UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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GOOGLE LLC,
Petitioner,

v.

METARAIL, INC.,
Patent Owner.

_____

Case No. IPR2024-01269
Patent No. 10,789,626

_____

DECLARATION OF DR. EDWARD A. FOX

Google Exhibit 1003
Google v Metarail

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a. [1PRE] A method, comprising: 49
b. [1A] generating, by a server computer, a deep-linked ad utilizing a universal variable map stored in a data store and accessible by the server computer, the universal variable map linking programming variables across multiple sites on the Internet and applications; 49
c. [1B] serving, by the server computer, the deep-linked ad through a first site or mobile application, the deep-linked ad linking a first set of programming variables of the first site on the Internet or the first mobile application[] with a second set of programming variables of a second site on the Internet or a second mobile application, the first set of programming variables being associated with the second set of programming variables in the universal variable map stored in the data store; 56
d. [1C] and in response to a user interacting with the deep-linked ad displayed on a user device through an instance of the first site on the Internet or the first mobile application: 61
e. [1D] extracting, through the first site on the Internet or the first mobile application, values corresponding to the first set of programming variables; 62
f. [1E] automatically directing the user device to the second site on the Internet or the second mobile application; and 63
g. [1F] and passing the values corresponding to the first set of programming variables to the second set of programming variables such that one or more fields corresponding to the second set of programming variables of the second site on the Internet or the second mobile application are explicitly or implicitly prepopulated with the values extracted through the first site on the Internet or the first mobile application. 64

2. Claim 4: The method according to claim 1, wherein serving the deep-linked ad comprises fetching and displaying a deep-linked page, the deep-linked page having information for a product or service. 66
3. Claim 5: The method according to claim 4, wherein the first set of programming variables comprises a programming variable associated with the product or the service and wherein the second set of programming variables comprises a programming variable associated with an attribute or element of the product or the service. 66
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    b. [7B] … and passes values corresponding to the second set of programming variables to the third set of programming variables such that one or more fields corresponding to the third set of programming variables of the third site on the Internet or the third mobile application are explicitly or implicitly prepopulated with the values passed from the first site on the Internet or the first mobile application through the second site on the Internet to the third site on the Internet or the third mobile application. 69
    c. Claim 8: The method according to claim 1, wherein the second mobile application comprises a second deep-linked ad that utilizes the universal variable map stored in the

data store and wherein the second deep-linked ad links the second set of programming variables of the second mobile application with a third set of programming variables of a third site on the Internet or a third mobile application, the second set of programming variables being associated with the third set of programming variables in the universal variable map stored in the data store.....71

6. Claim 9 71

a. [9A] The method according to claim 8, wherein interaction between an end user and the second deep-linked ad in the second mobile application on a computing device of the end user directs the computing device to the third site on the Internet or to the third mobile application … 71

b. [9B] … and passes values corresponding to the second set of programming variables to the third set of programming variables such that one or more fields corresponding to the third set of programming variables of the third site on the Internet or the third mobile application are explicitly or implicitly prepopulated with the values passed from the first site on the Internet or the first mobile application through the second mobile application to the third site on the Internet or the third mobile application. 72

7. Claim 10: The method according to claim 1, wherein the deep-linked ad comprises at least one of a page, a banner, an icon, an animated ad, a text-based ad, or a check box. 73

B. Ground 2: Claims 1 and 4-10 are Obvious Over the Combination of Belanger and Admitted Prior Art (APA) In View of Halevy.....74

C. Ground 3: Claims 2 and 3 are Obvious Over Belanger and Halevy In View of Reichardt. 76

1. Claim 2: The method according to claim 1, wherein serving the deep-linked ad comprises inserting the deep-linked ad into a video on the first site on the Internet or in the first mobile application, the video showing a product or service. 76

2. Claim 3: The method according to claim 2, wherein the deep-linked ad is selected based on content being displayed or played to the user through the first site on the Internet or the first mobile application. 79

D. Ground 4: Claims 2 and 3 are Obvious Over Belanger, Admitted Prior Art (APA), and Halevy In View of Reichardt. 79

X. DECLARATION 81

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 1-10 (the "challenged claims") of U.S. Patent No. 10,789,626 ("the '626 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 '626 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. Pat. No. 10,789,626 ("the '626 patent")
1002	Prosecution History of U.S. Patent No. 10,789,626
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., "*What Happens after an Ad Click? Quantifying the Impact of Landing Pages in Web Advertising*," 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")
1009	U.S. Pat. App. Pub. No. 2002/0124255 to Reichardt et al. ("Reichardt")
1013	Michael Uschold, "*Ontology and database schema: What's the difference?*," 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., Programming Web Services with SOAP (1st ed. 2001) ("Tidwell")

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 '626 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 '626 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 '626 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 '626 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 '626 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 '626 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 ’626 PATENT

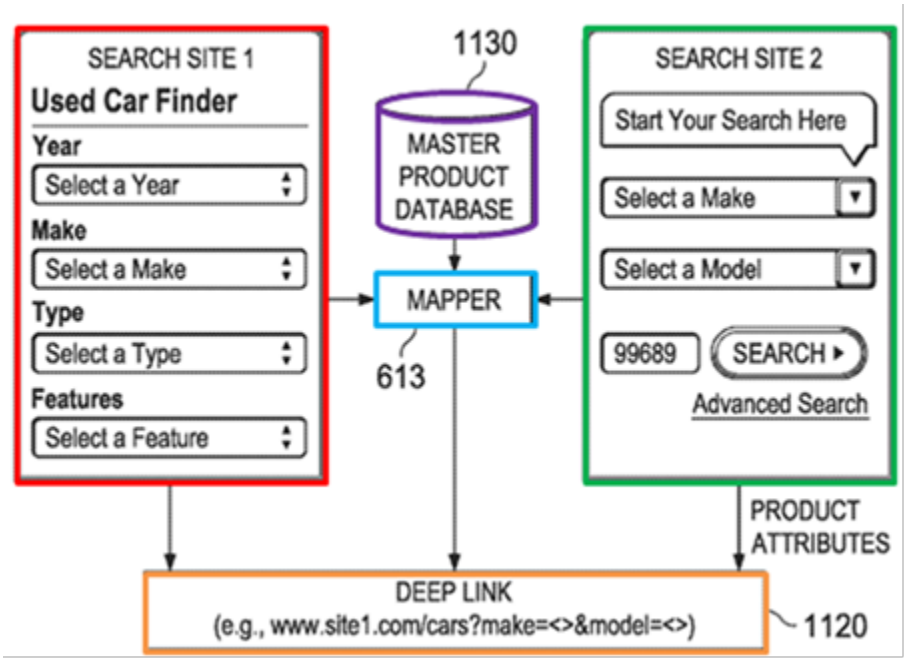
A. Background

34. The ’626 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 ’626 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*., 8:53-66; 9:51-63. These “names” are stored in the universal variable map and associated with “normalized variables.” *Id*., 5:21-25, 10:3-4. 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*., 5:21-25.

35. The ’626 patent acknowledges that “deep-linked” or “parameter-based” digital advertising technologies were known at the time of filing. *Id.*, 2:53-67. In such prior art systems, as described by the ’626 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*., 2:57-59. Advertisers use these passed-along parameters, for example, to “automatically activate searches” from the advertiser’s homepage, “thereby landing the web user ‘deep’” into a website rather than on the advertiser’s homepage. *Id*., 2:61-67.

36. The ’626 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.*, 3:7-20. The ’626 patent simply purports to automate these mappings. *Id.*, Abstract; 1:35-46, 3:36-42, 3:48-55, 4:18-20.

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).



Id., 14:6-7. To generate the deep-linked ad, mapper 613 accesses the universal variable map of Master Product Database 1130, "cross reference[s] programming variables[1] 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.*, 14:7-14. 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 directing the user's browser to the deep link location, the form at Search Site 1 may "be pre-populated with field identifier values," for example, "product attributes such as 'Toyota' and 'Prius.'" *Id.*, 14:20-23.

38. The purported improvement that this process provides over the prior art is the automating of the manual process of "mapping" programming variables used by one site to corresponding programming variables on another site. *Id.*, 3:26-37. 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.*, 8:36-60, Figs. 4, 5. As described in Figure 11A above, this data is

[1] The '626 patent uses the terms "programming variable," "variable," "field identifier," and "identifier" interchangeably. *See* Ex-1001, 4:31-32, 9:30-37, 9:51-55, 13:37-41.

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.*, 14:7-20.

B. Prosecution History

39. I have reviewed the prosecution history of the ’626 patent (Ex-1002). The ’626 patent issued without substantive discussion during the course of the examination regarding the prior art of record. Ex-1002, 203-06, 216-20. No substantive prior art rejections were applied.

C. The Challenged Claims

40. My opinion herein addresses how claims 1-10 of the ’626 patent are obvious. Claim 1, the only independent claim in the ’626 patent, is copied below and annotated with bracketed letters for purposes of cross reference. The remaining claims, annotated with bracketed letters, are listed in my analysis in Section IX, below.

[1PRE] A method, comprising:

[1A] generating, by a server computer, a deep-linked ad utilizing a universal variable map stored in a data store and accessible by the server computer, the universal variable map linking programming variables across multiple sites on the Internet and applications;

[1B] serving, by the server computer, the deep-linked ad through a first site or mobile application, the deep-linked ad linking a first set of

programming variables of the first site on the Internet or the first mobile applications with a second set of programming variables of a second site on the Internet or a second mobile application, the first set of programming variables being associated with the second set of programming variables in the universal variable map stored in the data store; and

[1C] in response to a user interacting with the deep-linked ad displayed on a user device through an instance of the first site on the Internet or the first mobile application:

[1D] extracting, through the first site on the Internet or the first mobile application, values corresponding to the first set of programming variables;

[1E] automatically directing the user device to the second site on the Internet or the second mobile application; and

[1F] passing the values corresponding to the first set of programming variables to the second set of programming variables such that one or more fields corresponding to the second set of programming variables of the second site on the Internet or the second mobile application are explicitly or implicitly prepopulated with the values extracted through the first site on the Internet or the first mobile application.

Ex-1001, 22:21-53 (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" published on June 30, 2005. *Id.*, 1. Accordingly, I understand that Belanger qualifies as prior art to the '626 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).

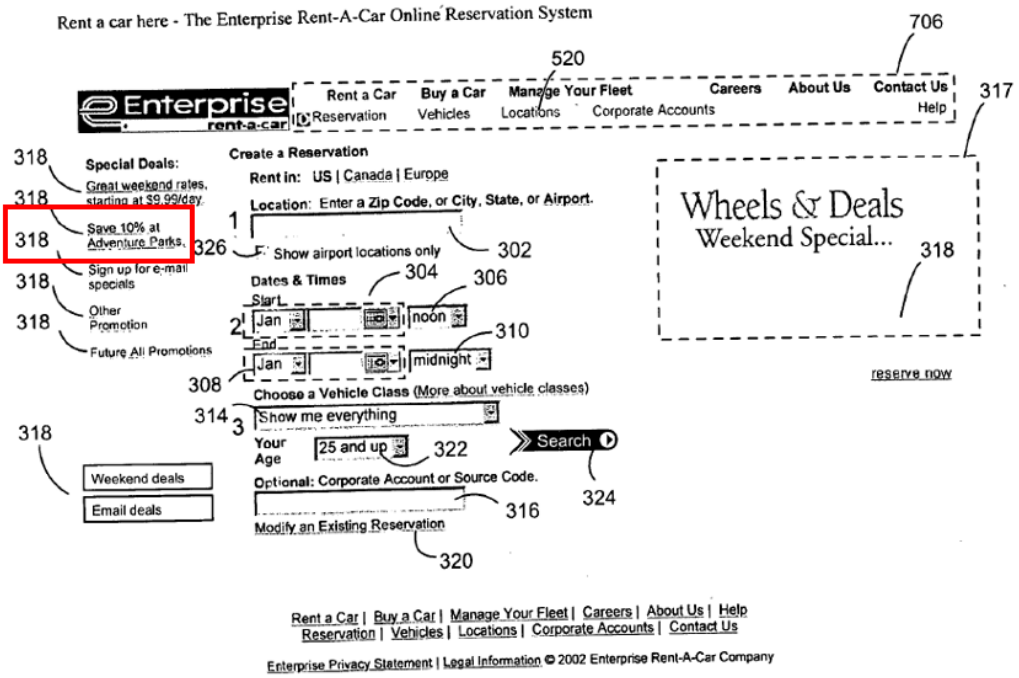


Fig. 37

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, 4:14-17, 14:20-25 (deep-links can take the user to a page with a "form" that is "pre-populated with field identifier values" "such as 'Toyota' and 'Prius'").

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.

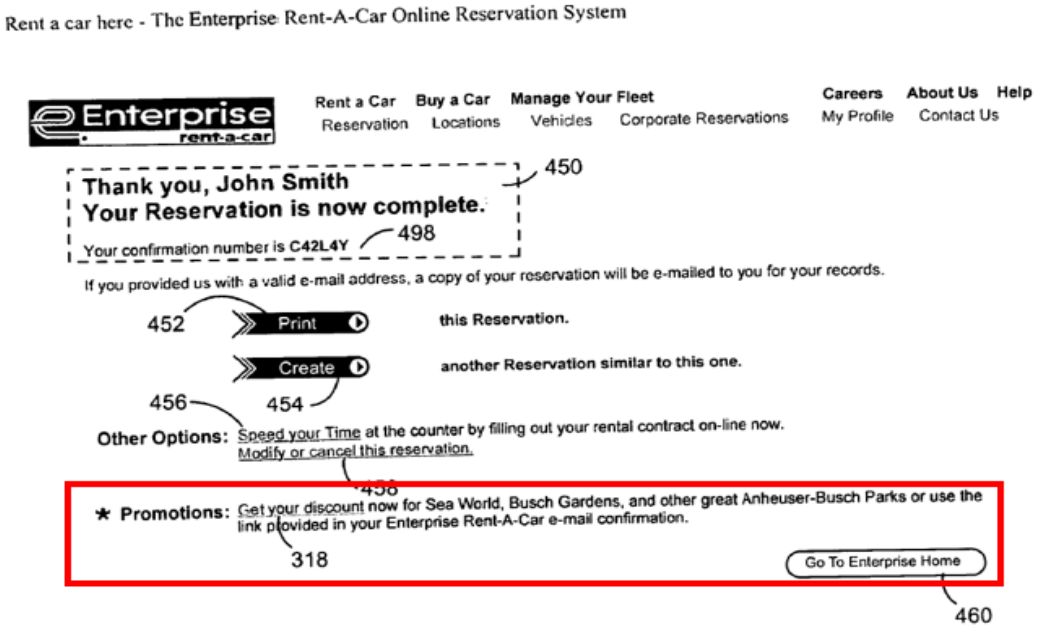


Fig. 53

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 '626 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, 2:53-67 (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 '626 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, 3:7-9. 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 '626 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 '626 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.

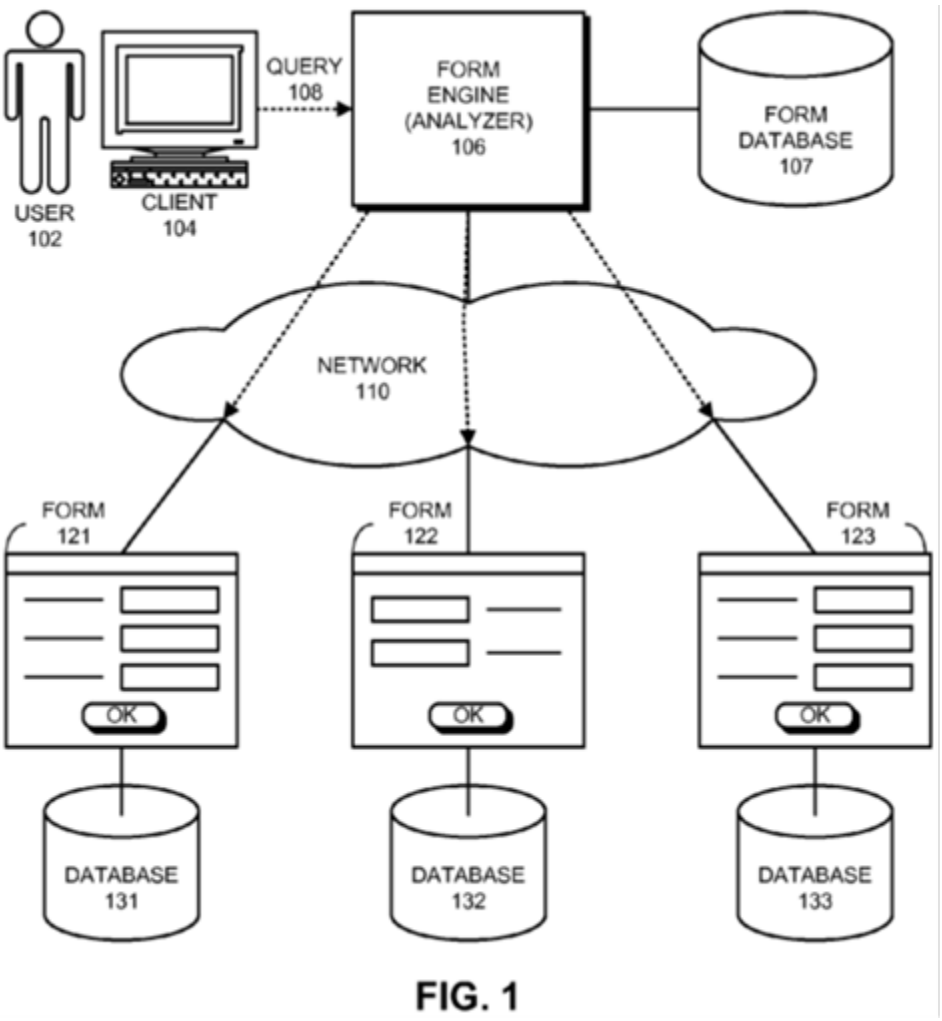


FIG. 1

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 programming variable. *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].

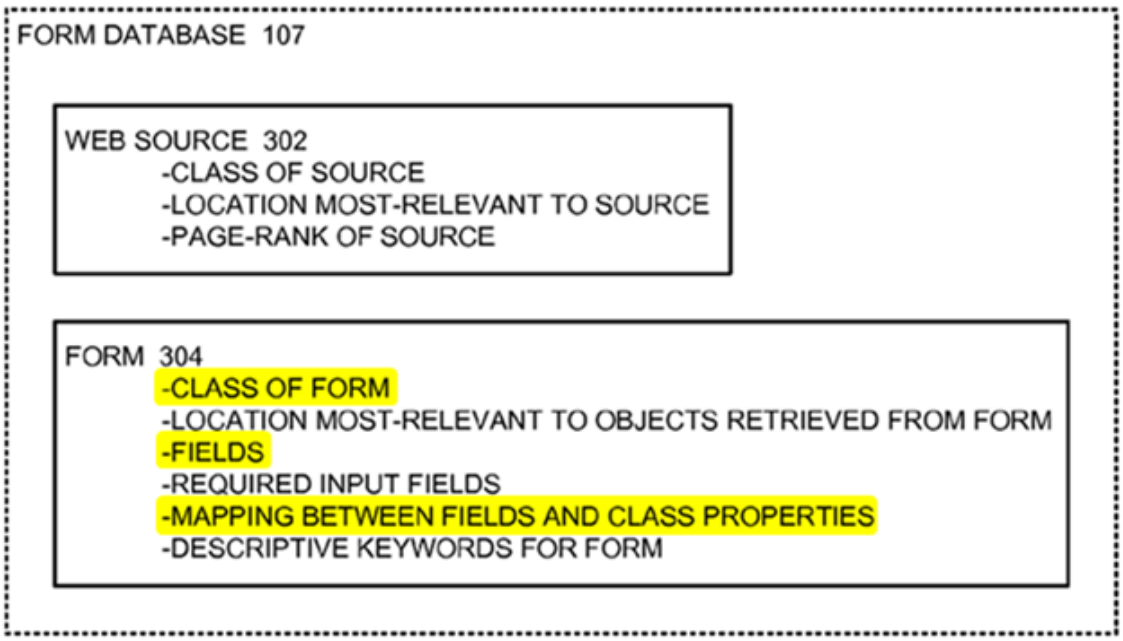


FIG. 3

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).

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].

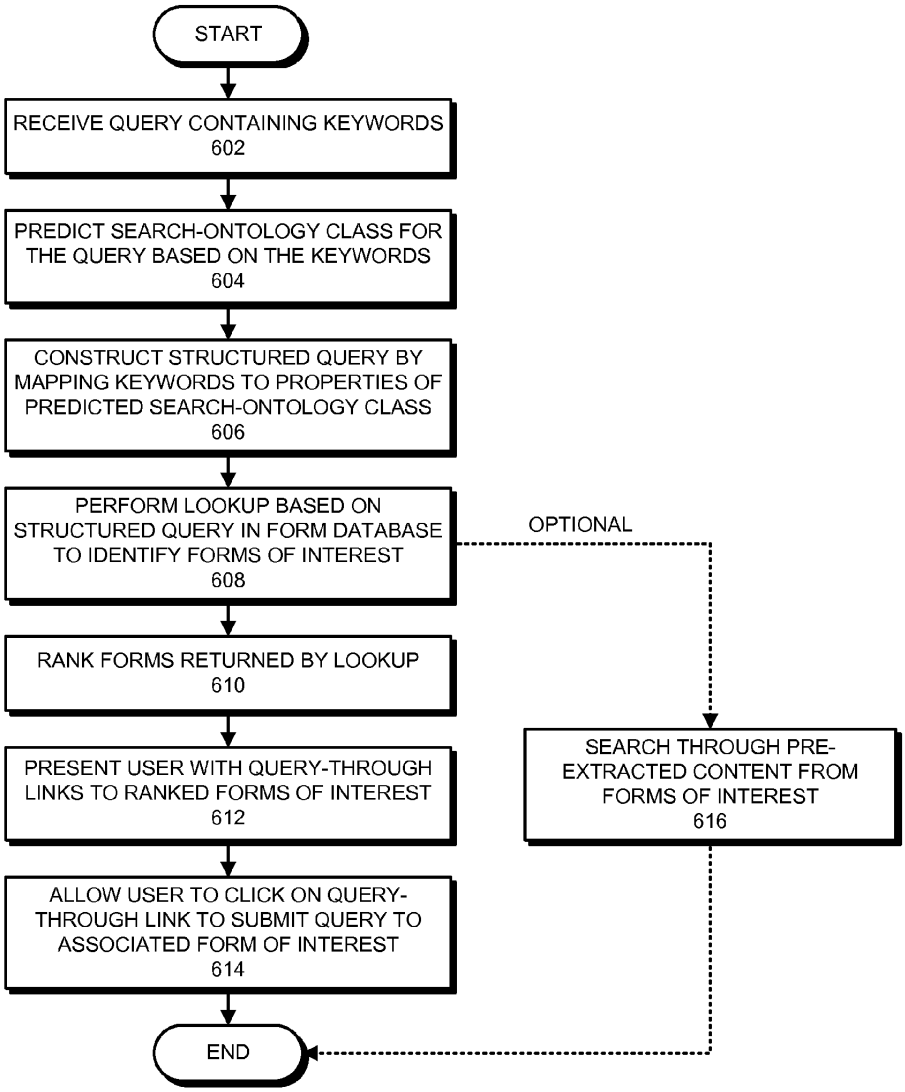


FIG. 6

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-though 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. Reichardt

74. U.S. Patent Application Publication No. 2002/0124255 to Reichardt, et al. ("Reichardt") (Ex-1009) entitled "Systems and Methods for Coordinating Interactive and Passive Advertisement and Merchandising Opportunities" (Ex-

1009) was published on September 5, 2002. Accordingly, I understand that Reichardt is prior art to the '626 patent under pre-AIA 35 U.S.C. § 102(b).

75. Reichardt discloses methods to provide interactive advertisements in various types of video products, including videos displayed in a web browser, to "enhance advertising and merchandising opportunities." Reichardt, Abstract, [0010]. The interactive advertisements can include "one or more graphic advertisements" that are "aired on" a video as "an interactive advertisement indicating the promotion and … its sponsor." *Id*, [0015], [0089], Fig. 11. Selecting the interactive advertisement directs the user to content from the sponsor. *Id*., [0015-20], [0089].

76. The interactive advertisements can be selected for display on a video by, for example, including "a flag in [the video's] header (e.g., in its vertical blanking interval (VBI))" that notifies the web browser "to find and retrieve interactive content for a particular advertiser." *Id*., [0090]. This flag indicates "what content is displayed" by the video, "as well as how the content is being displayed." *Id*., [0091], [0094]. POSAs would have understood this "finding and retrieving" to include retrieving a link that directs the web browser to the advertiser when selected. *Id*., [0015-20], [0090], [0095].

77. One form of advertiser content taught by Reichart is "interactive impulse purchase fulfillment." *Id*., [0099]. Here, a video "product segment may be

sponsored, for example, by DiGiorno and feature an interview with Papa John's Pizza (FIG. 11a)." *Id*. [0099-0100]. An "alert icon 1100 (FIG. 11b)" is also shown on the video that, when selected by the user, displays a "[p]oint-of-purchase window 1120 … to allow the user to order products associated with the interactive content" (Fig. 11c). *Id*. Advertisements selected for this impulse fulfillment feature can "be complimentary to one another and may interact synergistically, thereby enhancing the advertising value of the individual advertisements." *Id*.

B. Motivation to Combine

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

78. 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.

79. 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.

80. 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).

81. 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.

82. 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].

83. 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.

84. 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.

85. 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.

86. 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].

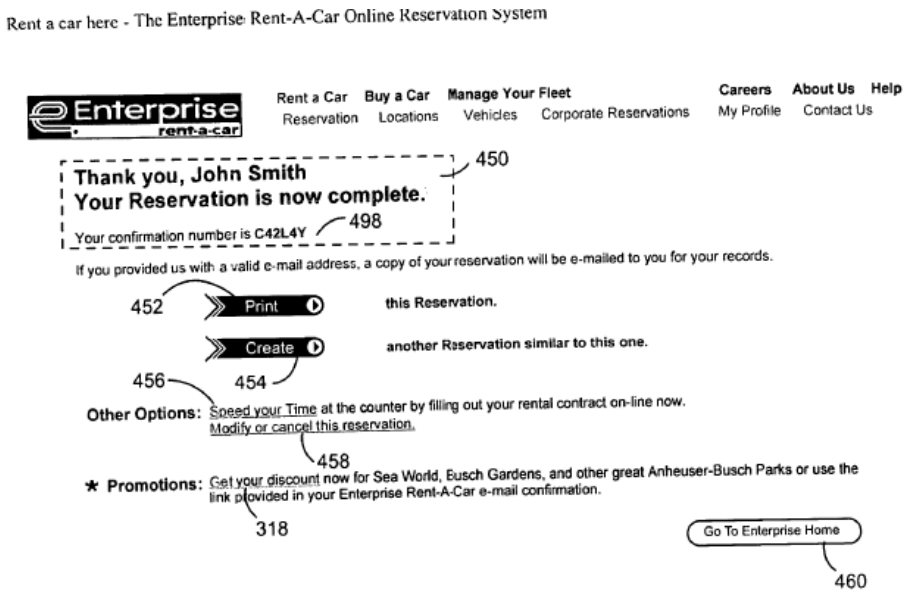


Fig. 53

87. 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.

88. 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].

89. 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].

90. 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 Reichardt.

91. As explained above in Section VIII.B.1, Belanger/Halevy discloses an application server that selects for display promotional deep-links going to the websites of other vendors by querying Halevy's form database with Belanger's user-entered values. POSAs would have been motivated to implement Belanger's application server to generate these promotional deep-links to other websites automatically because POSAs would have understood that generating deep-links that reuse values already entered by the user would have enhanced the user experience by streamlining the user's experience and by providing better ad targeting leading to better overall performance. *See* Belanger, [0026]; *see also* Ex-1001, 2:22-24 ("Advertisers and publishers are finding that the better the targeting of an ad, the better its performance for all parties."), 3:4-6 ("[D]eep-linked ads

have much higher overall return-on-investment for advertisers, translating to much higher monetization rates for publishers.").

92. While Belanger/Halevy does not specifically disclose displaying video on its website, displaying video on webpages through a web browser to advertise products or services was known to POSAs. *See* Reichardt, [0010-15]. POSAs would have been motivated to display videos on websites like Belanger to show users various aspects of its car rental service or points of interest at locations indicated by the user's location entry. For these videos, POSAs also would have been motivated by Reichardt to "integrate interactive program sponsorship, advertising, merchandising opportunities, or any suitable combination thereof, with the video content" as a way to provide Belanger "with an opportunity to collect advertisement revenues" for displaying video promotions. Reichardt, [0010], [0090].

93. Reichardt teaches deriving an interactive ad to insert into a video based on a flag included in the video's header indicating "what content is displayed" by the video, "as well as how the content is being displayed." *Id.*, [0091], [0094]. POSAs looking to display Reichardt's videos with interactive ads on Belanger/Halevy (discussed in the section above) would have been motivated to derive these ads with deep-links by including a description of the video's content in the query to Halevy's form database for the same reasons that Belanger

discloses for providing deep-links to its own website, namely improved user experience by prepopulating some of the parameter values to land the user deeper into the vendor's website based on what is being displayed in the video. Belanger, [0012], [0019-20].

94. POSAs would have understood that implementing Reichardt's teachings regarding dynamically selecting an interactive ad based on the video content by querying Halevy's form database to retrieve a deep-link would have achieved the desirable result discussed in the section directly above of enabling Belanger's application server to dynamically present advertisements including deep-links to a variety of advertiser websites based not only on the user-entered values, but also the content displayed to the user. Specifically, POSAs would have been motivated by Reichardt to implement Belanger/Halevy to display videos on its website that display interactive advertisements based on the video content, where deep-links for the ads are derived from Halevy's form database based on the content in the video. For instance, a video displaying features of a particular vehicle available for rental would include a header indicating the type of vehicle that the application server would use to query the form database to return a deep-link to the vehicle manufacture's website showing a page to configure/purchase the vehicle. *See, e.g.*, Reichardt, [0094], [0099], Figs. 11a-d.

95. POSAs would have reasonably expected success in such an implementation. Reichardt discloses displaying videos on websites with interactive ads based on the content of the video, and it would have been within a POSA's skill to implement this as part of Belanger's application server determining the content to display to the user. *See* Belanger, [0106]. Displaying videos with interactive ads by querying Halevy's database for a deep-link by including the video header data indicating the content of the video would also be within a POSA's skill, as it would have required standard programming techniques well-known to a POSA to concatenate the video header data to the query string submitted to Halevy's system.

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

96. I have been asked to provide my opinion concerning whether claims 1-10 of the '626 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 1-10 would have been obvious to a POSA.

A. Ground 1: Claims 1 and 4-10 are Obvious Over the Combination of Belanger In View of Halevy.

97. After reviewing Belanger, Halevy, and claims 1 and 4-10 of the '626 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, and "Belanger" or "Halevy" refer to their respective disclosures as discussed in Section VIII.A.

1. Claim 1

a. [1PRE] A method, comprising:

98. Belanger teaches a "method of processing a reservation transaction." Belanger, [0014]. An example of performing Belanger's method—when Belanger is implemented to query Halevy's form database—includes displaying promotions on Belanger's webpages with deep-links that reuse the values entered by the user on Belanger's website (e.g., via the webpage in Fig. 37). As detailed below, this method comprises the remaining limitations of claim 1.

b. [1A] generating, by a server computer, a deep-linked ad utilizing a universal variable map stored in a data store and accessible by the server computer, the universal variable map linking programming variables across multiple sites on the Internet and applications;

i. "generating, by a server computer, a deep-linked ad…"

99. In Belanger/Halevy, a promotion displayed on Belanger's webpages (e.g., in Fig. 53 or another page) is a *deep-linked ad*, and Belanger/Halevy discloses *generating* this ad *by a server computer*, as explained below.

100. In Belanger/Halevy, Belanger's "application server" determines the content displayed on Belanger's webpages, including displaying promotions having deep-links generated by querying Halevy's system for deep-links with values in the query mapped to corresponding parameter names in each link.

101. POSAs would have thus recognized Belanger's promotions with Halevy-generated deep-links to be *deep-linked ads*. A POSA would have understood that these ads are 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 a deep-link.

102. A POSA would have understood that Belanger's "application server 200" shown in Figures 6 and 7 that runs a "servlet 220" is a *server computer*. Belanger, [0106-07]. Belanger explains that the application server is part of the "reservation transaction processor 150," which "can be any *computer* that is network connectable." Belanger, [0106], Fig. 6. The application server serves the webpages for Belanger's reservation website via servlet 220 that "retrieve[s]

promotional data" to generate promotions with deep-links. *Id.*, [0107]. Thus, a POSA would have understood that Belanger's application server is software that runs on a *server computer*, and that the servlet generating promotions with Halevy's deep-links discloses *generating*, *by a server computer, a deep-linked ad*.

ii. "… utilizing a universal variable map stored in a data store and accessible by the server computer, the universal variable map linking programming variables across multiple sites on the Internet and applications"

103. In Belanger/Halevy, Belanger's server submits a query to Halevy's system, where the query includes values entered by the user in the fields on Belanger's Fig. 37 webpage. Belanger discloses that its application server runs on a *server computer* (as discussed in the section above) and that when combined with Halevy, submits queries to Halevy's form engine via a web service protocol (e.g., SOAP/XML) to generate deep-links for promotions displayed during the booking process. Belanger, [0110].

104. Halevy's form engine (Fig. 1 below) can "exist on any computing device … accessible through network 110," and processes the submitted query to return deep-links to forms categorized in its form database, with query values mapped to corresponding parameter names in each linked form. Halevy, [0018], [0034], [0136-38], Fig. 1. Thus, POSAs would have recognized that in Halevy's

system, the "form database" (107) is "stored in a data store" and is "accessible by" Belanger's "server computer" via a network.

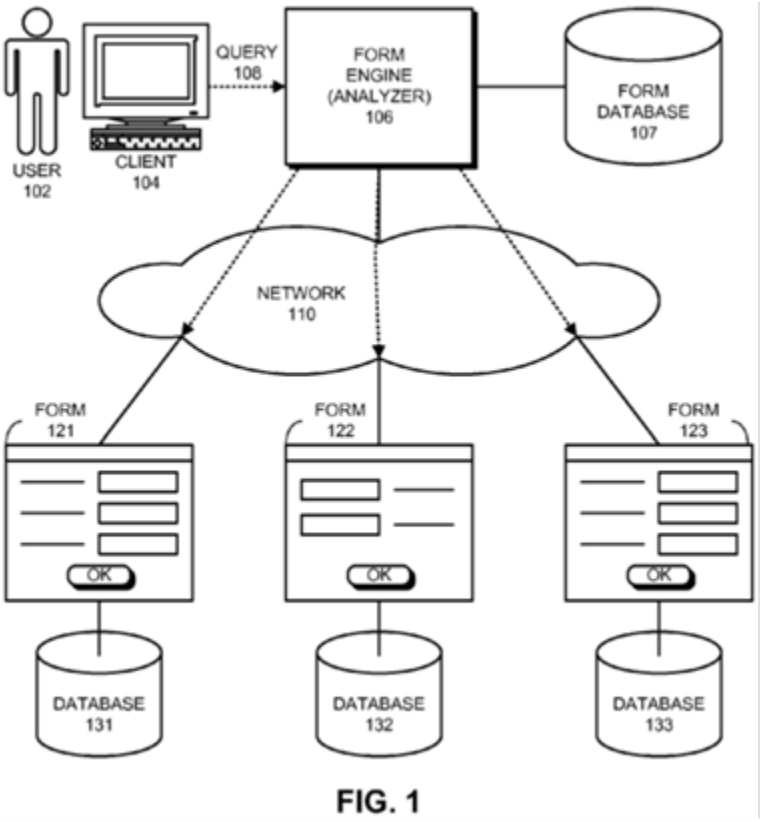


FIG. 1

105. Furthermore, as discussed below, in Belanger/Halevy, generating one or more deep-linked ads involves *utilizing* Halevy's "form database," and this database meets the claimed *universal variable map linking programming variables across multiple sites on the Internet and applications*.

106. Halevy's form database (107) stores information about forms found on multiple different websites. Halevy, [0035], [0043-49]. Halevy discloses that forms are written in "HTML," which a POSA would have understood was a standard language for webpages. Halevy, [0142]; Belanger, [0012]; Jha (Ex-1005),

[0063], [0098]. For each form, Halevy's database stores information about fields in the form, including the "parameter name" of each field. Halevy, [0044]. POSAs would have understood that in HTML, parameter names of fields are the same as what the '626 patent describes as the "names of programming variables and identifiers" (Ex-1001, 13:37-41, Fig. 9). Thus, these parameter names are *programming variables* as claimed.

107. Halevy's database also stores the "output properties" for each form; these properties represent "the type of information [that is] obtain[ed]," and are also called "SO-properties." Halevy, [0048].

108. Halevy's database maps the fields on the form to SO-properties. Halevy, [0049] ("Schema mapping – This is the mapping between the fields in the form and the SO-properties."), Fig. 3 (annotated below).

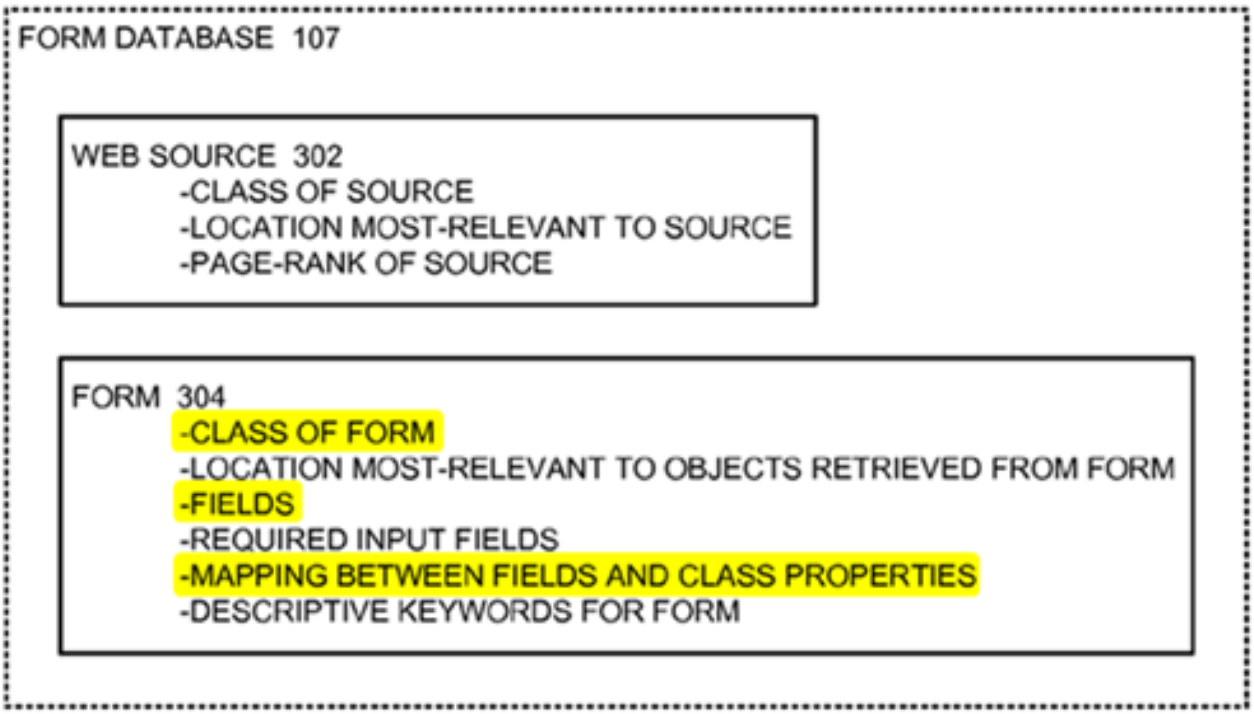


FIG. 3

109. Furthermore, fields from different forms on different sites can map to the same SO-properties. Halevy discloses that for each form, the form database stores the "class" of the form (e.g., "houses, jobs, and cars for sale"). Halevy, [0043-45]. POSAs thus would have understood Halevy to teach that two different forms on two different sites related to, e.g., hotels, would both be cataloged in the form database with the "hotel" SO-class. Accordingly, for each form, the fields on the form are mapped to SO-properties of the "hotel" SO-class via the "schema mapping." Halevy, [0049], [0062]. Thus, POSAs would have understood that, for example, if two different hotel reservation forms both have fields for check-in date, these fields would map to the same SO-property, even if the HTML code on the

two different websites used different parameter names (i.e., *programming variable*) for the check-in date fields.

110. Halevy's disclosure of a database in which corresponding fields from different forms on different websites are mapped to the same SO-properties would have been recognized by a POSA as what the '626 patent refers to as a *universal variable map*. *See* Ex-1001, 17:52-55 ("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)).

111. Thus, Halevy's form database meets the claimed *universal variable map linking programming variables across multiple sites and applications*, because parameter names of corresponding form fields from multiple different websites are linked to each other in the form database by being mapped to the same SO-properties.

112. Furthermore, as discussed below, in Belanger/Halevy, Belanger's "application server" is modified to *utilize* Halevy's form database via a web service communication protocol (e.g., SOAP). In this combination, Belanger's "servlet" on the "application server" (Belanger, [0107-08]) processes data entered by the user in the form fields on Belanger's reservation website and constructs a query submitted via SOAP/XML to Halevy's form database for retrieval of one or

more "query-through links," each link pointing to a "form of interest." Halevy, Abstract, [0137-38].

113. POSAs would have thus recognized that Belanger's server in the combination "*utilizes*" Halevy's form database (i.e., "*universal variable map linking programming variables across multiple sites on the Internet and applications*") to *generate* deep-linked ads.

114. POSAs would have recognized that this same process is applicable to "*applications*" because it was known in the art (as acknowledged by the '626 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. *See* Ex-1001, 1:58-63, 3:7-25; *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").

c. [1B] serving, by the server computer, the deep-linked ad through a first site or mobile application, the deep-linked ad linking a first set of programming variables of the first site on the Internet or the first mobile application[] with a second set of programming variables of a second site on the Internet or a second mobile application, the first set of programming variables being associated with the second set of programming variables in the universal variable map stored in the data store;

i. "serving, by the server computer, the deep-linked ad through a first site or mobile application …"

115. Belanger's "website" discloses "*a first site or mobile application*." Belanger, Abstract, [0020].

116. As explained for Limitation [1A], in Belanger/Halevy, Belanger's "servlet" on the "application server," which runs on the server that meets the claimed *server computer*, 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). A POSA would have understood that Belanger/Halevy would have displayed one or more deep-linked ads resulting from Belanger's application server generating a promotion that includes a deep-link queried from Halevy's form database. Thus, Belanger/Halevy discloses *serving, by the server computer, the deep-linked ad through a first site or mobile application*.

ii. "… the deep-linked ad linking a first set of programming variables of the first site on the Internet or the first mobile applications with a second set of programming variables of a second site on the Internet or a second mobile application, the first set of programming variables being associated with the second set of programming variables in the universal variable map stored in the data store;"

117. 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, … find[ing] web-based forms through methods other than crawling." Halevy, [0009]. A POSA would have recognized that Belanger's own website (i.e., *a first site … or mobile application*) would have been included among the set of "sources" used to "identify web-based forms" (Halevy, [0035]) because Belanger discloses form fields (i.e., *a first set of programming variables*) on its own website. Belanger, [0122]. 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 Belanger's website has a number of forms (i.e., shown in multiple figures), where a POSA would have understood that in the software running Belanger's website each form is associated with "*a set of computer-readable field identifiers used by a first site*"); thus the website is one of "a number of sources" used to "identify web-based forms." Halevy, [0035]; Belanger, [0122].

118. Likewise, to the extent that Belanger's form webpage (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 each of Belanger's form webpages 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.

119. An advertised promotion generated using the combination of 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 web 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 as discussed above, the promotion served on Belanger's webpages (e.g., promotional deep-link 318 in Fig. 53), is a *deep-linked ad* as discussed for Limitation [1A], that includes a deep-link retrieved by querying the 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].

120. POSAs thus would have recognized Belanger's promotion with Halevy's deep-link to each be a "*deep-linked ad linking a first set of programming variables of the first site on the Internet … with a second set of programming variables of a second site on the Internet*" 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. Halevy, [0136-38].

121. Furthermore, POSAs would have understood that *the first set of programming variables*, namely parameter names of the fields from Belanger's reservation web form, would have been *associated with the second set of programming variables*, namely the parameter names of corresponding fields from a vendor's web form, *in the universal variable map stored in the data store*, namely the form database, as explained for Limitation [1A].

122. Halevy explains that the form database is built according to a "schema" (*i.e.*, a model/structure) consisting of a "search ontology" (SO) of "classes and properties." Halevy [0038]; *see* Uschold (Ex-1013), p.1 (defining and explaining "ontology" and "database schema"). The SO-classes (e.g., "a portal, university, news paper") are determined for "each web page." Halevy, [0039-41]. SO-classes are also determined for each form in the webpage to "specif[y] the types of objects … obtained by querying the form," *e.g.*, "books, hotels, restaurants," and "houses, jobs and cars for sale." *Id.*, [0039-45], [0057]. The SO-classes are determined using "web pages that have already been labeled with SO-classes" as training data (*id.*, [0055]) and "the forms on the page are classified into the classes" by "predict[ing] which kinds of objects would be found in the database queried by the form." *Id.*, [0057]. Because existing SO-classes in the hierarchy are used to label web pages and forms, POSAs would have recognized that similar forms across different websites are categorized into the same SO-classes. The SO-

properties are in turn determined for the fields in each form such that multiple corresponding fields from different forms, that are categorized to the same SO-class, map to the same SO-property, as explained for Limitation [1A]. *See* Halevy, [0037], [0095].

123. Because the values for *the first set of programming variables* from Belanger's reservation website (e.g., date and location) are used to query Halevy's form database (including a hierarchy of SO-classes and SO-properties) to retrieve deep-links to vendor web forms prepopulated with the user-entered values mapped to the *second set of programming variables* (the fields at the vendor's website), POSAs would have understood the two sets are *associated with* each other in the form database (i.e., *universal variable map*). Thus, Halevy's SO-properties *link* each mapped field.

d. [1C] and in response to a user interacting with the deep-linked ad displayed on a user device through an instance of the first site on the Internet or the first mobile application:

124. The claimed *deep-linked ad* is the "promotion" shown on Belanger's webpages (e.g., Fig. 53 or another page) with a deep-link generated by Halevy's system, as explained for Limitation [1A]. Belanger discloses that a "customer[]" or "*user*" of its website may "select" promotional deep-links in the promotions, *i.e.*, *interact with* them. Belanger, Abstract, [0019]. This interaction happens *through an instance of the first site on the Internet*, since it happens through one of the

webpages generated by Belanger's reservation website, which is the claimed *first site*, as explained for Limitation [1B]. Furthermore, 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.

125. As detailed below for Limitations [1D] to [1F], the steps that happen *in response to* the user selecting the link in a deep-linked ad in an ad meet the remaining limitations of claim 1.

e. [1D] extracting, through the first site on the Internet or the first mobile application, values corresponding to the first set of programming variables;

126. As explained above for Limitation [1B], serving an ad on Belanger's reservation website (e.g., via Fig. 53 or another webpage) 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 the user-entered values (e.g., date and location) entered on Belanger's reservation website (e.g., Fig. 37 webpage) mapped to corresponding parameter names in Halevy's deep-link. These date and location values are *values corresponding to the first set of programming variables* 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 *first set of programming variables*.

127. 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 through* Belanger's website, for two alternative reasons. First, POSAs would have recognized that these values would have been *extracted through* 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]. 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 *through* the website *in response to the user selecting the deep-link ad*.

f. [1E] automatically directing the user device to the second site on the Internet or the second mobile application; and

128. As explained for Limitations [1C] and [1D], the user's browser in Belanger/Halevy is taken to the vendor website, *i.e.*, the *second site … or mobile application, in response to* the user *interacting with the deep-linked ad* by clicking a promotional deep-link.

129. 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* the vendor website or mobile application. As explained for Limitation [1C], 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 the target destination of that link without the need for further user intervention. Jha, [0168]; Becker, 1.

g. [1F] and passing the values corresponding to the first set of programming variables to the second set of programming variables such that one or more fields corresponding to the second set of programming variables of the second site on the Internet or the second mobile application are explicitly or implicitly prepopulated with the values extracted through the first site on the Internet or the first mobile application.

130. As explained above, POSAs would have understood Halevy to teach that a web form at a website can be automatically invoked using a deep-link including an "invocation string" containing field names (i.e., *programming variables*) set to certain values. Halevy, [0022-23], [0123].

131. 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., *second set of*

programming variables) set to the date and location values (i.e., *values corresponding to the first set of programming variables*), 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 the corresponding fields on the form at the vendor's website.

132. In Belanger/Halevy, the invocation string constructed for the deep-links on Belanger's promotions 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].

133. In view of Halevy's above-discussed teachings 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 the first set of programming variables*" (e.g., date and location values of the corresponding fields from Belanger's reservation website) *"to the second set of programming variables*" (e.g., date and location fields at the vendor's website).

2. Claim 4: The method according to claim 1, wherein serving the deep-linked ad comprises fetching and displaying a deep-linked page, the deep-linked page having information for a product or service.

134. As explained above for Limitation [1A], the *deep-linked ad* recited in claim 4 (which depends from claim 1) is met in Belanger/Halevy by a "promotional deep-link" for a vendor served on a reservation webpage, for example, the promotion 318 shown in Figure 53. Examples of "promotions" in Belanger include promotions for amusement parks. *E.g*., Belanger, Fig. 53 (showing a promotion for an amusement park). A POSA would have understood that a promotion with a deep-link to an amusement park directs the user to a *deep-linked page* for the amusement park *service.*

3. Claim 5: The method according to claim 4, wherein the first set of programming variables comprises a programming variable associated with the product or the service and wherein the second set of programming variables comprises a programming variable associated with an attribute or element of the product or the service.

135. As explained above for Limitation [1A], the fields on Belanger's webpages (e.g., Fig. 37) are "*the first set of programming variables*" for user-entered data "*associated with*" a car rental *product or service*. *See* Belanger, [0122], Fig. 37.

136. Halevy teaches that the fields obtained from a vendor's website form are "*the second set of programming variables*" "*associated with an attribute or*

element of the product or the service" on that website. Specifically, Halevy assigns SO-classes to a form on a webpage based on the form's content. Halevy, [0045] ("e.g., newspapers often have forms for looking for houses, jobs and cars for sale."). Halevy then assigns SO-properties to the form's fields based on the determined class. *Id.*, [0048]. These properties can include the "type of information … obtain[ed]" from the forms, or in other words the "*attribute or element of the product or the service*" obtained from the form. *Id.*

4. Claim 6: The method according to claim 1, wherein the second site on the Internet comprises a second deep-linked ad that utilizes the universal variable map stored in the data store and wherein the second deep-linked ad links the second set programming variables of the second site on the Internet with a third set of programming variables of a third site on the Internet or a third mobile application, the second set of programming variables being associated with the third set of programming variables in the universal variable map stored in the data store.

137. A POSA would have been motivated to utilize Halevy's form database as a web service where Belanger's application server queries the form database with the values entered by the user on Belanger's reservation website to generate a promotional deep-link to other travel-related booking websites (e.g., airline booking, hotel booking, or restaurant booking). As explained for Limitation [1F], the promotional deep-link prepopulates the user-entered data from Belanger's reservation website (e.g., date and location) to the corresponding fields (i.e., *programming variables*) on these other travel-related booking sites.

138. As with Belanger's website, POSAs would have likewise been motivated to implement promotional deep-links on these other travel-related websites using Halevy's web service for generating deep-links based on user-entered data. For example, a promotional deep-link on Belanger's website to an airline booking website (i.e., *a second site*) would have prepopulated the date and location values of the airline booking site's corresponding fields (i.e., *second set programming variables*) for date and location. In the same way as explained for Limitations [1A] and [1B], a promotional deep-link to, for example, a hotel booking site (i.e., *a third site*) would have then been generated for display on the airline booking site by querying (i.e., *utilizing*) Halevy's form database with these same date and location values.

139. As explained for Limitations [1A] and [1B], Halevy's form database is a *universal variable map* linking the fields across these various travel booking sites. A POSA thus would have recognized that via the form database, *the second set of programming variables* from the airline booking site is *associated with the third set of programming variables* from the hotel booking site *in the universal variable map*.

5. Claim 7

a. [7A] The method according to claim 6, wherein interaction between an end user and the second deep-linked ad on the second site on the Internet, through a browser running on a computing device of the end user, directs the browser to the

third site on the Internet or to the third mobile application …

140. As explained above for claim 6, a *second site* like an airline booking site serving a *second deep-linked ad* generated by querying Halevy's form database, deep-linked to a *third site* like a hotel booking site, would have *directed the* user's *browser* to the hotel booking site when the user selects the *second deep-linked ad* in the same way as discussed above for Limitations [1C] and [1E]. Belanger/Halevy thus teaches "*wherein interaction between an end user and the second deep-linked ad on the second site on the Internet, through a browser running on a computing device of the end user, directs the browser to the third site on the Internet or to the third mobile application*."

b. [7B] … and passes values corresponding to the second set of programming variables to the third set of programming variables such that one or more fields corresponding to the third set of programming variables of the third site on the Internet or the third mobile application are explicitly or implicitly prepopulated with the values passed from the first site on the Internet or the first mobile application through the second site on the Internet to the third site on the Internet or the third mobile application.

141. As explained above for Limitation [1F], the Belanger/Halevy combination teaches "*passing the values corresponding to the first set of programming variables to the second set of programming variables such that one or more fields corresponding to the second set of programming variables of the second site on the Internet or the second mobile application are explicitly or*

implicitly prepopulated with the values extracted through the first site on the Internet or the first mobile application."

142. As explained for claim 6, a *second site* like an airline booking site would have served a *second deep-linked ad* to a *third site* like a hotel booking site with user-values pre-populated from the *first site* in the second site's corresponding fields via the first deep-linked ad. POSAs would have similarly understood the Belanger/Halevy combination to likewise teach "*pass[ing] values corresponding to the second set of programming variables to the third set of programming variables such that one or more fields corresponding to the third set of programming variables of the third site on the Internet or the third mobile application are explicitly or implicitly prepopulated with the values passed from the first site on the Internet or the first mobile application through the second site on the Internet to the third site on the Internet or the third mobile application*" for the same reasons explained for Limitation [1F] for the first and second sites.

c. Claim 8: The method according to claim 1, wherein the second mobile application comprises a second deep-linked ad that utilizes the universal variable map stored in the data store and wherein the second deep-linked ad links the second set of programming variables of the second mobile application with a third set of programming variables of a third site on the Internet or a third mobile application, the second set of programming variables being associated with the third set of programming variables in the universal variable map stored in the data store.

143. This claim is the same as claim 6, except that "*second site on the Internet*" is replaced with "*second mobile application*." This limitation is disclosed by Belanger/Halevy for the same reasons explained for Limitation [1B] because Belanger/Halevy discloses linking programming variables across sites and the '626 patent does not provide any distinction between operating with websites and *mobile applications*.

144. POSAs thus would have understood that Belanger/Halevy would have likewise mapped the fields of a mobile application in the same way as it does for fields on websites using the same communication protocols.

6. Claim 9

a. [9A] The method according to claim 8, wherein interaction between an end user and the second deep-linked ad in the second mobile application on a computing device of the end user directs the computing device to the third site on the Internet or to the third mobile application …

145. This limitation is the same as Limitation [7A] above except that "*second site on the Internet*" is replaced with "*second mobile application*." This

limitation is disclosed by the Belanger/Halevy combination for the same reasons explained for Limitation [1B] because Belanger's website is displayed in a web browser application and POSAs would have understood that a mobile application would have displayed Belanger's site or other travel-related sites according to the user interaction, or that such a mobile application would implement similar display, interaction, and linking behavior as with the websites.

b. [9B] … and passes values corresponding to the second set of programming variables to the third set of programming variables such that one or more fields corresponding to the third set of programming variables of the third site on the Internet or the third mobile application are explicitly or implicitly prepopulated with the values passed from the first site on the Internet or the first mobile application through the second mobile application to the third site on the Internet or the third mobile application.

146. This limitation is the same as Limitation [7B] except that "*second site on the Internet*" is replaced with "*second mobile application*." This limitation is disclosed by Belanger/Halevy for the same reasons explained for Limitation [1B] because Belanger's reservation website is displayed in a web browser application and POSAs would have understood that a mobile application would have displayed Belanger's site as well as other travel-related sites according to the user interaction, or that such a mobile application would implement similar display, interaction, communication, and linking behavior as with the websites. Accordingly, POSAs

would have recognized the passing of values to mobile applications to behave in the same way as for websites.

7. Claim 10: The method according to claim 1, wherein the deep-linked ad comprises at least one of a page, a banner, an icon, an animated ad, a text-based ad, or a check box.

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

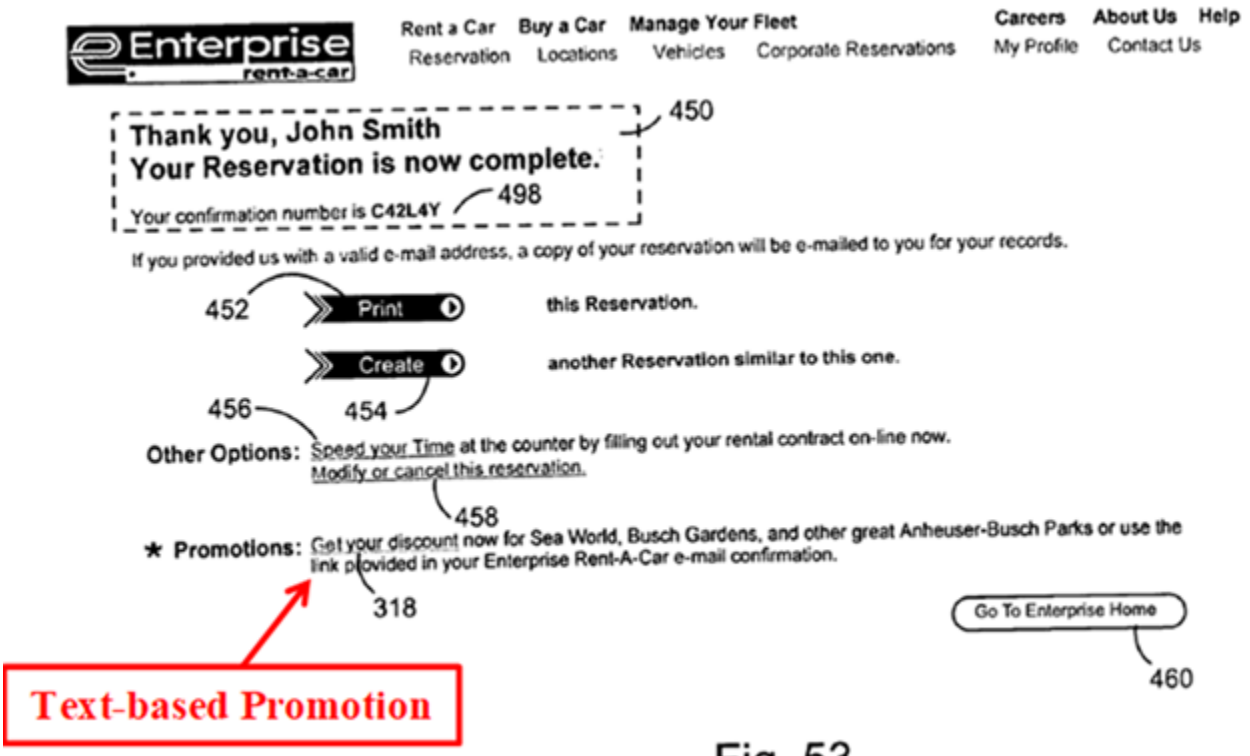


Fig. 53

148. POSAs would have thus recognized Belanger to teach that its deep-linked promotions (i.e., "*the deep-linked ad*") "*comprise[] at least one of … a text-based ad ….*"

B. Ground 2: Claims 1 and 4-10 are Obvious Over the Combination of Belanger and Admitted Prior Art (APA) In View of Halevy.

149. Belanger in view of Halevy (Ground 1) renders claims 1 and 4-10 obvious.

150. 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 '626 patent, such sites were known, as were mobile applications doing the same. Ex-1001, 2:53-59, 3:7-25. 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.*, 2:53-59.

151. 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.*, 2:57-66.

152. 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.*, 3:11-13. This mapping was done via manual coding "by

developing programmatic integrations between variables and fields" on the publisher's and advertiser's websites. *Id.*, 3:17-20. Manual coding was necessary because each website was known to use "its own field descriptors and variable names." *Id.*, 3:20-25.

153. 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.

154. 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.*, 3:26-28. 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 2 and 3 are Obvious Over Belanger and Halevy In View of Reichardt.

155. After reviewing Reichardt in addition to Belanger and Halevy (as discussed in Ground 1), and claims 2 and 3 of the '626 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/Reichardt" refers to Belanger and Halevy in view of Reichardt as discussed in Section VIII.B.2, and "Belanger," "Halevy," or "Reichardt" refer to their respective disclosures as discussed in Section VIII.A.

1. Claim 2: The method according to claim 1, wherein serving the deep-linked ad comprises inserting the deep-linked ad into a video on the first site on the Internet or in the first mobile application, the video showing a product or service.

156. As explained for Limitation [1B], Belanger/Halevy teaches "*serving the deep-linked ad … on the first site on the Internet or in the first mobile application*" by serving promotional deep-links on its webpages.

157. To the extent that Belanger/Halevy does not specifically disclose that these promotional deep-links are "*inserted*" into a video displayed on Belanger's reservation website, Reichardt teaches a method for inserting selectable linked ads into a video.

158. Reichardt discloses providing interactive advertisements in videos being displayed in a web browser. Reichard, [0010], [0015-17]. These interactive advertisements include "one or more graphic advertisements, such as selectable graphics" that "promote any suitable product or service." *Id.*, [0015], [0089], [0094]. These selectable advertisement graphics include an interactive ad displayed as an "alert icon" that is overlaid "onto the video signal to alert the user" that an interactive ad is available. *Id.*, [0090], [0093-94]. The user selecting the interactive advertisement (e.g., "alert icon"), causes the "display [of] a point-of-purchase window in which purchase information for the product or service is displayed." Reichardt, [0094].

159. One method that Reichardt teaches for inserting an interactive ad is overlaying an alert icon in a video (e.g., playing in a web browser) by using "a flag in [the video's] header (e.g., in its vertical blanking interval (VBI)) that alerts" the web browser "to find and retrieve" an interactive ad "for a particular advertiser." *Id*., [0090] (describing retrieving "interactive content" as one approach for "displaying a linked interactive advertisement"), [0093-94]. The flag can include

"passive guide characteristics" that indicate "what content is displayed by the passive video product, as well as how the content is being displayed." Reichardt, [0091], [0094]. Thus, POSAs would have understood Reichardt to teach that its interactive ad (e.g., alert icon) is "*inserted into a video … showing a product or service*" because the interactive ad is overlaid on a video based on finding and retrieving the ad for a particular advertiser according to the content being displayed in the video.

160. Since Reichardt teaches that its interactive advertisements "provide the system provider or some other interested entity with an opportunity to collect advertisement revenues" (*id.*, [0090]) and that "content related to the segment" is used to select an ad icon for display in a video based on "[p]assive guide characteristics" including "information that indicates what content is displayed" (*id.*, [0091], [0094]), POSAs would have found it obvious to modify Belanger/Halevy to likewise insert promotional deep-links into video segments playing on Belanger's website according to Reichardt's teachings, where the deep-link would have been derived from Halevy's form database based on the flag described in Reichardt indicating the video's content.

2. Claim 3: The method according to claim 2, wherein the deep-linked ad is selected based on content being displayed or played to the user through the first site on the Internet or the first mobile application.

161. Reichard discloses selecting an ad for a video "*based on content being displayed or played to the user*" because a flag is inserted in the video header that notifies the web browser "to find and retrieve interactive content for a particular advertiser." *Id*., [0090], [0094]. This flag can include "passive guide characteristics" that indicate "what content is displayed by the passive video product, as well as how the content is being displayed." *Id*., [0091], [0094].

162. POSAs would have understood that modifying Belanger/Halevy with Reichardt's teachings would have allowed Belanger/Halevy to likewise insert interactive advertisements in videos playing on its website based on the content indicated for the video included in the video header's flag. POSAs would have recognized that the flag would have been used to query Halevy's form database to return a deep-link based on the content indicated for the video, thereby selecting the deep-linked ad "*based on content being displayed or played to the user*" on Belanger's website.

D. Ground 4: Claims 2 and 3 are Obvious Over Belanger, Admitted Prior Art (APA), and Halevy In View of Reichardt.

163. This ground incorporates the analysis of Belanger and APA in view of Halevy over claim 1 as set forth in Ground 2 (Section IX.B), and the analysis of

Belanger/Halevy in view of Reichardt as set forth in Ground 3 (Section IX.C). This ground additionally renders claims 2 and 3 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 ’626 patent discussed for Ground 2.

X. 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 Alan Fox