessitating any pre-existing relationship between the pages.”

2. **Claim 2: “The method according to claim 1, wherein the plurality of sites or applications is categorized by a plurality of verticals, sub-verticals or product or service categories, and wherein generating the deep-linked ad comprises selecting one or more verticals, sub-verticals or product or service categories of the plurality of verticals, sub-verticals or product or service categories.”**

a. [2A] “wherein the plurality of sites or applications is categorized by a plurality of verticals, sub-verticals or product or service categories, ...”

132. Limitation [2A] recites claim 1’s “*plurality of sites or applications is categorized by a plurality of verticals, sub-verticals or product or service categories.*”

133. As explained for Limitation [1C], Halevy’s form database categorizes webpage forms into a hierarchy of SO-classes based on the “types of objects that can be obtained by querying the form” (e.g., books, hotels, restaurants, houses, jobs, cars, etc.). Halevy, [0038], [0045], [0057-58]. An example is shown in Figure 2 (in part), below (showing classes for “Real-estate” and “Person”).



134. Halevy’s SO-classes are similar to the ’378 patent’s description of “verticals.” Ex-1001, 8:34-36 (“An example of list entries for verticals can be Travel, Real Estate, Cars, Jobs, etc.”). Thus, POSAs would have recognized Halevy’s hierarchy of SO-classes of the crawled web forms to be “*categorized by a plurality of verticals.*”

- b. **[2B] “... and wherein generating the deep-linked ad comprises selecting one or more verticals, sub-verticals or product or service categories of the plurality of verticals, sub-verticals or product or service categories.”**

135. Limitation [2B] recites that claim 1’s “*generating*” comprises “*selecting one or more*” from the list that the “*plurality*” is “*categorized by*” as recited in [2A].

136. As explained for Limitation [1D], Belanger/Halevy *generates the deep-linked ad* by querying Halevy’s form database with the values entered by the user into Belanger’s website. Halevy, Abstract, [0137-38]. As discussed for Limitation [2A], Halevy’s hierarchy of SO-classes form a “*plurality of verticals.*” Halevy’s process for searching the form database thus includes “*selecting one or more verticals*” because an SO-class is identified for a query. This SO-class is then used to “map the individual words in the query to properties of the chosen search class.” Halevy, [0112].

- 3. **Claim 3: “The method according to claim 2, wherein selecting a vertical, sub-vertical or product or service**

category of the plurality of verticals, sub-verticals or product or service categories comprises examining meta tags associated with a site or application.”

137. Claim 3 recites that the “*selecting*” in claim 2 “*comprises examining meta tags associated with a site or application.*” As discussed *supra* § VI.D.2.b, searching Halevy’s form database with a query from Belanger’s website involves specifying an SO-class, which meets claim 2’s “*selecting one or more verticals, sub-verticals or product or service categories.*”

138. In the ’378 patent, “*meta tags*” are used “for selection of an appropriate vertical schema in the automated generation of deep-linked ads” by “checking [the site’s] meta tags.” Ex-1001, 11:27-30, 13:1-7. In Belanger/Halevy, a deep-linked ad is similarly generated based on selecting an SO-class, which is determined for a web form by Halevy’s crawler “obtaining metadata about an identified form” and computing “word vectors” based on both the “entire web page” and the form. Halevy, [0016], [0058]. Halevy’s determining of an SO-classes from analyzing the entire webpage would have been understood by POSAs to include “*selecting a vertical ...*” by “*examining meta tags*” on the webpage “*associated with a site or application.*”

4. Claim 4: “The method according to claim 1, wherein field identifiers are programmatically searched or scanned or received or gathered or inferred by content and mapped to normalized variables in the universal variable map.”

139. As explained for Limitations [1A] to [1C], Belanger/Halevy adds forms to its form database (i.e., “*universal variable map*”) via Halevy’s crawling process that analyzes webpages for web forms, categorizes each form to an SO-class, and *maps* the form’s fields to SO-properties (i.e., “*normalized variables*”) associated with the SO-class. Halevy, [0067], Fig. 3. When adding a new form to the database, Halevy’s crawling process “captures” the “[f]ields in the form” including each field’s “parameter name” (i.e., “*field identifier*”). Halevy, [0039-44]. POSAs thus would have understood Halevy’s crawling process to “*map*” claim 1’s “*field identifiers*” to “*normalized variables in the universal variable map*” as claim 4 requires.

140. POSAs recognized that Halevy’s crawling process “*programmatically search[es] and scan[s]*” for “*field identifiers*” because forms are added to the form database by the crawling process “pursu[ing] hyperlinks recursively starting from a seed page” to “discover[] content which is especially appropriate” and processing the forms “to extract the text corresponding to the fields in the form.” Halevy, [0081-82], [0051-53]. Halevy also teaches “*programmatically ... receiv[ing] or gather[ing]*” field identifiers because web forms can be received by the form

engine or found “through methods other than crawling,” such as obtained from “a set of candidate web sources.” Halevy, [0035], [0051].

5. Claim 5: “The method according to claim 4, wherein the programmatic mapping of field identifiers to normalized variables in the universal variable map is based on heuristic patterns of typical forms and field identifiers on the Internet, the heuristic patterns being adaptable based on the accuracy of mapping.”

141. Claim 5 recites that claim 4’s “*programmatic mapping*” is “*based on heuristic patterns of typical forms and field identifiers on the Internet.*” The ’378 patent describes heuristic patterns as rules that refine what is inferred “about forms and schemas and variables” (Ex-1001, 14:52-56) such as form categorization (*id.*, 14:57-67), data types of fields (*id.*, 15:10-20), and field proximity patterns (*id.*, 16:1-7).

142. As explained for Limitation [1B], Halevy teaches “*mapping field identifiers in the universal variable map to normalized variables*” in its process of mapping fields to SO-properties (i.e., “*normalized variables*”) associated with an SO-class in the form database (i.e., “*universal variable map*”). See Halevy, [0039-67]. This mapping process uses several different rules. For example, one rule categorizes forms into SO-classes “to predict which kinds of objects would be found in the database queried by the form” by computing a two-word vector for each form based on “a word vector for the entire page ..., and a word vector for the form that includes just the words that appear in the form and just before and after

the form.” *Id.*, [0057-58]. Once the form’s class is determined, Halevy uses other rules to predict a “mapping between the fields in the form and the SO-properties of the SO-classes that the form had been mapped to.” *Id.*, [0062-66]. These rules are implemented by an “internal name matcher,” “visible text matcher,” and “instance matcher.” *Id.*, [0063]. POSAs would have recognized that these rules mapping forms and fields to SO-classes and SO-properties are “*heuristic patterns of typical forms and field identifiers on the Internet.*”

143. Halevy also teaches that its rules (i.e., heuristic patterns) are “*adaptable based on the accuracy of mapping*” as claim 5 requires because these rules uses “training data” from a set of candidate sources that can be “shown to a human annotator who can certify the database contents and can change them if necessary.” *Id.*, [0051], [0055], [0058], [0064].

6. Claim 6: “The method according to claim 1, wherein the universal variable map comprises a database containing classes and instances of products and services searchable on the Internet.”

144. As explained for Limitation [1C], Halevy’s form database is a “*universal variable map*” of claim 1 that categorizes forms from various Internet websites and applications into a searchable hierarchy of SO-classes (i.e., “*searchable classes ... on the Internet*”) and SO-properties (i.e., *searchable ... attributes of products and services*”). Halevy, [0045], [0095], [0098-101], [0136-37]. POSAs thus would have understood the form database to comprise a

“database containing classes and instances for products and services searchable on the Internet” as claim 6 requires.

7. **Claim 9: “The method according to claim 1, wherein the user interaction with the deep-linked ad comprises the user explicitly or implicitly selecting the deep-linked ad.”**

145. As explained for Limitation [1F], Belanger/Halevy teaches *“user interaction with the deep-linked ad”* by the user *“explicitly ... selecting the deep-linked ad”* on Belanger’s website displayed in the user’s browser, thus satisfying claim 9, which requires *“explicitly or implicitly selecting”* the ad. Belanger, Abstract, [0019].

8. **Claim 10: “The method according to claim 1, wherein the deep-linked ad is displayed on the page of the first site or application as a product ad, a banner, an icon, an animated ad, a text ad, a check box, a link, a form, a video clip, or any element of interest.”**

146. Belanger teaches displaying deep-linked promotions on its website. As shown in Figure 53 (annotated below) these promotions are displayed as text:

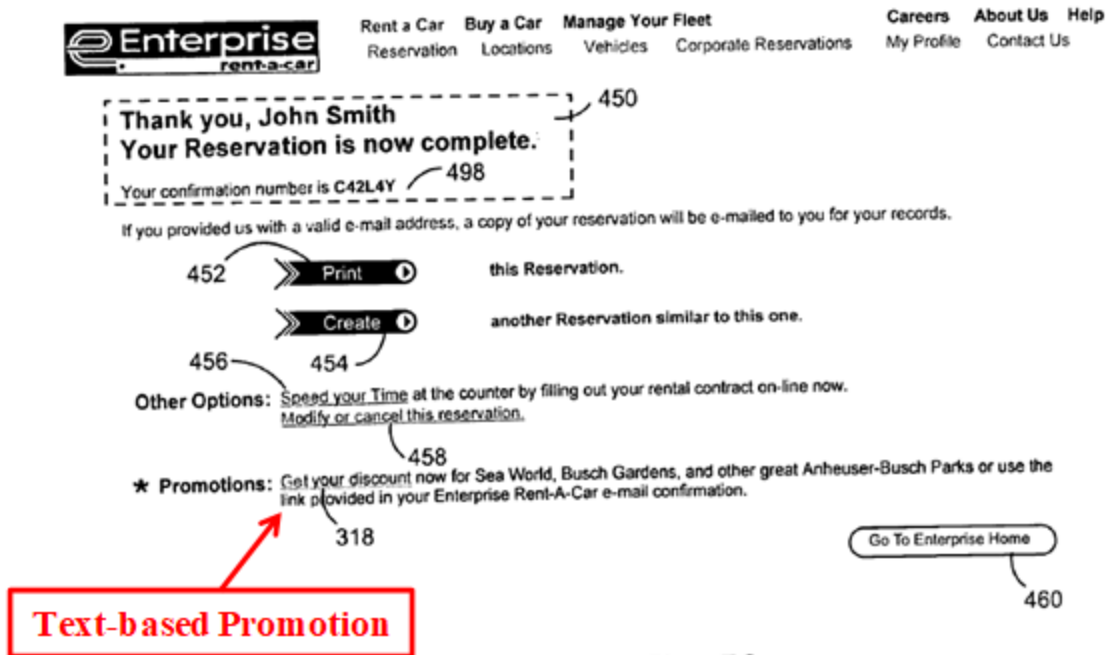


Fig. 53

147. POSAs would have thus recognized Belanger to teach that its deep-linked promotions (i.e., “the deep-linked ad” of claim 1) “is displayed ... as ... a text ad.”

9. **Claim 11:** “The method according to claim 1, wherein the user interaction with the deep-linked ad provides a query string, wherein the extracting or inferring includes parsing the query string, and wherein the values extracted or inferred from the query string are used to identify normalized product attributes in the universal variable map.”

148. As explained for Limitation [1F], Belanger/Halevy teaches “user interaction with the deep-linked ad” in the user selecting the promotion with Halevy’s deep-link displayed on Belanger’s webpage. POSAs would have recognized that Halevy’s deep-link includes a query string (e.g., the mapping of

keywords to the corresponding fields on the vendor's website) that is *extracted* from Belanger's webpage when the promotions is selected and *provided* to Halevy's process, which *parses the query string* to concatenate the mapped keywords and parameter names to an invocation string for form submission, as explained for Limitation [1G]. Halevy, [0127].

149. As explained for Limitation [1D], Belanger/Halevy generates promotional deep-links by querying Halevy's form database with keywords including user-entered data. POSAs would have recognized that these keywords are "*values ... used to identify normalized product attributes in the universal variable map*"² because Halevy's process for querying the form database includes converting the query string to Halevy's "structured query format" that maps query keywords to SO-properties. Halevy, [0112]. As explained for Limitation [1C], Halevy's SO-properties in the form database (i.e., a "*universal variable map*")

² To the extent Patent Owner argues that claim 11 requires a specific sequence where "*the values ... from the query string are used identify normalized product attributes*" after interacting with the deep-linked ad, it is my opinion that this claim is not so limited as it does not require a specific sequence of steps. Further, the '378 specification lacks disclosure of generating a second deep-link in response to clicking a deep-linked ad. In addition, a POSA would have understood that such sequencing would unduly and inappropriately slow down system interactions.

represent *normalized* variables determined from the “type of information ... obtain[ed]” from a form. Halevy, *Id.*, [0048]. As also is explained for Limitation [1C], the SO-properties include “*attributes of products.*”

10. **Claim 12: “The method according to claim 11, further comprising: identifying a product or service category using the normalized product attributes in the universal variable map; identifying at least one form associated with the product or service category, the at least one form associated with the second site or application; and populating the at least one form associated with the second site or application with the values extracted or inferred from the query string.”**

150. As explained for claim 11, Belanger/Halevy generates promotions by querying Halevy’s form database with the user-entered values as keywords in the query. Querying Halevy’s form database with user-entered values to obtain deep-links constitutes “*identifying a product or service category using the normalized product attributes in its form database*” as claim 12 requires because Halevy’s query process identifies SO-classes based mapping the query values to SO-properties. Halevy, [0095], [0136-37].

151. In Halevy, *forms* are *identified* based on the identified SO-class (i.e., *the product or service category* as recited in claims 12) and the SO-properties of the SO-class. Halevy, [0136-37]. Specifically, Halevy’s form searching process identifies a class from keywords in a submitted query, “map[s] keywords to properties” of the identified class, and “perform[s] a lookup” based on a query “in

the form database to identify forms of interest.” *Id.*, [0136-37], Fig. 6. As explained for Limitation [1A], Halevy’s form database includes forms obtained by crawling multiple websites. POSAs thus would have understood that the deep-links returned from querying the form database includes “*at least one form associated with*” a different website (i.e., *the second site*), as claims 12 requires.

152. Finally, as explained for Limitation [1E], querying Halevy’s form database with user-entered values from Belanger’s website maps the user-entered values to corresponding form fields in the deep-link. Halevy, [0136], [0123]. As explained for Limitation [1I], the mapped values are passed to the form invoked at the deep-link so that the values prepopulate their corresponding fields based on the mapping. Halevy, [0138]. POSAs would have recognized that Belanger/Halevy’s process of returning a deep-link that maps user-entered values to corresponding fields on a different website is *populating the form associated with the second site ... with the values extracted ... from the query string*.

11. Claims 13-16, 19-22

153. Limitation [13PRE] recites a *system comprising at least one processor and at least one non-transitory computer readable medium*. As explained for Limitation [1PRE], Belanger teaches an application server, which a POSA would have understood is a *system*, that has *at least one processor* and also has *non-transitory computer memory*, which POSAs would have understood is a *non-*

transitory computer readable medium. Belanger, [0106-07]. Belanger also discloses that its application server executes “software” to present its website. Belanger, [0107-08], Fig. 7. Thus, POSAs would have recognized the application server’s memory to “*stor[e] instructions translatable by the at least one processor to perform*” the steps in limitations [1A]-[1H] for the same reasons explained in Section IX.A.1.

154. Limitation [13A] is the same as Limitation [1A], except that [13A] adds obtaining “*product or service attributes*” from the sites or applications. Belanger/Halevy also discloses obtaining “*product or service attributes*” from websites analyzed by Halevy’s crawling process because for each form, the crawler obtains “output properties” or “the type of information ... obtain[ed] from answers to a successful form submission.” Halevy, [0048]. POSAs would have recognized that output properties being the types of objects obtained from a form are the “*product or service attributes*” for the product or service offered by the form.

155. Claim 13 is otherwise identical to claim 1, and every other element is met by Belanger/Halevy for the reasons summarized in the following table and explained in the sections indicated below.

Claim 13 Element	Corresponding Claim 1 Element	Section(s)
[13B]	[1B]	IX.A.1.c
[13C]	[1C]	IX.A.1.d.i– IX.A.1.d.ii

[13D]	[1D]	IX.A.1.e.i– IX.A.1.e.ii
[13E]	[1E]	IX.A.1.f
[13F]	[1F]	IX.A.1.g
[13G]	[1G]	IX.A.1.h
[13H]	[1H]	IX.A.1.i
[13I]	[1I]	IX.A.1.j

156. Certain dependent claims from claim 13 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 13 Dependent	Corresponding Claim 1 Dependent	Section(s)
14	2	IX.A.2.a- IX.A.2.b
15	3	IX.A.3
16	6	IX.A.6
19	9	IX.A.7
20	10	IX.A.8
21	11	IX.A.9
22	12	IX.A.10

12. Claims 23-24, 26

157. Claim 23 is identical to claim 13 except that [23Pre] recites a *computer program product* rather than a *system* and does not recite a *processor*. The software on Belanger’s application server that implements Belanger’s website is a *computer program product*, and the remainder of claim 23 is met for the same reasons discussed *supra* § IX.A.11 for claim 13. Belanger, [0107].

158. The additional limitations of claims 24 and 26 are identical to the additional limitations of claims 2 and 9, respectively, and are met for the same reasons (*see* Sections IX.A.2. and IX.A.7).

B. Ground 2: Claims 1-6, 9-16, 19-24, and 26 are Obvious Over Belanger and APA In View of Halevy

159. Belanger in view of Halevy (Ground 1) renders claims 1-6, 9-16, 19-24, and 26 obvious.

160. To the extent that explicit disclosure is required regarding travel websites utilizing deep-link advertising, as evidence of the knowledge of the art presumed for a POSA, the Applicant Admitted Prior Art (“APA”) states that at the time of the ’378 patent, such sites were known, as were mobile applications doing the same. Ex-1001, 2:43-49, 2:64-3:15. Specifically, Applicants admitted that deep-linked-based advertising was known and in use for advertising on “search and E-commerce sites where the user is searching for a product or service,” like the “travel sites” described in Belanger. *Id.*, 2:43-49. With these sites, a 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.*, 2:49-57.

161. 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.*, 3:1-4. This mapping was done via manual coding “by developing programmatic integrations between variables and fields” on the publisher’s and advertiser’s websites. *Id.*, 3:6-10. Manual coding was necessary because each website was known to use “its own field descriptors and variable names.” *Id.*, 3:10-15.

162. POSAs would have recognized the partner and reservation websites described in Belanger to be examples of publisher websites and applications described in the APA, having fields that require manual coding to map their search parameters to the deep-links provided by Belanger so that their search parameter values would have been passed along in the promotional deep-links on Belanger’s reservation website.

163. 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.*, 3:16-18. POSAs would have thus looked to Halevy to automate this manual mapping process as Halevy’s form database, as discussed for Ground 1, 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 7-8, 17-18, and 25 are Obvious Over Belanger and Halevy In View of Haveliwala.

164. After reviewing Haveliwala in addition to Belanger and Halevy (as discussed in Ground 1), and claims 7-8, 17-18, and 25 of the '378 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, "Belanger/Halevy" refers to Belanger in view of Halevy as discussed in Section VIII.B.1, "Belanger/Halevy/Haveliwala" refers to Belanger and Halevy in view of Haveliwala as discussed in Section VIII.B.2, and "Belanger," "Halevy," or "Haveliwala" refer to their respective disclosures as discussed in Section VIII.A.

1. Claim 7: “The method according to claim 1, wherein the deep-linked ad is generated or refined based on information provided by a user’s implicit action on the page of the first site or application.”

165. Belanger/Havely/Haveliwala discloses Belanger’s application server generating deep-linked ads by querying Halevy’s form database to return a ranked list of deep-links, that in combination with Haveliwala, include ranking the deep-links based on monitoring user pointer activities on a webpage.

166. One example of such monitoring includes determining a “longer pointer hover period.” Haveliwala, 4:14-19, 4:65-5:11.

167. POSAs would have understood information about actions like hovering to be “*information provided by a user’s implicit action on the page of the first site or application*” as claim 7 requires because the ’378 patent describes pointing activities like hovering as implicit user actions. Ex-1001, 3:38-48, claim 8 (depending from claim 7 and specifying “*hovering*” as a “*user’s implicit action*”).

168. This pointing activity, per Haveliwala, updates an advertisement’s relevancy values so subsequent responses from the search engine can “identify a new set” of advertisements” or “provide them in a different order in accordance with their updated relevancy values.” *Id.*, 3:13-24. POSAs would have recognized that identifying new advertisements or providing them in a different order based on relevancy values determined from a user’s hover action, when applied to Halevy’s

ranked list of deep-links, is “*generat[ing] or refin[ing]*” the deep-linked ads “*based on information provided by a user’s implicit action*” as claim 7 requires.

2. Claims 17 and 25

169. Claims 17 and 25 are identical to claim 7 except that they recite “*contextual information*” rather than “*information.*” This is disclosed by Haveliwala for the same reasons explained above for claim 7 because monitoring the user’s pointing activity includes “monitor[ing] a predefined region of the display that is associated with the informational item, and the user’s pointer placement activities with respect to that predefined region” to “determine[] a continuous hover period” Haveliwala, 4:62-5:3. POSAs would have recognized the region in which hovering occurs provides context, and that determining a continuous hover period over a specific item to determine a user’s interest is determining “*contextual information provided by a user’s implicit action.*”

3. Claims 8 and 18: “The method according to claim 7/17, wherein the user’s implicit action comprises the user hovering over a target of interest on the page of the first site or application.”

170. Belanger/Halevy/Haveliwala meets the additional limitation in claims 8 and 18 for the same reasons explained above for claim 7 because Haveliwala teaches “*the user’s implicit action*” including “*the user hovering over a target of interest on*” a webpage, as claims 8 and 18 require. Haveliwala, 4:14-19, 4:65-5:11.

D. Ground 4: Claims 7-8, 17-18, and 25 are Obvious Over Belanger, APA, and Halevy In View of Haveliwala

171. This ground incorporates the analysis of Belanger and APA in view of Halevy over claims 1, 13, and 23 as set forth in Ground 2 (Section IX.B), and the analysis of Belanger/Halevy in view of Haveliwala as set forth in Ground 3 (Section IX.C). This ground additionally renders claims 7-8, 17-18, and 25 obvious for the same reasons as Ground 3, but adds the APA to the extent that explicit disclosure is required regarding travel websites utilizing deep-link advertising, as evidence of the knowledge of the art acknowledged in the '378 patent discussed for Ground 2.

X. CLAIM LISTING

The following claim listing assigns element labels (e.g., [1A1], [1A2], etc.) to certain claims for clarity.

Claim 1
[1PRE] A method, comprising:
[1A] at and by a server computer operating in a network environment and having at least one processor and non-transitory computer memory:
[1B] obtaining, utilizing a set of obtaining rules, a plurality of explicit or implicit computer-readable field identifiers from a plurality of sites or applications on the Internet;
[1C] applying via programming code a set of enhancing rules to enhance results of the obtaining of the plurality of computer-readable field identifiers;
[1D] mapping the plurality of computer-readable field identifiers to one another using a set of normalized variables stored in a normalized variable data database, the normalized variable data database representing a universal variable map of searchable classes and attributes of products or services on the Internet, the mapping linking computer-readable field identifiers of the plurality of sites or applications;
[1E] automatically programmatically generating a deep-linked ad utilizing the universal variable map, the deep-linked ad linking one or more of a set of computer-readable field identifiers used by a first site or application with one or more of a set of computer-readable field identifiers used by a second site or application;
[1F] placing the deep-linked ad on a page of the first site or application; and
[1G] in response to user interaction with the deep-linked ad on the page of the first site or application on a user device:
[1G1] extracting, from the user interaction with the deep-linked ad on the page of the first site or application, values corresponding to the one or more of the set of computer-readable field identifiers used by the first site or application;
[1G2] automatically directing the user device to display a page of the second site or application; and

[1G3] passing the values corresponding to the one or more of the set of computer-readable field identifiers used by the first site or application to the correspondingly linked one or more of the set of computer-readable field identifiers used by the second site or application such that the correspondingly linked one or more of the set of computer-readable field identifiers used by the second site or application are determined using the universal variable map and such that one or more fields on the page of the second set or application are explicitly or implicitly pre-populated with the values extracted from the user interaction with the deep-linked ad on the page of the first site or application without necessitating any pre-existing relationship between the pages.

Claim 2

The method according to claim 1, wherein the plurality of sites or applications is categorized by a plurality of verticals, sub-verticals or product or service categories, and wherein generating the deep-linked ad comprises selecting one or more verticals, sub-verticals or product or service categories of the plurality of verticals, sub-verticals or product or service categories.

Claim 3

The method according to claim 2, wherein selecting a vertical, sub-vertical or product or service category of the plurality of verticals, sub-verticals or product or service categories comprises examining meta tags associated with a site or application.

Claim 4

The method according to claim 1, wherein field identifiers are programmatically searched or scanned or received or gathered or inferred by content and mapped to normalized variables in the universal variable map.

Claim 5

The method according to claim 4, wherein the programmatic mapping of field identifiers to normalized variables in the universal variable map is based on heuristic patterns of typical forms and field identifiers on the Internet, the heuristic patterns being adaptable based on the accuracy of mapping.

Claim 6

The method according to claim 1, wherein the universal variable map comprises a database containing classes and instances of products and services searchable on the Internet.

Claim 7

The method according to claim 1, wherein the deep-linked ad is generated or refined based on information provided by a user's implicit action on the page of the first site or application.

Claim 8
The method according to claim 7, wherein the user's implicit action comprises the user hovering over a target of interest on the page of the first site or application.
Claim 9
The method according to claim 1, wherein the user interaction with the deep-linked ad comprises the user explicitly or implicitly selecting the deep-linked ad.
Claim 10
The method according to claim 1, wherein the deep-linked ad is displayed on the page of the first site or application as a product ad, a banner, an icon, an animated ad, a text ad, a check box, a link, a form, a video clip, or any element of interest.
Claim 11
The method according to claim 1, wherein the user interaction with the deep-linked ad provides a query string, wherein the extracting or inferring includes parsing the query string, and wherein the values extracted or inferred from the query string are used to identify normalized product attributes in the universal variable map.
Claim 12
[12PRE] The method according to claim 11, further comprising:
[12A] identifying a product or service category using the normalized product attributes in the universal variable map;
[12B] identifying at least one form associated with the product or service category, the at least one form associated with the second site or application; and
[12C] populating the at least one form associated with the second site or application with the values extracted or inferred from the query string.
Claim 13
[13PRE] A system, comprising:
[13A] at least one processor; and
[13B] at least one non-transitory computer readable medium storing instructions translatable by the at least one processor to perform:
[13C] obtaining, utilizing a set of obtaining rules, a plurality of explicit or implicit computer-readable field identifiers or product or service attributes from a plurality of sites or applications on the Internet;
[13D] applying via programming code a set of enhancing rules to enhance results of the obtaining of the plurality of computer-readable field identifiers;

[13E] mapping the plurality of computer-readable field identifiers to one another using a set of normalized variables stored in a normalized variable data database, the normalized variable data database representing a universal variable map of searchable classes and attributes of products or services on the Internet, the mapping linking computer-readable field identifiers of the plurality of sites or applications;
[13F] automatically programmatically generating a deep-linked ad utilizing the universal variable map, the deep-linked ad linking one or more of a set of computer-readable field identifiers used by a first site or application with one or more of a set of computer-readable field identifiers used by a second site or application;
[13G] placing the deep-linked ad on a page of the first site or application; and
[13H] in response to user interaction with the deep-linked ad on the page of the first site or application on a user device:
[13H1] extracting, from the user interaction with the deep-linked ad on the page of the first site or application, values corresponding to the one or more of the set of computer-readable field identifiers used by the first site or application;
[13H2] automatically directing the user device to display a page of the second site or application; and
[13H3] passing the values corresponding to the one or more of the set of computer-readable field identifiers used by the first site or application to the correspondingly linked one or more of the set of computer-readable field identifiers used by the second site or application such that the correspondingly linked one or more of the set of computer-readable field identifiers used by the second site or application are determined using the universal variable map and such that one or more fields on the page of the second set or application are pre-populated with the values extracted from the user interaction with the deep-linked ad on the page of the first site or application without necessitating any pre-existing relationship between the pages.
Claim 14
The system of claim 13, wherein the plurality of sites or applications is categorized by a plurality of verticals, sub-verticals or product or service categories, and wherein generating the deep-linked ad comprises selecting one or more verticals, sub-verticals or product or service categories of the plurality of verticals, sub-verticals or product or service categories.
Claim 15
The system of claim 14, wherein selecting a vertical, sub-vertical or product or service category of the plurality of verticals, sub-verticals or product or service categories comprises examining meta tags associated with a site or application.

Claim 16
The system of claim 13, wherein the universal variable map comprises a database containing classes and instances of products and services searchable on the Internet.
Claim 17
The system of claim 13, wherein the deep-linked ad is generated or refined based on contextual information provided by a user's implicit action on the page of the first site or application.
Claim 18
The system of claim 17, wherein the user's implicit action comprises the user hovering over a target of interest on the page of the first site or application.
Claim 19
The system of claim 13, wherein the user interaction with the deep-linked ad comprises the user explicitly or implicitly selecting the deep-linked ad.
Claim 20
The system of claim 13, wherein the deep-linked ad is displayed on the page of the first site or application as a product ad, a banner, an icon, an animated ad, a text ad, a check box, a link, a form, a video clip, or an element of interest.
Claim 21
The system of claim 13, wherein the user interaction with the deep-linked ad provides a query string, wherein the extracting or inferring includes parsing the query string, and wherein the values extracted or inferred from the query string are used to identify normalized product attributes in the universal variable map.
Claim 22
[22PRE] The system of claim 21, further comprising:
[22A] identifying a product or service category using the normalized product attributes in the universal variable map;
[22B] identifying at least one form associated with the product or service category, the at least one form associated with the second site or application; and
[22C] populating the at least one form associated with the second site or application with the values extracted or inferred from the query string.
Claim 23
[23PRE] A computer program product comprising at least one non-transitory computer readable medium storing instructions translatable by at least one processor to perform:
[23A] obtaining, utilizing a set of obtaining rules, a plurality of explicit or implicit computer-readable field identifiers or product or service attributes from a plurality of sites or applications on the Internet;
[23B] applying via programming code a set of enhancing rules to enhance results

of the obtaining of the plurality of computer-readable field identifiers;
[23C] mapping the plurality of computer-readable field identifiers to one another using a set of normalized variables stored in a normalized variable data database, the normalized variable data database representing a universal variable map of searchable classes and attributes of products or services on the Internet, the mapping linking computer-readable field identifiers of the plurality of sites or applications;
[23D] automatically programmatically generating a deep-linked ad utilizing the universal variable map, the deep-linked ad linking one or more of a set of computer-readable field identifiers used by a first site or application with one or more of a set of computer-readable field identifiers used by a second site or application;
[23E] placing the deep-linked ad on a page of the first site or application; and
[23F] in response to user interaction with the deep-linked ad on the page of the first site or application on a user device:
[23F1] extracting, from the user interaction with the deep-linked ad on the page of the first site or application, values corresponding to the one or more of the set of computer-readable field identifiers used by the first site or application;
[23F2] automatically directing the user device to display a page of the second site or application; and
[23F3] passing the values corresponding to the one or more of the set of computer-readable field identifiers used by the first site or application to the correspondingly linked one or more of the set of computer-readable field identifiers used by the second site or application such that the correspondingly linked one or more of the set of computer-readable field identifiers used by the second site or application are determined using the universal variable map and such that one or more fields on the page of the second set or application are pre-populated with the values extracted from the user interaction with the deep-linked ad on the page of the first site or application without necessitating any pre-existing relationship between the pages.
Claim 24
The computer program product of claim 23, wherein the plurality of sites or applications is categorized by a plurality of verticals, sub-verticals or product or service categories, and wherein generating the deep-linked ad comprises selecting one or more verticals, sub-verticals or product or service categories of the plurality of verticals, sub-verticals or product or service categories.

Claim 25

The computer program product of claim 23, wherein the deep-linked ad is generated or refined based on contextual information provided by a user's implicit action on the page of the first site or application.

Claim 26

The computer program product of claim 23, wherein the user interaction with the deep-linked ad comprises the user explicitly or implicitly selecting the deep-linked ad.

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 A. Fry