UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

GOOGLE LLC,
Petitioner,

v.

BOOTLER, LLC,
Patent Owner.

Case No. IPR2025-00967
Patent No. 10,445,683

PETITION FOR INTER PARTES REVIEW
UNDER 35 U.S.C. §§ 311-319 AND 37 C.F.R. § 42.1 et seq

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1024	U.S. Patent Application Publication No. 2012/0246132 ("Sebastian")
1025	U.S. Patent Application Publication No. 2017/0270184 ("Huang")
1026	U.S. Patent No. 5,896,517 ("Wilson")
1027	U.S. Patent Application Publication No. 2012/0233414 ("Meier")
1028	U.S. Patent Application Publication No. 2012/0123910 ("George")
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MANDATORY NOTICES

A. Real Party-In-Interest

Petitioner Google LLC is the real party-in-interest.[1]

B. Related Matters

1. United States Patent & Trademark Office

The following U.S. patent application claims the benefit of priority to U.S. Patent 10,445,683:

U.S. Patent Application 16/565,034 (U.S. Patent No. 11,037,090), filed September 9, 2019.

2. United States Patent Trial and Appeal Board

Petitioner is concurrently filing a petition for *inter partes* review of U.S. Patent No. 11,037,090 under Case No. IPR2025-00958

3. U.S. District Court for the Northern District of Illinois

U.S. Patent No. 10,445,683 and U.S. Patent No. 11,037,090 are currently asserted in *Bootler, LLC v. Google LLC*, Case No. 1:24-cv-3660.

[1] Google LLC is a subsidiary of XXVI Holdings Inc., which is a subsidiary of Alphabet Inc. XXVI Holdings Inc. and Alphabet Inc. are not real parties-in-interest to this proceeding.

C. Counsel and Service Information - §42.8(b)(3) and (4)

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A power of attorney is submitted with the Petition. Counsel for Petitioner consents to service of all documents via electronic mail.

I. INTRODUCTION

Petitioner requests *inter partes* review and cancellation of claims 1-16 (the "challenged claims") of U.S. Patent No. 10,445,683 ("the '683 patent") (EX1001).

II. STANDING

Petitioner certifies that the '683 patent is available for *inter partes* review and that Petitioner is not barred or estopped from requesting *inter partes* review as to the challenged claims. 37 C.F.R. §42.104(a).

III. GROUNDS FOR UNPATENTABILITY

The challenged claims are unpatentable under 35 U.S.C. §103 according to the following grounds:

Ground Number and Reference(s)		Claims
1	Rahle (EX1005), Rhodes (EX1006)	1-6, 10-16
2	Rahle, Rhodes, Jin (EX1007)	1-16
3	Rahle, Rhodes, Belousova (EX1008)	1-6, 10-16
4	Rahle, Rhodes, Belousova, Jin	1-16

Each reference above is prior art under at least post-AIA 35 U.S.C. §102(a)(2). Rahle and Jin are prior art under §102(a)(1).

None of these references were of record during prosecution of the '683 patent.

IV. THE ’683 PATENT

A. Specification Embodiments

The ’683 patent discusses “aggregating, processing, and presenting service data,” which is “data retrieved from a particular delivery service source,” *e.g.*, “food or beverage delivery services.” EX1001, 3:48-54. According to the “background” section, “delivery services” were known commercial entities that had “recently…been introduced” to allow customers to order “food and beverage items from among several restaurants for which the delivery service can deliver food and beverage items” to the “customer’s home or business.” EX1001, 1:24-45. Example delivery services include “Eats Inc.” and “DeliverMe.co,” and both these services deliver from restaurants including “Flo Crepes Delivery.” EX1001, FIG. 11, 17:1-3, 17:59-60.

In some embodiments, data collected from delivery services can be used to “allow[] a consumer to search” for “restaurant and delivery services that are available from a particular location and match some search criteria.” EX1001, 3:55-59. For example, a user can search the ’683 patent’s system for “American” food, and the system can present “matching restaurant results that are available through one or more delivery services.” EX1001, 15:37-16:19, FIGs. 8-9.

Embodiments discussed in the ’683 patent “request (pull) restaurant and menu data from a plurality of delivery service computers…by scraping (harvesting

or extracting) the requested data from websites or by interfacing with the delivery service computer via an application programming interface (API)." EX1001, 10:40-51. A "record linkage" process "identifies common restaurants" represented in data from "multiple delivery services" (e.g., a same restaurant that more than one delivery service delivers from), by recognizing that the "restaurant name, geocoordinates, street address, etc." in more than one delivery service's data belong to the same "master restaurant" known to the system. EX1001, 11:45-12:8. System embodiments also combine "multiple source menus"—e.g., obtained from different delivery services delivering from the same restaurant—by "match[ing] or link[ing]" each "source menu item" to an identical "master menu item" in the system's "single master menu" for the restaurant. EX1001, 12:47-13:21. In one example, the combined data "allows for the user to search for terms such as 'pizza' and find all restaurants associated with that label." EX1001, 13:41-60.

B. Person of Ordinary Skill in the Art ("POSA")

A POSA as of the '683 patent's filing date would have had a bachelor's degree in computer science, computer engineering, electrical engineering, or a similar degree, with one or two years of experience with data management. EX1001, 1:19-20. More education could compensate for less practical experience, and vice versa. EX1003 ("Crovella-Decl."), [0019]-[0021].

C. Prosecution History

The applicants amended the originally-filed claims after a rejection. EX1002, 90-103, 127-133. Applicants argued that the amendments distinguished over cited prior art that collected data from either restaurants or review sites rather than from delivery service computers. EX1002, 134-138, 145. The examiner then allowed the claims. EX1002, 161-162.

V. CLAIM INTERPRETATION

Claim terms are construed herein using the standard used in civil actions under 35 U.S.C. §282(b), in accordance with the ordinary and customary meaning as understood by a POSA and the patent's prosecution history. 37 C.F.R. §42.100(b).

VI. GROUND 1: RAHLE+RHODES RENDERS OBVIOUS CLAIMS 1-6, 10-16

A. Rahle (EX1005)

Rahle describes techniques for aggregating and sharing "[s]tructured information about nodes…in a social networking system…, such as menu items for a restaurant." Rahle, Abstract. A social networking system is a web service that stores information about users, entities (including restaurants), and other "real-world concepts" (e.g., food items) in a "social graph" data structure, wherein users and entities are represented as "nodes" connected by "edges" representing interactions between nodes. Rahle, [0002]-[0005], [0014]. A restaurant having a

web page is representable as a "page object" node, and the social graph can store associations between the restaurant node and "sub-nodes…representing…the menu items served by the restaurant." Rahle, [0014]-[0016], [0017]-[0018] (restaurant page object is a "type of node"), [0039]. Each sub-node representing a particular menu item can be stored with connections to all nodes representing restaurants that serve that menu item; "a sub-node for burritos, for example, may be used for all restaurants serving burritos." Rahle, [0016], [0023]-[0024], [0035]. A user can search the social graph for menu-item sub-nodes to find restaurants (represented by associated nodes) that serve those menu items, such as "by searching for all restaurants that serve burritos" in a specified location. Rahle, [0023], [0059], claims 27-28. Crovella-Decl., [0034]-[0036].

Rahle describes "a variety of methods" for generating sub-nodes, such as menu items, and associating those sub-nodes with nodes, such as restaurants that serve those menu items, in the social-graph structure. Rahle, Abstract, [0021]-[0022], [0005], [0037]-[0050]. The system gathers information regarding restaurants' menu items from various sources, and generates data mappings that associate the appropriate restaurant nodes with the appropriate menu-item sub-nodes based on the gathered information. Rahle, [0037]-[0044]. One way the system can gather such information is by providing a "user interface" or an "application programming interface (API)" by which a restaurant "page owner"

can input or upload the restaurant's "menu items," which the system maps to "sub-nodes to be associated with" the restaurant's "page." Rahle, [0041] (discussing "page interface module"). Another way is to gather information from "third-party website[s] and other data licensed from third-party providers," such as gathering information on a restaurant's "menu items [as] listed on an external website" or licensing such information from "restaurant-review websites." Rahle, [0038] (discussing "external data gathering module"). The system processes this information to identify the sub-nodes corresponding to the listed menu items, and a "data mapping module" maps them "to the correct page object" (e.g., restaurant) node in the system. Rahle, [0038]-[0039]. "Inexact matching, including fuzzy matching that accounts for misspellings, and feedback from users…may also be used in matching sub-node[s]…to attributes of page objects." Rahle, [0022]. "A machine learning module…may be used…to refine data mapping of external data and other information gathered about sub-node and page objects." Rahle, [0044]. As a result of these various techniques, for example, multiple "Mexican restaurants represented by page objects" that "all serve burritos" may "be associated with a sub-node object…for 'burrito'" in the social-graph data structure. Rahle, [0035]. Crovella-Decl., [0037]-[0043].

B. Rhodes (EX1006)

Rhodes discusses a "service" that "enable[s] customers to order food items from a variety of restaurants, and may arrange for couriers to deliver the food items from the restaurants to the customers" (Rhodes, 1:11-15)—i.e., a "delivery service" (Rhodes, 3:8-29), as discussed in the '683 patent's Background (EX1001, 1:33-45). The customer "may use the website associated with the [delivery] service provider…to place an order." Rhodes, 9:31-35. The customer's "web browser" and the delivery service's "website" together function as a "buyer application" that "present[s] a GUI…that enables the buyer…to browse through the items available from different merchants" (e.g., restaurants) and "plac[e] an order." Rhodes, 9:28-37, 11:46-51. "[T]he buyer may scroll through the listing of merchants, select a merchant from which to order, and then be presented with a menu of the items provided by the selected merchant." Rhodes, 24:42-45, FIGs. 8-9; Crovella-Decl., [0051]-[0052].

Rhodes teaches that "[c]onventionally," delivery services charge "delivery fees" tied to "delivery zones," such that "the further away the buyer is from the merchant [restaurant], the higher the delivery fee." Rhodes, 2:31-37. Additionally, different restaurants may have different "revenue sharing arrangement[s]" with different delivery services that affect the delivery fees. Rhodes, 3:52-60, Abstract, 3:17-20. For example, a restaurant having a "higher

revenue sharing arrangement" with the delivery service may have "a very large delivery zone" while another restaurant may have a "dramatically smaller" zone "due to a lower revenue sharing arrangement," such that "the delivery fee is higher for merchants having lower shared revenue and lower for merchants having higher shared revenue values." Rhodes, 3:52-60, 24:1-4, 13:43-47. The delivery service's website GUI may present to the buyer "merchants and items and the delivery fee that are available for the buyer to select for delivery." Rhodes, 15:14-17, FIGs. 8-9; Crovella-Decl., [0053].

C. Rahle-Rhodes Combination

Rahle's system seeks to gather information about restaurants' menu items from various sources, enabling users to compare "aggregated" information in a rich data structure where "more information" provides "enhanced user experience" where "users become more engaged." Rahle, [0004]-[0005], [0023], [0035], [0038], [0064]; *supra* §VI.A. Information about restaurants' menu items can be gathered directly from restaurants and/or from "external…third-party website[s] and other data licensed from third-party providers." Rahle, [0038], [0041]. For example, a restaurant "may already have menu items listed on an external website" from which Rahle's system can "gather such menu information." Rahle, [0038]. Also, "a third-party database or external system," *e.g.*, a "restaurant review website[]," can "provide a listing of sub-nodes" including menu items directly to

Rahle's system via API, "to be associated with" a particular restaurant's "page object." Rahle, [0021]; Crovella-Decl., [0054].

Rahle teaches that one type of "external system" that makes available "a listing of sub-node objects" including a restaurant's menu items is "a food ordering system." Rahle, [0047]. Rhodes teaches that a known type of food ordering system is a "delivery service," which can provide a website, hosted on a computer, presenting "a menu of the items provided by" each restaurant from which the delivery service delivers. *Supra* §VI.B; Rhodes, 2:31-34, 3:8-29, 24:42-45, FIGs. 8-9, 9:28-37, 11:46-51, 36:1-12; Crovella-Decl., [0055]. And the '683 patent acknowledges that it was "background" knowledge that "delivery services" provided "a website or application" listing "items…available" for ordering from "restaurants for which the delivery service can deliver." EX1001, 1:22-45 ("Background of the Invention" section); Crovella-Decl., [0055]. Thus, POSAs understood that a delivery service is both "an external website" (external to the restaurant) where a restaurant "may already have menu items listed" and an "external system" (e.g., a "food ordering system") capable of providing restaurant menu items via API, as Rahle discusses. Rahle, [0038], [0021], [0047]; Crovella-Decl., [0055]. Given Rahle's teachings to gather information about restaurants' menu items from such "third-party" "website[s]" and "external systems" (Rahle, [0038]), POSAs would therefore have been motivated and reasonably expected

success to implement Rahle's system to obtain such information from delivery services like Rhodes's (alternatively or in addition to obtaining menu-item information from other sources Rahle describes). Crovella-Decl., [0056]. POSAs understood that "receiving, aggregating, and sharing" this information from available sources including delivery services would provide "a better understanding of" items available from restaurants and "enhanced user experience." Rahle, [0004]; Crovella-Decl., [0057].

For example, POSAs understood that not all restaurant owners may be attentive to providing or updating their own information in a social-networking system, whereas a delivery service's information about restaurant menu items may be more likely up-to-date to allow customers to order those items; therefore, POSAs would have been motivated to implement Rahle's system to obtain menu data from delivery services to capture data that might otherwise be missed or left out-of-date. Crovella-Decl., [0057]; *see* Rahle, [0025] (teaching desirability of obtaining restaurant menu-item data from sources other than the restaurant page owner to identify items being served that the page owner did not input to the social graph).

Also, Rhodes teaches (and POSAs knew from experience) that it was "[c]onventional[]" for customers to order restaurant food from delivery services that may charge differing "delivery fee[s]." Rhodes, 2:31-41; *supra* §VI.B;

Crovella-Decl., [0058]. Based on Rhodes's teachings, POSAs understood that delivery services may have differing "revenue sharing arrangement[s]" with restaurants, which may result in different services charging different delivery fees for delivering from the same restaurant. Rhodes, 3:52-60, Abstract, 3:17-20, 3:52-60, 24:1-4, 13:43-47; Crovella-Decl., [0059]. POSAs would therefore have been motivated to implement Rahle's system to obtain information about restaurants and their menu items from delivery services for the additional purpose of collecting and sharing information about applicable delivery fees for ordering such menu items from various delivery services, to "enhance[] [the] user experience" by "provid[ing] a better understanding" including such "valuable structured information" (Rahle, [0004]), which is readily available from delivery services' websites and systems as Rhodes teaches (Rhodes, 15:14-17, FIGs. 8-9). Crovella-Decl., [0059].

Rahle further teaches generally that "web pages hosted on websites external to the social networking system…may be represented as page objects," and that "[a]ny concept that can be embodied in a web page may become a node in the social graph…in this manner." Rahle, [0015]. Thus, in implementing Rahle's system to obtain restaurant and menu-item information from delivery-service websites, POSAs would further have been motivated and reasonably expected success to represent each delivery service as a node (e.g., page object) in the social

graph. Crovella-Decl., [0060]. This would further a goal Rahle teaches of using the social graph to allow "users [to] interact with many objects external to the social networking system that are relevant" to an entity the user is interested in, like a restaurant (e.g., "'San Tung Chinese Restaurant'"). Rahle, [0015]; Crovella-Decl., [0060].

In the resulting implementation, a restaurant's page-object node and menu-item sub-nodes would be linked (associated) with each delivery service's page-object node in the social graph, because both are "attributes" of the delivery service's webpage and have a connection to the delivery service that is desirably representable as information in the graph. Rahle, [0014], [0022], [0040]; Crovella-Decl., [0061]. POSAs would have reasonably expected success because Rahle teaches that nodes (including page objects) and sub-nodes can be linked to multiple different other nodes and sub-nodes. *E.g.*, Rahle, [0035] ("Mexican restaurants represented by page objects…may all serve burritos and be associated with a sub-node object…for 'burrito.'"), [0040] ("multiple streaming music services may be linked to the same sub-node object…for a song that is listed on the artist's page on the social networking system"). POSAs would have been motivated to associate menu-item sub-nodes with delivery-service page objects to beneficially allow users to search for a menu item and be presented options for delivery services providing that item, potentially with different delivery fees that can also be presented to

better inform the user, as Rhodes discloses. Rhodes, 2:31-37, 15:14-17; Crovella-Decl., [0062].

POSAs would reasonably have expected success in each above-described implementation aspect, which all utilize capabilities Rahle already discloses, including the "external data gathering module," "sub-nodes," and "page objects." Rahle, Abstract, [0015], [0038]; Crovella-Decl., [0065]. Rahle's system is intended to be flexible and to provide links between sub-nodes and various types of page objects beyond the specific examples Rahle mentions. Rahle, [0015] ("Any concept that can be embodied in a web page may become a node…."), [0017]-[0018] (restaurant page object is a "type of node"); Crovella-Decl., [0065]. Adapting Rahle's system, which already gathers information on restaurants and their menu items from various sources including "third-party" "website[s]" and "external systems," to collect such menu data from delivery services that each host menus for multiple restaurants would have been a simple adaptation of Rahle's software programming that was within a POSA's ordinary skill. Crovella-Decl., [0065] (citing corroborating EX1010, [0009]-[0010]; EX1011, [0002]; EX1012, [0005]; EX1013, [0003]).

D. Mapping to Challenged Claims

1. Claim 1: [1PRE] A computer-implemented method for providing a searchable aggregated data structure for a networked application, the method comprising:

Rahle discloses "***method***[s]" (Rahle, pp. 10-13: claims) *for providing a* "social graph" including "nodes connected by edges that are stored on a social networking system" (Rahle, [0014]). "Nodes include…objects of the social networking system, such as web pages embodying concepts and entities, and edges connect the nodes." Rahle, [0014]. One node type is "a graph object for a restaurant" whose "web page[] may be represented as [a] page object[] in the social networking system." Rahle, [0014]-[0015]. Within the graph, there are "sub-node objects" representing potential "attributes of page objects" (nodes), "such as menu items for a restaurant." Rahle, [0022], [0005]. By "generat[ing] associations between…sub-nodes and [a] node," the graph stores information about, *e.g.*, which "menu items [are] served by a restaurant." Rahle, [0005].

Rahle's social graph—or alternatively a portion of the social graph containing nodes representing restaurants and sub-nodes representing menu items—is *a searchable aggregated data structure*. The graph is composed of "***structured data***" (Rahle, [0064]) including nodes and sub-nodes connected by edges/associations (Rahle, Abstract, [0014], [0005], [0018], FIG. 1 below); thus, it is a *data structure*. Information in the graph is "***aggregated***," including around

menu-item sub-node objects (Rahle, Abstract, [0004]-[0005], [0023], [0035], [0064]), and the graph can be "***searched***"—e.g., for restaurants that serve a user's desired menu item, or for known menu items that are already represented as sub-nodes to be associated with a restaurant newly identified as serving those items. Rahle, [0022]-[0023], [0031], [0047]-[0049], claims 27-28. Thus, the graph is a *searchable aggregated data structure*.

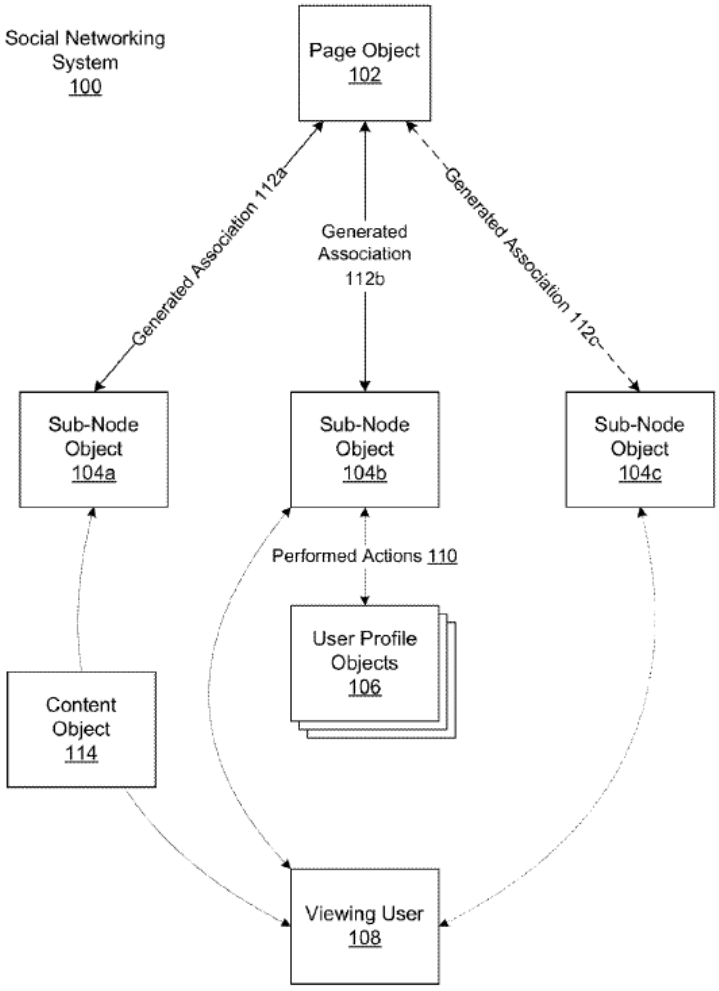


FIG. 1

Rahle's methods are "***implemented by computer***" in a "social networking system 100" including a "web server" and other *computer-implemented* "modules." Rahle, [0067]-[0070], [0029]-[0036], FIG. 2 (below).

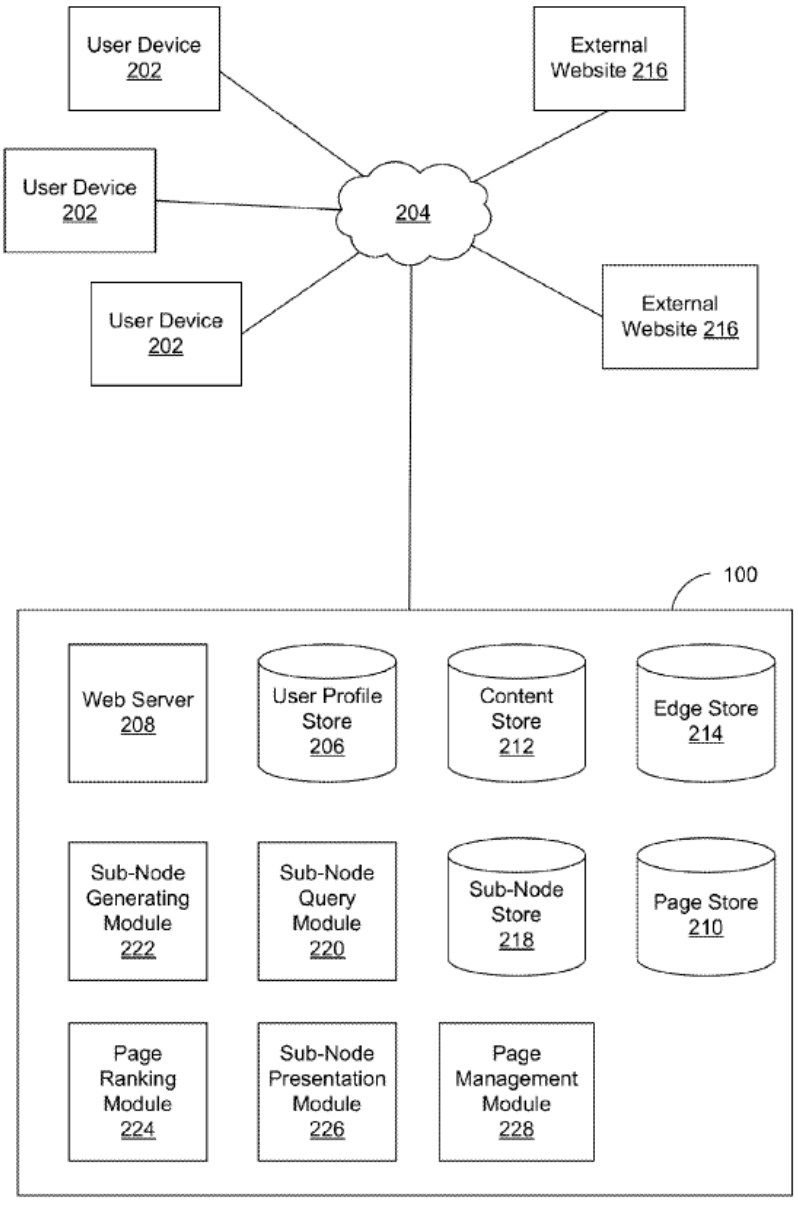


FIG. 2

Social networking system 100 includes "modules for various ***applications***," and interacts via "***network*** 204" with "user devices" that execute "an ***application***, for example, a browser ***application***…to interact with the social networking system," such as by searching the social graph. Rahle, [0026]-[0031], [0023], claim 8. Thus, Rahle's *searchable aggregated data structure* is *provided for a networked application*.

a. [1A] acquiring, by a processor, source data from a plurality of delivery service computers associated with a plurality of food or beverage delivery services over a communication network, the acquired source data being in a plurality of formats, where the acquired source data includes, for each one of the plurality of food or beverage delivery services, data representing multiple source menu items provided by multiple restaurants,

Rahle's techniques "can be executed by a computer ***processor*** for performing any or all of the steps, operations, or processes described." Rahle, [0068]. Rahle's techniques discussed *supra* §VI.A include *acquiring source data from a plurality of computers over a communication network, where the acquired source data includes data representing multiple source menu items provided by multiple restaurants*. For example, "[a]n external data gathering module" executed by the system's *processor* "interfaces with external websites" to *acquir[e] source data representing source* "***menu items*** listed on [the] external website[s]" as being *provided by* particular *restaurants*. Rahle, [0038]. The data Rahle's system

acquires *includes multiple source menu items provided by multiple restaurants*, such as data representing "nachos" and "flan" as menu items one "Mexican restaurant" provides, data representing "burritos, quesadillas, and nachos" as menu items another "Mexican restaurant" provides, and data sufficient to identify "all restaurants serving burritos." Rahle, [0021], [0036], [0016], [0035], [0059] (system "provide[s] an interface for users to view…food ***items***…such as tacos, burritos, and quesadillas, as well as ***restaurants*** represented by pages that serve these items"). Furthermore, as discussed *supra* §VI.C and further below in this section, in Rahle-Rhodes, the acquired data may include the same restaurant's menu acquired from multiple sources (*e.g.*, websites of different delivery services serving that restaurant). The "external websites" are hosted on *a plurality of computers* from which the system *acquires* this *source data over* "***network*** 204" (*a communication network*), as shown in FIG. 2. Rahle, [0026]-[0030].

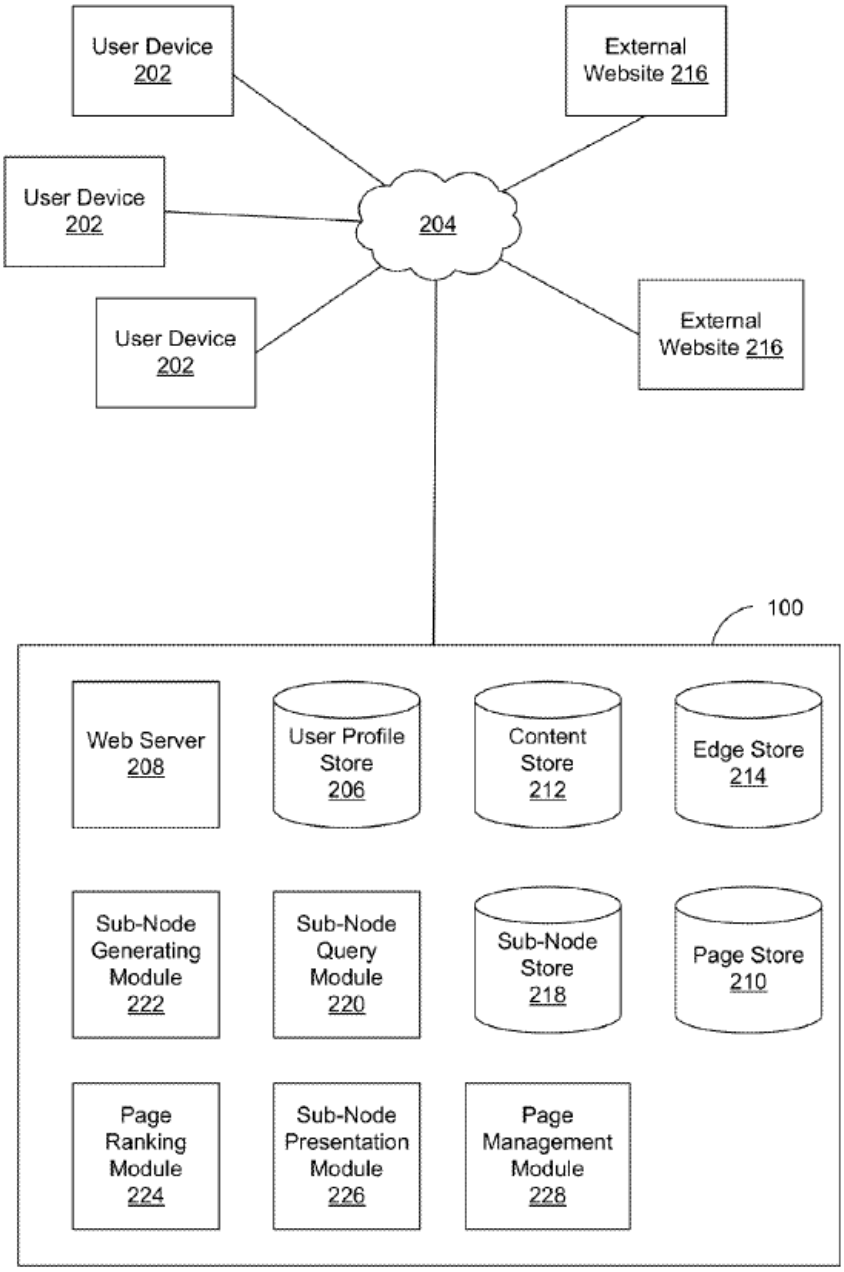


FIG. 2

In the Rahle-Rhodes combination, Rahle's *processor acquires* this *source data from a plurality of food or beverage delivery services* like Rhodes's; these delivery services use *computers* (Rhodes, 36:1-12) which host "external

website[s]" or "external systems" from which source menu data is acquired in Rahle (Rahle, [0038]). *Supra* §VI.C; Crovella-Decl., [0055]. Thus, in Rahle-Rhodes, the delivery services' computers are *a plurality of delivery service computers associated with a plurality of food and beverage delivery services*, and Rahle's system *acquires source data* from these computers *over a communication network* as discussed in the previous paragraph.

Rhodes teaches that each delivery service has a "computing device 102" that communicates over "network(s) 106" and can host a website presenting "a ***menu*** of the ***items*** provided by" each *restaurant* from which the service delivers. Rhodes, 36:1-37:49 ("service computing device 102" includes "communication interface(s)" enabling communication over networks such as "Internet" or "cellular networks"), FIG. 1 (showing "Service Computing Device(s) 102" connected to other devices over "Network(s) 106"), FIG. 12 (illustrating components of "service computing device"), 24:42-45 (buyer application lets user "select a merchant from which to order, and then be presented with a ***menu*** of the ***items*** provided by the selected merchant"), 25:64-26:1 (describing "Italian ***Restaurant***" as exemplary "merchant"), FIGs. 8-9 (illustrating buyer application, *see* 23:1-4, 25:64-26:1), 9:28-37 (buyer can use buyer application to place order from a "service provider," *i.e.*, delivery service, *see supra* §VI.B), 11:46-51 (buyer can browse "items available from various different merchants" and place order with delivery service).

Rhodes teaches that the *source data* that can be *acquired from each one of the plurality of food or beverage delivery services* includes *data representing multiple source menu items provided by multiple restaurants—e.g.*, "California burrito," "chili queso & chips," various "tacos," and "iced tea" provided by "The Tex-Mex Restaurant," and "spaghetti primavera" and "cheese lasagna" provided by "The Italian Restaurant." Rhodes, FIGs. 8-10, 3:11-16, 11:46-51 (delivery service website lets buyer "browse through the items [plural] available from various different merchants").

Rahle teaches that "listing[s]" of "sub-node objects" received "through an external system" can be in the form of an "Excel spreadsheet, a database file, or a comma separated value file." Rahle, [0047]-[0049]. Additionally, Rahle teaches that "data exchanged over [a] network" linking the social networking system with external websites can be "represented using technologies and/or ***formats*** including the hypertext markup language (HTML) and the extensible markup language (XML)." Rahle, [0028]. Thus, Rahle discloses the *acquired source data being in a plurality of formats*. *Compare* Rahle, [0028] *with* EX1001, 10:35-64 (referring to delivery service computers storing data in various "file formats" and noting that "data acquisition and processing module" can acquire data in "format[s]" including "HTML" and "XML").

b. [1B] wherein said acquiring data comprises one or more of: employing an application programming interface (API) to interface with the plurality of delivery service computers; or scraping data from the plurality of delivery service computers;

Rahle discloses that a "third-party external system may have listings of sub-nodes that are associated with [a] page object, such as menu items that a particular restaurant serves," and that "[t]hrough an ***interface*** with the social networking system, sub-nodes may be generated for respective page objects representing the restaurant," where the sub-nodes may include "menu items served by the restaurant." Rahle, [0016]. One such "interface" Rahle discloses is an "***application programming interface (API)***," which third parties may use "to generate sub-node objects…to be associated with a particular page object…such as…a menu of food items for a restaurant." Rahle, [0032]; *see also* Rahle, [0047]. In Rahle-Rhodes, Rhodes's "delivery services" are third parties whose *plurality of delivery service computers* (*supra* §VI.D.1.a ([1A])) submit data to Rahle's social-networking system. *Supra* §VI.C. Thus, in Rahle-Rhodes, *acquiring data comprises employing an application programming interface (API) to interface with the plurality of delivery service computers*. This suffices to meet claim 1, which can be met by any "***one*** *or more of*" the two recited *acquiring* options.

Rahle also discloses an "external data **gathering** module" that "interfaces with external websites"—*e.g.*, Rhodes's delivery-service websites in Rahle-Rhodes

(*supra* §VI.C)—"to process information about sub-node objects…of the social networking system…. For example, a page owner of a page object…for a restaurant may…have menu items listed on an external website…. The external data **gathering** module…may be used to gather such menu information…to generate sub-nodes." Rahle, [0038]. POSAs understood that "gathering" information from the external websites involves what the '683 patent refers to as *scraping*. EX1001, 10:48-49 (referring to "scraping (harvesting or extracting) the requested data from websites"); Crovella-Decl., [0040]. At minimum, POSAs would have found it obvious to implement the "external data gathering module" to scrape websites, as this was a typical and customary way to extract information from websites that was within a POSA's skill. Crovella-Decl., [0040] (citing corroborating EX1014, 1:11-13 ("Web scraping generally includes activities to extract data or content from a website"); EX1009, [0004]-[0005]).

c. [1C] mapping, by the processor, the acquired source data according to a predetermined data format to provide formatted data, wherein said mapping comprises aliasing fields of the acquired data from formats used by the plurality of delivery service computers to respective fields of the predetermined data format;

Restaurant menu items that Rahle's system acquires from third-party websites/systems (including Rhodes' delivery service webpages/systems) are *acquired source data*. *Supra* §VI.D.1.a ([1A]). The menu items are stored in

Rahle's "social graph." *Supra* §VI.D.1 ([1PRE]); Rahle, [0005], [0014]-[0015], [0022]. Rahle's social graph uses a *predetermined data format* representing information as node objects (including page objects), sub-node objects, and edges/associations linking nodes and sub-nodes; the sub-node objects are stored in a "sub-node store," ([0031]), page objects are stored in a "page store," ([0031]), and edges are stored in an "edge store" ([0034]). Storing the menu information in Rahle's format involves *mapping*, *e.g.* converting, the information from the format in which it existed on the third-party websites/systems into Rahle's format, to *provide formatted data* (*i.e.* data in Rahle's social graph). *See* EX1001, 11:24-27 ("A mapping module…transforms the received raw files by converting the raw files from its particular source format to a standardized format.").

The '683 patent provides an "example" of "aliasing" in which fields used by delivery services (which may be in different forms from each other) to describe the same concept are mapped to a standardized set of one or more fields in a database. EX1001, 11:26-44 (showing different representations for delivery fees from two different services being converted to the same field format). The patent provides no other definition or description of "aliasing," and POSAs understood that the mapping of one or more fields representing the same concept in potentially differing forms to the same standardized field invokes the generally known connotation of "aliases" as different ways of representing or referring to a same

thing (e.g., as an author's "alias" is another name for the same person). Crovella-Decl., [0032].

Rahle discloses using "[i]nexact matching, including fuzzy matching that accounts for misspellings," to match pages to sub-node objects. Rahle, [0022]. In Rahle-Rhodes, where sub-nodes represent menu items and a menu item can be provided by multiple delivery services (*supra* §VI.C), this results in mapping to the same sub-node different mentions of the same menu item from different delivery service computers that may use different terminology or spelling for that item, such that the sub-node field and the various source fields having different terminology/spellings are aliases of each other. Thus, in Rahle-Rhodes, the *mapping comprises aliasing fields of the acquired data from formats used by the plurality of delivery service computers to respective fields of the predetermined data format*.

For example, Rahle's system maps different types of fields used by different third-party systems to the same standardized sub-node fields in similar fashion as the '683 patent's above-discussed example, as explained below. Rahle discloses that "[e]ach of the menu items in [a] file" obtained from a restaurant "may be searched for in the social networking system…to identify a sub-node matching the menu item." Rahle, [0047]. "[I]dentifying information of a sub-node object" includes fields such as "a sub-node object identifier or the name of the sub-node."

Rahle, [0048]. Rahle discloses that this search capability allows a sub-node to be "matched" to a user query for an item, where the query may include the item's name as it appears on a menu, such as "tofu taco." Rahle, [0049]-[0050]. Thus, Rahle teaches that a food item that is represented by one *field* in source data from an external system such as a restaurant's menu (*e.g.* an item name that may be spelled differently and/or use different terminology in different menus) is represented in the graph by a sub-node that has its own identifying fields (*e.g.* a standardized sub-node name or identifier), enabling a search for a form of the item's name to return the sub-node identifying that item. Thus, in Rahle-Rhodes, where the external third-party systems include Rhodes's delivery services (*see supra* §VI.C), Rahle's system maps *fields* used to store data on the different delivery services' computers to *fields* of sub-nodes.

As discussed *supra* §VI.D.1.a ([1A]), Rahle's techniques "can be executed by a computer ***processor*** for performing any or all of the steps, operations, or processes described"; thus, the *mapping* is performed *by the processor*. Rahle, [0068].

d. [1D] linking, by the processor, the formatted data to common restaurants based on restaurant identifier data such that at least one food or beverage delivery service is linked to each common restaurant and its source menu items;

In Rahle's system, a "graph object for a restaurant may have several defined attributes," including "location." Rahle, [0014]. Rahle's system includes a "data mapping module" that maps "data gathered from external systems" to "the correct page object" "based on analyzing attributes of the page objects to identify matching external data." Rahle, [0039]-[0040]. Thus, Rahle teaches that the data mapping module *links* the *formatted data*, *i.e.*, the formatted menu-item data gathered from external systems (*see supra* §VI.D.1.c ([1C])), to the correct page object for a restaurant *based on* "attributes" including, *e.g.*, the restaurant's "location" as matched in the external data.

"Restaurant location data" is a type of *restaurant identifier data*. *See* EX1001, claim 3. The restaurants that the *formatted data* is linked to are *common restaurants*, for two independent reasons. First, the restaurants share menu items in common. *Supra* §VI.A; Rahle, [0016], [0023]-[0024], [0035]. Second, in Rahle-Rhodes, any restaurant may be served by multiple delivery services. *Supra* §VI.C; *see* EX1001, 11:51-56 (referring to a "master ***restaurant***…that may be ***common*** across multiple delivery services"). Additionally, as explained *supra* §VI.C, in Rahle-Rhodes, a restaurant's page-object node and its menu-item sub-

nodes are linked in the social graph with the page-object node for any delivery service serving the restaurant. Rahle, [0014], [0022], [0040]. Thus, *at least one food or beverage delivery service is linked to each common restaurant and its source menu items*.

This linking is performed *by the processor* for the same reasons discussed *supra* §VI.D.1.c ([1C]).

e. [1E] identifying, by the processor, common menu items among the source menu items in the formatted data, and, for each identified common menu item, associating the source menu items with a master menu item;

As discussed *supra* §VI.C, in Rahle-Rhodes, "sub-nodes" represent food items such as burritos that may appear in multiple menus from multiple restaurants, and these sub-nodes are associated with "page objects" representing restaurant websites or delivery-service websites. Rahle, [0014], [0022], [0040]. Rahle says that "sub-node objects" may be "associated with a page object" by "***identifying*** attributes of page objects that match existing sub-node objects." Rahle, [0022]. Thus, Rahle associates the sub-node for a food item (*e.g.*, a burrito) with the page object representing a restaurant or delivery service website by *identifying* the listing of a burrito as an item on the website as an "attribute" of the page object representing the site, which "match[es]" the "sub-node object[]" for the burrito menu item. Rahle, [0022].

The burrito is a *common menu item*, because it is a menu item that appears on, and is thus *common* to, multiple menus. Rahle, [0035] ("Mexican restaurants represented by page objects 102 may all serve burritos and be associated with a sub-node object 104 for 'burrito.'"), [0016], [0023]-[0024], [0059]. As discussed *supra* §VI.D.1.a ([1A]), the restaurant menu items are *source menu items*, which are in *source data*. Thus, Rahle teaches that the *source menu items* appear *in the formatted data* that is created by formatting the source data as discussed *supra* §VI.D.1.c ([1C]). Moreover, Rahle discloses that there are multiple items common to different menus. Rahle, [0036] ("The page object… may provide a complete listing of the ***menu items*** served, including burritos, quesadillas, and nachos."), [0059] ("a viewing user may view typical Mexican food items, such as tacos, burritos, and quesadillas, as well as restaurants represented by pages that serve these items"). In Rahle-Rhodes, which gathers menu-item information from multiple delivery services that can serve food from the same and/or different restaurants as discussed *supra* §VI.C, Rahle's system will identify not only menu items that are *common* to multiple restaurants, but also *common* to multiple delivery services (e.g., multiple delivery services serving the same restaurant and/or serving different restaurants that offer the same menu item). Thus, Rahle-Rhodes *identifies common menu items among the source menu items in the*

formatted data. The *identifying* is performed *by the processor* for the same reasons discussed *supra* §VI.D.1.c ([1C]).

The '683 patent discusses an exemplary "*master menu item*" as a logical representation of a menu item that is linked to the corresponding item on the menus of various restaurants; in other words, for example, if multiple restaurants have pizza as a menu item, those source menu items may all be associated with a master menu item representing pizza. EX1001, 13:1-5 ("In an example method, the trained algorithm identifies sets of identical items…. For each set of identical items that is identified, all items in the set are linked (e.g., related) to a combined master menu item…"), 13:10-13, 13:58-60 (system allows identification of "all restaurants associated with [the] label" "pizza"); Crovella-Decl., [0031]. Rahle likewise discloses that a "sub-node" representing a food item such as a burrito may be linked to the menus of multiple restaurants serving burritos. Rahle, [0016] ("a sub-node for burritos, for example, may be used for all restaurants serving burritos"), [0023] (discussing "sub-node object 104 for 'burrito'" and ranking restaurants linked to that sub-node as serving burritos), [0024], [0035], [0059]. Thus, a "sub-node" of Rahle representing a food item such as a burrito is a *master menu item*.

Furthermore, by virtue of restaurants being associated with a sub-node, the items on each restaurant's menu that correspond to the sub-node, *i.e.*, the *source*

menu items, are also *associated* with the sub-node, *i.e.*, the *master menu item* (as explained in the paragraph above). This is consistent with Bootler's apparent construction in litigation. *See* EX1015, 10 (pointing out for "*identifying…*" limitation [1E] that restaurants are grouped around food items: "Google Food also groups restaurants by restaurant type, as shown here for 'hamburger.'").

f. [1F] combining, by the processor, the linked data and the master menu items into a master data set;

The '683 patent refers to "[e]xample systems" where "the ***master data set*** represent[s] the multiple menu items provided by the plurality of food delivery services." EX1001, 5:28-40. As discussed *supra* §VI.D.1.d ([1D]), Rahle-Rhodes's formatted *data*, *i.e.*, the menu-item data gathered from external systems and formatted, is *linked* to page objects for restaurants. Additionally, as discussed *supra* §VI.D.1.e ([1E]), the "sub-nodes" representing food items are *master menu items*, and these "sub-nodes" are also associated with restaurants' page objects and menu-item data. In Rahle-Rhodes, the "sub-nodes" represent food items that may be delivered by multiple delivery services, as discussed *supra* §VI.C. Thus, Rahle-Rhodes meets *combining the linked data and the master menu items into a master data set*, *i.e.*, the set of formatted source menu-item data and sub-node data. The *combining* is performed *by the processor* for the same reasons discussed *supra* §VI.D.1.c ([1C]).

g. [1G] importing the master data set and the restaurant identifier data into the searchable aggregated data structure; and

Rahle's social graph—or alternatively a portion of the social graph containing nodes representing restaurants and sub-nodes representing menu items—is *the searchable aggregated data structure* discussed *supra* §VI.D.1.a ([1A]). Rahle discloses adding, *i.e.*, *importing*, data into the social graph as new data is acquired, *e.g.*, added by users or discovered by the "external data gathering module." *See*, *e.g.*, Rahle, [0016] ("social networking system may ***import***…user generated content as generated sub-nodes of" a "page object[] representing" a "restaurant"), [0038] (describing exemplary use of "external data gathering module" to "***import***" a music catalogue), [0021] (discussing creation of new sub-node objects for newly-discovered food), [0051] (same). Thus, in Rahle-Rhodes, after a set of restaurant menu data is acquired and associated with sub-nodes representing food items (as discussed *supra* §VI.C), the *master data set* representing the menu data and sub-nodes (*see supra* §VI.D.1.f ([1F])) is *imported into* the social graph. Likewise, *restaurant identifier data* is *imported* into the social graph as new "attributes" of a restaurant's page object in the social graph (*see supra* §VI.D.1.d ([1D])) when new restaurant data identifying those attributes is acquired as discussed above. The *importing* is performed *by the processor* for the same reasons discussed *supra* §VI.D.1.c ([1C]).

h. [1H] storing the searchable aggregated data structure in a database accessible to the processor.

Rahle *stores* its social graph, *i.e.*, the *searchable aggregated data structure* (*supra* §VI.D.1 ([1Pre])), as data in a collection of data "***stores***." Rahle, [0029]-[0036], Fig. 2. Rahle teaches that the stores are *accessible to the processor* because the *processor* performs various operations on the social graph (which is data stored in the stores), including search and retrieval operations (*supra* §VI.D.1 ([1Pre])) as well as others discussed above for Elements [1A], [1C]-[1G]. POSAs understood that these stores together constitute a *database*. Crovella-Decl., [0044]; *see* EX1033 ("Fedorov") (incorporated by reference in Rahle, [0014]), 4:8-10 (disclosing representing social-networking "object[s]…in…formats, such as a database"), 25:42 ("database objects"); EX1016, 462 ("database" defined as "a collection of data arranged for ease and speed of search and retrieval"). At a minimum, POSAs would have found it obvious and reasonably expected success to implement the "stores" in a database, because using databases to store structured data such as social-graph data was customary and was within a POSA's skill. Rahle, [0032] (sub-nodes may be created from information in a "database of structured information" input to Rahle's system); Crovella-Decl., [0044] (citing corroborating EX1017, 1:38-41 ("dataset[s]" are "typically stored according to digital, electronic data structures such as…an electronic relational database."); EX1018, [0003] (discussing known background concept of "graph databases")).

2. Claim 2

The ’683 patent discusses “raw” data obtained from delivery service computers as being data in the format in which it is acquired before conversion to the system’s data structure’s format. EX1001, 5:43-46, 10:58-64. Rahle’s “external data gathering module,” which “interfaces with external websites” to retrieve *data objects* (e.g., menu items), performs *scraping* to *extract* the menu items *from webpage data* (e.g., menu listings on the webpage), or at minimum would have been obvious to implement this way. Rahle, [0038]; *Supra* §VI.D.1.b ([1B]). POSAs knew, for example, that “***extracting*** or mapping content found on multiple websites related to a specific business” was a beneficial way of gathering “details about local restaurants” that “can then be searched by an end-user through a web-based interface.” Crovella-Decl., [0040] (quoting corroborating EX1009, [0004]-[0006], [0064] (corroborating POSAs’ knowledge that “identifying, collecting, analyzing, mapping and ***extracting*** relevant information…associated with a specific local business gathered from multiple online data sources” including third-party “websites” was a beneficial way of gathering information “about restaurants” as in Rahle)). In Rahle-Rhodes, menu-item data objects are gathered in their native format from external websites and then converted to the social graph’s formatting; thus, the objects are *raw data objects* when they are extracted from webpage data. *Supra* §VI.D.1.c ([1C]). Furthermore, in Rahle-

Rhodes, external websites include *delivery service computers* as Rhodes teaches. *Supra* §§VI.C, VI.D.1.a ([1A]). Thus, *said scraping comprises extracting raw data objects from webpage data from the delivery service computers*.

3. Claim 3

Rahle makes use of "attributes" of a restaurant, which are *restaurant identifier data* and include the restaurant's location, *i.e.*, *restaurant location data*. Rahle, [0014]; *supra* §VI.D.1.d ([1D]). This satisfies claim 3, which recites, "restaurant identifier data comprise ***one or*** more" of a list. Furthermore, Rhodes discloses (consistent with POSAs' understanding) that restaurants have "names"; thus, in Rahle-Rhodes, it would at minimum have been obvious to treat the restaurant's name, *i.e. restaurant name data*, as a restaurant "attribute." Rhodes, 24:42-50; Rahle, [0014], [0022]; Crovella-Decl., [0063].

4. Claim 4

Said linking is [1D]'s *linking*, which is met in Rahle-Rhodes by Rahle's "data mapping module" mapping formatted menu-item data to "the correct page object" for a restaurant "based on analyzing attributes," *i.e. restaurant identifier data*, "of the page objects to identify matching external data." Rahle, [0039]-[0040]; *supra* §VI.D.1.d. Restaurants identified by the page objects are *the common restaurants*. *Supra* §VI.D.1.d ([1D]). POSAs understood, or at minimum would have found obvious, from Rahle's description at [0039]-[0040] that the

"correct page object" representing a restaurant is identified by *analyzing* the restaurant page-object attributes, *i.e.*, *the restaurant identifier data*, to determine, for a given set of externally-acquired data, the correct restaurant to which the data should be mapped, especially given that restaurant menu data may come from sources other than the restaurants themselves, such as Rhodes's delivery service websites/systems in Rahle-Rhodes (*supra* §VI.C). Crovella-Decl., [0041].

In Rahle-Rhodes, each restaurant is represented by its own "page ***object***"; thus, the page object representing a restaurant is a *master restaurant data object*. *Supra* §§VI.C, VI.A; Rahle, [0014]-[0016], [0017]-[0018]; EX1001, 11:60-64 ("…master restaurant data object (e.g., a data object uniquely identifying a master restaurant…)"). Each common restaurant is *linked to formatted data* including that restaurant's menu. *Supra* §VI.D.1.d ([1D]). Because restaurants are represented by "page objects," *i.e. master restaurant data objects* as discussed above, the formatted data is *associated with like common restaurants* and is *linked to a master restaurant data object*.

5. Claim 5:

a. [5PRE]-[5A]

The recited *identifying* occurs as part of Rahle's process of associating sub-node objects representing food items with corresponding menus from restaurants serving those items (as provided by delivery-services in Rahle-Rhodes). *Supra*

§VI.D.1.e ([1E]); Rahle, [0022]. Rahle discloses performing this associating as part of "generating" sub-nodes (Rahle, [0022]), and discloses an embodiment where a "sub-node generating module" uses a "machine learning module" using a "machine learning ***algorithm***" to "analyze user feedback…to ***train*** the data mapping model for mapping sub-node objects to page objects[.]" Rahle, [0044], [0029]. Thus, the *identifying comprises training an algorithm* in Rahle-Rhodes based on Rahle's teachings. Additionally, identifying items on different menus that map to the same food item involves *identifying sets of identical menu items*, because mentions of a menu item identified on more than one different menu constitute a *set* of menu items, and each set of mentions that all refer to the same food item (e.g., a burrito) is a *set of identical menu items*.

Moreover, Rahle discloses that the *identified menu items* include *menu items having same or different spellings or descriptions*, because different restaurants may or may not spell or describe the same item slightly differently. Rahle, [0022] ("Inexact matching, including fuzzy matching that accounts for misspellings…may also be used in matching sub-node[s]…to attributes of page objects."). Furthermore, the menu items from which the identical sets are identified are *from across different delivery services*, since the menus are obtained from the delivery-service computers. *Supra* §VI.D.1.a ([1A]).

b. [5B]

Each set of identical menu items in Rahle-Rhodes is a set of items on different menus that are all associated with a sub-node representing a given food item. *Supra* §VI.D.5.a ([5A]). The sub-node objects are *master menu items*. *Supra* §VI.D.1.e ([1E]). The recited *associating* is met by Rahle's disclosure of associating page objects for restaurant menus with sub-node objects for food items served by those restaurants. *Supra* §VI.D.1.e ([1E]); Rahle, [0016], [0024], [0035], [0045]. Rahle discloses "generat[ing]," *i.e.* "***creat[ing]***," sub-nodes for food items during the associating process if a food item is found on a menu and a sub-node for that item does not already exist. Rahle, [0021] ("a new sub-node object…for flan may be **generated** because the sub-node object…for flan had not yet been ***created*** in the social networking system").

Finally, as explained below, for *each set of identical menu items*, the sub-node, *i.e.* the *master menu item* as discussed above, *contains references to the identified identical menu items*. In Rahle, each sub-node representing a particular menu item can be stored with connections to all nodes representing restaurants that serve that menu item. *Supra* §VI.A; Rahle, [0016], [0023]-[0024], [0035]. POSAs understood, or at least would have found obvious, that these connections are implemented via *references* in the sub-node objects to the page objects representing the restaurant menu webpages, because implementing objects with

such references to other objects was a typical way to create connections between objects and was within a POSA's programing skill. Crovella-Decl., [0046] (citing corroborating EX1019, 1:22-25, 1:42-49; EX1020, [0004]; EX1021, 3:35-45).

6. Claim 6

Rahle discloses an embodiment where the "***train[ing]***" process discussed *supra* §VI.D.5.a ([5A]) utilizes "user feedback." Rahle, [0044] ("a social networking system…uses a machine learning algorithm to analyze user feedback…to ***train*** the data mapping model for mapping sub-node objects to page objects"). POSAs understood that using "user feedback" to "train" involves *using the multiple source menu items and/or previously collected menu data*, because the "feedback" provided by the user is feedback on how accurately the previously-collected menu data was mapped. Crovella-Dec., [0042]; Rahle, [0044] (discussing example of user feedback used to identify data previously "incorrectly mapped" to wrong page object).

7. Claim 10

a. [10PRE]-[10A]

The '683 patent refers to generating a "grid of points spanning a city's area," where "each master restaurant data object is determined to fall either inside of or outside of a given point's delivery range." EX1001, 13:50-56. The patent does not explain what it means for a "point" to have a delivery range, but it refers to "geographic points that each restaurant is available from." EX1001, 16:7-11.

Thus, POSAs understood that *grid points within a city to which the restaurants can deliver* encompass the set of geographic locations in a city to which a restaurant can deliver. Crovella-Decl., [0030].

Rhodes discloses that restaurants have a "delivery zone" that represents a set of locations to which food from the restaurant can be delivered, *i.e.*, *grid points within a city to which the restaurants can deliver*. Rhodes, 4:38-60. In Rahle-Rhodes, POSAs would have been motivated to *associate* the "page objects" representing restaurants, *i.e.*, *master restaurant data objects* (*see supra* §VI.D.4 (claim 4)), with the restaurants' delivery zones to beneficially allow social-graph users to determine whether food from a restaurant can be delivered to their location. Crovella-Dec., [0064]. POSAs would reasonably have expected success in such an implementation, because it utilizes capabilities Rahle already discloses, including the "external data gathering module" (to gather delivery-zone data) and "page objects" (representing restaurants to which delivery-zone data is associated). Rahle, Abstract, [0015], [0038]; Crovella-Dec., [0064].

b. [10B]

POSAs understood that "indexing" is a typical technique for facilitating searching by creating a record (akin to a book's index) of locations of certain data. Crovella-Decl., [0028] (citing corroborating EX1022, 1:23-28; EX1023, [0005]; EX1024, [0004]). The '683 patent's specification does not expressly define

"restaurant tag descriptor"; however, the patent discusses a set of "restaurant-related tags" (e.g., "Ecuadorian" or "Spanish") as being shown in the "tags" column in Figure 3's table. EX1001, 12:28-38, Fig. 3. As the figure shows, these "tags" are text strings describing the restaurant; *e.g.*, "Ecuadorian," "Latin American," "South American," and "Spanish" are all descriptions applying to "La Zumita."

data_source	bootler_id	source_resto_id	name	tags	price_rating	order_minimum	sales_tax	delivery_fee	...
5	NULL	'2706'	'La Zumita'	['Ecuadorian']	NULL	0	10.5	{"as_percentage": false, "flat": 599, "taxable": false}	...
4	NULL	'305977'	'La Zumita'	['Latin American', 'South American', 'Spanish']	NULL	800	11	{"as_percentage": false, "flat": 300, "taxable": false}	...
1	'E18Q5Ateg'	NULL	'La Zumita'	['Ecuadorian', 'Latin American', 'South American', 'Spanish']	2	NULL	NULL	NULL	...
...	...	...	...	...	...	...	...	...	...

EX1001, Fig. 3

Thus, POSAs understood that "*indexing restaurant tag descriptors*" encompasses indexing descriptive strings associated with restaurants so the strings can be searched. Crovella-Decl., [0029].

Rahle discloses that "page objects" for restaurants may have associated "attributes," with non-limiting examples including "hours, location, recommendations," and "menus." Rahle, [0014]. Rahle also discloses (consistent with POSAs' understanding) that different types of restaurants may serve different types of food, *e.g.*, "Mexican" or "Chinese," similar to the '683 patent's example "tag" values of "Ecuadorian" or "Spanish," and discloses that users often "***search***"

for different food types. Rahle, [0017], [0003], [0023]; EX1001, Fig. 3. Thus, POSAs would at minimum have found it obvious to implement Rahle to include cuisine type as a restaurant page-object "attribute." Crovella-Decl., [0047]. Each of restaurant hours, location, recommendation, cuisine, and menus is a *tag*, and POSAs would have been motivated to implement Rahle to index these tags so users may search for restaurants having, *e.g.*, specific hours, ratings, or cuisines, and would have reasonably expected success because creating search indices was well-known and within a POSA's skill. Crovella-Decl., [0047]-[0048] (citing corroborating EX1025, [0003] (discussing "conventional technologies of establishing indexes for search objects"); EX1024, [0004]).

8. Claim 11: [11PRE] A system for providing an interactive food ordering service accessible by a user computing device, the system comprising

The parties have not yet taken positions on whether "*for providing an interactive food ordering service*" is limiting, or is a statement of purpose without patentable weight because it does not "provide[] antecedents for ensuing claim terms." *Outdry Technologies Corp. v. Geox SpA*, 859 F.3d 1364, 1368 (Fed. Cir. 2017) (citation omitted). Absent a dispute by Patent Owner, the Board need not decide this issue, because claim 11 is unpatentable either way. *Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (Board need construe claims "only to the extent necessary to resolve [a]

controversy"); *Google LLC v. Security First Innovations, LLC*, IPR2024-00215, Paper 15 at 6 (May 23, 2024) (presenting alternative constructions and showing unpatentability under both "complies with" 37 C.F.R. §42.104(b)(3)). If the phrase is non-limiting, Rahle-Rhodes meets [11PRE] as discussed in this section below. If the phrase is limiting, Grounds 3-4 (*infra* §§VIII-IX) demonstrate how it is met by Rahle-Rhodes-Belousova and Rahle-Rhodes-Belousova-Jin.

Rahle's social graph is part of a "social networking ***system***." Rahle, Abstract, [0005]. This system is *accessible by a user computing device*. Rahle, [0026]-[0027], Fig. 2 (discussing "***user*** devices" that "comprise one or more computing devices" that access the social networking system).

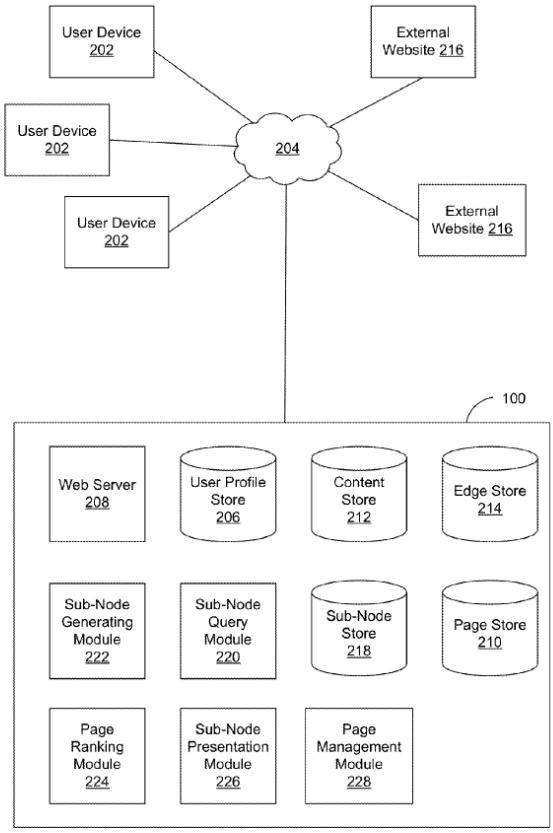


FIG. 2

Rahle, Fig. 2

In Rahle-Rhodes, Rahle's *system comprises* the remaining elements of claim 11 as discussed *infra* §§VI.D.8.a-g for [11A]-[11G].

a. [11A] a data acquisition and processing module including a processor, memory accessible to the processor, and a set of computer-readable instructions stored on a non-transitory medium that are executable by the processor to acquire source data from a plurality of delivery service computers associated with a plurality of food delivery services and provide a master data set of formatted data, wherein the master data set includes, for each one of the plurality of food delivery computers, data representing multiple menu items provided by multiple restaurants; and

Rahle's techniques "can be executed by a computer ***processor*** for performing any or all of the steps, operations, or processes described." Rahle, [0068]. The processor "execute[s]" a "computer program product" comprising "instructions" stored on a "non-transitory, tangible computer readable storage medium." Rahle, [0068]-[0069]. POSAs understood that such instructions are loaded into a *memory* for execution by a processor. Crovella-Decl., [0049] (citing corroborating EX1026, 1:11-21; EX1027, [0002]). Thus, Rahle's system comprises *a processor*, a *memory accessible to the processor, and a set of computer-readable instructions stored on a non-transitory medium that are executable by the processor*.

As discussed below, Rahle's processor, memory, and instructions (as modified in view of Rhodes's teachings as discussed *supra* §VI.C) in Rahle-Rhodes together comprise a *data acquisition and processing module* performing [11A]'s recited task. The processor executing the instructions does, *inter alia*, the

following: (1) *acquires source data from a plurality of delivery service computers associated with a plurality of food delivery services* (*supra* §VI.D.1.a ([1A])); and (2) *provides formatted data* (*supra* §VI.D.1.c ([1C])). The *formatted data*, which represents menu items, is part of a *master data set*. *Supra* §VI.D.1.f ([1F]). *Data representing multiple menu items provided by multiple restaurants* is part of data collected from the delivery-service computers (*supra* §VI.D.1.a ([1A])), and this data gets mapped to the *formatted data* (*supra* §VI.D.1.c ([1C])). Thus, because the *formatted data* is part of the *master data* set as discussed above, the *master data set includes*, *for each one of the plurality of food delivery computers, data representing multiple menu items provided by multiple restaurants.*

b. [11B] a website database accessible to the processor and configured for receiving the most recent data from the master data set, the master data set representing the multiple menu items provided by each one of the plurality of food delivery services for the multiple restaurants;

The set of formatted menu item data and sub-node data in Rahle-Rhodes are a *master data set*. *Supra* §VI.D.1.f ([1F]). The *master data set* includes, and thus *represents, multiple menu items* served by the *multiple restaurants* (*supra* §VI.D.1.a ([1A])); in Rahle-Rhodes, these items are *provided by each one of* Rhodes's delivery services for the multiple restaurants (*supra* §VI.C), *i.e.*, provided by *each one of the plurality of food delivery services for the multiple restaurants*.

The ’683 patent describes an exemplary “website database” as a database “in communication with a user-facing website server” and designed to “receive objects in the way that is expected for rendering pages to the user.” EX1001, 14:12-26. Rahle discloses that users access the social-networking system via a “web server” that serves “web pages” to the user. Rahle, [0030]. POSAs would have found it obvious to implement this web server to access a database that stores content that has been prepared for display on a webpage, as this was a typical web-server architecture that was within a POSA’s skill to implement. Crovella-Decl., [0050] (citing corroborating EX1028, [0005]; EX1029, [0003]). Moreover, POSAs understood that databases were an obvious way to store data. *Supra* §VI.D.1.h ([1H]) (citing Rahle, [0032]; Crovella-Decl., [0044] (citing corroborating EX1017, 1:38-41; EX1018, [003]; EX1033, 4:8-10, 25:42)). Such a database for storing webpage content for display is a *website database*. Furthermore, POSAs would have found it obvious for the website database to be *configured for receiving the most recent data from the master data set*, because POSAs understood that it would be beneficial for content shown to the user on the social-networking system’s “web pages” to be the most up-to-date possible. Crovella-Decl., [0050]; Rahle, [0003] (noting one problem motivating Rahle’s invention is the inability to share information about “restaurant that recently opened”).

The *website database* is intended for storing content to display to users of Rahle's social networking system as discussed above. Rahle's techniques "can be executed by a computer ***processor*** for performing any or all of the steps, operations, or processes described" (*supra* §VI.D.1.a ([1A]); Rahle, [0068]); thus, the website database is *accessible to the processor*, because the processor performs the displaying of the content.

c. wherein said data acquisition and processing module comprises: [11C] an extraction module configured to extract the source data from the plurality of delivery service computers as raw files;

Rahle's "external data gathering module" gathers, *i.e.*, *extracts*, *source data from the plurality of delivery service computers* in Rahle-Rhodes. Rahle, [0038]; *supra* §VI.D.1.a ([1A]). This data is extracted as *raw* data. *Supra* §VI.D.2 (claim 2). Rahle discloses receiving data from external sources in the form of "file[s]." Rahle, [0028], [0041], [0047]-[0049]. Thus, the "external data gathering module" constitutes *an extraction module configured to extract the source data from the plurality of delivery service computers as raw files*.

Rahle-Rhodes's *data acquisition and processing module comprises* the *extraction module*, as well as the other *modules* recited in [11D]-[11G], as explained below. The '683 patent discusses "extraction," "mapping," "linking," and "menu combining" "modules" as software modules. EX1001, 19:53-20:8 ("modules" are implemented as "software" executed by hardware "such as a

processor"), 11:14-27, 11:45-51, 12:47-50. Likewise, as discussed above and in the sections below for [11D]-[11G], Rahle discloses the processor performing the required functions; moreover, these functions are performed by the processor as part of the same "computer program product" discussed *supra* §VI.D.8.a ([11A]) that is part of the *data acquisition and processing module*. Rahle, [0068] (Rahle's techniques "can be executed by a computer processor for performing ***any or all*** of the steps, operations, or processes described").

d. [11D] a mapping module configured to convert the raw files to a standardized format to provide formatted data, wherein said converting comprises aliasing fields of the acquired data from formats used by the plurality of delivery service computers to respective fields of the predetermined data format;

The *raw files* represent the *source data* in Rahle-Rhodes. *Supra* §VI.D.8.c ([11C]). Rahle's *processor maps* this source data *to* the format used by Rahle's social graph, *i.e.*, a *standardized format*, *to provide formatted data*. *Supra* §VI.D.1.c ([1C]). This mapping process *converts* the data, since the data starts in the "raw" format and ends up in Rahle's format. The mapping, which results in *converting* as just mentioned, *comprises aliasing fields of the acquired data from formats used by the plurality of delivery service computers to respective fields of the predetermined data format* as discussed *supra* §VI.D.1.c ([1C]). Thus, Rahle-Rhodes includes a *mapping module* that is *configured to* perform [11D]'s recited task.

e. [11E] a linking module configured to perform record linkage on the formatted data according to identification data that identifies the multiple restaurants; and

Rahle *links formatted data* to restaurants based on restaurant identifier data, *i.e.*, *identification data that identifies the multiple restaurants*. *Supra* §VI.D.1.d ([1D]).

The '683 patent describes an exemplary "record linkage" that "identifies a unique restaurant…that may be common across multiple delivery services based on the identification data, and links the mapped source data to data associated with that master restaurant." EX1001, 11:51-56. In Rahle-Rhodes, Rahle's *linking* process does the same thing the '683 patent discusses, by identifying common restaurants served by multiple delivery services and linking those restaurants to their formatted menu-item data (*supra* §VI.D.1.d ([1D])); thus, Rahle's linking performs *record linkage on the formatted data*. Rahle-Rhodes therefore includes a *linking module* that is *configured to* perform the task [11E] recites.

f. [11F] a menu combining module configured to combine multiple source menus from linked restaurants into the master data set;

Rahle *combines* formatted menu data with sub-nodes into a *master data set*. *Supra* §VI.D.1.f ([1F]). The menu data combined into the master data set in Rahle-Rhodes includes multiple *source menus* from the same restaurant gathered from different sources (*e.g.*, from different delivery services, and potentially from

the restaurant itself) and/or *source menus* from multiple *restaurants*. *Supra* §VI.D.1.a ([1A]), §VI.C. These restaurants are *linked restaurants* because Rahle links page objects for restaurants to the restaurants' menu items. *Supra* §VI.D.1.d ([1D]). Thus, Rahle-Rhodes includes a *menu combining module* that is *configured to* perform the task [11F] recites.

g. [11G]

See supra §VI.D.1.b for [1B], which recites the same options for *acquiring*.

9. Claim 12

Rahle-Rhodes's *master data set* is made up of formatted menu-item data and sub-node data. *Supra* §§VI.D.8.b ([11B]), VI.D.1.f ([1F]). This data is part of Rahle's social graph, which is a *searchable* data set (*supra* §VI.D.1 ([1Pre])), and which has its own *format* (*supra* §VI.D.1.c ([1C])). The website database contains, and thus *comprises*, the master data set. *Supra* §VI.D.8.b ([11B]). Thus, Rahle-Rhodes meets claim 12.

10. Claim 13

Rahle-Rhodes's *master data set*, which is *in a searchable format* (*see supra* §VI.D.9 (claim 12)) is part of the social graph. *Supra* §VI.D.1.g ([1G]). Rahle's social graph is stored in a database. *Supra* §VI.D.1.h ([1H]). This database is a *data warehouse configured to store the provided master data set in a searchable format*, because it is a database implemented to store the master data set, as the '683 patent describes. Crovella-Decl., [0033]; EX1001, 14:7-10 ("data

warehouse" may be implemented as an "SQL database"). Furthermore, the *website database* is *provided* the most recent *master data set*. *Supra* §VI.D.8.b ([11B]). Since the *data warehouse* stores the social graph, the *data warehouse is accessible by the website database to receive data*, *i.e.*, the most recent master data set.

11. Claim 14: [14PRE] An apparatus for providing a searchable aggregated data structure for a networked application, the apparatus comprising:

Rahle discloses a method *for providing a searchable aggregated data structure for a networked application*. *Supra* §VI.D.1 ([1Pre]). This method is performed by an *apparatus*, e.g. Rahle's "social networking system." Rahle, Abstract, [0005]. As discussed *infra* §§VI.D.11.a-VI.D.11.b ([14A]-[14I]), this apparatus *comprises* claim 14's remaining elements.

a. [14A] a processor; a memory accessible by the processor; and a set of computer-readable instructions stored on a non-transitory medium and accessible by the processor, the instructions being executable by the processor to perform a method comprising:

Rahle discloses a *processor, a memory accessible by the processor, and a set of computer-readable instructions stored on a non-transitory medium and accessible by the processor*, where the instructions are *executable by a processor*. *Supra* §VI.D.8.a ([11A]). Rahle's techniques "can be executed by a computer ***processor*** for performing any or all of the steps, operations, or processes described." Rahle, [0068]. Thus, Rahle's processor executes the instructions *to*

perform a method. As discussed *infra* §VI.D.11.b, in Rahle-Rhodes, this method *comprises* the recited steps.

b. [14B]-[14I]

Rahle-Rhodes meets [14B]-[14I] for the reasons discussed in the corresponding sections listed below.

Element	**Addressed in Section:**
[14B]	VI.D.1.a ([1A])
[14C]	VI.D.1.c ([1C])
[14D]	VI.D.1.d ([1D])
[14E]	VI.D.1.e ([1E])
[14F]	VI.D.1.f ([1F])
[14G]	VI.D.1.g ([1G])
[14H]	VI.D.1.h ([1H])
[14I]	VI.D.1.b ([1B])

12. Claim 15

POSAs understood that databases store data in *storage devices*. Crovella-Decl., [0045] (citing corroborating EX1030, 4:21-33 (describing known "data ***storage*** requirements" for databases)). Thus, Rahle-Rhodes's *database* that stores the *searchable aggregate data structure* (*supra* §§VI.D.11.b, ([14H]), VI.D.1.h

([1H])) uses a *storage device* that is *for storing the searchable aggregated data structure in the database*. This storage device is *in communication with the processor* because the processor performs the storage of the aggregated data structure in the database. Rahle, [0068] (Rahle's techniques "can be executed by a computer ***processor*** for performing any or all of the steps, operations, or processes described").

13. Claim 16

Rahle's "social networking system," *i.e.*, the *apparatus of claim 14* (*supra* §VI.D.11 ([14Pre])), includes "conventional components such as ***network interfaces***," which POSAs understood are used by the system *for communicating* with external websites/systems. Rahle, [0029]-[0030]. In Rahle-Rhodes, these external websites/systems include the *plurality of delivery service computers*. *Supra* §§VI.C, VI.D.1.a ([1A]).

VII. GROUND 2: RAHLE+RHODES+JIN RENDERS OBVIOUS CLAIMS 1-16

A. Jin (EX1007)

Jin relates to "information retrieval," including for scenarios where "the user specifies a query…specifying areas of interest, and the system then retrieves documents it determines may satisfy the query." Jin, 1:11-27; *compare with* EX1001, 15:37-57 (user specifies query and system "retrieves data…that relate to the…search term"), 16:12-19; Crovella-Decl., [0066].

Jin discloses techniques for "search[ing] for documents relevant to a topic." Jin, 2:11-12. Jin's method involves "score normalization" using "statistics" that include "scores" assigned to "training stories," also called "training documents," where the stories/documents are either "off-topic" or "on-topic" and where a "score" is "a measure of the relevance of a particular [story/document] to a topic." Jin, 3:1-11, 3:54-57; Crovella-Decl., [0067]. "The training documents are input to a training module" that "examin[es] the frequency of key words in the training documents in order to generate a model…for each topic." Jin 4:30-34. The model "relates to how frequently different key words appear in the training documents that have been annotated as being on-topic for a particular topic. This frequency is used to characterize the topic." Jin, 4:35-38. This model is then used to compute a document's "score[]." Jin, 4:50-58; Crovella-Decl., [0067]. Each topic also has a "threshold score" "determined by an initial tuning session." Jin, Abstract, 1:66-67, 5:1-6; Crovella-Decl., [0067]. Subsequently, when a story or document is analyzed for relevance, it is considered "on-topic" if its score is above the "threshold score." Jin, 3:11-25; Crovella-Decl., [0067].

B. Rahle-Rhodes-Jin Combination

POSAs would have been motivated to implement Rahle in view of Rhodes in the same manner and for the same reasons discussed *supra* §VI.C in Ground 1,

and additionally to incorporate teachings of Jin as discussed below. Crovella-Decl., [0068].

Rahle says "sub-node objects" may be "associated with a page object" by "identifying attributes of page objects that match existing sub-node objects." Rahle, [0022]. POSAs seeking to implement Rahle's teaching to identify matching attributes would have been motivated to use Jin's teachings discussed *supra* §VII.A as specific techniques for identifying attribute matches, for multiple reasons. Crovella-Decl., [0069].

First, POSAs understood that the task to which Jin is directed—i.e., "search[ing] for documents relevant to a topic" (Jin, 2:11-12), *see supra* §VII.A—is well-suited to accomplish Rahle's goal of "associat[ing]" "sub-node objects" with page objects by "identifying attributes of page objects that match existing sub-node objects" (Rahle, [0022]). Jin says "[a] topic is one or more words or phrases specifying an area of interest." Jin, 3:41-42. POSAs understood that a food-item sub-node as discussed in Rahle (e.g., "burrito"—Rahle, [0016]) can be a "word[] or phrase[] specifying an area of interest" (Jin, 3:41-42), that a menu portion might be relevant to. Thus, POSAs understood that, just as Jin's techniques are usable to identify whether a particular news-topic concept has a match in an article document in the specific example Jin discusses (Jin, 3:42-44), Jin's techniques would be equally applicable in Rahle-Rhodes to identify whether a

particular food-topic concept has a match to items in a menu document such as on a webpage. In particular, items on a restaurant's menu are "attributes" of a "page object" representing a webpage with that restaurant's menu. *Supra* §VI.D.1. ([1Pre]); Rahle, [0022], [0005]. Using Jin's techniques, these items can beneficially be matched to "topics" (concepts) that are the food items represented by sub-nodes, as Rahle teaches. Rahle, [0014]-[0016], [0017]-[0018], [0039]; *supra* §VI.A; Crovella-Decl., [0070].

Second, POSAs would have been motivated to use Jin's techniques to achieve the benefits Jin teaches, such as better determination of matches. Jin, 7:25-36 (stating that Jin's technique leads to a "more accurate decision" about whether a document matches a topic), 8:52-55 ("From the foregoing description, it should be apparent that an automatic, efficient, and robust system and method for normalizing scores associated with testing documents has been presented."); Crovella-Decl., [0071].

The resulting Rahle-Rhodes-Jin combination is identical to Ground 1's Rahle-Rhodes combination, with the addition of using Jin's teachings for implementing Rahle's process of identifying matching attributes, as discussed in the previous paragraph. For example, Jin's technique would be used to determine whether a menu item and/or its description on a restaurant menu relate to the "topic" (e.g., concept) of a food item such as a burrito that is represented by a sub-

node object. *Supra* §VII.A; Jin, 3:5-11, 3:54-57; Crovella-Decl., [0072]. POSAs would reasonably have expected success implementing Rahle's attribute identification using Jin's techniques because those techniques were within a POSA's skill to implement via a processor executing instructions, as Rahle discloses (*see*, *e.g.*, *supra* §VI.D.8.a ([11A])). Crovella-Decl., [0073]; Jin, 2:20-23 ("apparatus consistent with [Jin's] invention" includes "a memory having program instructions and a processor responsive to the program instructions").

C. Mapping to Challenged Claims

1. Claims 1-4, 10-16

Rahle-Rhodes-Jin meets claims 1-4 and 10-16 for the same reasons discussed in Ground 1, since the addition of Jin does not disturb any aspect of Rahle-Rhodes relevant to these claims.

2. Claim 5

a. [5PRE]-[5A]

As discussed *supra* §VI.D.1.e for [1E] in Ground 1, the recited *identifying* occurs as part of identifying page-object attributes that match sub-nodes. Rahle, [0022]. As discussed *supra* §VII.B, in Rahle-Rhodes-Jin, Rahle's identifying process is implemented using the teachings from Jin discussed *supra* §VII.A. Jin's teachings involve using "***training*** documents" that are "input to a ***training*** module" that "examine[s] the frequency of key words in the training documents in order to generate a model…for each topic." Jin, 4:30-34. Thus, in Rahle-Rhodes-

Jin, the *identifying* of [1E] *comprises training an algorithm*. The remaining portions of [5PRE]-[5A] are met for the same reasons discussed *supra* §VI.D.5.a for [5Pre]-[5A] in Ground 1 in Rahle-Rhodes.

b. [5B]

Rahle-Rhodes-Jin meets [5B] for the same reasons discussed *supra* §VI.D.5.b for [5B] in Ground 1 for Rahle-Rhodes.

3. Claim 6

In Rahle-Rhodes-Jin, [5A]'s recited *training* is met by Jin's technique that uses "training documents" that are "input to a training module." Jin, 4:30-34; *supra* §VII.C.2.a. Jin says "training documents" may be "any…files or data that are identifiable by their association with one or more topics." Jin, 3:36-44. Thus, in Rahle-Rhodes-Jin, where the relevant "topics" are food items, POSAs would have found it obvious to use *previously collected* menu items, *i.e. menu data*, as "training documents," because those items would be "identifiable by their association with" food items. Jin, 3:35-44; Crovella-Decl., [0072].

4. Claim 7

Rahle-Rhodes-Jin's *training an algorithm* involves using "training documents" that are "input to a training module." Jin, 4:30-34; *Supra* §VII.C.2.a ([5A]). Jin says the "training module" into which documents are input "examine[s] the ***frequency*** of key ***words*** in the training documents in order to generate a

model…for each topic." Jin 4:30-34. Thus, *said training an algorithm trains one or more word frequency models*.

5. Claim 8

The '683 patent refers to "training an algorithm…to recognize identical items across source menus using word frequency models" by using "manual training…accomplished by labeling pairs of items matched using the simpler word frequency techniques." EX1001, 12:50-67.

Rahle discloses "analyz[ing] user feedback…to train the data mapping model for mapping sub-node objects to page objects based on external data." Rahle, [0044]. Jin says a "human annotator" may "***label[]***…training documents as being" "on-topic" or "off-topic." Jin, 6:51-56. Thus, in view of Jin, POSAs would have been motivated and reasonably expected success to implement Rahle's training of the data mapping model by *labeling pairs* in which a page is "on-topic" for a sub-node object as being good *matches*; these *pairs of items* (pages and sub-nodes) are *matched* using *word frequency techniques* as discussed *supra* §VII.C.2.a ([5A]). Crovella-Decl., [0072]. Thus, Rahle-Rhodes-Jin meets claim 8.

6. Claim 9

Rahle-Rhodes-Jin's *associating* is met by Rahle's disclosure of associating page objects for restaurant menus with sub-node objects for food items served by those restaurants. *Supra* §VII.C.2.b (citing §VI.D.5.b). This associating is done

after sub-node objects representing food items are matched to page objects representing menus of restaurants serving those items. *Supra* §VI.D.1.e ([1E]). This matching involves *processing source menu items against the one or more word frequency models* because the word frequency models are used for the matching. *Supra* §VII.C.2.a ([5Pre]-[5A]). Thus, Rahle-Rhodes-Jin meets claim 9.

VIII. GROUND 3: RAHLE+RHODES+BELOUSOVA RENDER OBVIOUS CLAIMS 1-6, 10-16

A. Belousova (EX1008)

Belousova discloses a "restaurant service system includ[ing] a restaurant server" that "builds a food taxonomy including dishes, dish attributes and dish ingredients." Belousova, Abstract. A "restaurant service" "aggregates the participating restaurants' menus, each of which includes a plurality…of menu items," each of which has a "title (meaning a name), a description…and attributes, such as price." Belousova, 1:21-27. "A dish is a food item that has the same or different menu item titles in different menus." Belousova, 7:21-29. Belousova's system can be used for "food search and food ordering." Belousova, 4:39-44.

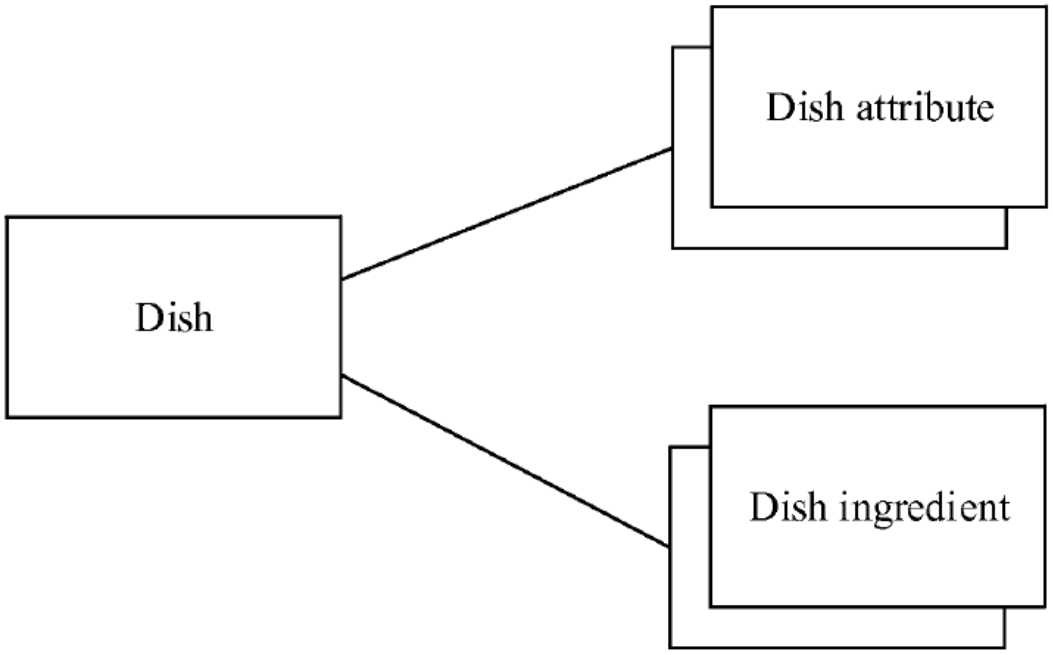
Like Rahle, Belousova recognizes that "[t]wo menu items from two different restaurants may indicate the same dish…but have different menu item titles." Belousova, 2:3-7; Rahle, [0022]; Crovella-Dec., [0074]-[0075]. Belousova notes that these different names for the same items may cause "conventional restaurant

service[s]" to "treat the two menu items as two unrelated items, and thus provide inferior food search results." Belousova, 2:6-9. Belousova's "taxonomy" addresses the shortcomings of conventional restaurant services by "provid[ing] superior food search results and recommendation, and rich navigation and discovery capabilities." Belousova, 2:19-29; Crovella-Decl., [0075].

Belousova represents "dishes" in its "taxonomy" as "nodes," where each node for a dish has "properties, such as dish attributes and dish ingredients." Belousova, 3:61-4:1. This is similar to Rahle's representation of menu items, with Belousova's use of "nodes" for dishes and Rahle's use of "sub-nodes" for menu items being merely a difference in terminology reflecting the fact that Rahle's menu-item sub-nodes are associated with restaurant "nodes" that serve them. Crovella-Decl., [0076]. The nodes representing dishes in Belousova's taxonomy are arranged hierarchically such that, *e.g.*, "nodes" for different types of salads all descend from a "salad" "root node." Belousova, 6:56-7:4, Fig. 20; Crovella-Decl., [0076]. For each dish, the "taxonomy" also includes "attributes" such as "healthy" or "vegan," and "ingredients" such as "noodle" or "tofu." Belousova, Abstract, 7:30-43, Fig. 15; Crovella-Decl., [0076].

FIG. 20

Belousova, Fig. 20



Belousova, Fig. 15

Belousova's taxonomy is stored in a "database operatively coupled to the restaurant server." Belousova, 5:35-38, 7:14-15. Belousova's taxonomy is built by a "server software application." Belousova, 7:44-45. For each restaurant, the application "retrieves the menu and menu items of the restaurant" and "saves the menu and the menu items into the database." Belousova, 7:49-51, 7:66-67. "Inside the database…the menu is associated with the restaurant…, and each menu item is associated with the menu" and "also associated with the restaurant." Belousova, 7:67-8:4. The application also "maps…menu items to dishes." Belousova, 8:4-7. The server software performs "one or more processes to map

menu items to dishes." Belousova, 8:41-43. One such process uses, "[f]or each dish in the taxonomy, a machine learning based classifier" that is "trained from the menu items mapped to [a] dish. The trained classifier is then applied to new menu items and unmapped menu items to determine whether they should be mapped to the dish." Belousova, 10:15-19; Crovella-Decl., [0077]-[0078].

B. Rahle-Rhodes-Belousova Combination

Belousova's "taxonomy" and Rahle's "social graph" both represent food items as "nodes" (called "sub-nodes" in Rahle) and link those food-item nodes to menus of restaurants that serve those items. Belousova, 3:61-4:1; Rahle, [0014]-[0015], [0022], [0005]; *supra* §§VI.A, VIII.A; Crovella-Decl., [0079]. Specifically, in Rahle, a "sub-node" representing a "menu item" is stored with connections to all nodes representing restaurants that serve that menu item; "a sub-node for burritos, for example, may be used for all restaurants serving burritos, enabling users…to compare user reviews…of burritos nearby." Rahle, [0016], [0023]-[0024], [0035]; *supra* §VI.A; Crovella-Decl., [0079]. Likewise, in Belousova, a "dish," represented by a "node," is also mapped to "menu items" on restaurant menus. Belousova, 3:61-4:1, 8:4-7. Thus, POSAs understood that Belousova uses the term "dish" for what Rahle refers to as a "menu item," and that in both cases, the dish/item is associated with restaurant menus. Belousova and Rahle also both disclose that nodes for food items can have properties such as

ingredients or other "attributes" (e.g., "[h]ealthy," "vegan") associated with them. Belousova, Abstract, 7:30-43, Fig. 15; Rahle, [0022] (referring to "attributes of a particular meal…such as…vegetarian, vegan, and gluten-free"), [0056] (referring to "sub-node attributes"). Furthermore, POSAs understood that Belousova's "taxonomy" (Belousova, 3:61-4:1) is a graph structure, like Rahle's "social graph" (Rahle, [0014]) in that it represents concepts as nodes and relationships between those concepts as associations/links/edges connecting the nodes. Crovella-Decl., [0079] (citing corroborating EX1018, [0002]); Belousova, 6:56-57 ("A food taxonomy…includes a hierarchical graph of dishes…."), 7:5-6 (describing Figure 20's exemplary taxonomy as a "directed graph").

POSAs would have found it obvious to implement Rahle using Belousova's teachings in either or both of the two manners discussed below, which are each implementable and obvious independent of each other. Crovella-Decl., [0080].

First, Belousova teaches to use a graph structure with nodes representing restaurants and the food items they serve to provide a "food ordering" service. Belousova, 4:39-44; Crovella-Decl., [0081]. In view of Belousova's teachings and the similarities between the data structures and system components described in Rahle and Belousova (*see supra* §§VI.A, VIII.A), POSAs would have been motivated and reasonably expected success to add such a service to Rahle's "social networking system" (Rahle, Abstract) using Rahle's restaurant-and-food graph

structure, whether as a separately provided service (e.g., with a separate user interface) or integrated with the rest of Rahle's social-network service, to beneficially enable users of Rahle's system to order food. Crovella-Decl., [0081].

Second, in Rahle-Rhodes, "sub-nodes" representing menu items are linked to "page objects" representing websites showing restaurant menus, as Rahle teaches, where the websites can be either restaurant websites or websites of "delivery services" as Rhodes teaches. *Supra* §VI.C; Rahle, [0014]-[0018], [0039]; Rhodes, 1:11-15, 2:42-45, 3:8-29. Crovella-Decl., [0082]. Rahle teaches to implement its "sub-node generating module" to determine which menu items are linked to which websites. Rahle, [0037]-[0038]; Crovella-Decl., [0082]. POSAs looking for specific ways to implement Rahle's teachings would have been motivated and reasonably expected success to use Belousova's technique of using a "classifier" to map "menu items to dishes" (i.e., sub-nodes in the graph) to achieve Belousova's benefits discussed *supra* §VIII.A (*e.g.*, Belousova, 2:19-29), and because "classifiers" such as Belousova's were well-known software modules within a POSA's skill to implement. Crovella-Decl., [0082] (citing corroborating EX1031, [0002]; EX1032, [0002]).

In all other respects, Rahle-Rhodes-Belousova is identical to Ground 1's Rahle-Rhodes combination.

C. Mapping to Challenged Claims

1. Claim 1: [1PRE]

Rahle-Rhodes-Belousova meets [1Pre] for the same reasons discussed *supra* §VI.D.1 for [1Pre] in Ground 1, which are unchanged in Rahle-Rhodes-Belousova. *Supra* §VIII.B.

Rahle-Rhodes-Belousova meets [1Pre] for the additional reason that Belousova teaches that a graph structure storing restaurant menu items, like Belousova's "food taxonomy" or Rahle's social-graph structure, is a *searchable aggregated data structure*. It can be implemented as a "hierarchical ***structure*** with dishes being nodes at different levels within the hierarchical ***structure***." Belousova, 3:62-4:4, 6:56-7:4. "The food taxonomy ***data*** is stored in [a] database." Belousova, 7:48-49. The graph structure *aggregates* "menu items" from multiple restaurants, mapped to dishes (nodes) in the graph structure. Belousova, 3:18-25; *see* 1:22-25 ("The restaurant service ***aggregates*** the…menus" of "hundreds or thousands [of] participating restaurants."). Via the graph structure, "the dishes, dish attributes and dish ingredients are indexed in the database…for fast ***searching***" by the server software application. Belousova, 6:56-7:20, 11:48-56, 12:29-37.

a. [1A]-[1D], [1F]-[1H]

Rahle-Rhodes-Belousova meets [1A]-[1D], [1F]-[1H] for the same reasons discussed *supra* §§VI.D.1.a-d, VI.D.1.f-h for [1A]-[1D], [1F]-[1H] in Ground 1, which are unchanged in Rahle-Rhodes-Belousova. *Supra* §VIII.B.

Rahle-Rhodes-Belousova meets [1H] for an additional, independent reason. Belousova teaches storing a graph structure like Rahle's in a "database." *E.g.*, Belousova, 7:14-15 ("The nodes and the node properties are stored in the database[.]"), 7:48-49 ("The food taxonomy data is stored in a database."), 3:20-25, 6:37-45, Figs. 1-6. Thus, Belousova provides additional teachings evidencing the obviousness of storing Rahle-Rhodes's social-graph data in a database as discussed *supra* §VI.D.1.h ([1H]). Crovella-Decl., [0085]. In Rahle-Rhodes-Belousova, the *searchable aggregated data structure* is stored in a *database* as Belousova teaches, and that database is *accessible to the processor* as Rahle teaches (*supra* §VI.D.1.h ([1H])).

b. [1E]

As discussed *supra* §VI.D.1.e for [1E] in Ground 1, the food items found on restaurant menus are *common menu items among the source menu items in the formatted data*, and Rahle's sub-nodes representing food items are *master menu items*. Food items that appear on multiple restaurant menus are referred to as "dishes" in Belousova, and these items are represented as "sub-nodes" in in Rahle-

Belousova-Rhodes. *Supra* §VIII.B. The "sub-nodes" representing "dishes" are associated with page objects representing menus using Belousova's "classifier"-based technique that "maps…***menu items*** to dishes." Belousova, 8:4-7, 10:15-19; *supra* §VIII.B. Thus, in Rahle-Rhodes-Belousova, the *processor identifies common menu items among the source menu items in the formatted data*, and *for each identified common menu item*, the *source menu items* on each restaurant menu representing that item is *associated with* the corresponding *master menu item*, *i.e.*, the sub-node representing that "dish."

2. Claims 2-4, 10-16

Rahle-Rhodes-Belousova meets the added limitations of claims 2-4 and 10-16 for the same reasons discussed in Ground 1. *Supra* §VIII.B.

Rahle-Rhodes-Belousova also meets claims 11-13 even if "*for providing an interactive food ordering service*" in [11Pre] is limiting. Belousova discloses providing a "food ordering" service to users (Belousova, 4:39-44)—*i.e.*, a service users can *interact* with—and POSAs would have found it obvious to incorporate such a service into Rahle's "social networking system" (Rahle, Abstract), making use of Rahle-Rhodes's graph structure containing restaurant menu-item data as provided by food delivery services. *Supra* §VIII.B, Crovella-Decl., [0081]. Thus, in Rahle-Rhodes-Belousova, Rahle's "social networking ***system***" is *for providing an interactive food ordering service* (e.g., in addition to other uses/services).

3. Claim 5

a. [5PRE]-[5A]:

In Rahle-Rhodes-Belousova, the recited *identifying* occurs as part of using Belousova's "classifier" to "map[]…menu items to dishes." Belousova, 8:4-7, 10:15-19; *supra* §VIII.C.1.b ([1E]). Belousova discloses "***train[ing]***" the classifier, *i.e.*, *training an algorithm*. Belousova, 3:34-36. In this training process, "[f]or each dish, the server ***trains*** a dish classifier from menu items mapped to the dish and menu items that are mapped to different dishes. The dish classifier is then applied to new menu items and other unmapped menu items to determine whether these menu items should be mapped to the dish;" thus Belousova trains the classifier to *identify sets of identical menu items*, *i.e.*, sets of "menu items" that should be mapped to a given "dish." Belousova, 3:34-41. Furthermore, Belousova notes (consistent with POSAs' understanding and with Rahle ([0022])) that the different "menu items" that map to the same dish may have the *same or different spellings or descriptions from each other*. Belousova, 2:3-7 ("[t]wo menu items from two different restaurants may indicate the same dish…but have different menu item titles"); Crovella-Decl., [0075]. Additionally, the menu items from which the identical sets are identified are *from across different delivery services*, since the menus are obtained from the delivery-service computers. *Supra* §VI.C.1.a ([1A]).

b. [5B]

The recited *associating* is met in Rahle-Rhodes-Belousova by Belousova's "classifier" "map[ping]…menu items to dishes." Belousova, 8:4-7, 10:15-19; *supra* §VIII.C.1.b ([1E]). *Each set of identical menu items* is a set of items on different menus that are mapped to a dish. *Supra* §VIII.C.3.a ([5A]). In Rahle-Rhodes-Belousova, dishes are represented by sub-node objects (*supra* §VIII.B), which are *master menu items* (*supra* §VIII.C.1.b ([1E])). Rahle discloses "generat[ing]," *i.e.* "***creat[ing]***," sub-nodes for food items if a food item is found on a menu and a sub-node for that item does not already exist. Rahle, [0021]. Belousova likewise discloses *generating* a new "dish" to map to a menu item if the corresponding dish did not previously exist. Belousova, 8:5-8. Thus, in Rahle-Rhodes-Belousova, *said associating comprises, for each set of identical menu items, creating a master menu item* if necessary, *i.e.*, a new sub-node representing a dish.

Finally, as explained below, POSAs understood, or at least found obvious, that for *each set of identical menu items*, the sub-node, *i.e.* the *master menu item* as discussed above, *contains references to the identified identical menu items*. Belousova discloses that each "menu item" that a dish gets mapped to is represented by a "menu item record" and that a "menu item dish mapping between the menu item record and the dish record" is stored in a "database." Belousova,

8:8-12. POSAs understood, or at least would have found obvious, that the "menu item dish mapping" is implemented via *references* from the dish records to the menu item records, as such references were the customary way to create connections between objects and were within a POSA's programing skill. Crovella-Decl., [0078] (citing corroborating EX1019, 1:22-24; 1:42-49; EX1020, [0004]; EX1021, 3:35-45). Thus, in Rahle-Belousova-Rhodes, where what Belousova calls "dishes" are represented by sub-nodes (*supra* §VIII.B), POSAs would have found it obvious in view of Belousova to implement the sub-nodes with *references* to corresponding items on restaurant menus. Crovella-Decl., [0083]-[0084].

4. Claim 6

Claim 6's *training an algorithm* is met by Belousova's "train[ing]" of its classifier in Rahle-Belousova-Rhodes. Belousova, 3:34-36; *supra* §VIII.C.3.a ([5A]). Belousova says the classifier is trained "from menu items mapped to the dish and menu items that are mapped to different dishes." Belousova, 3:34-41. Thus, the training *uses the multiple source menu items and/or previously collected menu data*, because menu items, *i.e. menu data*, can only have been "mapped" (past tense) if they were *previously collected*.

IX. GROUND 4: RAHLE+RHODES+BELOUSOVA+JIN RENDER OBVIOUS CLAIM 1-16

POSAs would have been motivated and reasonably expected success to incorporate the same teachings of Jin discussed *supra* §VII.A into Rahle+Rhodes+Belousova for the same reasons given *supra* §VII.B for incorporating the teachings of Jin into Rahle+Rhodes, because the addition of Belousova to Rahle+Rhodes does not disturb any aspect of Rahle+Rhodes relevant to the reasons for combining Rahle+Rhodes with Jin. Crovella-Decl., [0086]. The resulting Rahle+Rhodes+Belousova+Jin combination meets claims 1-6, 10-16 for the same reasons given *supra* §VIII in Ground 3 for Rahle+Rhodes+Belousova. Rahle+Rhodes+Belousova+Jin also meets the additional limitations of claims 5-9 for the same reasons given *supra* §VII in Ground 2 for Rahle+Rhodes+Jin.

X. NO BASIS EXISTS FOR DISCRETIONARY DENIAL

The litigation is still in the motion-to-dismiss stage, and no trial date has been set. Additionally, none of the Grounds' references were cited in prosecution. Thus, discretionary denial is unwarranted.

XI. CONCLUSION

The Board should institute review and cancel claims 1-16.

Dated: May 6, 2025

Respectfully submitted,
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XII. CLAIM LISTING APPENDIX

The following claim listing assigns labels (e.g., [1A], [1B], etc.) to certain claim elements for ease of reference.

Claim 1
[**1PRE**] A computer-implemented method for providing a searchable aggregated data structure for a networked application, the method comprising:
[**1A**] acquiring, by a processor, source data from a plurality of delivery service computers associated with a plurality of food or beverage delivery services over a communication network, the acquired source data being in a plurality of formats, where the acquired source data includes, for each one of the plurality of food or beverage delivery services, data representing multiple source menu items provided by multiple restaurants,
[**1B**] wherein said acquiring data comprises one or more of: employing an application programming interface (API) to interface with the plurality of delivery service computers; or scraping data from the plurality of delivery service computers;
[**1C**] mapping, by the processor, the acquired source data according to a predetermined data format to provide formatted data, wherein said mapping comprises aliasing fields of the acquired data from formats used by the plurality of delivery service computers to respective fields of the predetermined data format;
[**1D**] linking, by the processor, the formatted data to common restaurants based on restaurant identifier data such that at least one food or beverage delivery service is linked to each common restaurant and its source menu items;
[**1E**] identifying, by the processor, common menu items among the source menu items in the formatted data, and, for each identified common menu item, associating the source menu items with a master menu item;
[**1F**] combining, by the processor, the linked data and the master menu items into a master data set;
[**1G**] importing the master data set and the restaurant identifier data into the searchable aggregated data structure; and
[**1H**] storing the searchable aggregated data structure in a database accessible to the processor.
Claim 2
The method of claim 1, wherein said scraping comprises extracting raw data objects from webpage data from the delivery service computers.

Claim 3
The method of claim 1, wherein the restaurant identifier data comprise one or more of restaurant name data, restaurant location data, or restaurant identification code.
Claim 4
The method of claim 3, wherein said linking comprises:
analyzing the restaurant identifier data to determine the common restaurants; and
linking the formatted data associated with like common restaurants to a master restaurant data object.
Claim 5
The method of claim 1,
[**5A**] wherein said identifying comprises: training an algorithm to identify sets of identical menu items from the menu items across different delivery services, wherein the identified menu items include menu items having same or different spellings or descriptions; and
[**5B**] wherein said associating comprises, for each set of identical menu items, creating a master menu item that contains references to the identified identical menu items in that set.
Claim 6
The method of claim 5, wherein said training an algorithm uses the multiple source menu items and/or previously collected menu data.
Claim 7
The method of claim 6, wherein said training an algorithm trains one or more word frequency models.
Claim 8
The method of claim 7, wherein training one or more word frequency models comprises labeling pairs of items matched using word frequency techniques.
Claim 9
The method of claim 7, wherein said associating comprises: processing the source menu items against the one or more word frequency models.
Claim 10
The method of claim 1, further comprising:
[**10A**] associating master restaurant data objects with grid points within a city to which the restaurants can deliver; and
[**10B**] indexing restaurant tag descriptors that may be searched by a user.

Claim 11
[**11PRE**] A system for providing an interactive food ordering service accessible by a user computing device, the system comprising:
[**11A**] a data acquisition and processing module including a processor, memory accessible to the processor, and a set of computer-readable instructions stored on a non-transitory medium that are executable by the processor to acquire source data from a plurality of delivery service computers associated with a plurality of food delivery services and provide a master data set of formatted data, wherein the master data set includes, for each one of the plurality of food delivery computers, data representing multiple menu items provided by multiple restaurants; and
[**11B**] a website database accessible to the processor and configured for receiving the most recent data from the master data set, the master data set representing the multiple menu items provided by each one of the plurality of food delivery services for the multiple restaurants;
wherein said data acquisition and processing module comprises:
[**11C**] an extraction module configured to extract the source data from the plurality of delivery service computers as raw files;
[**11D**] a mapping module configured to convert the raw files to a standardized format to provide formatted data, wherein said converting comprises aliasing fields of the acquired data from formats used by the plurality of delivery service computers to respective fields of the predetermined data format;
[**11E**] a linking module configured to perform record linkage on the formatted data according to identification data that identifies the multiple restaurants; and
[**11F**] a menu combining module configured to combine multiple source menus from linked restaurants into the master data set;
[**11G**] wherein said acquiring comprises one or more of: employing an application programming interface (API) to interface with the plurality of delivery service computers; or scraping data from the plurality of delivery service computers.
Claim 12
The system of claim 11, wherein the website database comprises the master data set in a searchable format.
Claim 13
The system of claim 11, further comprising: a data warehouse configured to store the provided master data set in a searchable format;
wherein the data warehouse is accessible by the website database to receive data.

Claim 14
[**14PRE**] An apparatus for providing a searchable aggregated data structure for a networked application, the apparatus comprising:
[**14A**] a processor; a memory accessible by the processor; and a set of computer-readable instructions stored on a non-transitory medium and accessible by the processor, the instructions being executable by the processor to perform a method comprising:
[**14B**] acquiring source data from a plurality of delivery service computers associated with a plurality of food or beverage delivery services over a communication network, the acquired source data being in a plurality of formats, where the acquired source data includes, for each one of the plurality of food or beverage delivery services, data representing multiple source menu items provided by multiple restaurants;
[**14C**] mapping the acquired source data according to a predetermined data format to provide formatted data, wherein said mapping comprises aliasing fields of the acquired data from formats used by the plurality of delivery service computers to respective fields of the predetermined data format;
[**14D**] linking the formatted data to common restaurants based on restaurant identifier data such that at least one food or beverage delivery service is linked to each common restaurant and its source menu items;
[**14E**] identifying common menu items among the source menu items in the formatted data, and, for each identified common menu item, associating the source menu items with a master menu item;
[**14F**] combining the linked data and the master menu items into a master data set;
[**14G**] importing the master data set and the restaurant identifier data into the searchable aggregated data structure; and
[**14H**] storing the searchable aggregated data structure in a database accessible to the processor;
[**14I**] wherein said acquiring data comprises one or more of: employing an application programming interface (API) to interface with the plurality of delivery service computers; or scraping data from the plurality of delivery service computers.
Claim 15
The apparatus of claim 14, further comprising: a storage device in communication with the processor for storing the searchable aggregated data structure in the database.

Claim 16
The apparatus of claim 14, further comprising: a network interface for communicating with the plurality of delivery source computers.

CERTIFICATE OF SERVICE UNDER 37 C.F.R. § 42.6 (E)(4)

I certify that on May 6, 2025, a copy of the foregoing document, including any exhibits or appendices filed therewith, is being served via Priority Mail Express at the following correspondence address of record for the patent:

Greer, Burns & Crain, Ltd
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Date: May 6, 2025

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WOLF, GREENFIELD & SACKS, P.C.

CERTIFICATE OF WORD COUNT

Pursuant to 37 C.F.R. § 42.24, the undersigned certifies that the foregoing Petition for *Inter Partes* Review contains 13,962 words excluding a table of contents, a table of authorities, Mandatory Notices under § 42.8, a certificate of service or word count, or appendix of exhibits or claim listing. Petitioner has relied on the word count feature of the word processing system used to create this paper in making this certification.

Date: May 6, 2025

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