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Toupin et al.

(54) **SYSTEM, METHOD, AND NON-TRANSITORY COMPUTER-READABLE STORAGE MEDIA FOR DISPLAYING INFORMATION ON MOBILE DEVICES**

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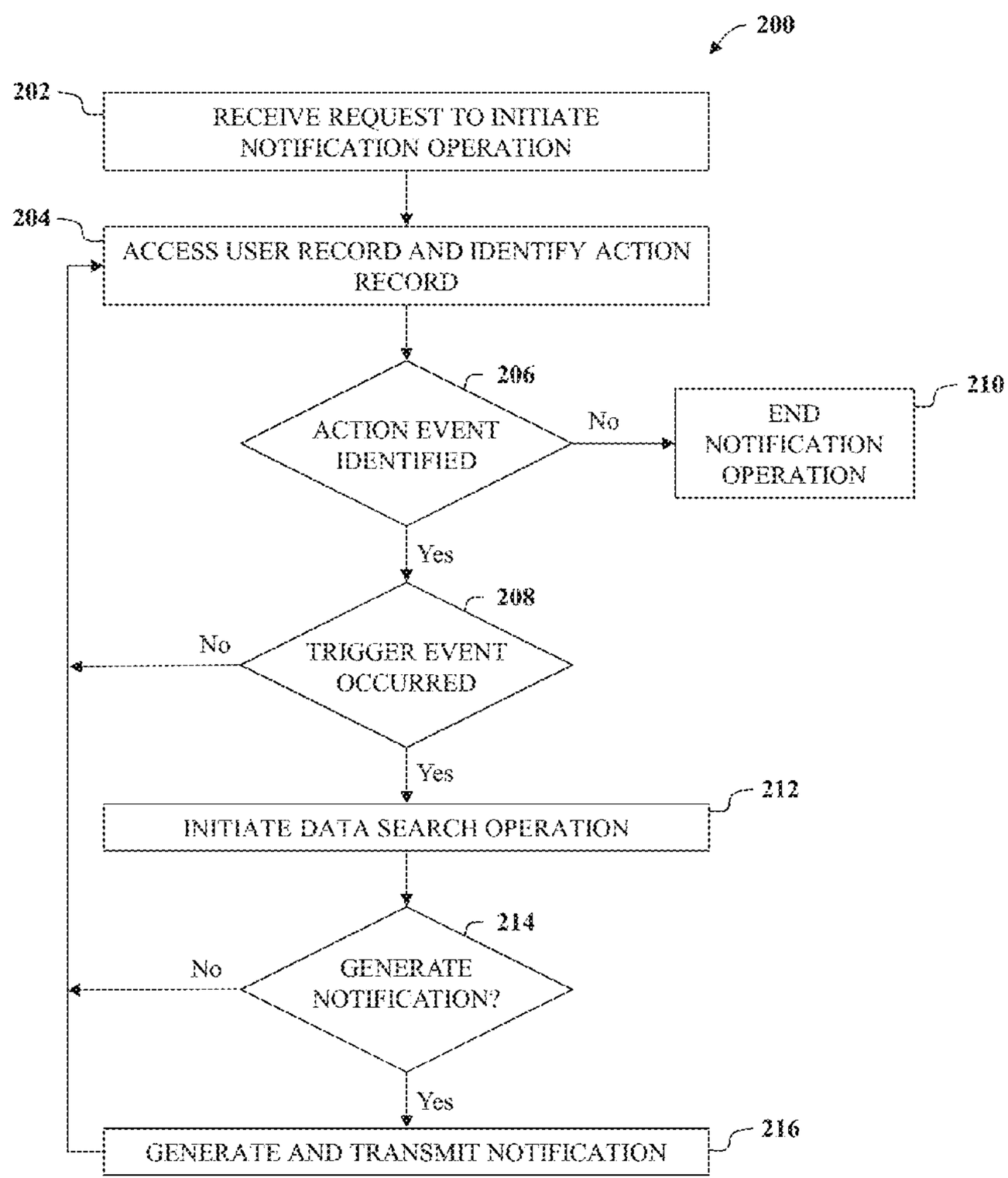
(57) **ABSTRACT**

A networked computer system for displaying information to a user via a mobile computing device is described herein. The networked computer system includes a database including a list of user pharmacy account records and a server computer. The server computer is programmed to receive a request to display a notification message to a user including a corresponding user ID, access the database, and identify a user pharmacy account record associated with the received user ID. The server computer determines an action record associated with the determined pharmaceutical drug including action event, and initiates a data search operation associated with the action event data. The server computer generates a notification message as a function of the outcome of the data search operation, and generates and transmits a signal including the notification message to the mobile computing device.



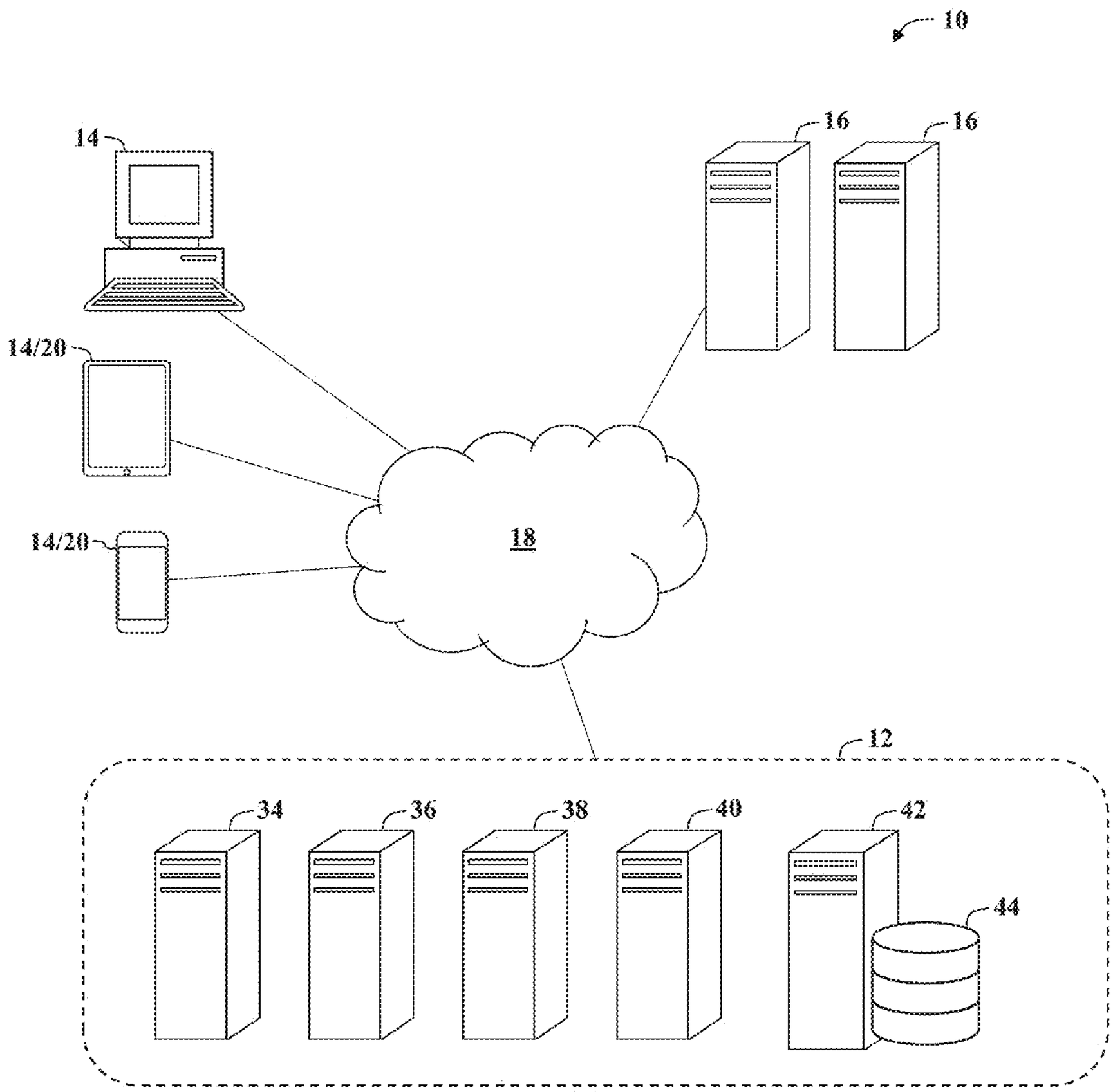


FIG. 1

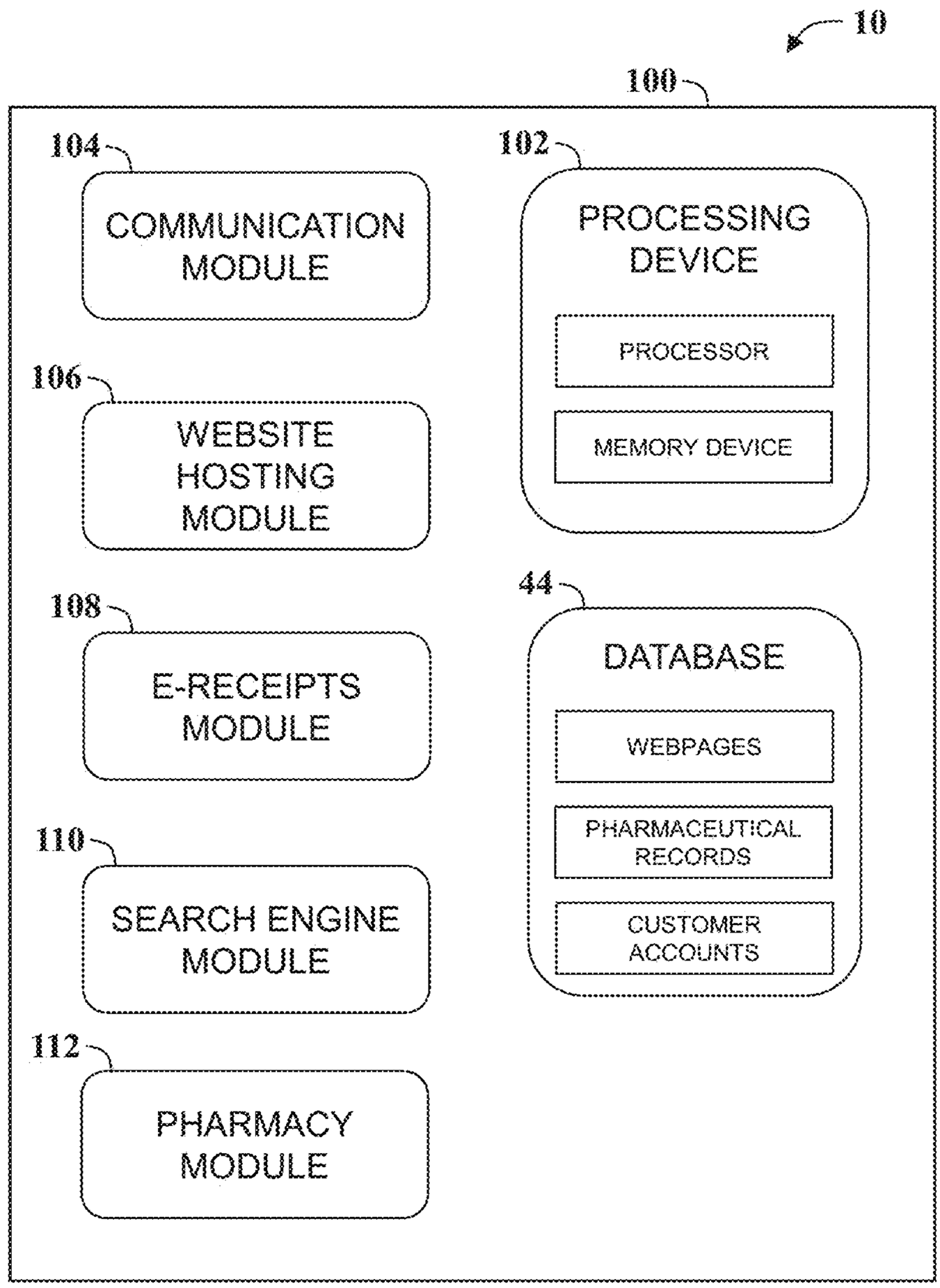

10
100
104
COMMUNICATION MODULE
102
PROCESSING DEVICE
PROCESSOR
MEMORY DEVICE
106
WEBSITE HOSTING MODULE
108
E-RECEIPTS MODULE
44
DATABASE
WEBPAGES
PHARMACEUTICAL RECORDS
CUSTOMER ACCOUNTS
110
SEARCH ENGINE MODULE
112
PHARMACY MODULE

FIG. 2

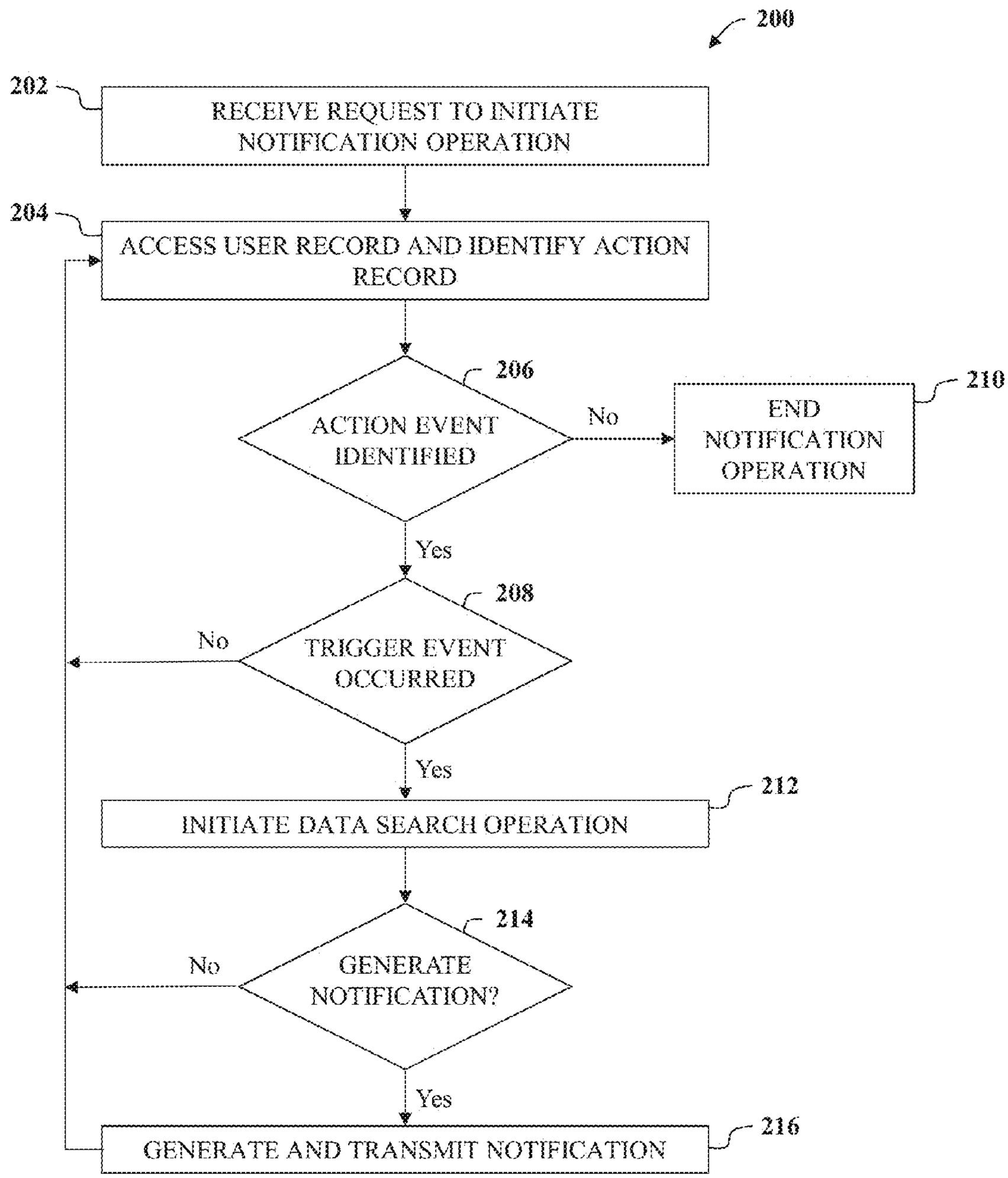

200
202
RECEIVE REQUEST TO INITIATE NOTIFICATION OPERATION
204
ACCESS USER RECORD AND IDENTIFY ACTION RECORD
206
ACTION EVENT IDENTIFIED
No
210
END NOTIFICATION OPERATION
Yes
208
No
TRIGGER EVENT OCCURRED
Yes
212
INITIATE DATA SEARCH OPERATION
214
No
GENERATE NOTIFICATION?
Yes
216
GENERATE AND TRANSMIT NOTIFICATION

FIG. 3

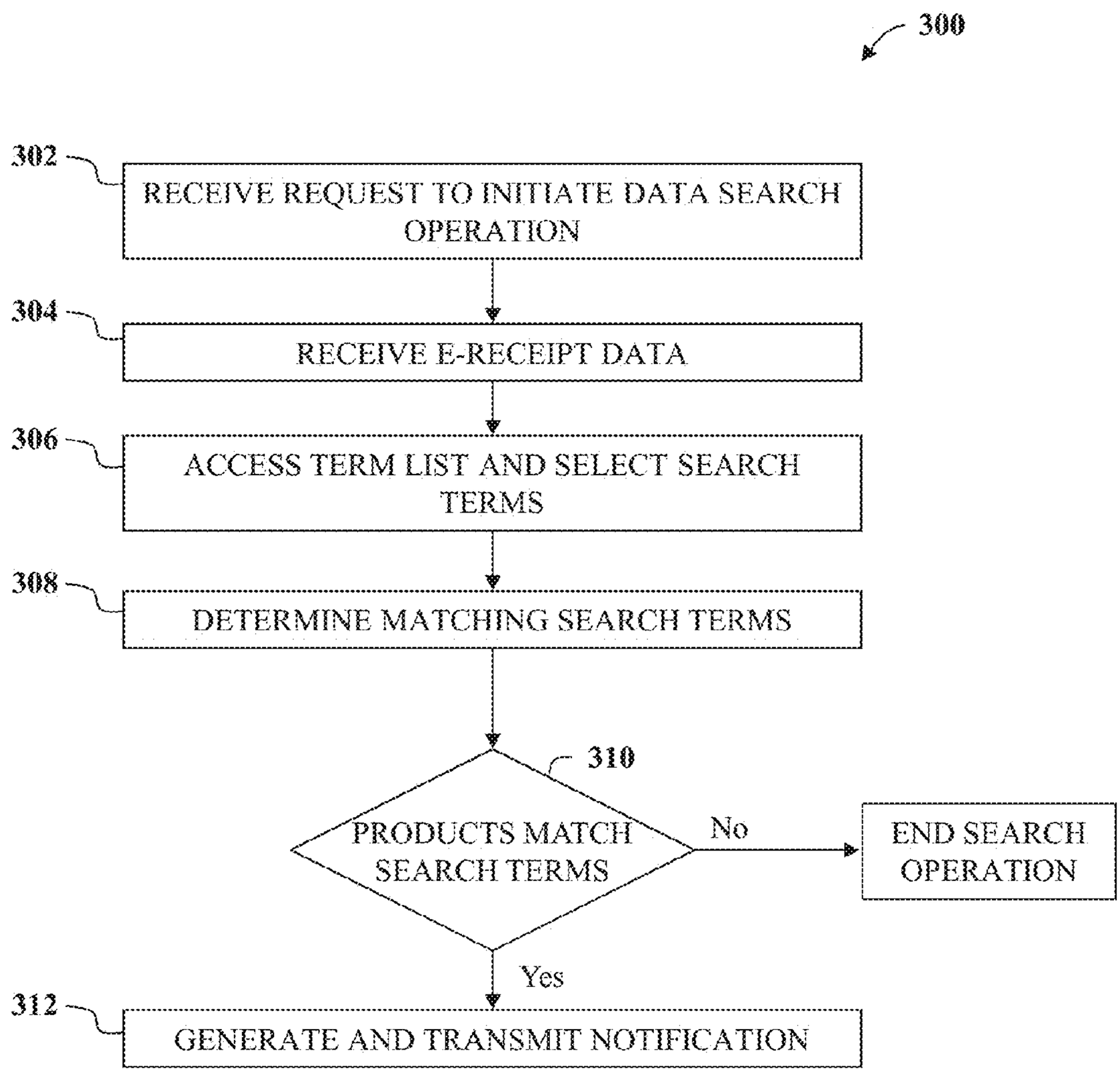

300
302
RECEIVE REQUEST TO INITIATE DATA SEARCH OPERATION
304
RECEIVE E-RECEIPT DATA
306
ACCESS TERM LIST AND SELECT SEARCH TERMS
308
DETERMINE MATCHING SEARCH TERMS
310
PRODUCTS MATCH SEARCH TERMS
No
END SEARCH OPERATION
Yes
312
GENERATE AND TRANSMIT NOTIFICATION

FIG. 4

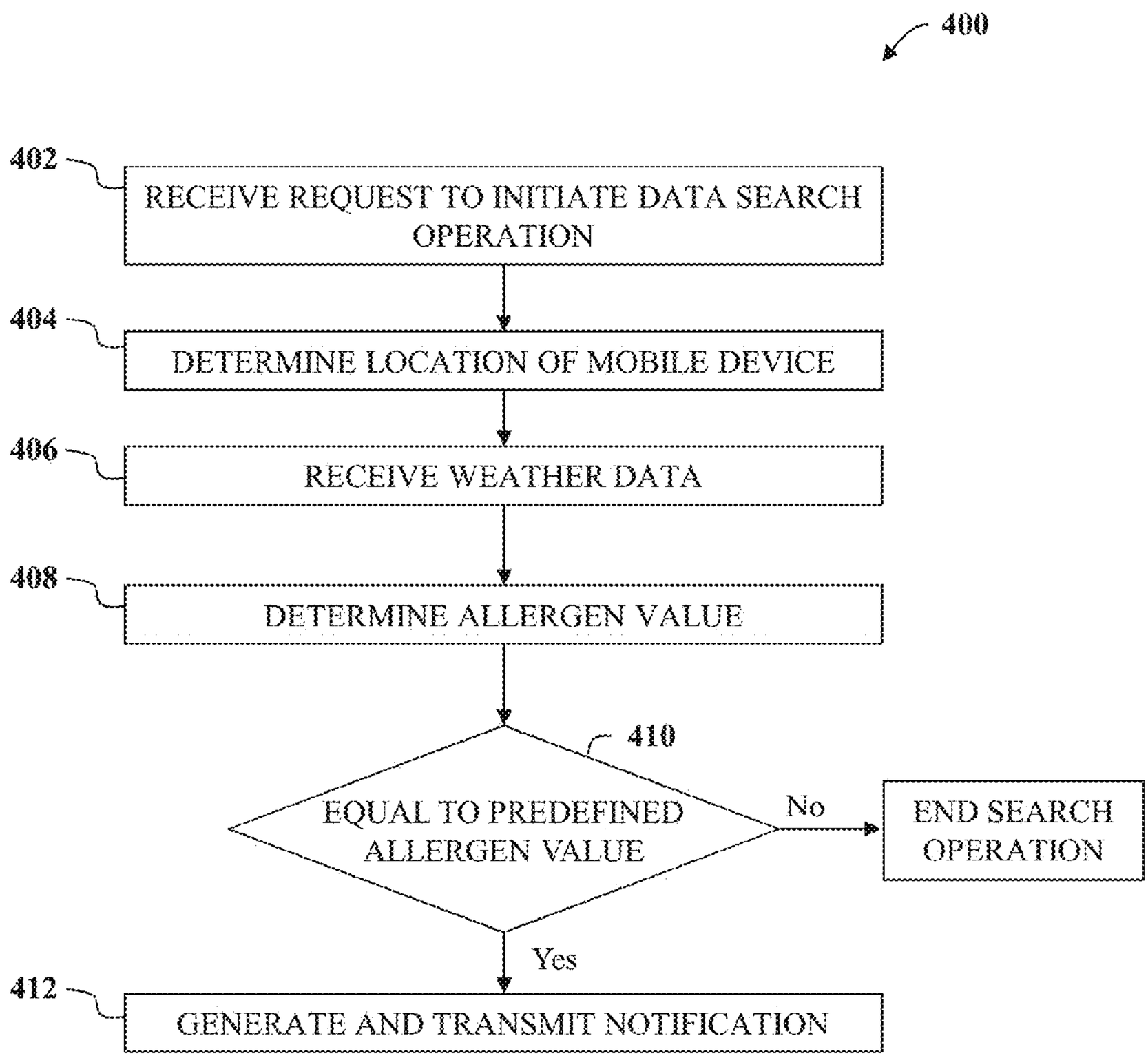

400
402
RECEIVE REQUEST TO INITIATE DATA SEARCH OPERATION
404
DETERMINE LOCATION OF MOBILE DEVICE
406
RECEIVE WEATHER DATA
408
DETERMINE ALLERGEN VALUE
410
EQUAL TO PREDEFINED ALLERGEN VALUE
No
END SEARCH OPERATION
Yes
412
GENERATE AND TRANSMIT NOTIFICATION

FIG. 5

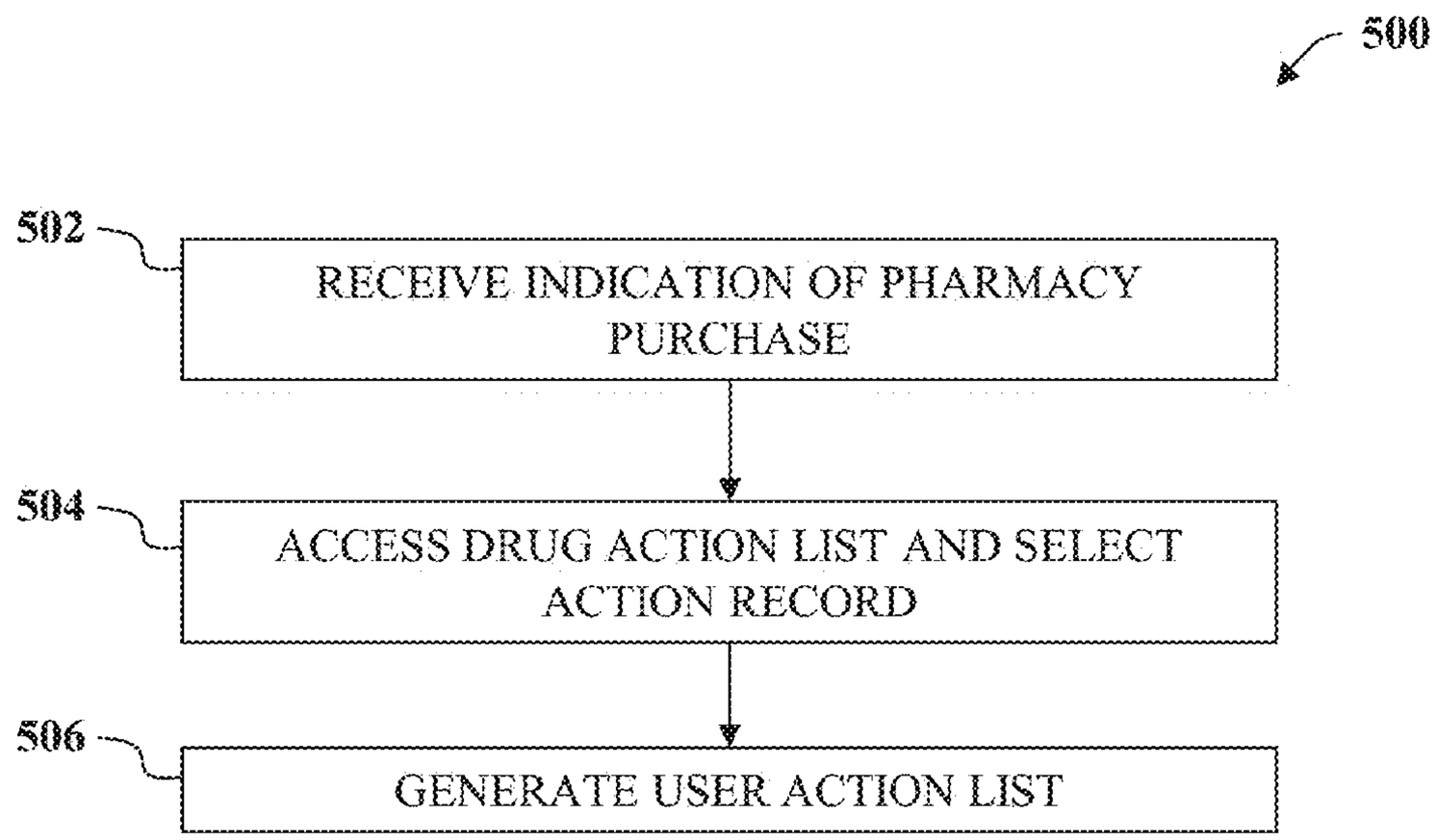

500
502
RECEIVE INDICATION OF PHARMACY PURCHASE
504
ACCESS DRUG ACTION LIST AND SELECT ACTION RECORD
506
GENERATE USER ACTION LIST

FIG. 6

46

52

50

User ID	Drug ID	Prescription Drug	Category	Dosage	No. of Refills
48 Alice011	Drug001	Albuterol	Bronchodilator	200 mcg	2
	Drug005	Benadryl	Antihistamines	25mg	12
48 Barbara003	Drug012	Captopril	Ace Inhibitor	12.5mg	5
Carl004	Drug020	Digoxin	Glycosides	750 mcg	2

FIG. 7

54

52

58

60 62

Drug Category	Drug IDs	Action Event Description	Action ID	Action Rule Description	Event Trigger
56 Bronchodilators	Drug001; Drug010; Drug0015	Food-Drug interaction	Action01	Search E-Receipt data	Food Purchase
		Use Reminder	Action31	Search Local Weather Forecast	Calendar Event
56 Ace Inhibitors	Drug012; Drug115	Food-Drug interaction	Action21	Search E-Receipt data	Food Purchase
		Drug-Drug Interaction	Action04	Search Drug interaction data	Pharmacy Purchase
Antihistamines	Drug005	Use Reminder	Action82	Search Local Allergy Forecast	Calendar Event

FIG. 8

64

68

66

	Action Record ID	Event Trigger	Action Rule File	Rule Description	Notification Message File	Message Type
58	Action001	Food Purchase	Action001.API	Search E-Receipt data	AlertMessage011	Food-Drug Interaction
58	Action004	Pharmacy Purchase	Action004.API	Search Drug interaction data	AlertMessage014	Drug-Drug Interaction
	Action021	Food Purchase	Action021.API	Search E-Receipt data	AlertMessage012	Food-Drug Interaction
	Action031	Calendar Event	Action031.API	Search Local Weather Forecast	ReminderMessage002	Use Reminder
	Action082	Calendar Event	Action082.API	Search Local Allergy Forecast	ReminderMessage003	Use Reminder

FIG. 9

70

68

50 52 58 66 74

User ID	Drug ID	Action Record ID	Action Rule File	Rule Description	Event Trigger	Mobile Device ID/ Messaging API
72 Alice011	Drug001	Action01	Action001.API	Search E-Receipt data	Food Purchase	MD002; androidAPI01
	Drug001	Action31	Action031.API	Search Local Weather Forecast	Calendar Event	MD002; androidAPI01
	Drug005	Action82	Action082.API	Search Local Allergy Forecast	Calendar Event	MD002; androidAPI01
72 Barbara003	Drug012	Action21	Action021.API	Search E-Receipt data	Food Purchase	MD0062; iPhoneAPI002
	Drug012	Action04	Action004.API	Search Drug interaction data	Pharmacy Purchase	MD0062; iPhoneAPI002

FIG. 10

76

	Action Record ID	Drugs	Food-Drug Interaction Search Terms	Drug-Drug Interaction Search Terms
78	Action001	**Bronchodilators** albuterol theophylline	Caffeine; non-decaf coffee; non-herbal tea; energy drinks	Drug001; Drug 008; Drug112
78	Action021	**Ace Inhibitors** captopril enalapril lisinopril moexipril quinapril ramipril	High potassium foods; bananas; oranges	Drug018; Drug120
	Action032	**Glycosides** digoxin	High fiber foods; oat bran; high fiber cereals	Drug001; Drug018
	Action041	**Statins** atorvastatin fluvastatin lovastatin	Grapefruit juice; grapefruit	Drug304; Drug305
	Action088	**Anticoagulants** warfarin	Cranberry juice; cranberry	Drug018; Drug033; Drug42

FIG. 11

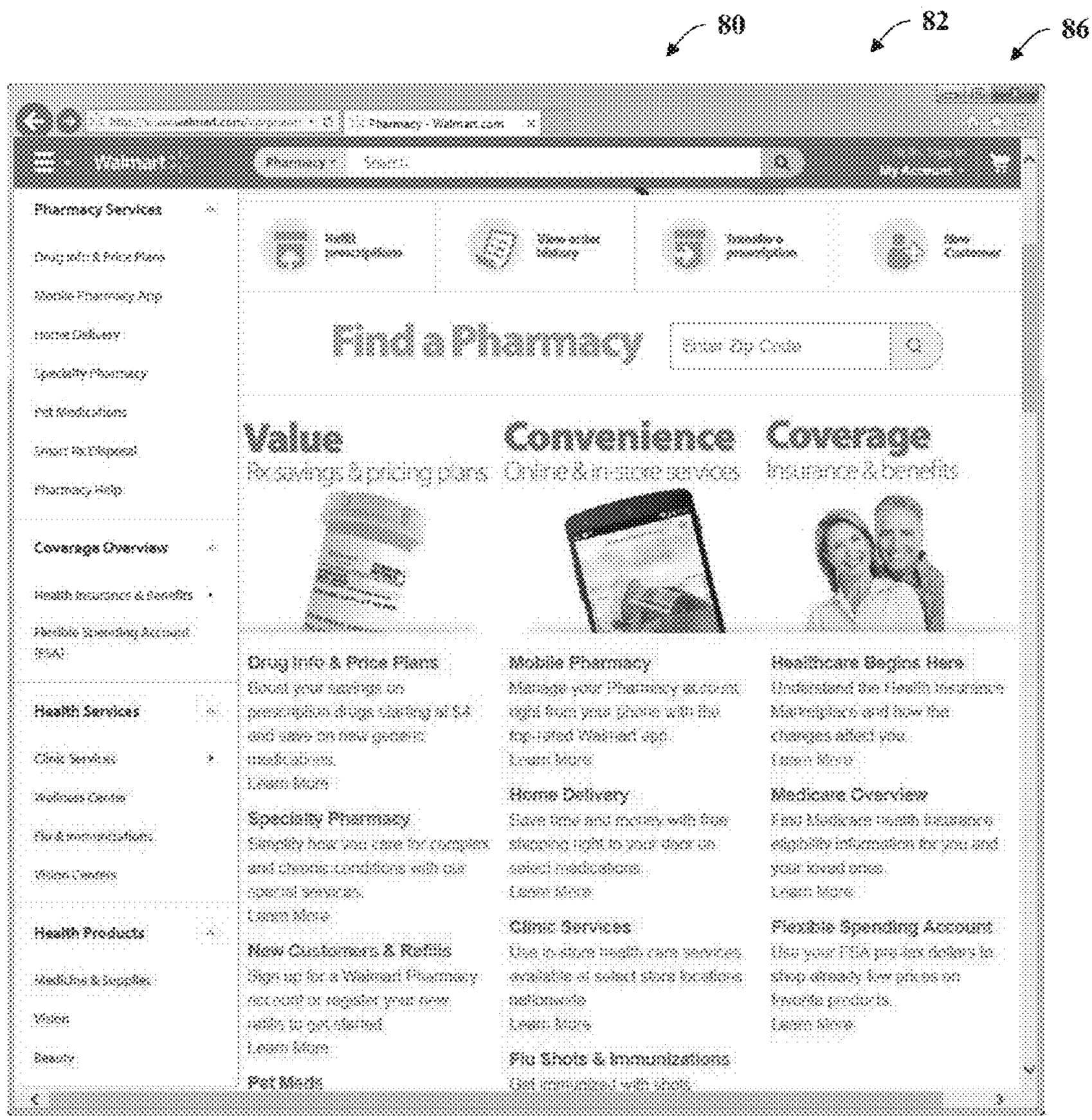

80
82
86
Pharmacy Services
Coverage Overview
Health Services
Health Products
Find a Pharmacy
Value
Convenience
Coverage
Drug Info & Price Plans
Mobile Pharmacy
Healthcare Begins Here
Home Delivery
Medicare Overview
Specialty Pharmacy
Clinic Services
Flexible Spending Account
New Customers & Refills
Pet Meds
Flu Shots & Immunizations

FIG. 12

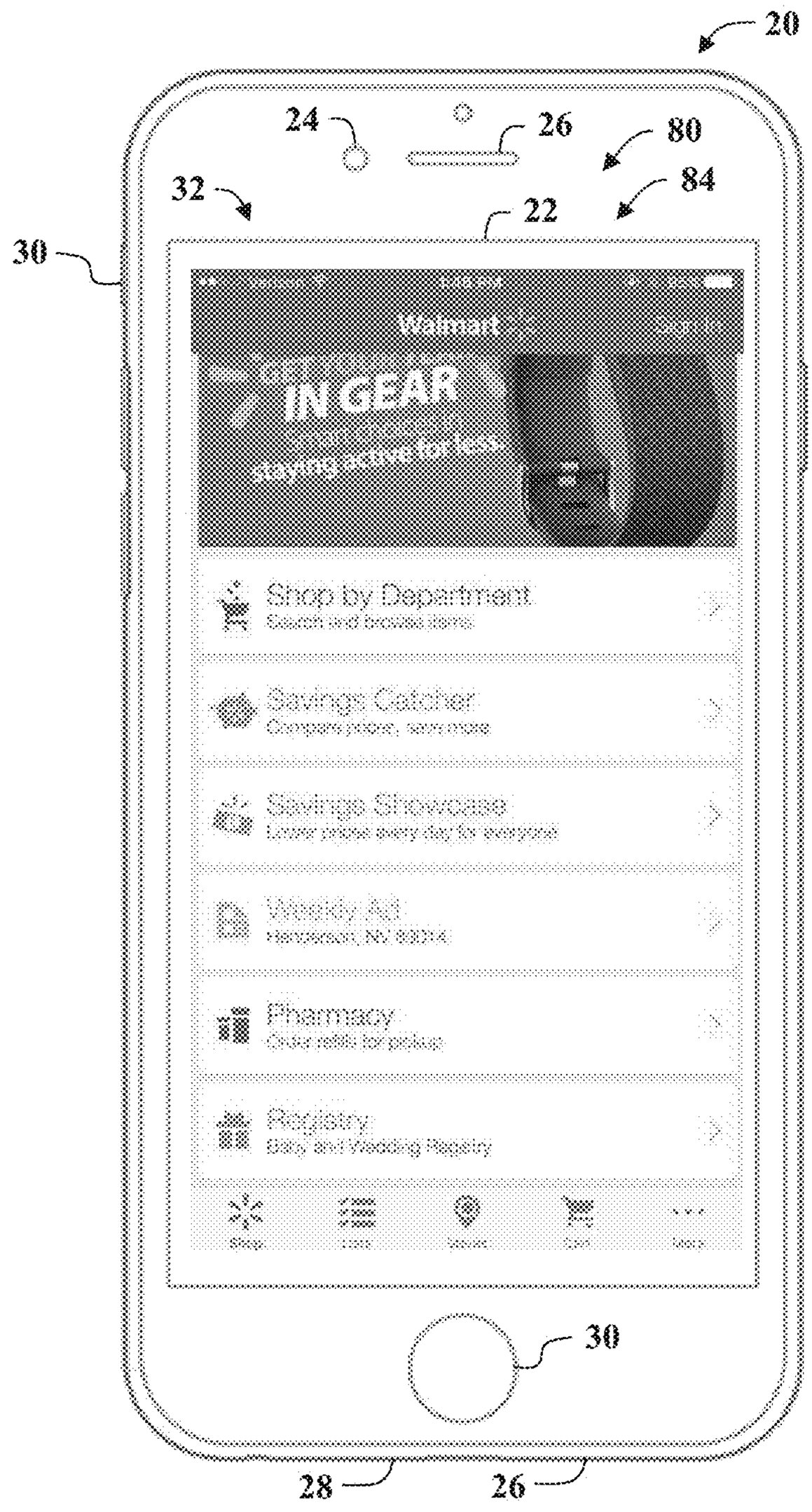

20
24
26
80
84
32
22
30
Walmart
IN GEAR
Shop by Department
Savings Catcher
Savings Showcase
Weekly Ad
Pharmacy
Registry
30
28
26

FIG. 13

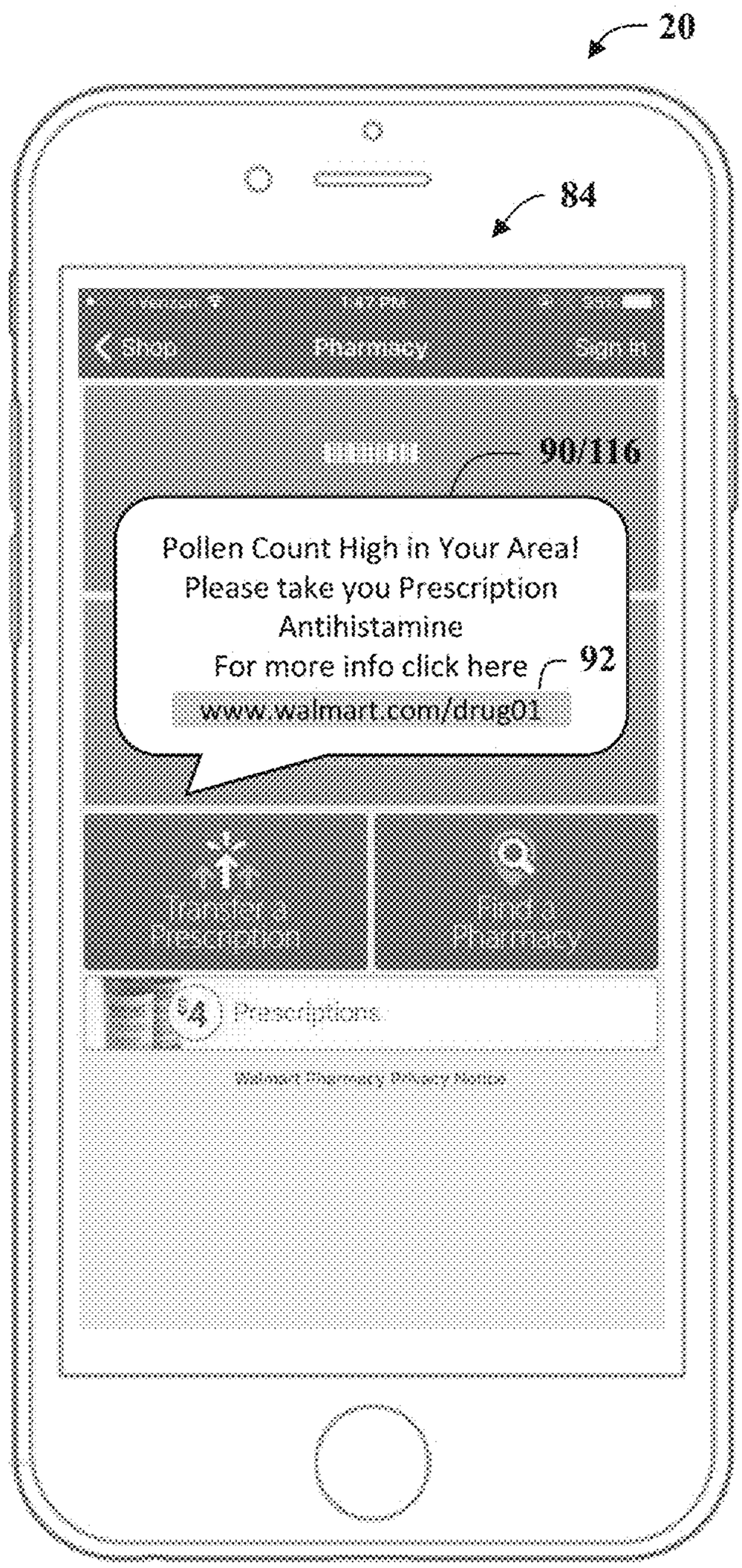

20
84
Pharmacy
90/116
Pollen Count High in Your Area!
Please take you Prescription
Antihistamine
For more info click here
92
www.walmart.com/drug01
Prescriptions

FIG. 14

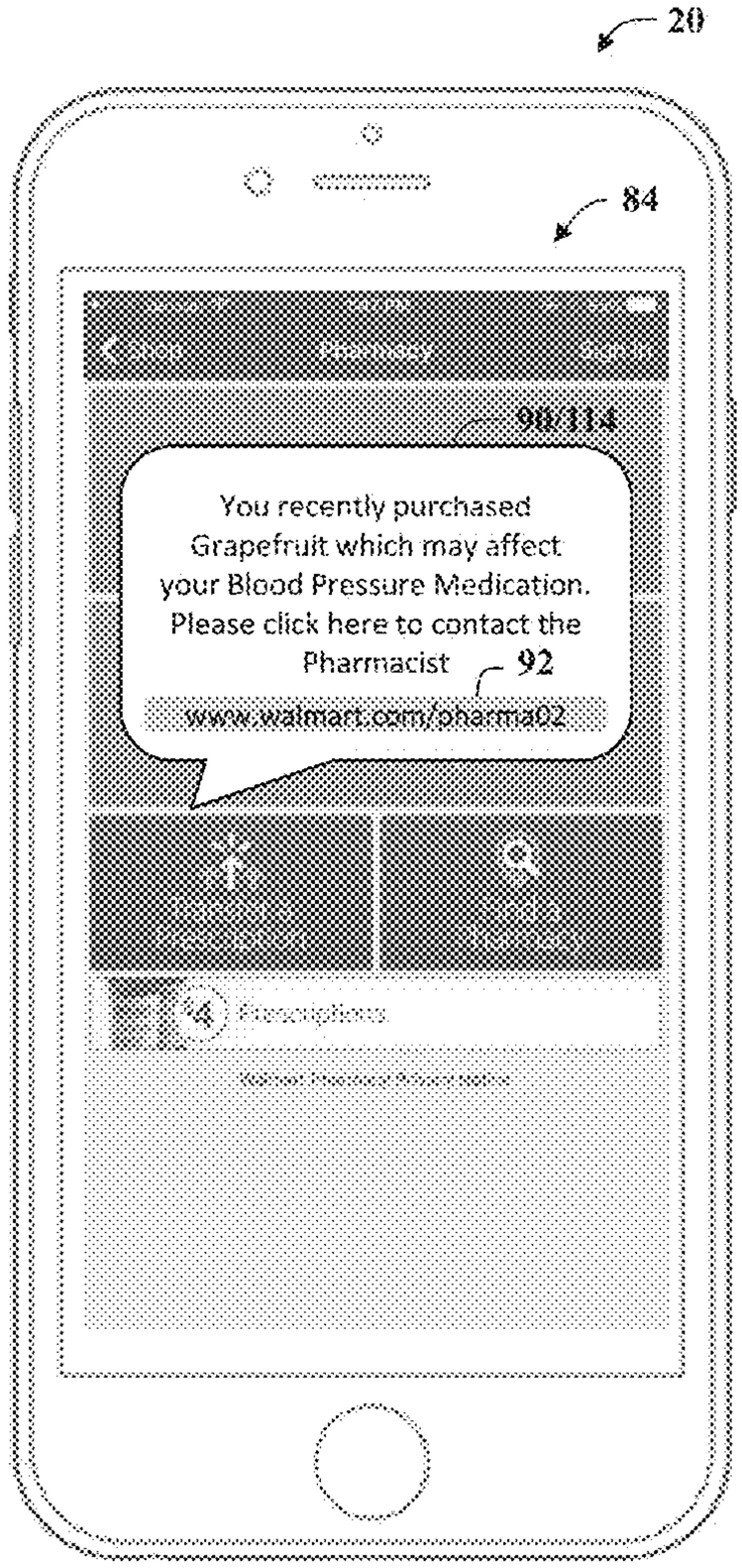

20
84
90/114
You recently purchased Grapefruit which may affect your Blood Pressure Medication. Please click here to contact the Pharmacist
92
www.walmart.com/pharma02

FIG. 15

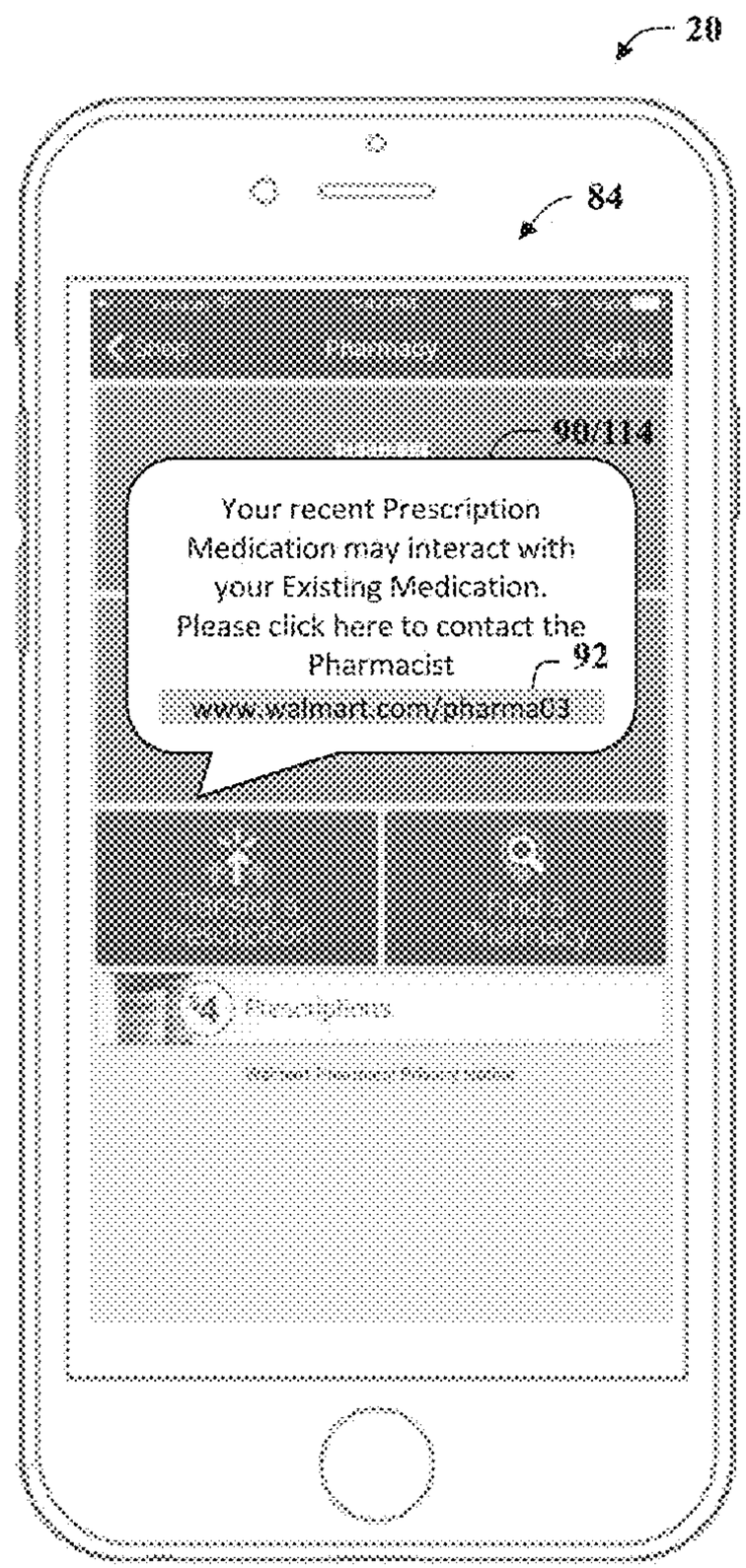

20
84
90/114
Your recent Prescription Medication may interact with your Existing Medication. Please click here to contact the Pharmacist
92
www.walmart.com/pharma03

FIG. 16

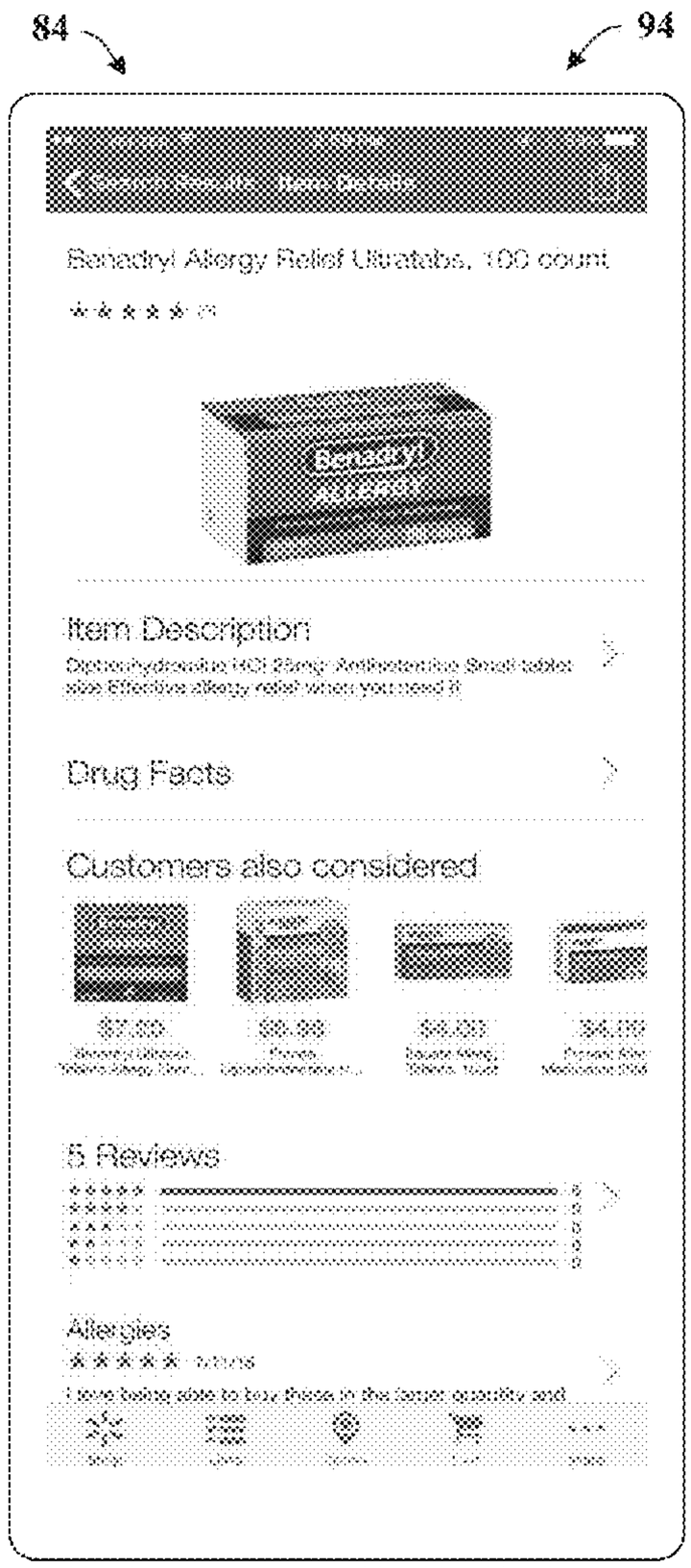

84
94
Benadryl Allergy Relief Ultratabs, 100 count
Item Description
Drug Facts
Customers also considered
5 Reviews
Allergies

FIG. 17

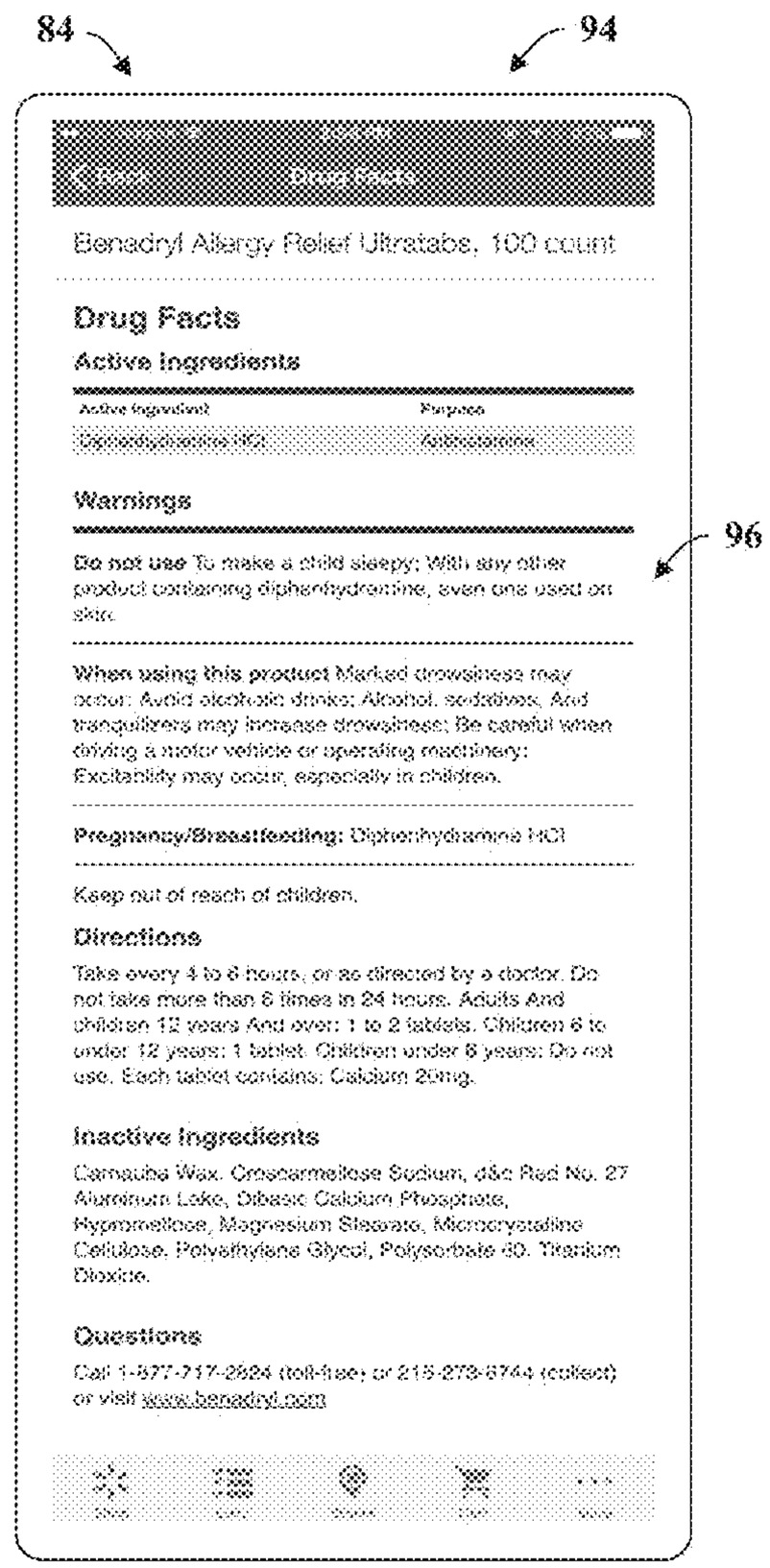

84
94
Back
Drug Facts
Benadryl Allergy Relief Ultratabs, 100 count
Drug Facts
Active Ingredients
Active Ingredient
Purpose
Warnings
96
Do not use To make a child sleepy; With any other product containing diphenhydramine, even one used on skin.
When using this product Marked drowsiness may occur; Avoid alcoholic drinks; Alcohol, sedatives, And tranquilizers may increase drowsiness; Be careful when driving a motor vehicle or operating machinery; Excitability may occur, especially in children.
Pregnancy/Breastfeeding: Diphenhydramine HCl
Keep out of reach of children.
Directions
Take every 4 to 6 hours, or as directed by a doctor. Do not take more than 6 times in 24 hours. Adults And children 12 years And over: 1 to 2 tablets. Children 6 to under 12 years: 1 tablet. Children under 6 years: Do not use. Each tablet contains: Calcium 20mg.
Inactive Ingredients
Carnauba Wax, Croscarmellose Sodium, d&c Red No. 27 Aluminum Lake, Dibasic Calcium Phosphate, Hypromellose, Magnesium Stearate, Microcrystalline Cellulose, Polyethylene Glycol, Polysorbate 80, Titanium Dioxide.
Questions
Call 1-877-717-2624 (toll-free) or 215-273-6744 (collect) or visit www.benadryl.com

FIG. 18

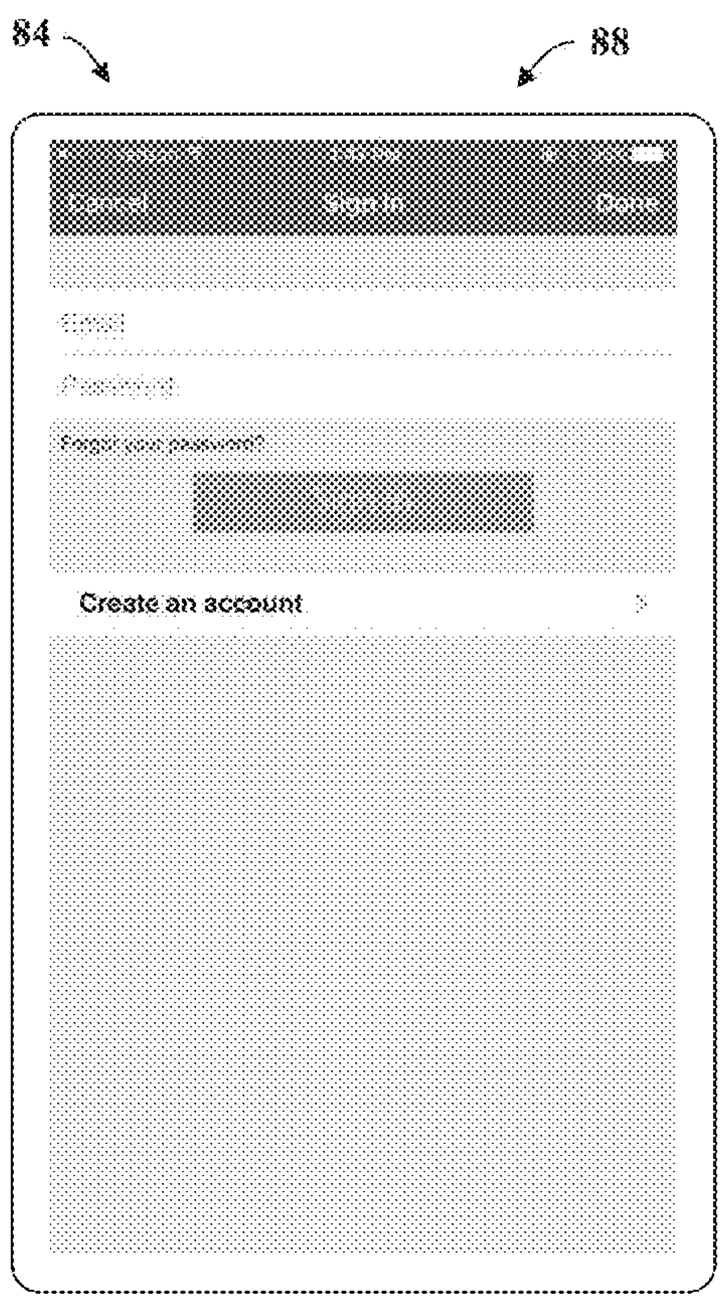

84
88
Cancel
Sign In
Done
Email
Password
Forgot your password?
Create an account

FIG. 19

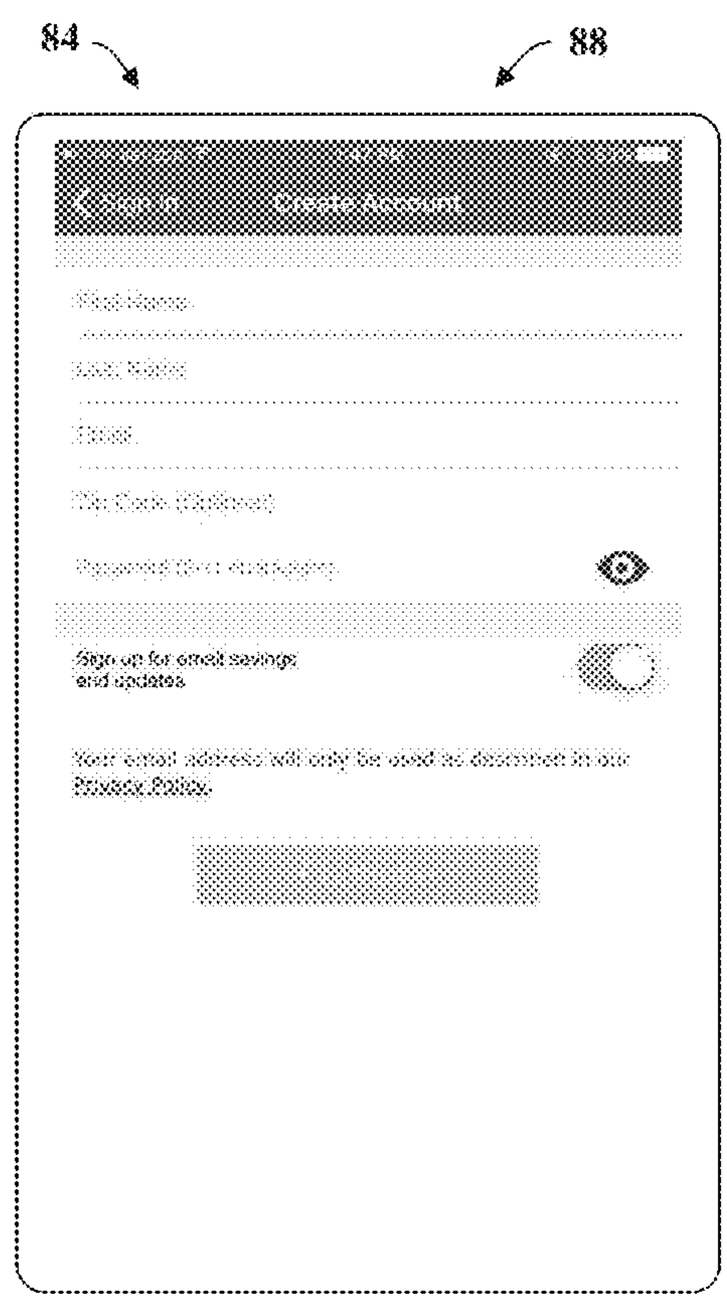

84
88
Sign In
Create Account
First Name
Last Name
Email
Zip Code (Optional)
Password (8+ characters)
Sign up for email savings and updates
Your email address will only be used as described in our Privacy Policy.

FIG. 20

SYSTEM, METHOD, AND NON-TRANSITORY COMPUTER-READABLE STORAGE MEDIA FOR DISPLAYING INFORMATION ON MOBILE DEVICES

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FIELD OF THE DISCLOSURE

[0002] U.S. Patent Classification Primary Class: 707 (DATA PROCESSING: DATABASE, DATA MINING, AND FILE MANAGEMENT OR DATA STRUCTURES). Art Unit: 2161.

[0003] The present invention relates to providing product information to a consumer, and more particularly, to systems, methods, and computer-readable storage media that monitor activities of pharmacy customers, determine potential drug interactions, and generate and displays product information via a website in response to potential drug interactions.

BACKGROUND

[0004] Many pharmacy consumers desire to obtain information related to the pharmaceutical medications being prescribed to them remotely, e.g., on-line, through the Internet, or using a specially designed application or app on a personal computer or mobile device, such as a tablet or cell phone. At least some known web hosting systems include information associated with pharmaceutical drugs including treated illnesses and potential side effects.

[0005] These known systems allow customers to search drug databases for the names of particular pharmaceutical drugs, select one or more drugs stored in the database, and display information related to the selected drugs. However, because of the increasing number of pharmaceutical drugs being made available to consumers and the amount of drug information associated with the pharmaceutical drugs, consumer may become frustrated with the lack of relevant information being provided by known systems. In addition, because of the number of records that may be included in a drug database, at least some known search engines require significant computing time and resources to generate and display the sorted drug lists to the consumer. As the amount of records being included in a database increases, the amount of computing resources that are required to perform the search functions increase, thus reducing the overall performance of known web hosting systems.

[0006] The present invention is aimed at one or more of the problems identified above.

SUMMARY OF THE INVENTION

[0007] In different embodiments of the present invention, systems, methods, and computer-readable storage media for generating and displaying information to users via mobile computing devices.

[0008] In one embodiment of the present invention, a computer network system for displaying information to a user via a mobile computing device is provided. The computer network system includes a database including a list of user pharmacy account records and a server computer that includes a processor coupled to a memory device. Each user pharmacy account record includes a unique user ID associated with a user, pharmaceutical drug data indicating a corresponding pharmaceutical drug associated with the corresponding user, and an action record associated with the corresponding pharmaceutical drug. The action record includes triggering event data indicating a triggering event and action event data indicating data search operations. The server computer is programmed to receive a request to display a notification message to a user including a corresponding user ID, access the database, and identify a user pharmacy account record associated with the received user ID. The server computer determines a pharmaceutical drug included in the identified pharmaceutical account record and determines an action record associated with the determined pharmaceutical drug including a corresponding triggering event data and action event data. The server computer detects an occurrence of a triggering event as a function of the triggering event data, initiates a data search operation associated with the corresponding action event data upon detecting the occurrence of the triggering event, and determines an outcome of the data search operation. The server computer also generates a notification message as a function of the outcome of the data search operation, and generates and transmits a signal including the notification message to the mobile computing device to cause the mobile computing device to display the notification message on the mobile computing device.

[0009] In another embodiment of the present invention, a computer-implemented method of operating a networked computer system for displaying information to a user via a mobile computing device is provided. The networked computer system including a database and a server computer including a processor coupled to a memory device. The method includes the steps of the server computer receiving a request to display a notification message to a user including a corresponding user ID and accessing the database including a list of user pharmacy account records. Each user pharmacy account record includes a unique user ID associated with a user, pharmaceutical drug data indicating a corresponding pharmaceutical drug associated with the corresponding user, and an action record associated with the corresponding pharmaceutical drug. The action record includes triggering event data indicating a triggering event and action event data indicating data search operations. The server computer identifies a user pharmacy account record associated with the received user ID, determines a pharmaceutical drug included in the identified pharmaceutical account record, and determines an action record associated with the determined pharmaceutical drug including a corresponding triggering event data and action event data. The server computer detects an occurrence of a triggering event as a function of the triggering event data, initiates a data search operation associated with the corresponding action event data upon detecting the occurrence of the triggering event, and determines an outcome of the data search operation. The server computer generates a notification message as a function of the outcome of the data search operation; and generates and transmits a signal including the notification message to the mobile computing device to cause the mobile computing device to display the notification message on the mobile computing device.

[0010] In yet another embodiment, one or more non-transitory computer-readable storage media, having computer-executable instructions embodied thereon are provided. When executed by at least one processor, the computer-executable instructions cause the processor to receive a request to display a notification message to a user including a corresponding user ID and access a database including a list of user pharmacy account records. Each user pharmacy account record includes a unique user ID associated with a user, pharmaceutical drug data indicating a corresponding pharmaceutical drug associated with the corresponding user, and an action record associated with the corresponding pharmaceutical drug. The action record includes triggering event data indicating a triggering event and action event data indicating data search operations. The processor identifies a user pharmacy account record associated with the received user ID, determines a pharmaceutical drug included in the identified pharmaceutical account record, and determines an action record associated with the determined pharmaceutical drug including a corresponding triggering event data and action event data. The processor detects an occurrence of a triggering event as a function of the triggering event data, initiates a data search operation associated with the corresponding action event data upon detecting the occurrence of the triggering event, and determines an outcome of the data search operation. The processor generates a notification message as a function of the outcome of the data search operation, and generates and transmits a signal including the notification message to the mobile computing device to cause the mobile computing device to display the notification message on the mobile computing device.

BRIEF DESCRIPTION OF THE FIGURES

[0011] Non-limiting and non-exhaustive embodiments of the present invention are described with reference to the following figures. Other advantages of the present disclosure will be readily appreciated, as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings wherein:

[0012] FIG. **1** is a schematic illustrating various aspects of a system, according to the present invention;

[0013] FIG. **2** is a schematic illustrating example components of a server computer that may be used with the system shown in FIG. **1**, according to an embodiment of the present invention;

[0014] FIGS. **3-6** are flowcharts of methods that may be used with the system shown in FIG. **1**, according to embodiments of the present invention;

[0015] FIGS. **7-11** are illustrations of exemplary database records generated by the system of FIG. **1**, according to embodiments of the present invention; and

[0016] FIGS. **12-20** are illustrations of exemplary screenshots from the system of FIG. **1**, according to an embodiment of the present invention.

[0017] Corresponding reference characters indicate corresponding components throughout the several views of the drawings. Skilled artisans will appreciate that elements in the figures are illustrated for simplicity and clarity and have not necessarily been drawn to scale. For example, the dimensions of some of the elements in the figures may be exaggerated relative to other elements to help to improve understanding of various embodiments of the present invention. Also, common but well-understood elements that are useful or necessary in a commercially feasible embodiment are often not depicted in order to facilitate a less obstructed view of these various embodiments of the present invention.

DETAILED DESCRIPTION

[0018] In the following description, numerous specific details are set forth in order to provide a thorough understanding of the present invention. It will be apparent, however, to one having ordinary skill in the art that the specific detail need not be employed to practice the present invention. In other instances, well-known materials or methods have not been described in detail in order to avoid obscuring the present invention.

[0019] Reference throughout this specification to "one embodiment", "an embodiment", "one example" or "an example" means that a particular feature, structure or characteristic described in connection with the embodiment or example is included in at least one embodiment of the present invention. Thus, appearances of the phrases "in one embodiment", "in an embodiment", "one example" or "an example" in various places throughout this specification are not necessarily all referring to the same embodiment or example. Furthermore, the particular features, structures or characteristics may be combined in any suitable combinations and/or sub-combinations in one or more embodiments or examples. In addition, it is appreciated that the figures provided herewith are for explanation purposes to persons ordinarily skilled in the art and that the drawings are not necessarily drawn to scale.

[0020] Embodiments in accordance with the present invention may be embodied as an apparatus, method, or computer program product. Accordingly, the present invention may take the form of an entirely hardware embodiment, an entirely software embodiment (including firmware, resident software, micro-code, etc.), or an embodiment combining software and hardware aspects that may all generally be referred to herein as a "module" or "system." Furthermore, the present invention may take the form of a computer program product embodied in any tangible media of expression having computer-usable program code embodied in the media.

[0021] Any combination of one or more computer-usable or computer-readable media (or medium) may be utilized. For example, a computer-readable media may include one or more of a portable computer diskette, a hard disk, a random access memory (RAM) device, a read-only memory (ROM) device, an erasable programmable read-only memory (EPROM or Flash memory) device, a portable compact disc read-only memory (CDROM), an optical storage device, and a magnetic storage device. Computer program code for carrying out operations of the present invention may be written in any combination of one or more programming languages.

[0022] Embodiments may also be implemented in cloud computing environments. In this description and the following claims, "cloud computing" may be defined as a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned via virtualization and released with minimal management effort or service provider interaction, and then scaled accordingly. A cloud model can be composed of various characteristics (e.g.,

on-demand self-service, broad network access, resource pooling, rapid elasticity, measured service, etc.), service models (e.g., Software as a Service ("SaaS"), Platform as a Service ("PaaS"), Infrastructure as a Service ("IaaS"), and deployment models (e.g., private cloud, community cloud, public cloud, hybrid cloud, etc.).

[0023] The flowchart and block diagrams in the flow diagrams illustrate the architecture, functionality, and operation of possible implementations of systems, methods, and computer program products according to various embodiments of the present invention. In this regard, each block in the flowchart or block diagrams may represent a module, segment, or portion of code, which comprises one or more executable instructions for implementing the specified logical function(s). It will also be noted that each block of the block diagrams and/or flowchart illustrations, and combinations of blocks in the block diagrams and/or flowchart illustrations, may be implemented by special purpose hardware-based systems that perform the specified functions or acts, or combinations of special purpose hardware and computer instructions. These computer program instructions may also be stored in a computer-readable media that can direct a computer or other programmable data processing apparatus to function in a particular manner, such that the instructions stored in the computer-readable media produce an article of manufacture including instruction means which implement the function/act specified in the flowchart and/or block diagram block or blocks.

[0024] Several (or different) elements discussed below, and/or claimed, are described as being "coupled", "in communication with", or "configured to be in communication with". This terminology is intended to be non-limiting, and where appropriate, be interpreted to include without limitation, wired and wireless communication using any one or a plurality of a suitable protocols, as well as communication methods that are constantly maintained, are made on a periodic basis, and/or made or initiated on an as needed basis. The term "coupled" means any suitable communications link, including but not limited to the Internet, a LAN, a cellular network, or any suitable communications link. The communications link may include one or more of a wired and wireless connection and may be always connected, connected on a periodic basis, and/or connected on an as needed basis.

[0025] With reference to the FIGS. and in operation, the present invention provides a networked computer system **10**, methods and computer product media that monitors the activities of pharmacy customers and provides notification of potential drug interactions to a user via a website. Referring to FIG. **1**, an exemplary environment in which the networked computer system **10** operates is illustrated. In general, the present invention describes a networked computer system **10** that monitors activities of pharmacy customers for potential drug interactions and provides pharmacy notifications to customers when potential drug interactions with existing pharmaceutical medications currently used by the customer is detected. Moreover, the networked computer system **10** is configured to communicate with a mobile device associated with the customer to provide push notifications to the mobile devices including messages about the potential drug interactions to the pharmacy customers. In addition, the system **10** may determine the location of the customer based on the geographic location of the corresponding mobile device and determine environmental conditions associated with the geographic area of the mobile device that may affect or require the use of the pharmaceutical medications being used by the customer. The system **10** may then transmit push notifications to the customer with information about current weather conditions in the area and reminders to use the appropriate pharmaceutical drug. The system **10** may also include a mobile computer application being stored on a mobile device associated with the pharmacy customer. The mobile application uses location and public API's to give warnings based on known conditions of the user. For example, in one embodiment, the pharmacy customer receives a push notification warning in the morning because the pollen count in their area is high and they are known users of an allergy medication. The system may also allow the pharmacy customer to identify additional users such as, for example, family, friends, and healthcare professionals, to receive similar notifications to provide the additional users with the information associated with the pharmacy customer.

[0026] The system **10** is configured to generate and store user pharmacy data records associated with pharmacy customers that includes information associated with pharmaceutical drugs being used by the customers. The system **10** also determines action events that are associated with the pharmaceutical drugs and generates and stores action records that includes information associated with actions to be performed by the system upon detecting activities being performed by the customer. In addition, the user pharmacy data records may include triggering events that are detected by the system to initiate the action events. The triggering events may include detecting purchases being made by the customers, requests being received by the customers, and/or customer selected calendar dates. The action events may include initiating data search operations to search e-receipt data to determine potential drug interactions and/or provide notifications to the customer of the potential drug interaction via the customer's mobile device.

[0027] By generating action event records associated with customer activities that include triggering events that trigger corresponding system actions, the system **10** improves the speed and functionality of known computing systems by reducing the amount of computing time required to monitor customer activity, thus reducing the computing resources required to generate and display relevant pharmacy messages to pharmacy customers.

[0028] For clarity in discussing the various functions of the system **10**, multiple computers and/or servers are discussed as performing different functions. These different computers (or servers) may, however, be implemented in multiple different ways such as modules within a single computer, as nodes of a computer system, etc. . . . The functions performed by the system **10** (or nodes or modules) may be centralized or distributed in any suitable manner across the system **10** and its components, regardless of the location of specific hardware. Furthermore, specific components of the system **10** may be referenced using functional terminology in their names. The function terminology is used solely for purposes of naming convention and to distinguish one element from another in the following discussion. Unless otherwise specified, the name of an element conveys no specific functionality to the element or component.

[0029] Other features of the system **10** can be found in the following commonly owned US patent applications, which

are hereby incorporated by reference: U.S. patent application Ser. No. N/A, filed on Jan. 28, 2016 (Attorney Docket Number 068571.00243); U.S. patent application Ser. No. N/A, filed on Jan. 28, 2016 (Attorney Docket Number 068571.00244); U.S. patent application Ser. No. N/A, filed on Jan. 28, 2016 (Attorney Docket Number 068571.00245); U.S. patent application Ser. No. N/A, filed on Jan. 28, 2016 (Attorney Docket Number 068571.00246); U.S. patent application Ser. No. N/A, filed on Jan. 28, 2016 (Attorney Docket Number 068571.00247); U.S. patent application Ser. No. N/A, filed on Jan. 28, 2016 (Attorney Docket Number 068571.00248); U.S. patent application Ser. No. N/A, filed on Jan. 28, 2016 (Attorney Docket Number 068571.00249); U.S. patent application Ser. No. N/A, filed on Jan. 28, 2016 (Attorney Docket Number 068571.00250); U.S. patent application Ser. No. N/A, filed on Jan. 28, 2016 (Attorney Docket Number 068571.00251); U.S. patent application Ser. No. N/A, filed on Jan. 28, 2016 (Attorney Docket Number 068571.00252); and, U.S. patent application Ser. No. N/A, filed on Jan. 28, 2016 (Attorney Docket Number 068571.00253).

[0030] In the illustrated embodiment, the system **10** includes a server system **12** that is coupled in communication with one or more user computing devices **14** and one or more 3rd party computer servers **16** via a communications network **18**. The communications network **18** may be any suitable connection, including the Internet, file transfer protocol (FTP), an Intranet, LAN, a virtual private network (VPN), cellular networks, etc. . . . , and may utilize any suitable or combination of technologies including, but not limited to wired and wireless connections, always on connections, connections made periodically, and connections made as needed.

[0031] The user computing device **14** may include any suitable device that enables a user to access and communicate with the system **10** including sending and/or receiving information to and from the system **10** and displaying information received from the system **10** to a user. For example, in one embodiment, the user computing device **14** may include, but is not limited to, a desktop computer, a laptop or notebook computer, a tablet computer, smartphone/tablet computer hybrid, a personal data assistant, a handheld mobile device including a cellular telephone, and the like. The user computing device **14**, as well as any other connected computer systems and their components included in the system **10**, can create message related data and exchange message related data (e.g., near field communication ("NFC") payloads, Bluetooth packets, Internet Protocol ("IP") datagrams and other higher layer protocols that utilize IP datagrams, such as, Transmission Control Protocol ("TCP"), Hypertext Transfer Protocol ("HTTP"), Simple Mail Transfer Protocol ("SMTP"), etc.) over the network.

[0032] In one embodiment, the user computing device includes a mobile computing device **20** (shown in FIG. **13**) such as, for example, a smartphone such as an iPhone™. The mobile computing device **20** includes a processor coupled to a memory device, and a database for storing various programs and data for use in operating the mobile computing device **20**. The mobile computing device **20** may also include a touchscreen display device **22**, one or more video image cameras **24**, one or more speakers **26**, a microphone **28**, at least one input button **30**, and one or more sensors including, but not limited to, a touch ID fingerprint sensor coupled to an input button **30**, a barometer, a three-axis gyro, an accelerometer, proximity sensor, and an ambient light sensor. In addition, the mobile computing device **20** may also include a Wi-Fi antenna, a cellular network antenna, a Bluethooth™ communications device, assisted GPS and GLONASS, a digital compass, and an iBeacon microlocation device.

[0033] In the illustrated embodiment, the mobile computing device **20** includes a web browser programmed stored in the memory device. The processor executes the web browser program to display web pages on the touchscreen display device **22** that includes information received from the server system **12** to enable a user to interact with and operate the server system **12**. In addition, the mobile computing device **20** may be programmed to store and execute a mobile program application, e.g. a mobile application, that displays a user interface **32** (shown in FIG. **13**) on the touchscreen display device **22** that allows the user to access the server system **12** to retrieve and store information within the server system **12** as well as interact with and operate the server system **12**. In addition, in one embodiment, the system **10** may install one or more mobile application programs in the memory device of the mobile computing device **20**. When initiated by the processor of the mobile computing device **20**, the mobile application program causes the processor of the mobile computing device **20** to perform some or all of the functions of the server system **12**.

[0034] The 3rd party computer servers **16** include information and data associated with environmental condition associated with various locations. For example, in one embodiment, the 3rd party computer servers **16** may include environmental information associated with weather conditions for various geographical locations. The environmental information may include, for example, temperature, cloud conditions, wind conditions, air conditions such as dust and/or smog levels, UV data, barometric pressure, humidity, precipitation data, allergy information such as type of pollen and pollen counts, and/or any suitable environmental information associated with geographic locations. In addition, the environmental information may include historic weather and/or allergen conditions, and/or predictive weather and/or allergen conditions.

[0035] In the illustrated embodiment, the server system **12** includes a website hosting server **34**, an e-receipts server **36**, a pharmacy account server **38**, a search engine server **40**, a database server **42**, and a database **44**. The database server **42** includes a memory device that is connected to the database **44** to retrieve and store information contained in the database **44**. The database **44** contains information on a variety of matters, such as, for example, web pages associated with one or more websites, search queries, pharmaceutical drug information, food-drug interaction data, drug-drug interaction data, customer pharmacy account information, product records, e-receipt data, action events, action trigger conditions, notification messages, mobile device identifies, mobile device application program interfaces (APIs), and/or any suitable information that enables the system **10** to function as described herein. In one embodiment, some or all of the information contained in the database **44** may also be stored in the database of the mobile computing device **20**.

[0036] In the illustrated embodiment, the database **44** includes a pharmacy account list **46** (shown in FIG. **7**) that includes a plurality of user pharmacy account records **48**. Each user pharmacy account record **48** is associated with a corresponding pharmacy customer and includes user iden-

tification information **50** associated with the pharmacy customer and pharmaceutical drug information **52** associated with pharmaceutical drugs prescribed to and/or purchased by the corresponding pharmacy customer. The user identification information **50** includes user identifying data such as, for example, a unique ID and/or password. The user identification information **50** may also include user contact information such as, for example, a phone number, an email, and/or a mobile device data associated with a mobile computing device **20** associated with the corresponding pharmacy customer. For example, the mobile device data may include, but is not limited to, a unique mobile device ID, operating system, phone number, IP address, mobile device API, and/or any suitable information that enables the system **10** to communicate with the corresponding mobile computing device **20**. The pharmaceutical drug information **52** includes information associated with a corresponding pharmaceutical drug such as, for example, a unique drug ID associated with the pharmaceutical drug, a drug name, drug category, prescribed use information, dosage, number of refills, side effects, and/or any suitable information associated with the corresponding pharmaceutical drug.

[0037] In one embodiment, the database **44** also includes a drug action list **54** that includes a plurality of pharmaceutical drug action records **56**. Each pharmaceutical drug action record **56** includes pharmaceutical drug information **52** and corresponding action records **58**. The drug information includes information associated with pharmaceutical drugs such as, for example, drug categories **60** and drug identifiers **62** associated with the corresponding drug categories. Each action record **56** is associated with one or more drug identifiers **62** and includes and action record ID and information associated with actions and/or operations that may be initiated by the system **10**.

[0038] In one embodiment, the database **44** may also include an action event list **64** (shown in FIG. **9**) that includes a plurality of action records **58**. Each action record **58** may include triggering event data **66** indicating a triggering event and action event data **68** associated with an action and/or operation that may be initiated by the system **10**. Action event data **68** includes information and data including, but are not limited to, action event descriptions, an action record ID, and/or action rule description. As shown in FIGS. **9** and **10**, the action event description may include data associated with food-drug interactions, drug-drug interactions, and/or use reminders. The action rule description includes data that enables the system to perform particular actions and operations associated with the corresponding action record. For example, in one embodiment, the action rule description may include data that enables the system **10** to initiate a data search operation that searches e-receipt data for purchases the include foods and/or drugs that may interact with the corresponding pharmaceutical drug, and/or perform a search for weather data that may trigger medication reminder notifications. The triggering event data **66** includes data associated with a triggering event that includes an event or occurrence that may be detected by the system **10**. Event triggers may include, but are not limited to, requests and/or signals received by a user computing device **14**, a consumer product purchase, a pharmaceutical drug purchase, calendar events such as, for example, a day of the week, month, and/or year, a time of day, and/or any suitable triggering event that enable the system **10** to perform as described herein.

[0039] The database **44** may also include a user action event list **70** (shown in FIG. **10**) that include a plurality of user event action records **72** that are associated with a plurality of pharmacy customers. Each user event action record **72** includes a user ID **50** associated with the corresponding pharmacy customer, a drug identifier **52** indicating pharmaceutical drugs associated with the corresponding user ID **50**, and an action record **58** associated with each corresponding pharmaceutical drug. In addition, the user event action record **72** may also include messaging information **74** including data and information associated with a mobile computing device **20** associated with the corresponding user ID and/or API information associated with the corresponding mobile computing device **20**. In one embodiment, the messaging information **74** may also include contact information such as, for example, emails and/or text and phone numbers, associated with friends, relatives, and/or healthcare professionals associated with the pharmacy customer. The pharmacy customer may identify one or more additional users that may receive notifications generated by the pharmacy account server **38** and include contact information associated with the identified additional users in the messaging information **74**.

[0040] In one embodiment, the database **44** may include a drug interaction search term list **76** that includes information and search terms for use in performing data search operations. The drug interaction search term list **76** includes a plurality of data search records **78**. Each data search record **78** includes information associated with a corresponding action event. For example, the information included in the data search record **78** may include and action ID associated with a corresponding action event, associated drug information, food-interaction search terms, and/or drug interaction search terms.

[0041] The website hosting server **34** is configured to host a website **80** that is accessible by a user via one or more user computing devices **14**. The website hosting server **34** retrieves and stores web pages **82** (shown in FIG. **12**) associated with one or more websites **80** in response to requests received by the user via the user computing device **14** to allow users to interact with the website and search and/or purchase products such as, for example, goods and/or services via the website. In one embodiment, the website hosting server **34** is configured to generate and display web pages **82** associated with the website in response to requests being received from consumers via corresponding web browsers that are displayed on the user computing devices **14**. In addition, the website hosting server **34** may be configured to generate and display a mobile webpage **84** (shown in FIGS. **13-20**) that is displayed on one or more mobile computing devices **20**. For example, in one embodiment, the website hosting server **34** may display a pharmacy webpage **86** (shown in FIG. **12**) in response to receiving a user request that allows a user to access a corresponding customer pharmacy account record **48** and to input a product search request including search criteria including one or more search terms.

[0042] In one embodiment, the website hosting server **34** may allow customers to login and access corresponding customer pharmacy accounts including account information such as, for example, previous purchase, pending prescription orders, pending medication refills, and/or pharmaceutical drug information. For example, the website hosting server **34** may display a login page **88** (shown in FIGS.

19-20), receive a unique customer ID such as, for example, a username and/or password, and identify the customer account associated with the unique customer ID to enable the identified customer to access information and/or features associated with the corresponding customer pharmacy account. In addition, the website hosting server **34** may transmit search requests to the search engine server **40** and/or the pharmacy account server **38** for use in generating search data and/or pharmacy information in response to the user's search request. The website hosting server **34** may also receive one or more product lists from the search engine server **40** and/or the pharmacy account server **38** that includes information associated with products that are selected based on the user's search criteria. The website hosting server **34** may also display a search results webpage to display the product lists to the user and to allow the user to select one or more of the displayed products for purchase.

[0043] The e-receipts server **36** receives and stores information associated with consumer retail purchases in the database **44** and is programmed to generate and store electronic receipt data associated with the consumer retail purchases. In addition, the e-receipts server **36** may be programmed to transmit signals indicating consumer purchases to the pharmacy account server **38**. For example, in one embodiment, the e-receipts server **36** may communicate with a plurality of point-of-sale (POS) systems as well as other computer systems at each of the one or more physical store locations (e.g., on an internal corporate network) to facilitate business operations for the corresponding entity. The e-receipts server **36** is programmed to receive application identifiers and digital receipt data, including item data for one or more purchased items, from POS systems at various different store locations, and generate and store digital receipts from received receipt data. Generating digital receipts can include item data for items included in corresponding digital receipt data (but potentially in a different format, for example, a format deliverable to mobile devices). Formulated digital receipts can also contain other data related to a transaction, such as, for example, the payment method used for the transaction, coupons, surveys, etc. Additional details of adjacent special symbol positions, which may be used in the present invention, are described in U.S. patent application Ser. No. 13/730,721 to Argue et al, filed Dec. 28, 2012, titled "Searching Digital Receipts at a Mobile Device", the disclosure of which is incorporated herein by reference in its entirety.

[0044] In the illustrated embodiment, the search engine server **40** is configured to receive a search request from the website hosting server **34** and/or the pharmacy account server **38** including one or more search terms, and generate search data including a plurality of records as a function of the search terms. For example, in one embodiment, the search engine server **40** may initiate a search algorithm based on a Boolean model to search pharmacy records and/or search terms contained in the drug interaction search term list **76** contained in the database **44** based search terms received from the user and/or received from the pharmacy account server **38**. The search engine server **40** may generate search data including pharmaceutical drugs matching the search criteria, generate a relevance score associated with each pharmaceutical drug included in the search data, and transmit the relevancy score to the pharmacy account server **38**. In one embodiment, the relevance score may be determined based on statistical information, including, but not limited to the number of records in the database, the frequency in which the search terms appear in the database, and the frequency in which the search term appears in the pharmaceutical drug record. The relevance of a returned search record may be determined based on the corresponding relevance score and the relevance scores of the other pharmaceutical drugs records in the search data, wherein records having a higher relevance scores are more relevant to the search criteria.

[0045] In the illustrated embodiment, the pharmacy account server **38** is programmed to monitor activities associated with prescription drugs being used by pharmacy customers. For example, in one embodiment, the pharmacy account server **38** is configured to monitor consumer product purchases being made by pharmacy customers in order to determine potential drug interactions and/or food interactions with currently prescribed prescriptions drugs being used by the corresponding pharmacy customers. In addition, the pharmacy account server **38** is programmed to detect the occurrence of triggering events associated with pharmaceutical drugs being used by pharmacy customers and transmit pharmacy notification messages to the customers to provide information and notifications of the potential interactions. In addition, the pharmacy account server **38** may also be programmed to monitor environmental conditions associated the geographic locations of the pharmacy customers for use in generating pharmacy notification messages that include reminders for taking prescription allergy medication.

[0046] In the illustrated embodiment, the pharmacy account server **38** is programmed to receive a signal indicating a purchase of a pharmaceutical drug by a pharmacy customer. The signal may include an indication of a purchase being made by the customer and be received from the e-receipts server **36** and/or include a request to fill a prescription received from the pharmacy website **86**. In addition, the signal may include a pharmaceutical drug ID and a user ID. In one embodiment, the pharmacy account server **38** may access the pharmacy account list **46** being stored in the database an determine the user pharmacy account records **48** that is associated with the received user ID, determine one or more pharmaceutical drugs associated with the user ID, and determine the pharmaceutical drug ID associated with each corresponding pharmaceutical drug.

[0047] In the illustrated embodiment, the pharmacy account server **38** determines a drug category associated with each drug ID, and accesses the drug action list **54** included in the database **44** to determine a drug action record **56** associated with each corresponding pharmaceutical drug as a function of the determined drug category and the corresponding drug ID. The pharmacy account server **38** determines the action ID associated with the drug action record **56** and accesses the action event list **64** to obtain the corresponding action record **58** including the triggering event data **66** and action event data **68** associated with the action ID. The pharmacy account server **38** may then generate and store a user event action record **72** associated with the user ID including the information contained in the action record **58** and information associated with a pharmacy notification message associated with the action record **58**.

[0048] For example, in one embodiment, the pharmacy account server **38** may receive a signal indicating a purchase of a pharmaceutical drug including a pharmaceutical drug

ID and a user ID, access the drug action list **54** including pharmaceutical drug action records being stored in the database **44**, select a pharmaceutical drug action record as a function of the received pharmaceutical drug ID, determine the action event data associated with the selected pharmaceutical drug action record, and generate a user pharmacy account record associated with the received user ID including the determined action event data associated with the selected pharmaceutical drug action record. The corresponding user pharmacy account record includes information that allows the pharmacy account server **38** to monitor purchases being made by the pharmacy customer to facilitate notifying the pharmacy customer of potential food and drug interactions with current prescription medications.

[0049] In the illustrated embodiment, the pharmacy account server **38** receives a request to display a pharmacy notification message to a user via a user computing device **14**. For example, the pharmacy notification message may include information associated with a medication reminder and/or a drug interaction. In one embodiment, the pharmacy account server **38** may receive a request to display the pharmacy notification message on a mobile computing device **20**. In the illustrated embodiment, the request includes a corresponding user ID. Upon receiving the request, the pharmacy account server **38** accesses the database **44** and identifies a user pharmacy account record **48** associated with the received user ID. The pharmacy account server **38** is programmed to determine a pharmaceutical drug included in the identified user pharmacy account record **48** and determines an action record **58** associated with the determined pharmaceutical drug. The pharmacy account server **38** also determines the triggering event data and the action event data corresponding to the action record **58**.

[0050] The pharmacy account server **38** also detects an occurrence of a triggering event as a function of the triggering event data, and initiates a data search operation associated with the corresponding action event data upon detecting the occurrence of the triggering event. The pharmacy account server **38** then determines an outcome of the data search operation and generates a pharmacy notification message **90** as a function of the outcome of the data search operation. The pharmacy account server **38** then generates and transmits a signal including the pharmacy notification message to the mobile computing device **20** to cause the mobile computing device **20** to display the pharmacy notification message on the mobile computing device **20**.

[0051] In one embodiment, the pharmacy account server **38** may determine the triggering event to include an indication of a purchase of consumer products by the user. In addition, the triggering event may include a purchase of pharmaceutical drugs by the user and/or a request to fill a prescription for pharmaceutical drugs being submitted through the website **80**. For example, the pharmacy account server **38** may receive a signal from the e-receipts server **36** indicating a purchase being made by a customer. The signal may include a user ID associated with the customer. In addition, the pharmacy account server **38** may receive electronic receipt data including product information associated with consumer products purchased by the user from the e-receipts server **36**. In one embodiment, the pharmacy account server may retrieve the electronic receipt data from the database **44** using the corresponding user ID.

[0052] Upon receiving the electronic receipt data, the pharmacy account server **38** initiates the data search operation including transmitting the electronic receipt data to the search engine server **40** for use in conducted the data search operation using the electronic receipt data. In one embodiment, during the data search operation, the pharmacy account server **38** generates search terms associated with the pharmaceutical drug included in the identified user pharmacy account record **48** and transmits the search terms to the search engine server **40**. In one embodiment, the pharmacy account server **38** is programmed to access the drug interaction search term list **76** being stored in the database **44** to determine search terms associated with the determined pharmaceutical drug included in the associated user pharmacy account record **48**, and transmits the determined search terms to the search engine server **40**. The search engine server **40** conducts a data search operation to review the electronic receipt data to determine if at least one consumer product included in the electronic receipt data includes product information matching the determined search terms. In one embodiment, the search engine server **40** transmits the matching search terms to the pharmacy account server **38** for use in generating the pharmacy notification message.

[0053] For example, the pharmacy account server **38** may transmit the notification message upon determining at least one consumer product includes product information matching one or more of the determined search terms associated with the determined pharmaceutical drug. In one embodiment, search terms may be associated with other pharmaceutical drugs. The pharmacy account server **38** may select a notification message indicating a potential drug-drug interaction if the search engine server **40** returns a matching drug purchased by the consumer. In addition, in one embodiment, the search terms may be associated with food products. The pharmacy account server **38** may select a notification message indicating a potential food-drug interaction if the search engine server **40** returns a matching food purchased by the consumer.

[0054] In one embodiment, the triggering event may include a request for allergy information being received from a customer's mobile computing device **20**. Upon receiving a request for allergy information, the pharmacy account server **38** may request and receive weather data including location data and associated allergen data from the 3rd party computer server **16**. The pharmacy account server **38** may initiate the data search operation including, receiving location data from the corresponding mobile computing device **20**, determine a current location of the mobile computing device **20**, review the received weather data to identify location data matching the current location of the mobile computing device, and determine an allergen count value as a function of the allergen data associated with the identified location data. For example, the pharmacy account server **38** may generate a pollen count value as a function of the allergen data received from the 3rd party computer server **16**. In the illustrated embodiment, the pharmacy account server **38** determines if the allergen count associated with the location of the mobile computing device **20** is equal to, or greater than, a predefined allergen count, and generates and transmits a pharmacy notification message upon determining the determined allergen count value to be greater than, or equal to, the predefined allergen count value.

[0055] In one embodiment, the pharmacy account server **38** may allow the user to establish a calendar event as the triggering event to allow the system **10** to perform a daily, weekly, and or monthly review of environmental allergies.

In addition, the user may establish triggering events associated with food-drug interactions. For example, in one embodiment, the pharmacy account server **38** may display a notification trigger webpage (not shown) to allow the user to establish triggering events associated with the corresponding user pharmacy account record **48**. The user may establish calendared reminders to prompt the pharmacy account server **38** to conduct data search operations upon the occurrence of user defined events. In addition, the pharmacy account server **38** may allow the user to op-out of push notifications and not receive notifications generated by the system **10**.

[0056] Referring to FIGS. **14-16**, in one embodiment, the pharmacy account server **38** may generate the notification message including a hyperlink **92** including a pharmaceutical drug ID to allow the user to cause the system **10** to display additional information associated with the corresponding pharmaceutical drug. For example, the pharmacy account server **38** may receive a signal from the mobile computing device **20** indicating that the user has accessed the hyperlink **92**, access the list **54** of pharmaceutical drug records **56** stored in the database **44** with each pharmaceutical drug record **56** associated with a pharmaceutical drug and including a corresponding pharmaceutical drug ID and corresponding pharmaceutical drug data information associated including information associated with the corresponding pharmaceutical drug. The pharmacy account server **38** then retrieves the pharmaceutical drug record corresponding to the received pharmaceutical drug ID and generates and displays an information webpage **94** (shown in FIGS. **17-18**) on the mobile computing device **20** including drug-related information **96** included in the retrieved pharmaceutical drug record **56**.

[0057] Referring to FIG. **2**, in one embodiment, the system **10** may include a system server **100** that is configured to perform the functions of the website hosting server **34**, the e-receipts server **36**, the pharmacy account server **38**, the search engine server **40**, and the database server **42**. In the illustrated embodiment, the system server **100** includes a processing device **102** and the database **44**.

[0058] The processing device **102** executes various programs, and thereby controls components of the system server **100** according to user instructions received from the user computing device **14**. The processing device **102** may include memory, e.g., read only memory (ROM) and random access memory (RAM), storing processor-executable instructions and one or more processors that execute the processor-executable instructions. In embodiments where the processing device **102** includes two or more processors, the processors can operate in a parallel or distributed manner. In an example, the processing device **102** may execute a communications module **104**, a the website hosting module **106**, an e-receipts module **108**, a search engine module **110**, and a pharmacy account module **112**, and,

[0059] The processing device **102** may also include a memory device for storing programs and information in the database **44**, and retrieving information from the database **44** that is used by the processor to perform various functions described herein. The memory device may include, but is not limited to, a hard disc drive, an optical disc drive, and/or a flash memory drive. Further, the memory device may be distributed and located at multiple locations.

[0060] The communications module **104** retrieves various data and information from the database **44** and sends information to the user computing device **14** via the communications network **18** to enable the user to access and interact with the system **10**. In one embodiment, the communications module **104** displays various images on a graphical interface of the user computing device **14** preferably by using computer graphics and image data stored in the database **44** including, but not limited to, web pages, pharmacy records, pharmacy notification messages, product lists, and/or any suitable information and/or images that enable the system **10** to function as described herein.

[0061] The website hosting module **106** may be programmed to perform some or all of the functions of the website hosting server **34** including hosting various web pages associated with one or more websites that are stored in the database **44** and that are accessible to the user via the user computing device **14**. The website hosting module **106** may be programmed to generate and display web pages associated with a website in response to requests being received from users via corresponding web browsers.

[0062] The e-receipts module **108** may be programmed to perform some or all of the functions of the e-receipts serve **36** including generating, receiving, and storing e-receipt data in the database **44** and detecting purchases being made by the pharmacy customers.

[0063] The search engine module **110** may be programmed to perform some or all of the functions of the search engine server **40** including generating and storing search data in response to the user's product search request and/or pharmacy account module **112** search requests. In addition, the search engine module **110** may also be programmed to generate a relevance score associated with each of the records included in the search data.

[0064] The pharmacy account module **112** may be programmed to perform some or all of the functions of the pharmacy account server **38** including monitoring activities associated with pharmacy customers including consumer purchase and/or prescription refill requests and generate notification messages associated with the monitored activities. In addition, the pharmacy account module **112** may be programmed to perform calendared tasks requested by the user including scheduled review of environmental information associated with a geographic location of a mobile computing device **20**.

[0065] FIGS. **3-6** are flowcharts of methods **200**, **300**, **400**, and **500** that may be used with the system **10** for monitoring activities of pharmacy customers and generating and displaying information to the pharmacy customers on a website via a mobile computing device. The methods include a plurality of steps. Each method step may be performed independently of, or in combination with, other method steps. Portions of the methods may be performed by any one of, or any combination of, the components of the system **10**. FIGS. **12-20** are exemplary graphical displays that may be displayed by the system **10**.

[0066] In the illustrated embodiment, in method step **202**, the pharmacy account server **38** receives a request to initiate a notification operation to monitor an activity of a pharmacy customer. The request includes a corresponding user ID. In one embodiment, the request may be received from a mobile computing device **20** associated with a pharmacy customer. In another embodiment, the request may be initiated by the customer via the pharmacy website. In addition, the pharmacy account server **38** may be programmed to initiate a

notification operation at a predefined period of time and/or upon receiving an indication of activities associated with a pharmacy customer.

[0067] In method step **204**, the pharmacy account server **38** accesses the user pharmacy account list **46** being stored in the database **44** to determine a user pharmacy account records **48** associated with the received user ID. Upon determining the corresponding user pharmacy account **48** the pharmacy account server **38** identifies pharmaceutical drug data included in the corresponding user pharmacy account **48** to determine if the user pharmacy account record **48** includes action records **58** corresponding to the identified pharmaceutical drug data.

[0068] In method step **206**, the pharmacy account server **38** determines if the identified user pharmacy account records **48** includes an action record **58** including instructions associated with operations to be performed by the system **10**. If the identified user pharmacy account records **48** includes an action record **58**, the pharmacy account server **38** initiates method step **208**. If the pharmacy account server **38** determines that the identified user pharmacy account records **48** does not include an action record **58**, the pharmacy account server **38** proceeds to method step **210** and terminates the notification operation.

[0069] In method step **208**, upon identifying an action record **58** associated with a pharmaceutical drug included in the user pharmacy account record **48**, the pharmacy account server **38** accesses the action record **58** to determine the action event data indicating a data search operation and the triggering event data indicating a corresponding triggering event associated with the corresponding pharmaceutical drug. Upon determining the corresponding triggering event, the pharmacy account server **38** determines whether the identified triggering event has occurred. For example, in one embodiment, the triggering event may include a purchase being made by the consumer. The pharmacy account server **38** then determines that the triggering event has occurred upon detecting a purchase being made by the consumer. In addition, the triggering event may include a calendar event. The pharmacy account server **38** determines that the triggering event has occurred upon detecting the occurrence of the calendar event such as, for example, the occurrence of a predefined time of day and/or a user selected calendar day. If the pharmacy account server **38** detects the occurrence of the triggering event, the pharmacy account server **38** initiates method step **212** to initiate the action event. If the pharmacy account server **38** does not detect the occurrence of the triggering event, the pharmacy account server **38** returns to step **204** and determines if any additional action records **58** are included in the identified user pharmacy account record **48**.

[0070] In method step **212**, the pharmacy account server **38** initiates a data search operation associated with the corresponding action event data upon detecting the occurrence of the triggering event and determines an outcome of the data search operation. For example, in one embodiment, the data search operation may include generating a search query including search terms associated with the corresponding pharmaceutical drug and transmitting the search query to the search engine server **40** with a request to review e-receipt data associated with recent consumer purchases. For example, in one embodiment, the pharmacy account server **38** may generate search terms including foods that may interact with the corresponding pharmaceutical drug and request the search engine server **40** to review e-receipt data to identify foods included in recent customer purchases that may interact with the corresponding pharmaceutical drug.

[0071] In method step **214**, the pharmacy account server **38** determines the outcome of the data search operation and determines whether to generate a pharmacy notification message based on the determined outcome. For example, in one embodiment, the data search operation may include a search of e-receipt data using search terms indicating foods and/or drugs that may interact with the corresponding pharmaceutical drug. The pharmacy account server **38** may determine to generate the notification message upon determining that the e-receipt data includes products that match the search terms. In one embodiment, the data search operation may include accessing a 3rd party computer server **16** to obtain environmental information. The pharmacy account server **38** may request location data from the mobile computing device **20** such as, for example, current GPS location data, and determine a current geographic location of the mobile computing device **20** based on the received location data. The pharmacy account server **38** may transmit a search query to the search engine server **40** including the mobile device location data and request the search engine server **40** to review the data received from the 3rd party computer server **16** to identify environmental data matching the location of the mobile computing device **20**. The pharmacy account server **38** may then determine an environmental condition of the location of the mobile computing device **20** and generate the notification message if the determined environmental condition is different from a predefined condition.

[0072] In method step **216**, the pharmacy account server **38** generates and transmits a pharmacy notification message to the pharmacy customer. In the illustrated embodiment, the pharmacy account server **38** generates and transmits a signal including the notification message to the mobile computing device **20** to cause the mobile computing device **20** to display the notification message on the mobile computing device **20**. For example, the pharmacy account server **38** may generate a drug interaction notification **114** (shown in FIGS. **15-16**) upon detecting the purchase of a food and/or drug that may interact with the current pharmaceutical drug. In addition, the pharmacy account server **38** may generate a reminder notification **116** (shown in FIG. **14**) upon determining an environmental condition associated with the mobile device is different than a predefined condition. In one embodiment, the pharmacy account server **38** may request the website hosting server **34** to generate the notification message including a hyperlink including a pharmaceutical drug ID to allow the pharmacy customer to receive additional information associated with the notification message. Upon displaying the notification message **90** to the mobile computing device **20**, the user may access the hyperlink **92** to send instructions to the system **10** to request additional information. For example, the pharmacy account server **38** may receive a signal from the mobile computing device indicating that the user has accessed the hyperlink including the pharmaceutical drug ID, access the list of pharmaceutical drug records being stored in the database retrieve the pharmaceutical drug record corresponding to the received pharmaceutical drug ID, and generate and display a drug infor-

mation webpage **94** on the mobile computing device including information included in the retrieved pharmaceutical drug record.

[0073] In one embodiment, the system **10** may access the corresponding user pharmacy account records **48** to determine a messaging API associated with an operating system of the mobile computing device **20** and generates the notification message as a function of the retrieved messaging API to enable the mobile computing device **20** to display the received message. In one embodiment, each user account record includes information associated with the mobile computing device **20** including a unique mobile ID and message API. In another embodiment, the user pharmacy account records **48** may include a message preferences, such as, for example, an email, text message, push messaging, automated phone call, and the like. The pharmacy account server **38** identifies the messaging preference associated with the user pharmacy account records **48** and generates the notification message based on the message preference. In addition, the pharmacy account server **38** may also access the messaging information **74** to identify contact information associated with additional users associated with the pharmacy customer and generate and transmit similar notifications including the information associated with the pharmacy customer to the additional users designated by the pharmacy customer and identified in the messaging information **74**.

[0074] Referring to FIGS. **4-5**, methods **300** and **400** may be initiated by the system **10** for use in conducting a data search operation. In the illustrated embodiment, in method step **302**, the search engine server **40** receives a request from the pharmacy account server **38** to initiate a data search operation to determine a potential drug interaction with a pharmaceutical drug currently used by the pharmacy customer.

[0075] In method step **304**, the search engine server **40** requests and receives e-receipt data from the e-receipts server **36**.

[0076] In method step **306**, the pharmacy account server **38** identifies the pharmaceutical drug associated with the action record **58** including a drug category, and accesses the drug interaction search term list **76** to identify search terms associated with the identified pharmaceutical drug and/or the action event data associated with the identified action record **58**. The pharmacy account server transmits the search terms to the search engine server **40**.

[0077] In method step **308**, the search engine server **40** reviews the received e-receipt data to identify products being purchase by the pharmacy customer that are relevant to and/or matching the received search terms.

[0078] In method step **310**, the search engine server **40** returns the search results to the pharmacy account server **38**. In method step **312**, the pharmacy account server **38** then generates and transmits the notification message upon identifying one or more purchased products matching the search terms.

[0079] In method step **402**, the search engine server **40** receives a request from the pharmacy account server **38** to initiate a data search operation to determine an environmental condition of a geographic location associated with the pharmacy customer.

[0080] In method step **404**, the pharmacy account server **38** requests location data from the mobile computing device **20** such as, for example, GPS location data, and determines a geographic location of the mobile computing device **20** based on the received location data.

[0081] In method step **406**, the pharmacy account server **38** request and receives environmental data from the 3rd party computer server **16** and transmits the environmental data and the location data to the search engine server **40**. The search engine server **40** reviews the environmental data to determine environmental data matching the location data of the mobile computing device **20** transmits the matching environmental data to the pharmacy account server **38**.

[0082] In method step **408**, the pharmacy account server **38** generates allergen information based on the received environmental data and determines an allergen value associated with the location of the mobile computing device **20**.

[0083] In method step **410**, the pharmacy account server **38** determines if the determined allergen value of equal to a predefined allergen value. For example, the pharmacy account server **38** may access the user pharmacy account record to determine the predefine allergen count included in the action data associated with a pharmaceutical drug.

[0084] In method step **412**, the pharmacy account server **38** generates and transmits a reminder message **114** including information associated with the local allergen information upon determining that the determined allergen information different than a predefined allergen value. For example, in one embodiment, the pharmacy customer may be currently using allergy medication. The pharmacy account server **38** may generate and display a reminder message notifying the customer that the local pollen count is above a predefined level and that the pharmacy customer may wish to take their allergy medication.

[0085] Referring to FIG. **6**, method **500** may be initiated by the system **10** for use in generating a user pharmacy account record **48** that may be used to monitor activities of a pharmacy customer. In method step **502**, the pharmacy account server **38** receives an indication of a pharmacy purchase being made by a pharmacy customer. The pharmacy purchase may include a request to file prescription medication received via the pharmacy webpage **86** and/or a signal indicating a pharmacy purchase received from the e-receipts server **36**. The request includes a pharmaceutical drug ID and a user ID.

[0086] In method step **504**, the pharmacy account server **38** accesses the drug action list **54** including pharmaceutical drug action records being stored in the database **44** and selects a pharmaceutical drug action record **56** as a function of the received pharmaceutical drug ID. The pharmacy account server **38** may also access the event action list **64** to retrieve the action event data associated with the identified action record **58**.

[0087] In method step **506**, the pharmacy account server **38** generates a user event action record **72** including the corresponding user ID and the action event data associated with the determined action record **58**. The pharmacy account server **38** also modifies the user action event list **70** to include the generated user event action record **72**. During a notification operation described in methods **300** and **400**, the pharmacy account server **38** may access the user action event list **70** to determine action records associated with corresponding user IDs. In one embedment, the pharmacy account server **38** may identify a user pharmaceutical account associated with the User ID, and generate and/or modify the user pharmacy account record associated with

the received user ID to include the determined action event data associated with the selected pharmaceutical drug action record.

[0088] In one embodiment, the system **10** may store the user action event list **70** in the mobile computing device database and a mobile application including programs to cause the mobile computing device **20** to perform some or all of the functions performed by the system server **100**. For example, in one embodiment, the system server **100** may install a mobile application in the memory device of the mobile computing device **20** that is accessible by the user. When the user accesses the mobile application, the processor of the mobile computing device **20** may access the user action event list **70** being stored in the database an initiate one or more actions associated with user action event records **72** included in the user action event list **70**.

[0089] In general, the system **10** is configured to generate pharmacy user account records that include action event data that enable the system to monitor activities of pharmacy customers. For example, the system **10** may monitor the activities of pharmacy customers for potential drug interactions and provide pharmacy notifications to customers when potential drug interactions with existing pharmaceutical medications currently used by the customer is detected. Moreover, the system **10** is configured to provide push notifications to the mobile devices associated with the pharmacy customers to provide information about potential drug interactions and allow the customers to interact with an operate the system **10**. By generating user pharmacy account records that include action event records associated with customer activities including triggering events, the system **10** improves the speed and functionality of known computing systems by reducing the amount of computing time required to monitor customer activity, thus reducing the computing resources required to generate and display relevant pharmacy messages to pharmacy customers.

[0090] A controller, computing device, server or computer, such as described herein, includes at least one or more processors or processing units and a system memory (see above). The controller typically also includes at least some form of computer readable media. By way of example and not limitation, computer readable media may include computer storage media and communication media. Computer storage media may include volatile and nonvolatile, removable and non-removable media implemented in any method or technology that enables storage of information, such as computer readable instructions, data structures, program modules, or other data. Communication media typically embody computer readable instructions, data structures, program modules, or other data in a modulated data signal such as a carrier wave or other transport mechanism and include any information delivery media. Those skilled in the art should be familiar with the modulated data signal, which has one or more of its characteristics set or changed in such a manner as to encode information in the signal. Combinations of any of the above are also included within the scope of computer readable media.

[0091] The order of execution or performance of the operations in the embodiments of the invention illustrated and described herein is not essential, unless otherwise specified. That is, the operations described herein may be performed in any order, unless otherwise specified, and embodiments of the invention may include additional or fewer operations than those disclosed herein. For example, it is contemplated that executing or performing a particular operation before, contemporaneously with, or after another operation is within the scope of aspects of the invention.

[0092] In some embodiments, a processor, as described herein, includes any programmable system including systems and microcontrollers, reduced instruction set circuits (RISC), application specific integrated circuits (ASIC), programmable logic circuits (PLC), and any other circuit or processor capable of executing the functions described herein. The above examples are exemplary only, and thus are not intended to limit in any way the definition and/or meaning of the term processor.

[0093] In some embodiments, a database, as described herein, includes any collection of data including hierarchical databases, relational databases, flat file databases, object-relational databases, object oriented databases, and any other structured collection of records or data that is stored in a computer system. The above examples are exemplary only, and thus are not intended to limit in any way the definition and/or meaning of the term database. Examples of databases include, but are not limited to only including, Oracle® Database, MySQL, IBM® DB2, Microsoft® SQL Server, Sybase®, and PostgreSQL. However, any database may be used that enables the systems and methods described herein. (Oracle is a registered trademark of Oracle Corporation, Redwood Shores, Calif.; IBM is a registered trademark of International Business Machines Corporation, Armonk, N.Y.; Microsoft is a registered trademark of Microsoft Corporation, Redmond, Wash.; and Sybase is a registered trademark of Sybase, Dublin, Calif.)

[0094] The above description of illustrated examples of the present invention, including what is described in the Abstract, are not intended to be exhaustive or to be limitation to the precise forms disclosed. While specific embodiments of, and examples for, the invention are described herein for illustrative purposes, various equivalent modifications are possible without departing from the broader spirit and scope of the present invention.

What is claimed is:

1. A system, comprising:

a database including a list of user pharmacy account records, each user pharmacy account record including a unique user ID associated with a user, pharmaceutical drug data indicating a corresponding pharmaceutical drug associated with the corresponding user, and an action record associated with the corresponding pharmaceutical drug, the action record including triggering event data indicating a triggering event and action event data indicating data search operations; and

a server computer including a processor coupled to a memory device, the processor programmed to:

receive a request to display a notification message to a user, the request including a corresponding user ID;

access the database and identify a user pharmacy account record associated with the received user ID;

determine a pharmaceutical drug included in the identified user pharmacy account record and determine an action record associated with the determined pharmaceutical drug including action event data;

initiate a data search operation associated with the corresponding action event data and determine an outcome of the data search operation;

generate a notification message as a function of the outcome of the data search operation; and

generate and transmit a signal including the notification message to the mobile computing device to cause the mobile computing device to display the notification message on the mobile computing device.

2. A system in accordance with claim **1**, wherein the server computer is programmed to:

determine triggering event data associated with the determined pharmaceutical drug; and

detect an occurrence of a triggering event as a function of the triggering event data;

initiate the data search operation associated with the corresponding action event data upon detecting the occurrence of the triggering event.

3. A system in accordance with claim **1**, wherein the server computer is programmed to:

receive electronic receipt data including product information associated with consumer products purchased by the user;

initiate the data search operation including:

accessing a drug integration search term list being stored in the database to determine search terms associated with the determined pharmaceutical drug; and

review the electronic receipt data to determine if at least one consumer product included in the electronic receipt data includes product information matching the determined search terms; and

transmit the notification message upon determining at least one consumer product includes product information matching one or more of the determined search terms associated with the determined pharmaceutical drug.

4. A system in accordance with claim **3**, wherein the search terms are associated with at least one of other pharmaceutical drugs and food products.

5. A system in accordance with claim **2**, wherein the triggering event includes a purchase of consumer products by the user, the server computer is programmed to receive the electronic receipt data associated with the corresponding purchase of consumer products.

6. A system in accordance with claim **1**, wherein the server computer is programmed to:

receive weather data including location data and associated allergen data;

initiate the data search operation including:

determining a current location of the mobile computing device;

reviewing the received weather data to identify location data matching the current location of the mobile computing device;

determine an allergen count value as a function of the allergen data associated with the identified location data; and

transmit the notification message upon determining the determined allergen count value to be equal to a predefined allergen count value.

7. A system in accordance with claim **6**, wherein the triggering condition includes an occurrence of a calendar event.

8. A system in accordance with claim **1**, wherein the server system in programmed to:

receive a signal indicating a purchase of a pharmaceutical drug, the signal including a pharmaceutical drug ID and a user ID;

access a drug action list including pharmaceutical drug action records being stored in the database, each pharmaceutical drug record including a drug identifier and corresponding action records including associated triggering event data and associated action event data;

select a pharmaceutical drug action record as a function of the received pharmaceutical drug ID;

determine the action event data associated with the selected pharmaceutical drug action record; and

generate a user pharmacy account record associated with the received user ID including the determined action event data associated with the selected pharmaceutical drug action record.

9. A system in accordance with claim **1**, wherein the server computer system is programmed to:

generate the notification message including a hyperlink including a pharmaceutical drug ID;

receive a signal from the mobile computing device indicating that the user has accessed the hyperlink;

access a list of pharmaceutical drug records being stored in the database, each pharmaceutical drug record associated with a pharmaceutical drug and including a corresponding pharmaceutical drug ID and corresponding pharmaceutical drug data information associated including information associated with the corresponding pharmaceutical drug;

retrieve the pharmaceutical drug record corresponding to the received pharmaceutical drug ID; and

generate and display a webpage on the mobile computing device including information included in the retrieved pharmaceutical drug record.

10. A method comprising:

receiving a request to display a notification message to a user, the request including a corresponding user ID;

accessing a database including a list of user pharmacy account records, each user pharmacy account record including a unique user ID associated with a user, pharmaceutical drug data indicating a corresponding pharmaceutical drug associated with the corresponding user, and an action record associated with the corresponding pharmaceutical drug, the action record including triggering event data indicating a triggering event and action event data indicating data search operations;

identifying a user pharmacy account record associated with the received user ID;

determining a pharmaceutical drug included in the identified user pharmacy account record and determining an action record associated with the determined pharmaceutical drug including action event data;

initiating a data search operation associated with the corresponding action event data and determine an outcome of the data search operation;

generating a notification message as a function of the outcome of the data search operation; and

generating and transmitting a signal including the notification message to the mobile computing device to cause the mobile computing device to display the notification message on the mobile computing device.

11. A method in accordance with claim **10**, further comprising:

determine triggering event data associated with the determined pharmaceutical drug; and

detect an occurrence of a triggering event as a function of the triggering event data;

initiate the data search operation associated with the corresponding action event data upon detecting the occurrence of the triggering event.

12. A method in accordance with claim **10**, further comprising:

receiving electronic receipt data including product information associated with consumer products purchased by the user;

initiating the data search operation including:

accessing a drug integration search term list being stored in the database to determine search terms associated with the determined pharmaceutical drug; and

reviewing the electronic receipt data to determine if at least one consumer product included in the electronic receipt data includes product information matching the determined search terms; and

transmitting the notification message upon determining at least one consumer product includes product information matching one or more of the determined search terms associated with the determined pharmaceutical drug.

13. A method in accordance with claim **12**, wherein the search terms are associated with at least one of other pharmaceutical drugs and food products.

14. A method in accordance with claim **12**, wherein the triggering event includes a purchase of consumer products by the user, the method further comprising receiving the electronic receipt data associated with the corresponding purchase of consumer products.

15. A method in accordance with claim **10**, further comprising:

receiving weather data including location data and associated allergen data;

initiating the data search operation including:

determining a current location of the mobile computing device;

reviewing the received weather data to identify location data matching the current location of the mobile computing device;

determine an allergen count value as a function of the allergen data associated with the identified location data; and

transmitting the notification message upon determining the determined allergen count value to be equal to a predefined allergen count value.

16. A method in accordance with claim **15**, wherein the triggering condition includes an occurrence of a calendar event.

17. A method in accordance with claim **10**, further comprising:

receiving a signal indicating a purchase of a pharmaceutical drug, the signal including a pharmaceutical drug ID and a user ID;

accessing a drug action list including pharmaceutical drug action records being stored in the database, each pharmaceutical drug record including a drug identifier and corresponding action records including associated triggering event data and associated action event data;

selecting a pharmaceutical drug action record as a function of the received pharmaceutical drug ID;

determining the action event data associated with the selected pharmaceutical drug action record; and

generating a user pharmacy account record associated with the received user ID including the determined action event data associated with the selected pharmaceutical drug action record.

18. A method in accordance with claim **10**, further comprising:

generating the notification message including a hyperlink including a pharmaceutical drug ID;

receiving a signal from the mobile computing device indicating that the user has accessed the hyperlink;

accessing a list of pharmaceutical drug records being stored in the database, each pharmaceutical drug record associated with a pharmaceutical drug and including a corresponding pharmaceutical drug ID and corresponding pharmaceutical drug data information associated including information associated with the corresponding pharmaceutical drug;

retrieving the pharmaceutical drug record corresponding to the received pharmaceutical drug ID; and

generating and display a webpage on the mobile computing device including information included in the retrieved pharmaceutical drug record.

19. One or more non-transitory computer-readable storage media, having computer-executable instructions embodied thereon, wherein when executed by at least one processor, the computer-executable instructions cause the processor to:

receive a request to display a notification message to a user, the request including a corresponding user ID;

access a database including a list of user pharmacy account records, each user pharmacy account record including a unique user ID associated with a user, pharmaceutical drug data indicating a corresponding pharmaceutical drug associated with the corresponding user, and an action record associated with the corresponding pharmaceutical drug, the action record including triggering event data indicating a triggering event and action event data indicating data search operations;

identify a user pharmacy account record associated with the received user ID;

determine a pharmaceutical drug included in the identified pharmaceutical account record and determine an action record associated with the determined pharmaceutical drug including a corresponding triggering event data and action event data;

detect an occurrence of a triggering event as a function of the triggering event data;

initiate a data search operation associated with the corresponding action event data upon detecting the occurrence of the triggering event and determine an outcome of the data search operation;

generate a notification message as a function of the outcome of the data search operation; and

generate and transmit a signal including the notification message to the mobile computing device to cause the mobile computing device to display the notification message on the mobile computing device.

20. One or more non-transitory computer-readable storage media in accordance with claim **19**, wherein the computer-executable instructions cause the processor to:

receive a signal indicating a purchase of a pharmaceutical drug, the signal including a pharmaceutical drug ID and a user ID;

access a drug action list including pharmaceutical drug action records being stored in the database, each pharmaceutical drug record including a drug identifier and corresponding action records including associated triggering event data and associated action event data;

select a pharmaceutical drug action record as a function of the received pharmaceutical drug ID;

determine the action event data associated with the selected pharmaceutical drug action record; and

generate a user pharmacy account record associated with the received user ID including the determined action event data associated with the selected pharmaceutical drug action record.

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