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(54) **GUIDED PERSONAL IDENTITY BASED ACTIONS**

(71) Applicant: **Snap Inc.**, Santa Monica, CA (US)

(72) Inventors: **Landon Anderton**, Salt Lake City, UT (US); **Garrett Gee**, Los Angeles, CA (US); **Ryan Hornberger**, Playa Vista, CA (US); **Kirk Ouimet**, Orem, UT (US); **Kameron Sheffield**, South Jordan, UT (US); **Benjamin Turley**, Lehi, UT (US)

(73) Assignee: **SNAP INC.**, Santa Monica, CA (US)

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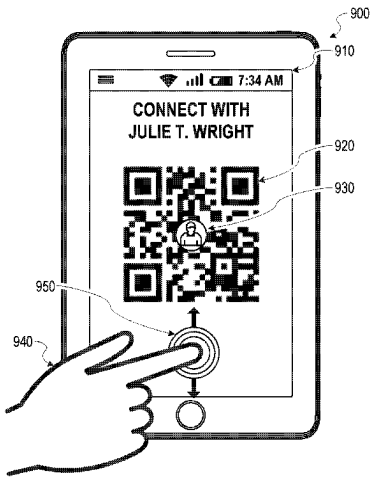
Primary Examiner — Andrew T McIntosh
(74) *Attorney, Agent, or Firm* — SCHWEGMAN LUNDBERG & WOESSNER, P.A.

(57) **ABSTRACT**

Systems and methods for guided personal identity based actions are provided. In example embodiments, a user-specified action from a first user device of a first user is received. The user-specified action pertains to the first user and uses data of the first user when performed. The user-specified action is linked to an identifier. An indication of the identifier is received from a second user device of a second user. In response to receiving the indication of the identifier, the user-specified action linked to the identifier is identified, the data of the first user is accessed, a user interface that includes an option to perform the user-specified action using the data of the first user is generated, and the generated user interface is presented on the second user device.

19 Claims, 14 Drawing Sheets



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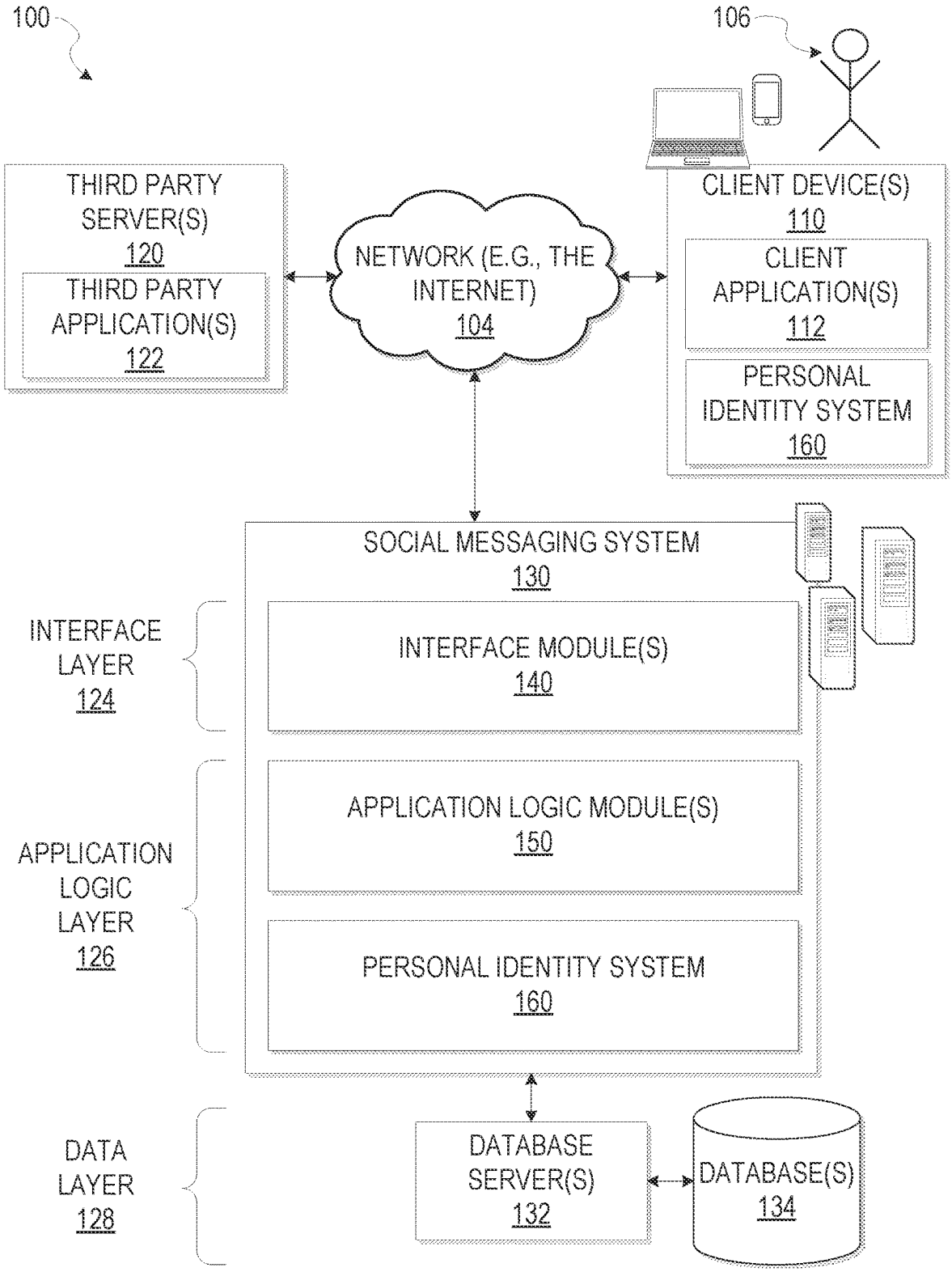
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DATABASE(S) 134

FIG. 1

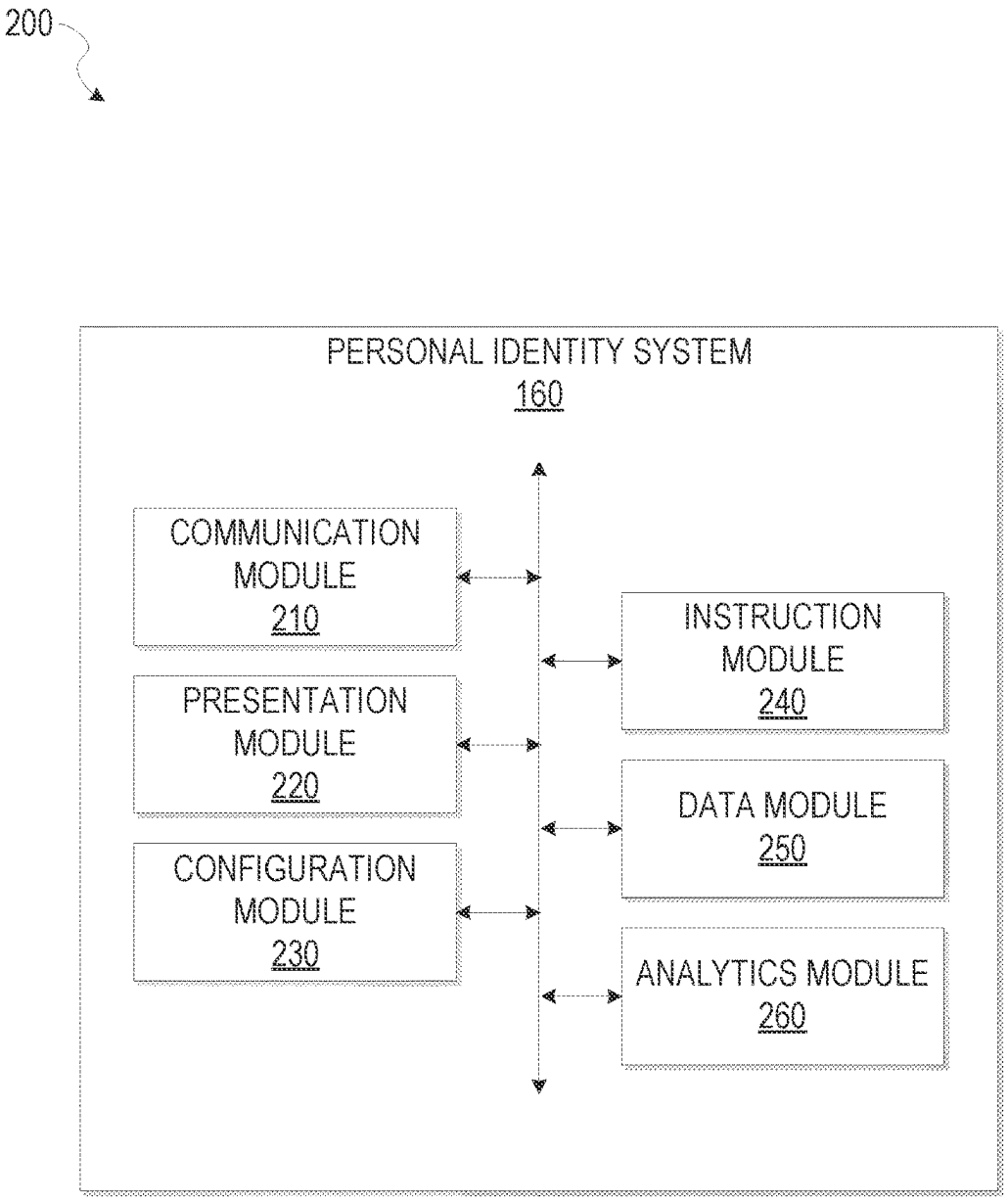
200
PERSONAL IDENTITY SYSTEM
160
COMMUNICATION MODULE
210
PRESENTATION MODULE
220
CONFIGURATION MODULE
230
INSTRUCTION MODULE
240
DATA MODULE
250
ANALYTICS MODULE
260

FIG. 2

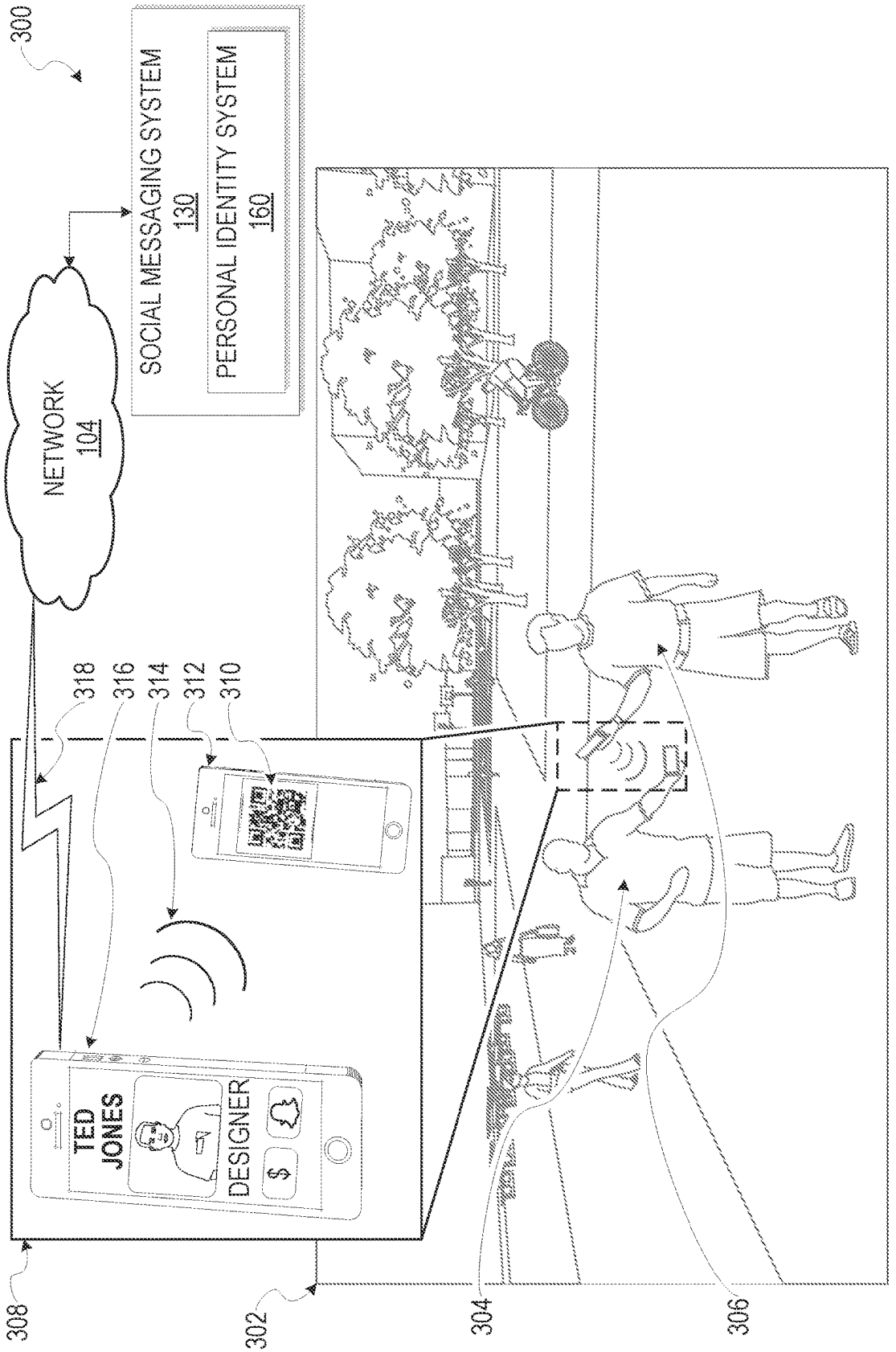
300
SOCIAL MESSAGING SYSTEM
130
PERSONAL IDENTITY SYSTEM
160
NETWORK
104
318
316
314
312
310
TED
JONES
DESIGNER
308
302
304
306

FIG. 3

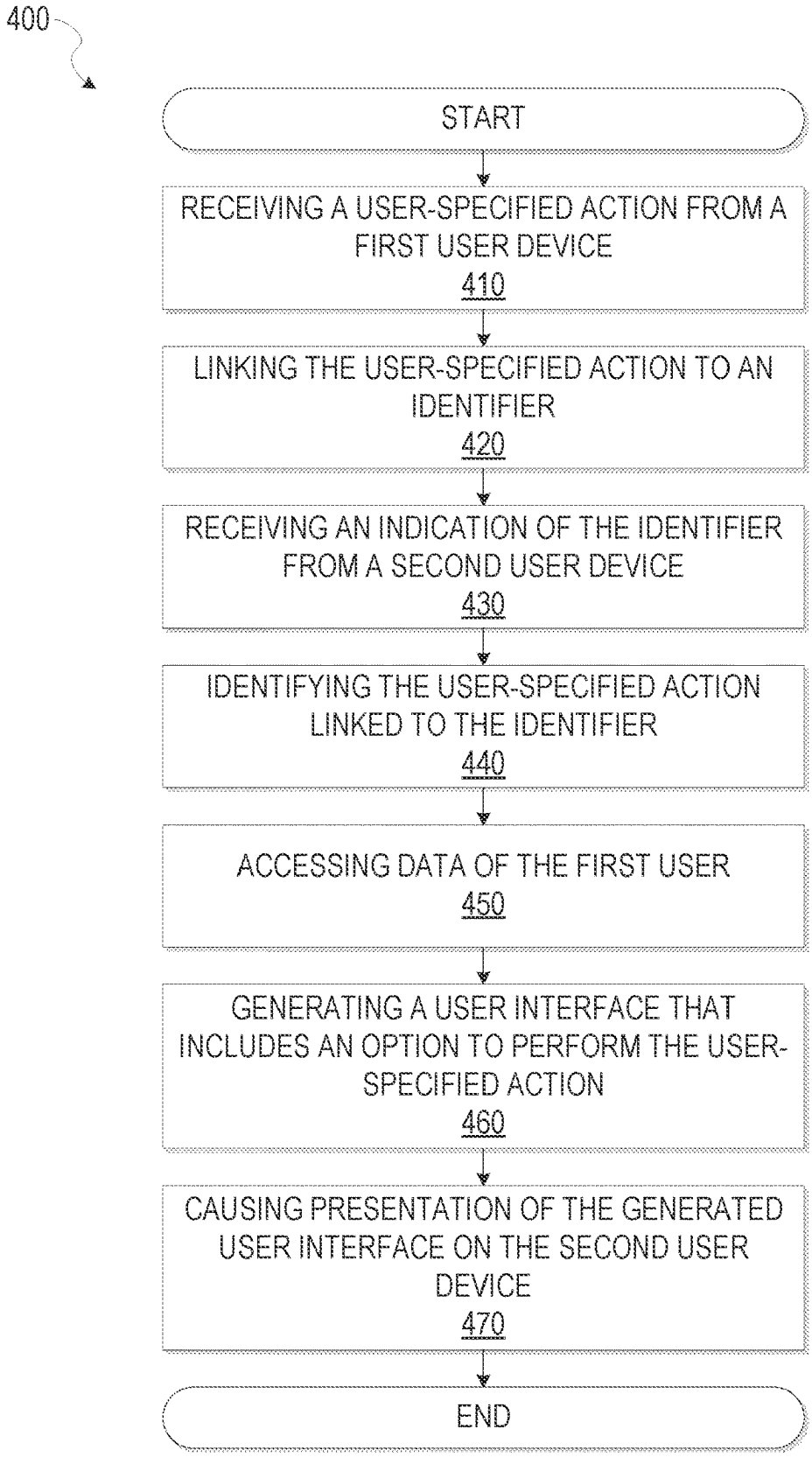
400
START
RECEIVING A USER-SPECIFIED ACTION FROM A FIRST USER DEVICE
410
LINKING THE USER-SPECIFIED ACTION TO AN IDENTIFIER
420
RECEIVING AN INDICATION OF THE IDENTIFIER FROM A SECOND USER DEVICE
430
IDENTIFYING THE USER-SPECIFIED ACTION LINKED TO THE IDENTIFIER
440
ACCESSING DATA OF THE FIRST USER
450
GENERATING A USER INTERFACE THAT INCLUDES AN OPTION TO PERFORM THE USER-SPECIFIED ACTION
460
CAUSING PRESENTATION OF THE GENERATED USER INTERFACE ON THE SECOND USER DEVICE
470
END

FIG. 4

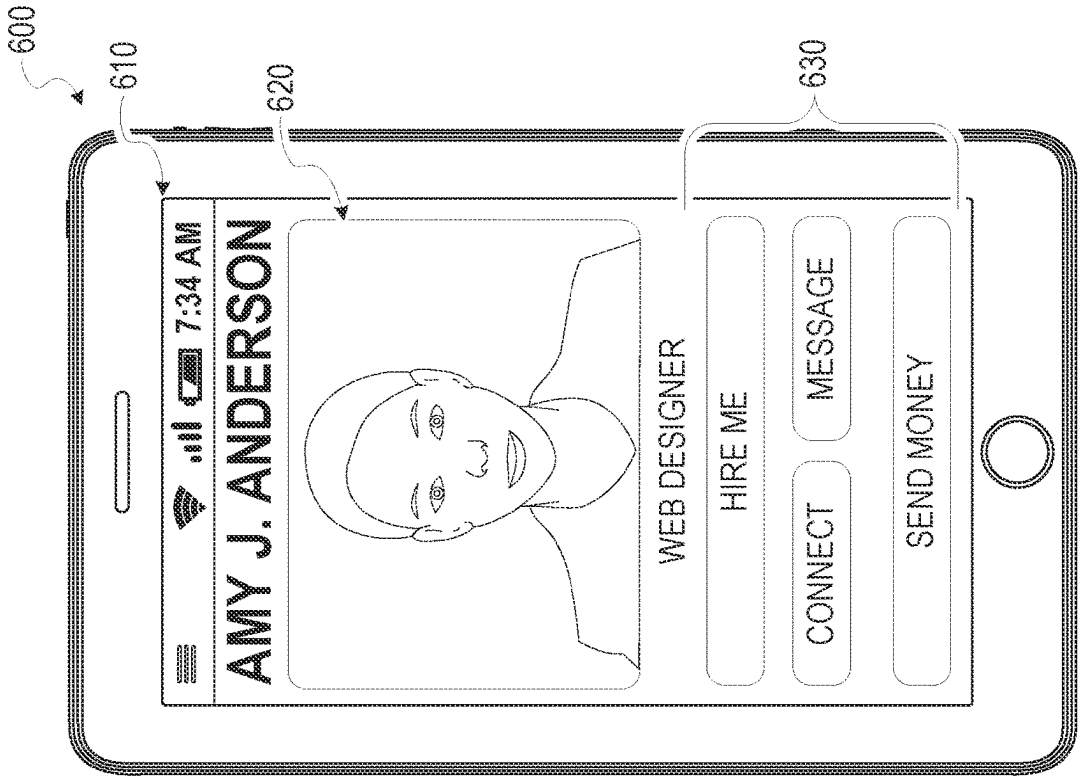
600
610
620
630
7:34 AM
AMY J. ANDERSON
WEB DESIGNER
HIRE ME
CONNECT
MESSAGE
SEND MONEY

FIG. 6

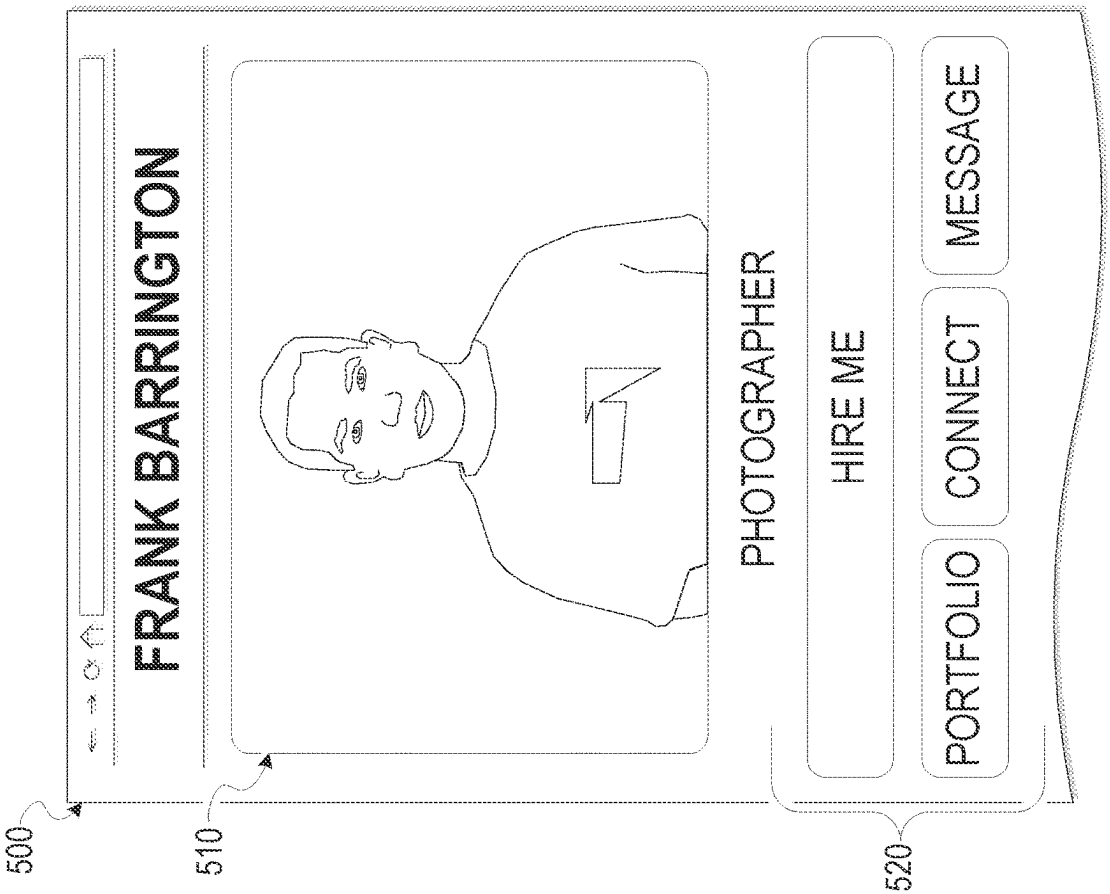
500
510
520
FRANK BARRINGTON
PHOTOGRAPHER
HIRE ME
PORTFOLIO
CONNECT
MESSAGE

FIG. 5

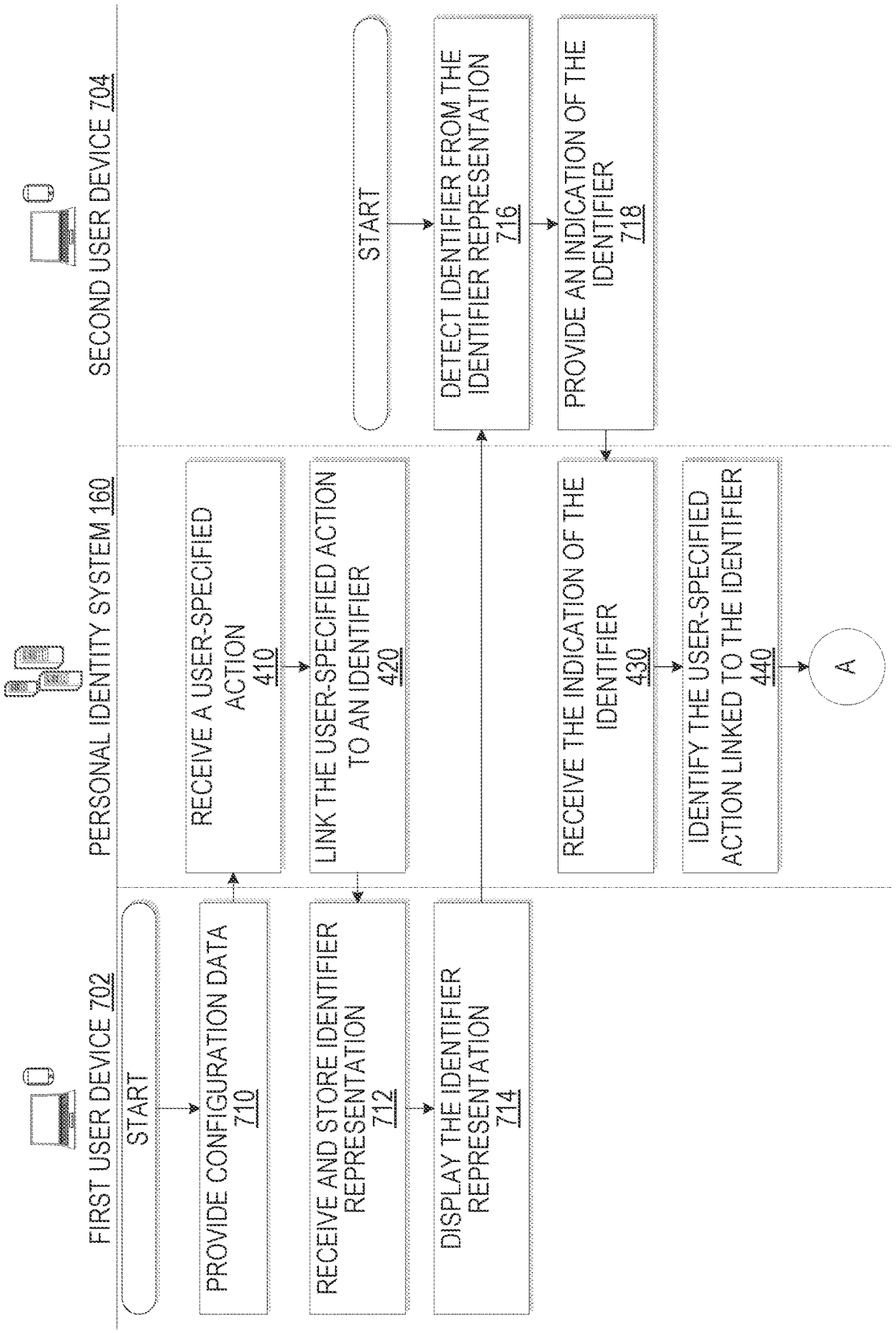
FIRST USER DEVICE 702
PERSONAL IDENTITY SYSTEM 160
SECOND USER DEVICE 704
START
PROVIDE CONFIGURATION DATA 710
RECEIVE A USER-SPECIFIED ACTION 410
LINK THE USER-SPECIFIED ACTION TO AN IDENTIFIER 420
RECEIVE AND STORE IDENTIFIER REPRESENTATION 712
DISPLAY THE IDENTIFIER REPRESENTATION 714
START
DETECT IDENTIFIER FROM THE IDENTIFIER REPRESENTATION 716
PROVIDE AN INDICATION OF THE IDENTIFIER 718
RECEIVE THE INDICATION OF THE IDENTIFIER 430
IDENTIFY THE USER-SPECIFIED ACTION LINKED TO THE IDENTIFIER 440
A

FIG. 7A

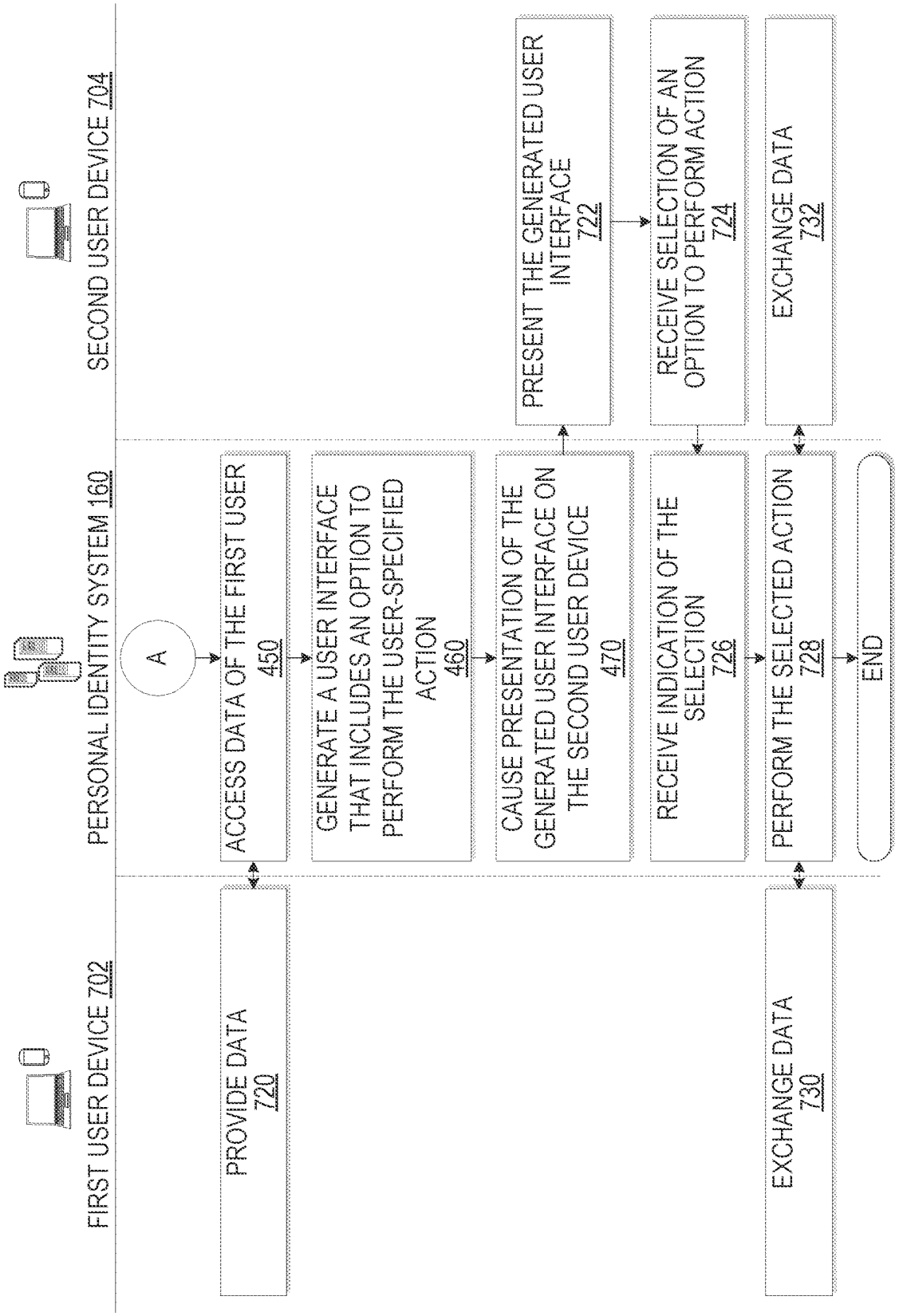
FIRST USER DEVICE 702
PERSONAL IDENTITY SYSTEM 160
SECOND USER DEVICE 704
A
PROVIDE DATA 720
ACCESS DATA OF THE FIRST USER 450
GENERATE A USER INTERFACE THAT INCLUDES AN OPTION TO PERFORM THE USER-SPECIFIED ACTION 460
CAUSE PRESENTATION OF THE GENERATED USER INTERFACE ON THE SECOND USER DEVICE 470
PRESENT THE GENERATED USER INTERFACE 722
RECEIVE SELECTION OF AN OPTION TO PERFORM ACTION 724
RECEIVE INDICATION OF THE SELECTION 726
PERFORM THE SELECTED ACTION 728
EXCHANGE DATA 730
EXCHANGE DATA 732
END

FIG. 7B

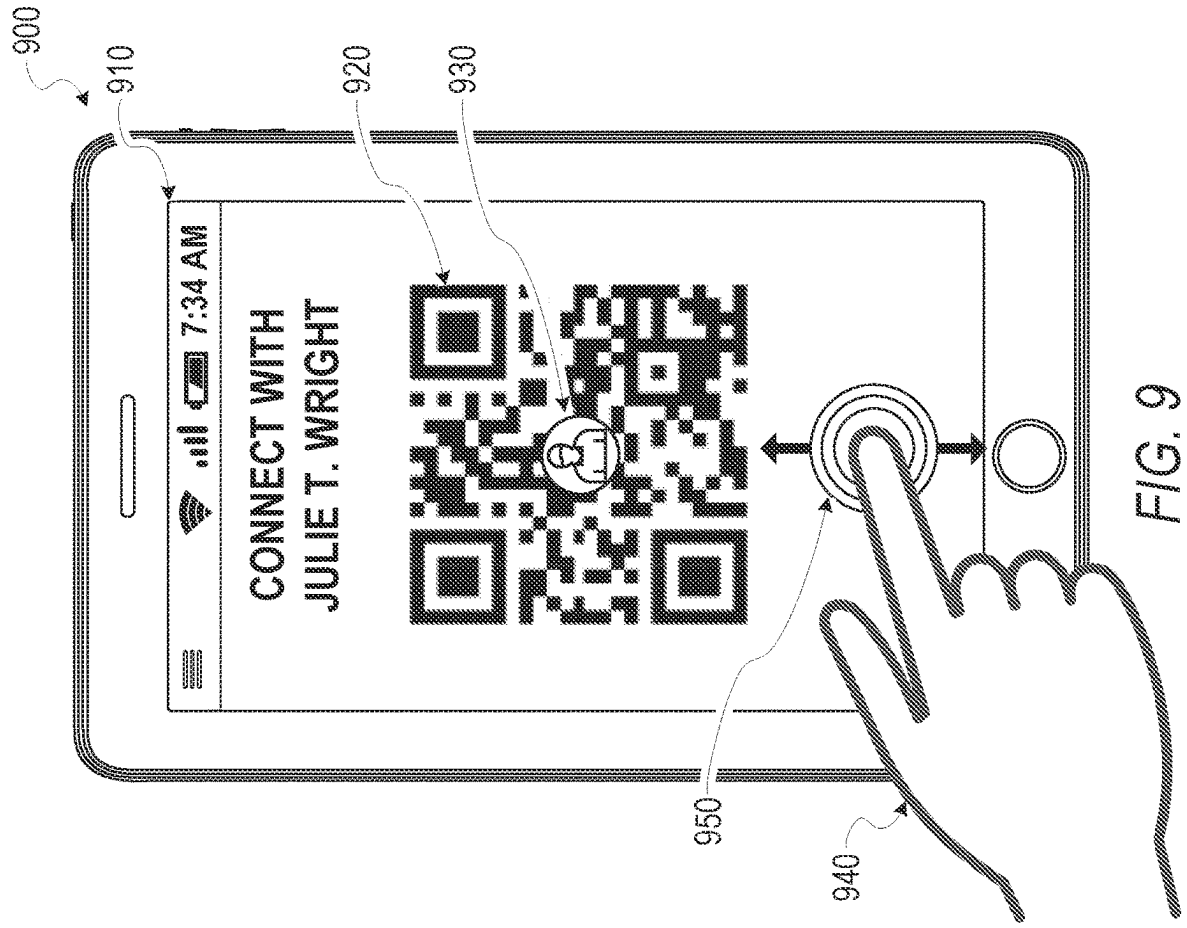
900
910
920
930
7:34 AM
CONNECT WITH
JULIE T. WRIGHT
950
940

FIG. 9

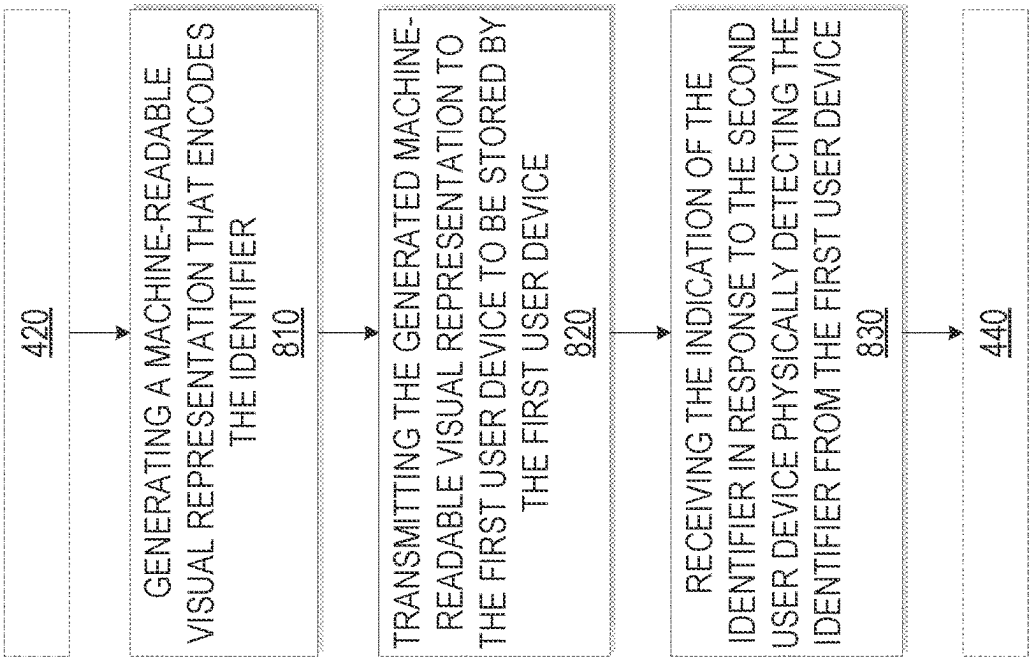
420
GENERATING A MACHINE-READABLE VISUAL REPRESENTATION THAT ENCODES THE IDENTIFIER
810
TRANSMITTING THE GENERATED MACHINE-READABLE VISUAL REPRESENTATION TO THE FIRST USER DEVICE TO BE STORED BY THE FIRST USER DEVICE
820
RECEIVING THE INDICATION OF THE IDENTIFIER IN RESPONSE TO THE SECOND USER DEVICE PHYSICALLY DETECTING THE IDENTIFIER FROM THE FIRST USER DEVICE
830
440

FIG. 8

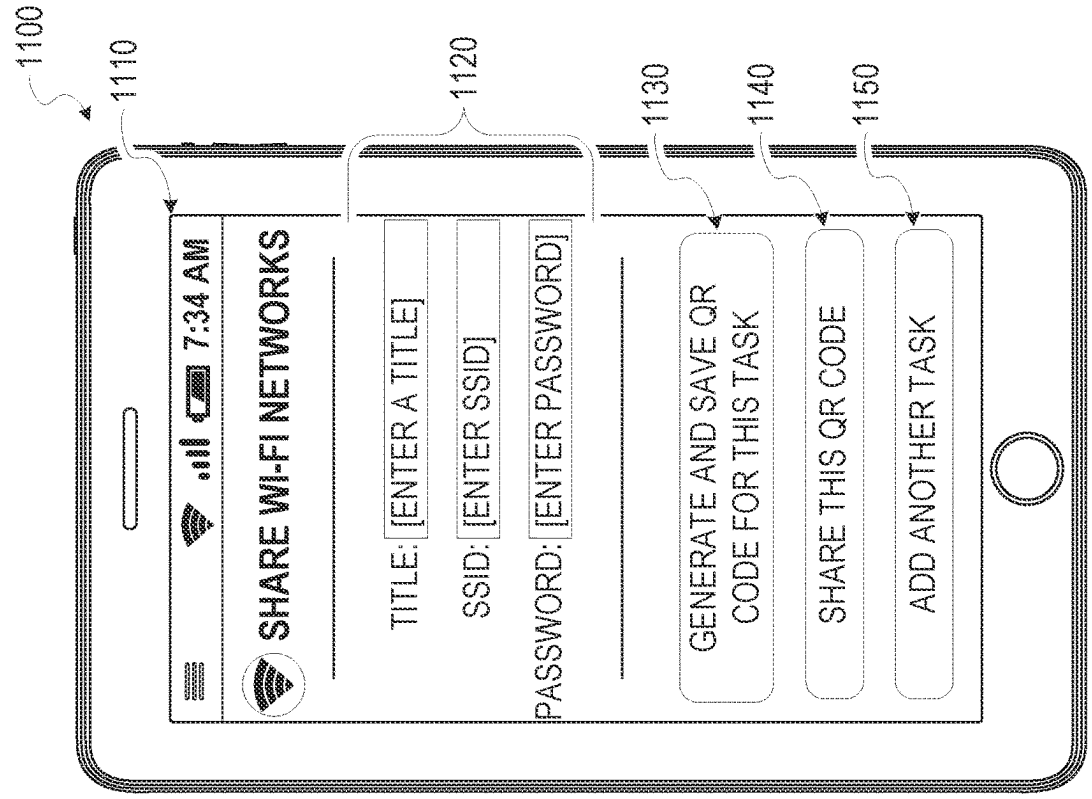
1100
1110
1120
1130
1140
1150
7:34 AM
SHARE WI-FI NETWORKS
TITLE: [ENTER A TITLE]
SSID: [ENTER SSID]
PASSWORD: [ENTER PASSWORD]
GENERATE AND SAVE QR CODE FOR THIS TASK
SHARE THIS QR CODE
ADD ANOTHER TASK

FIG. 11

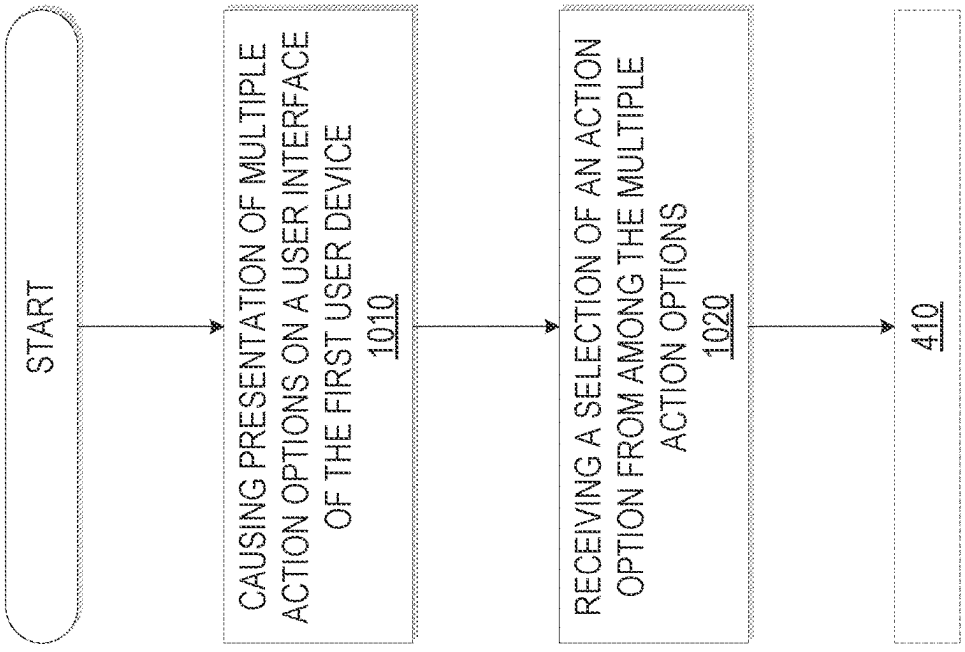
START
CAUSING PRESENTATION OF MULTIPLE ACTION OPTIONS ON A USER INTERFACE OF THE FIRST USER DEVICE
1010
RECEIVING A SELECTION OF AN ACTION OPTION FROM AMONG THE MULTIPLE ACTION OPTIONS
1020
410

FIG. 10

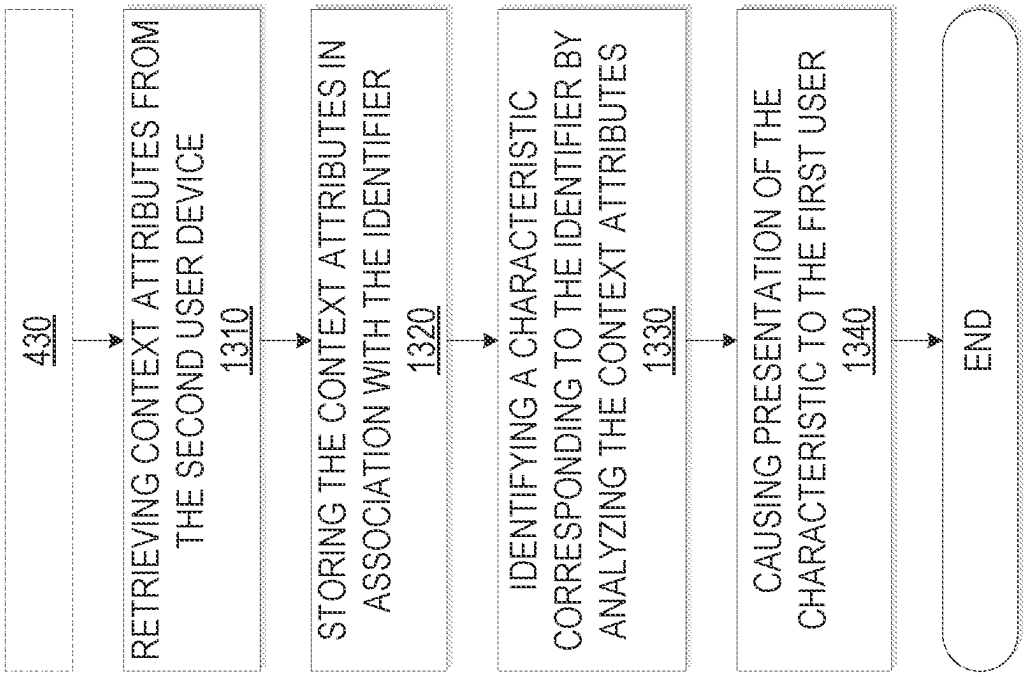
430
RETRIEVING CONTEXT ATTRIBUTES FROM THE SECOND USER DEVICE
1310
STORING THE CONTEXT ATTRIBUTES IN ASSOCIATION WITH THE IDENTIFIER
1320
IDENTIFYING A CHARACTERISTIC CORRESPONDING TO THE IDENTIFIER BY ANALYZING THE CONTEXT ATTRIBUTES
1330
CAUSING PRESENTATION OF THE CHARACTERISTIC TO THE FIRST USER
1340
END

FIG. 13

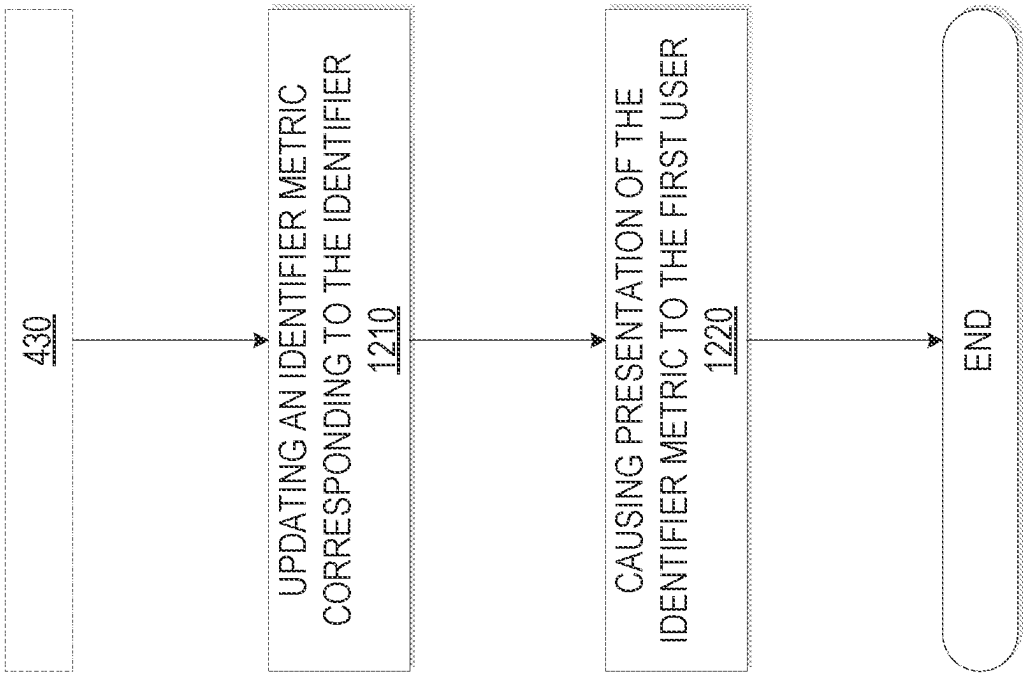
430
UPDATING AN IDENTIFIER METRIC CORRESPONDING TO THE IDENTIFIER
1210
CAUSING PRESENTATION OF THE IDENTIFIER METRIC TO THE FIRST USER
1220
END

FIG. 12

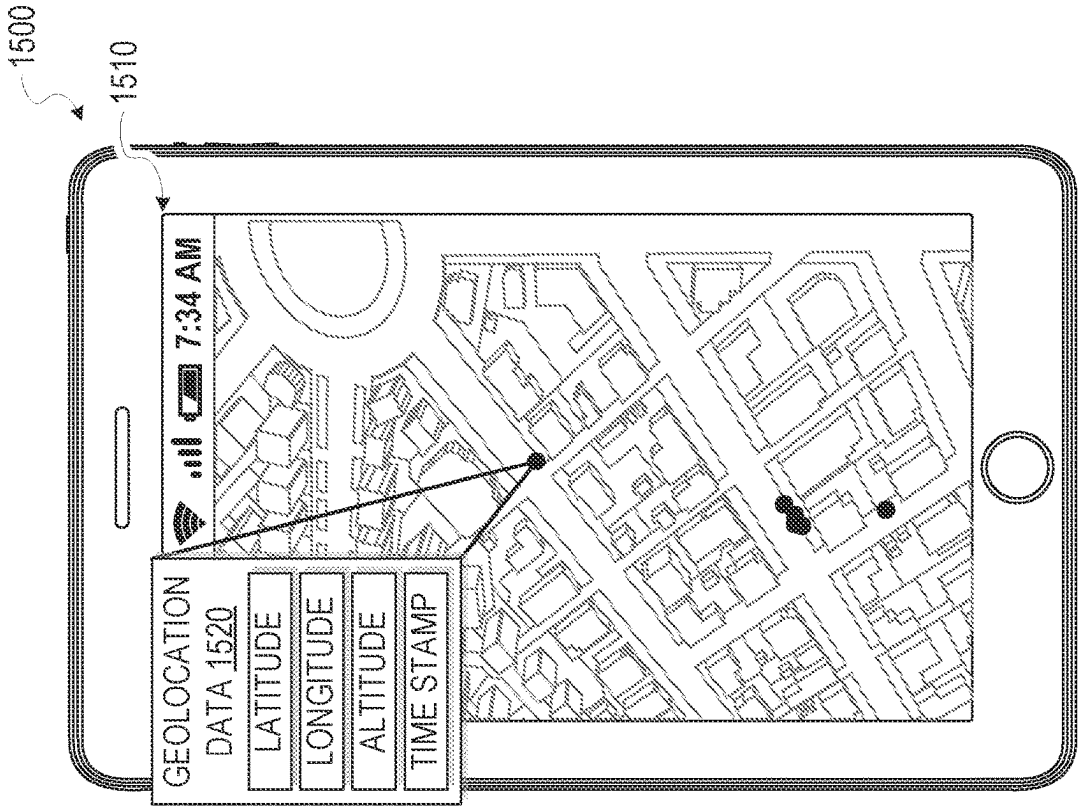
1500
1510
7:34 AM
GEOLOCATION DATA 1520
LATITUDE
LONGITUDE
ALTITUDE
TIME STAMP

FIG. 15

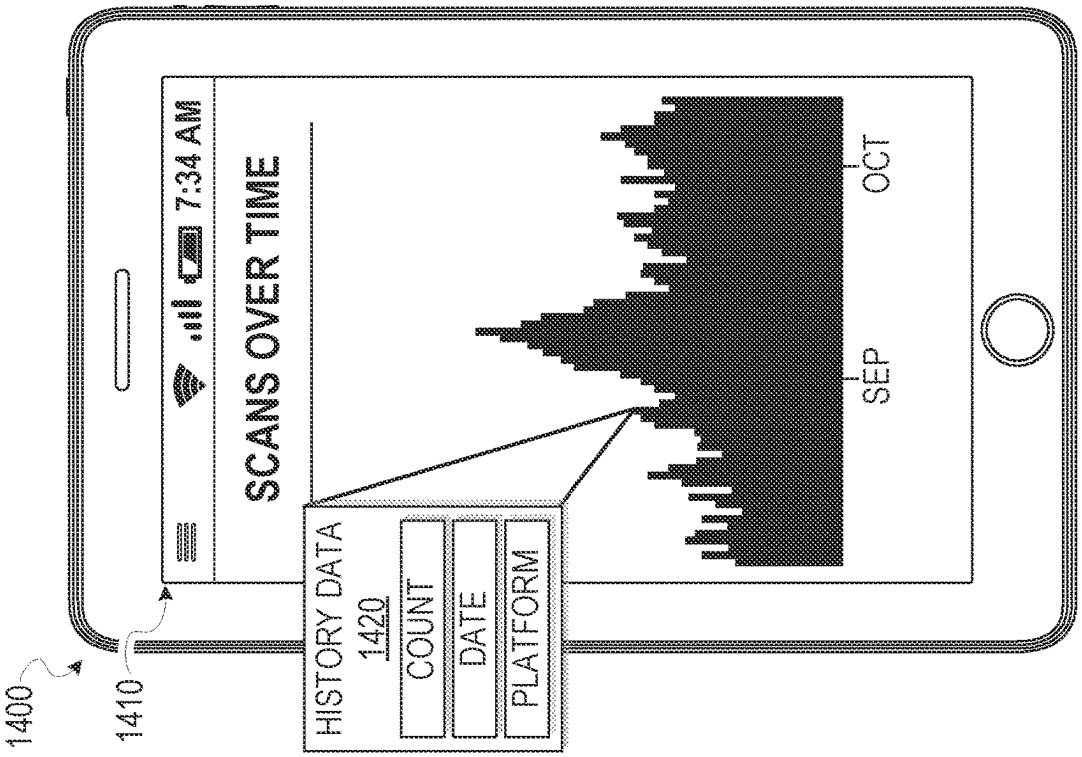
1400
1410
7:34 AM
SCANS OVER TIME
HISTORY DATA 1420
COUNT
DATE
PLATFORM
SEP
OCT

FIG. 14

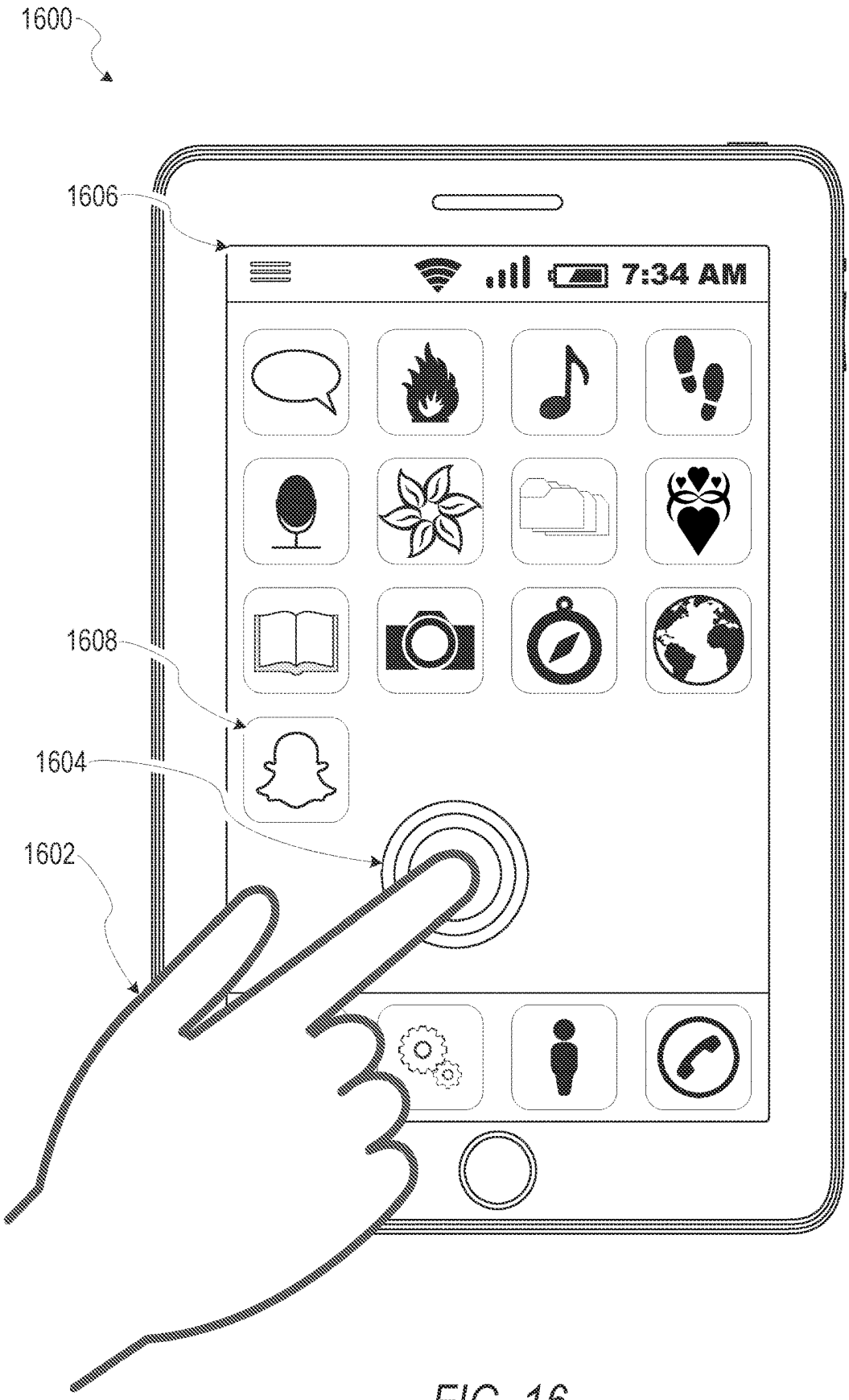

FIG. 16

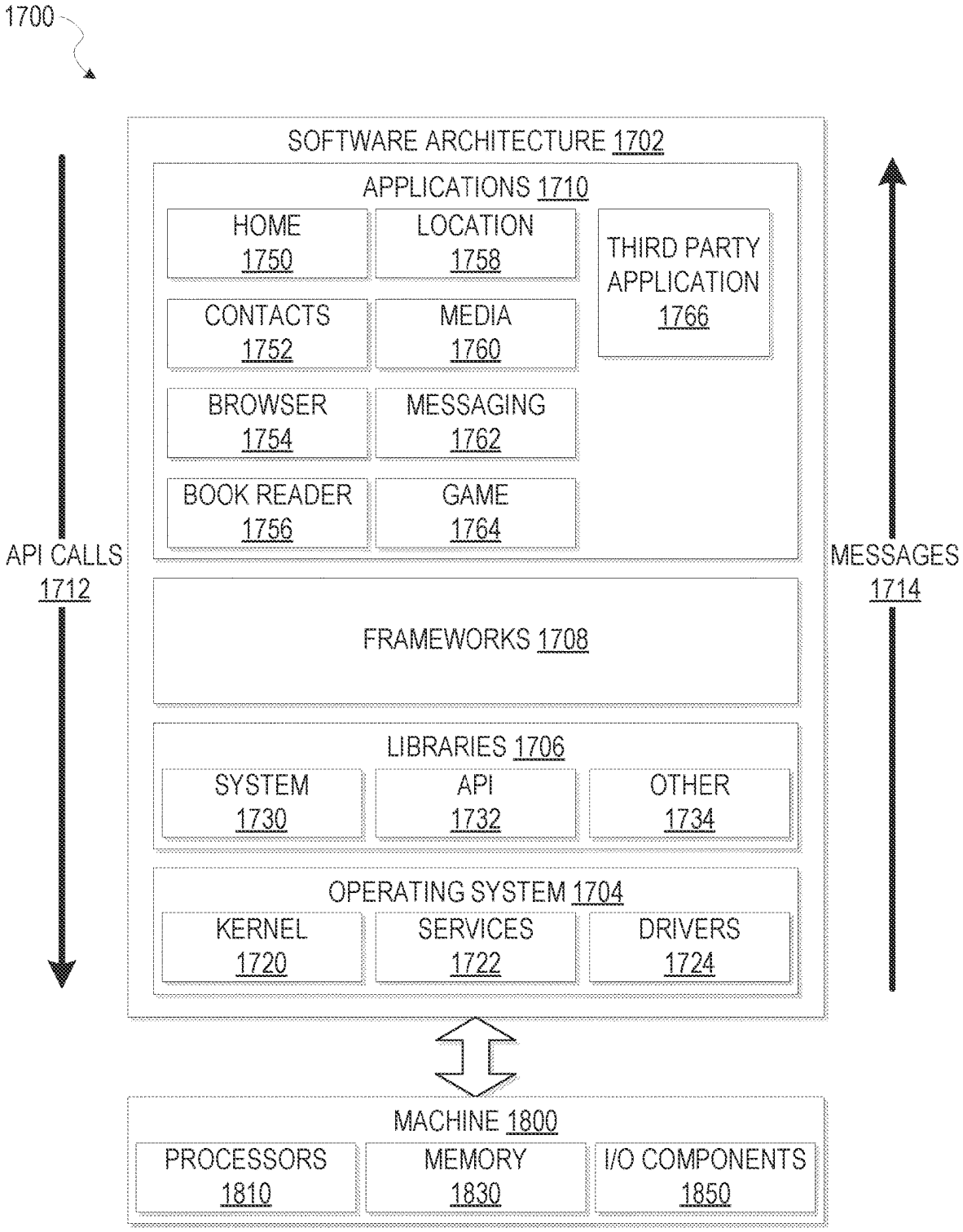
1700
SOFTWARE ARCHITECTURE 1702
APPLICATIONS 1710
HOME 1750
LOCATION 1758
THIRD PARTY APPLICATION 1766
CONTACTS 1752
MEDIA 1760
BROWSER 1754
MESSAGING 1762
BOOK READER 1756
GAME 1764
API CALLS 1712
MESSAGES 1714
FRAMEWORKS 1708
LIBRARIES 1706
SYSTEM 1730
API 1732
OTHER 1734
OPERATING SYSTEM 1704
KERNEL 1720
SERVICES 1722
DRIVERS 1724
MACHINE 1800
PROCESSORS 1810
MEMORY 1830
I/O COMPONENTS 1850

FIG. 17

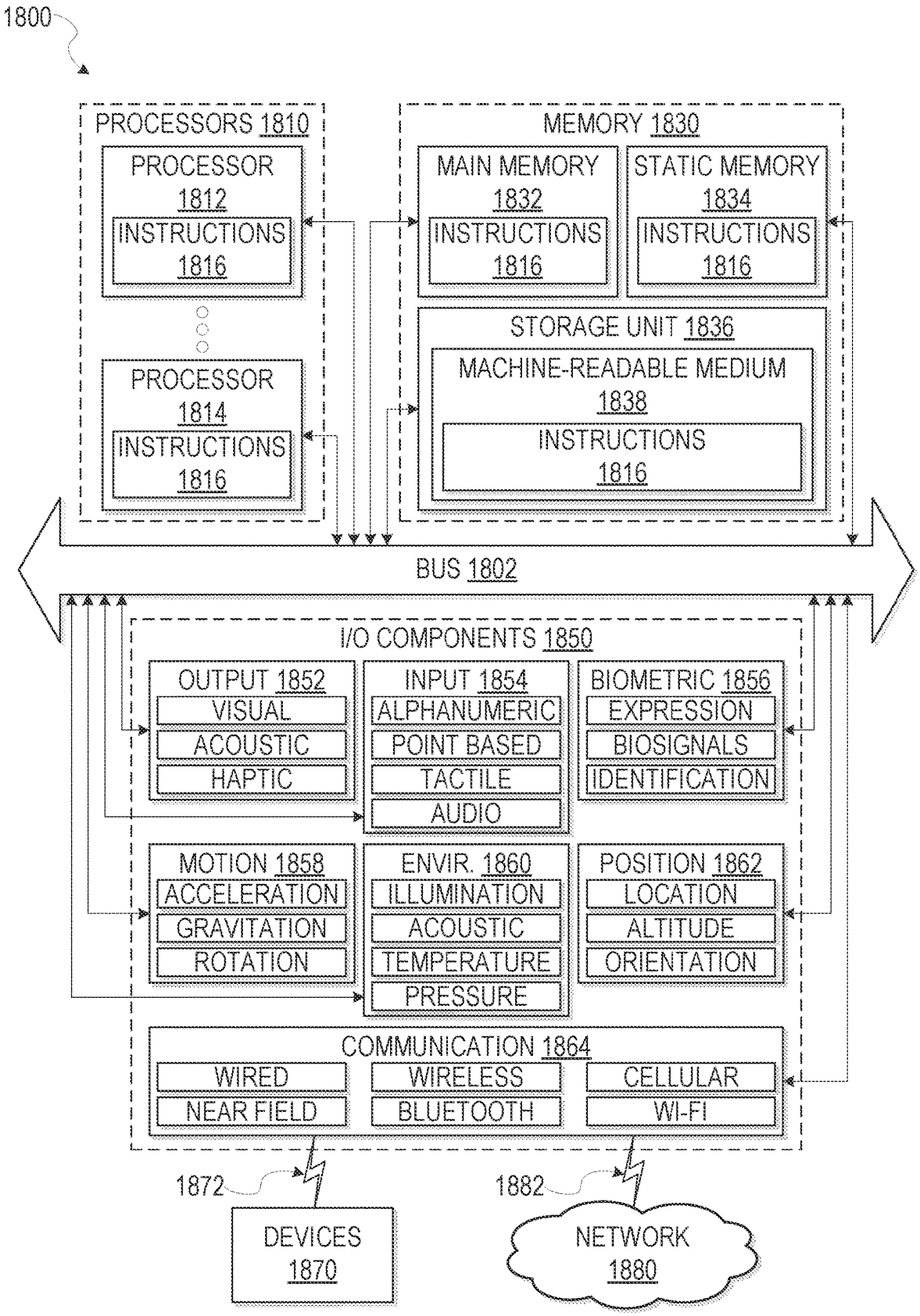
1800
PROCESSORS 1810
PROCESSOR 1812
INSTRUCTIONS 1816
PROCESSOR 1814
INSTRUCTIONS 1816
MEMORY 1830
MAIN MEMORY 1832
INSTRUCTIONS 1816
STATIC MEMORY 1834
INSTRUCTIONS 1816
STORAGE UNIT 1836
MACHINE-READABLE MEDIUM 1838
INSTRUCTIONS 1816
BUS 1802
I/O COMPONENTS 1850
OUTPUT 1852
VISUAL
ACOUSTIC
HAPTIC
INPUT 1854
ALPHANUMERIC
POINT BASED
TACTILE
AUDIO
BIOMETRIC 1856
EXPRESSION
BIOSIGNALS
IDENTIFICATION
MOTION 1858
ACCELERATION
GRAVITATION
ROTATION
ENVIR. 1860
ILLUMINATION
ACOUSTIC
TEMPERATURE
PRESSURE
POSITION 1862
LOCATION
ALTITUDE
ORIENTATION
COMMUNICATION 1864
WIRED
NEAR FIELD
WIRELESS
BLUETOOTH
CELLULAR
WI-FI
1872
DEVICES 1870
1882
NETWORK 1880

FIG. 18

GUIDED PERSONAL IDENTITY BASED ACTIONS

CROSS REFERENCE TO RELATED APPLICATIONS

This application is a continuation of U.S. patent application Ser. No. 17/830,839, filed Jun. 2, 2022, and entitled "GUIDED PERSONAL IDENTITY BASED ACTIONS", now issued as U.S. Pat. No. 11,962,645, which is a continuation of U.S. patent application Ser. No. 15/991,660, filed May 29, 2018, and entitled "GUIDED PERSONAL IDENTITY BASED ACTIONS," now issued as U.S. Pat. No. 11,388,226, which is a continuation of U.S. patent application Ser. No. 14/595,712, filed Jan. 13, 2015, and entitled "GUIDED PERSONAL IDENTITY BASED ACTIONS." The contents of these prior applications are considered part of this application and are hereby incorporated by reference in their entirety.

TECHNICAL FIELD

Embodiments of the present disclosure relate generally to mobile computing technology and, more particularly, but not by way of limitation, to guided personal identity based actions.

BACKGROUND

Automated identification techniques, such as Quick Response (QR) codes, are a popular way to share and provide small pieces of information to users of mobile devices, wearable devices, and other smart devices. Many automated identification techniques are limited to one-way communication and store a limited amount of data that is often static and non-executable. These characteristics can curb the usefulness of automated identification for tasks involving two-way communication, frequently updated data, or data transfers that exceed a capacity of an automated identification scheme.

BRIEF DESCRIPTION OF THE DRAWINGS

Various ones of the appended drawings merely illustrate example embodiments of the present disclosure and should not be considered as limiting its scope.

FIG. **1** is a block diagram illustrating a networked system, according to some example embodiments.

FIG. **2** is a block diagram illustrating an example embodiment of a personal identity system, according to some example embodiments.

FIG. **3** is a diagram illustrating an example of guided personal identity based actions, according to some example embodiments.

FIG. **4** is a flow diagram illustrating an example method for guided personal identity based actions, according to some example embodiments.

FIGS. **5** and **6** are example user interface diagrams depicting example user interfaces for providing an option to perform guided personal identity based actions, according to some example embodiments.

FIGS. **7**A and **7**B are swim-lane diagrams illustrating various communications between devices performing a method for guided personal identity based actions, according to some example embodiments.

FIG. **8** is a flow diagram illustrating further example operations for guided personal identity based actions, according to some example embodiments.

FIG. **9** is a user interface diagram depicting an example user interface for displaying a machine-readable visual representation that encodes an identifier, according to some example embodiments.

FIG. **10** is a flow diagram illustrating further example operations for configuring guided personal identity based actions, according to some example embodiments.

FIG. **11** is a user interface diagram depicting an example user interface for configuration of guided personal identity based actions, according to some example embodiments.

FIGS. **12** and **13** are flow diagrams illustrating further example operations for performing analytics associated with guided personal identity based actions, according to some example embodiments.

FIGS. **14** and **15** are user interface diagrams depicting an example user interface for presenting analytics associated with guided personal identity based actions, according to some example embodiments.

FIG. **16** is a user interface diagram depicting an example mobile device and mobile operating system interface, according to some example embodiments.

FIG. **17** is a block diagram illustrating an example of a software architecture that may be installed on a machine, according to some example embodiments.

FIG. **18** is a block diagram presenting a diagrammatic representation of a machine in the form of a computer system within which a set of instructions may be executed for causing the machine to perform any of the methodologies discussed herein, according to an example embodiment.

The headings provided herein are merely for convenience and do not necessarily affect the scope or meaning of the terms used.

DETAILED DESCRIPTION

The description that follows includes systems, methods, techniques, instruction sequences, and computing machine program products that embody illustrative embodiments of the disclosure. In the following description, for the purposes of explanation, numerous specific details are set forth in order to provide an understanding of various embodiments of the inventive subject matter. It will be evident, however, to those skilled in the art, that embodiments of the inventive subject matter may be practiced without these specific details. In general, well-known instruction instances, protocols, structures, and techniques are not necessarily shown in detail.

Automated identification techniques offer a convenient way for users of smart devices to access small pieces of information. For example, QR codes are two-dimensional optical bar codes that encode information readable by a device (e.g., a smart phone) equipped with a camera sensor. In a common scenario, a website address is encoded into a QR code and a smart device scans the QR code to access the website address. In this scenario, a user is directed to a website without guidance or direction as to performing a particular action or task associated with the website or a particular entity associated with the QR code. This aimlessness can diminish the likelihood of the user achieving a purpose of the QR code. According to various example embodiments, a guided, focused objective for a QR code, or similar automated identification scheme, can improve both user experience and the chances of the user completing an action associated with the QR code.

To assist users in providing guided personal identity based actions to other users, in various example embodiments, an application server provides a user interface for a first user to configure an action, task, or other instruction that uses data associated with the first user or entity (e.g., a business, organization, or individual). The application server receives a user-specified action and links the user-specified action to an identifier that can be encoded into a QR code or another type of automated identification tag (e.g., Radio Frequency Identification (RFID) tags, Near Field Communication (NFC) tags, smart tags, or audio based tags). The application server stores the configuration of the action to be accessed in association with the identifier.

Subsequently, a second user scans the QR code to trigger communication of an indication of the identifier encoded in the QR code to the application server that is storing or can facilitate retrieval of the configuration of the user-specified action. The application server identifies the user-specified action linked to the identifier and accesses the data of the first user to be used when performing the user-specified action. The application server uses the data of the first user to facilitate performing the user-specified action (e.g., the data of first user can include a member identification on a social network service used to facilitate a particular social network action such as friending the first user). In some embodiments, the first user can provide the data during configuration or a specification of the data to be retrieved dynamically by the application server. For instance, the application server can dynamically retrieve or access the data when the user-specified action is performed. This may be desirable in situations where the data is subject to change (e.g., a current geolocation of a food truck that is frequently in different locations). In some instances, the application server can automatically perform, on behalf of the second user, the user-specified action using the data of the first user. In other instances, the application server generates a user interface including an option to perform the user-specified action using the data of the first user and the user interface is presented to the second user.

The user-specified action can comprise a wide variety of actions that pertain to the first user or another entity. For example, the user-specified action can include providing certain data (e.g., directions to a particular geolocation specified by the first user or network login information), sending a text message to a certain number with a certain message content, placing a phone call to a certain number, adding an event to a calendar of the second user and the first user, downloading a particular media file (e.g., a song or an app), providing payment information to facilitate a payment to the first user, establishing a peer-to-peer communication link between a device of the first user and a device of the second user in real time (e.g., BLUETOOTH® pairing of devices), automatically logging into an online account, automatically becoming a member of an online service, a social network action (e.g., like, favorite, connect, friend, follow, post, tag, or check-in), or any suitable combination thereof.

FIG. **1** is a network diagram depicting a network system **100** having a client-server architecture configured for exchanging data over a network, according to one embodiment. For example, the network system **100** may be a messaging system where clients communicate and exchange data within the network system **100**. The data may pertain to various functions (e.g., sending and receiving text and media communication, determining geolocation, etc.) and aspects (e.g., guided personal identity based actions) associated with the network system **100** and its users. Although illustrated herein as client-server architecture, other embodiments may include other network architectures, such as peer-to-peer or distributed network environments.

As shown in FIG. **1**, the network system **100** includes a social messaging system **130**. The social messaging system **130** is generally based on a three-tiered architecture, consisting of an interface layer **124**, an application logic layer **126**, and a data layer **128**. As is understood by skilled artisans in the relevant computer and Internet-related arts, each module or engine shown in FIG. **1** represents a set of executable software instructions and the corresponding hardware (e.g., memory and processor) for executing the instructions. To avoid obscuring the inventive subject matter with unnecessary detail, various functional modules and engines that are not germane to conveying an understanding of the inventive subject matter have been omitted from FIG. **1**. Of course, additional functional modules and engines may be used with a social messaging system, such as that illustrated in FIG. **1**, to facilitate additional functionality that is not specifically described herein. Furthermore, the various functional modules and engines depicted in FIG. **1** may reside on a single server computer, or may be distributed across several server computers in various arrangements. Moreover, although the social messaging system **130** is depicted in FIG. **1** as a three-tiered architecture, the inventive subject matter is by no means limited to such an architecture.

As shown in FIG. **1**, the interface layer **124** consists of interface module(s) (e.g., a web server) **140**, which receive requests from various client-computing devices and servers, such as client device(s) **110** executing client application(s) **112**, and third party server(s) **120** executing third party application(s) **122**. In response to received requests, the interface module(s) **140** communicate appropriate responses to requesting devices via a network **104**. For example, the interface module(s) **140** can receive requests such as Hypertext Transfer Protocol (HTTP) requests, or other web-based Application Programming Interface (API) requests.

The client device(s) **110** can execute conventional web browser applications or applications (also referred to as "apps") that have been developed for a specific platform to include any of a wide variety of mobile computing devices and mobile-specific operating systems (e.g., IOS™, ANDROID™, WINDOWS® PHONE). In an example, the client device(s) **110** are executing the client application(s) **112**. The client application(s) **112** can provide functionality to present information to a user **106** and communicate via the network **104** to exchange information with the social messaging system **130**. Each of the client device(s) **110** can comprise a computing device that includes at least a display and communication capabilities with the network **104** to access the social messaging system **130**. The client device(s) **110** comprise, but are not limited to, remote devices, work stations, computers, general purpose computers, Internet appliances, hand-held devices, wireless devices, portable devices, wearable computers, cellular or mobile phones, personal digital assistants (PDAs), smart phones, tablets, ultrabooks, netbooks, laptops, desktops, multi-processor systems, microprocessor-based or programmable consumer electronics, game consoles, set-top boxes, network PCs, mini-computers, and the like. User(s) **106** can be a person, a machine, or other means of interacting with the client device(s) **110**. In some embodiments, the user(s) **106** interact with the social messaging system **130** via the client device(s) **110**.

As shown in FIG. **1**, the data layer **128** has database server(s) **132** that facilitate access to information storage

repositories or database(s) **134**. The database(s) **134** are storage devices that store data such as member profile data, social graph data (e.g., relationships between members of the social messaging system **130**), and other user data.

An individual can register with the social messaging system **130** to become a member of the social messaging system **130**. Once registered, a member can form social network relationships (e.g., friends, followers, or contacts) on the social messaging system **130** and interact with a broad range of applications provided by the social messaging system **130**.

The application logic layer **126** includes various application logic module(s) **150**, which, in conjunction with the interface module(s) **140**, generate various user interfaces with data retrieved from various data sources or data services in the data layer **128**. Individual application logic module(s) **150** may be used to implement the functionality associated with various applications, services, and features of the social messaging system **130**. For instance, a social messaging application can be implemented with one or more of the application logic module(s) **150**. The social messaging application provides a messaging mechanism for users of the client device(s) **110** to send and receive messages that include text and media content such as pictures and video. The client device(s) **110** may access and view the messages from the social messaging application for a specified period of time (e.g., limited or unlimited). In an example, a particular message is accessible to a message recipient for a predefined duration (e.g., specified by a message sender) that begins when the particular message is first accessed. After the predefined duration elapses, the message is deleted and is no longer accessible to the message recipient. Of course, other applications and services may be separately embodied in their own application server module(s) **150**.

As illustrated in FIG. **1**, the social messaging system **130** includes a personal identity system **160**. In various embodiments, the personal identity system **160** can be implemented as a standalone system and is not necessarily included in the social messaging system **130**. In some embodiments, the client device(s) **110** include a portion of the personal identity system **160** (e.g., a portion of the personal identity system **160** included independently or in the client application(s) **112**). In embodiments where the client device(s) **110** includes a portion of the personal identity system **160**, the client device(s) **110** can work alone or in conjunction with the portion of the personal identity system **160** included in a particular application server or included in the social messaging system **130**.

FIG. **2** is a block diagram **200** of the personal identity system **160**. The personal identity system **160** is shown to include a communication module **210**, a presentation module **220**, a configuration module **230**, an instruction module **240**, a data module **250**, and an analytics module **260**. All, or some, of the modules **210**-**260** communicate with each other, for example, via a network coupling, shared memory, and the like. Each module of the modules can be implemented as a single module, combined into other modules, or further subdivided into multiple modules. Other modules not pertinent to example embodiments can also be included, but are not shown.

The communication module **210** provides various communications functionality. For example, the communication module **210** receives an indication of an identifier linked to a particular user-specified action. In a specific example, when the client device(s) **110** scan a QR code, the client device(s) **110** communicate an indication of the identifier extracted from the QR code to the communication module **210**. The communication module **210** exchanges network communications with the database server(s) **132**, the client device(s) **110**, and the third party server(s) **120**. The information retrieved by the communication module **210** includes data associated with the user (e.g., member profile data from an online account or social network service data) or other data to facilitate the functionality described herein.

The presentation module **220** provides various presentation and user interface functionality operable to interactively present and receive information to and from the user. For instance, the presentation module **220** is utilizable to present machine-readable visual representations of an identifier (e.g., a QR code), a user interface configured to receive guided personal identity based action configuration data, or a user interface configured to provide an option to perform a guided personal identity based action. In various embodiments, the presentation module **220** presents or causes presentation of information (e.g., visually displaying information on a screen, acoustic output, haptic feedback). The process of interactively presenting information is intended to include the exchange of information between a particular device and the user. The user may provide input to interact with the user interface in many possible manners, such as alphanumeric, point based (e.g., cursor), tactile, or other input (e.g., touch screen, tactile sensor, light sensor, infrared sensor, biometric sensor, microphone, gyroscope, accelerometer, or other sensors). The presentation module **220** provides many other user interfaces to facilitate functionality described herein. The term "presenting" as used herein is intended to include communicating information or instructions to a particular device that is operable to perform presentation based on the communicated information or instructions.

The configuration module **230** provides functionality that allows users to upload configuration data for guided personal identity based actions such as user-specified actions and data for the user-specified actions. For example, the configuration module **230** can cause presentation of a user interface that includes multiple action options on the client device(s) **110**. In this example, a user specifies a particular action by selecting one of the multiple action options included in the user interface. The user can also specify data associated with the user-specified action. In this way, the configuration module **230** facilitates configuration and upload of user-specified actions and data for the user-specified actions.

The instruction module **240** provides functionality associated with performing the user-specified action. For example, the instruction module **240** identifies the user-specified action linked to a particular identifier (e.g., via a lookup of the user-specified action using the identifier). The instruction module **240** can perform or cause another device to perform the user-specified action. In further embodiments, the instruction module **240** modifies, alters, or otherwise augments the user-specified action based on a variety of data. For instance, the instruction module **240** determines a device capability to perform certain actions based on user data (e.g., determining that the user is a member of a particular social network service prior to performing an action associated with the particular social network service). In still further embodiments, the instruction module **240** can infer a preference of the user based on the user data (e.g., identifying a most frequently or recently used social network service indicates a preference for actions associated with the most frequently or recently used social network service). In various embodiments, the instruction module **240** can exchange network communications with the third party

server(s) **120**, the client device(s) **110**, or various components of the social messaging system **130** to facilitate performing or causing performance of the user-specified action.

The data module **250** provides various data functionality such as exchanging information with databases or servers. For example, the data module **250** accesses data from the third party server(s) **120**, the database(s) **134**, and the client device(s) **110**. In a specific example, the data module **250** accesses data used by the instruction module **240** to perform or cause performance of the user-specified action. In some instances, the data module **250** accesses the data for the user-specified action that is stored with the user-specified action (e.g., stored in the database(s) **134**). In other instances, the data module **250** retrieves the data for the user-specified action from the client device(s) **110**, the third party server(s) **120**, or other storage devices.

The analytics module **260** provides functionality to generate various analytics data associated with a particular identifier linked to the user-specified action. For example, the analytics module **260** can identify a characteristic corresponding to a particular identifier by analyzing context attributes associated with the identifier. For instance, the context attributes include attributes associated with a context corresponding to receiving an indication of a particular identifier (e.g., a geolocation of where a particular identifier was detected, a device type that detected the particular identifier). In some embodiments, the analytics module **260** updates, maintains, or otherwise manages data associated with the context associated with receiving indications. For instance, the analytics module **260** increments an access count each time an indication is received at the communication module **210**.

Turning now to FIG. **3**, a diagram **300** illustrating an example of guided personal identity based actions is shown. FIG. **3** is an overview of a particular example implementation of the personal identity system **160** facilitating a guided personal identity based action. Additional details and alternative implementations are discussed in connection with the figures to follow. In the diagram **300**, a scene **302** illustrates a first user **304** and a second user **306**. A scene **308** portrays an enlarged view of a portion of the scene **302**. The scene **308** shows a first user device **312** of the first user **304** and a second user device **316** of the second user **306**. The first user device **312** is displaying a code **310** (e.g., a machine-readable visual representation such as a QR code) that encodes an identifier detectable by the second user device **316**. The second user device **316** employs a camera sensor, or another optical sensor, to detect or scan a signal **314** (e.g., a camera sensor capturing an optical signal) corresponding to the code **310**. After scanning the code **310**, the second user device **316** decodes the identifier encoded in the code **310**. The second user device **316** is communicatively coupled to the network **104** and the social messaging system **130** via a communication link **318**, allowing for an exchange of data between the personal identity system **160** and the second user device **316**.

In an example scenario, the first user **304** has previously provided configuration data to the personal identity system **160** for a guided personal identity based action. For instance, the first user **304** provided a specification of an action that performs a social network action such as forming a relationship with another member on a social network service. In this instance, the user-specified action uses a member identification of the first user **304** on the social network service to perform the social network action. Subsequent to the first user **304** providing the user-specified action, the personal identity system **160** links the user-specified action to an identifier (e.g., an identifier corresponding to the first user **304** or a unique identifier to distinguish the user-specified action from among other user-specified actions). The personal identity system **160** can also generate the code **310** that encodes the identifier. The first user device **312** stores the code **310** that encodes the identifier corresponding to the user-specified action provided by the first user. After configuration of the guided personal identity based action is complete, the first user **304** can display and share the code **310** with other users such as the second user **306**. For example, the code **310** can be physically printed and distributed (e.g., on a billboard, in a newspaper publication, or on a business card), displayed on a display screen of the first user device **312**, or displayed on another device.

Continuing with the example scenario, the first user **304** displays the code **310** on a display screen of the first user device **312** and the second user **306** operates a camera sensor of the second user device **316** to physically detect the code **310**. Once the second user device **316** detects and decodes the identifier from the code **310**, the second user device **316** provides an indication of the identifier to the personal identity system **160**. In response to receiving the indication of the identifier, the personal identity system **160** identifies the user-specified action previously linked to the identifier during configuration of the guided personal identity based action, generates a user interface that includes an option to perform the user-specified action using the data of the first user **304**, and causes presentation of the generated user interface on the second user device **316**. As shown in the diagram **300**, the second user device **316** is displaying a user interface that includes a user interface element that, when activated by an operator of the second user device **316**, performs (or causes to be performed) the user-specified action. In this scenario, the personal identity system **160** performs the user-specified action by identifying the first user **304** and the second user **306** on a particular social network service and forming a relationship between the first user **304** and the second user **306** on the social network service. In some embodiments, no action aside from receiving the identifier is required before performing the user-specified action (i.e., an action commences immediately upon scanning). In some of these instances, a user interface may be displayed merely to inform a user that the user-specified action has occurred. Thus, FIG. **3** illustrates an example implementation of the personal identity system **160** facilitating a guided personal identity based action configured by the first user **304** and provided to the second user **306**.

FIG. **4** is a flow diagram illustrating an example method **400** for guided personal identity based actions. The operations of the method **400** may be performed by components of the personal identity system **160**, and are so described below for the purposes of illustration.

At operation **410**, the configuration module **230** receives a user-specified action from a first user device of a first user. The user-specified action pertains to the first user and uses data of the first user when performed. In some embodiments, the user-specified action comprises multiple user-specified actions received from the first user device, each of the multiple user-specified actions pertaining to the first user and using data of the first user when performed.

The instruction module **240** uses the data of the first user to facilitate performing the user-specified action. For instance, the data of the first user comprises a member identification operable to identity the first user on a social network service. In this instance, the user-specified action

can comprise a social network action of the social network service such as liking, friending, favoriting, posting, and so forth. The personal identity system **160** can perform (or cause performance of) the social network action by the instruction module **240** identifying the first user (using the data of the first user) and a second user on the social network service and sending a request to the social network service to perform the social network action involving the first user and the second user.

In various embodiments, the first user specifies rules or conditions associated with the user-specified action. In these embodiments, the instruction module **240** determines satisfaction of the condition prior to performing the user-specified action (e.g., if the condition is satisfied perform the user-specified action, and if the condition is not satisfied do not perform the user-specified action). In a specific example, if the user-specified action is a post or message, the first user can provide a rule for generating the message content to the configuration module **230** (e.g., automatically include a current geolocation of the second user in the message content). In other examples, the user-specified action is not available during a particular time period, or a particular user-specified action is not available to the second user unless the second user has a social network relationship with the first user such as being contacts or connected on the social network service.

In further embodiments, the user-specified action comprises sending a text message, such as a Short Message Service (SMS) message, a Multimedia Messaging Service (MMS) message, an Enhanced Messaging Service (EMS) message, and so forth. In some embodiments, the first user provides a message content for the text message to the personal identity system **160** along with the user-specified action (sending a text message in this example). In other embodiments, the message content is provided by the second user when the user-specified action is performed on the second user device of the second user.

In still further embodiments, the user-specified action comprises providing or sharing information such as contact information, WI-FI® settings, payment information (e.g., to allow for the second user to send a payment to the first user), availability based on the first user's calendar entries, and so forth. In a specific example, the user-specified action comprises providing WI-FI® settings to the second user to allow the second user to establish a connection with a WI-FI® network. In some instances, the first user provides the WI-FI® settings (e.g., a password, network name, and so on) to the configuration module **230** when configuring the user-specified action. In other instances, the instruction module **240**, upon performing the user-specific action (in this example providing WI-FI® settings to another user), retrieves the WI-FI® settings and communicates the retrieved WI-FI® settings to the second user device (e.g., retrieved from the first user device in real time and communicated to the second user device). In this way, the first user does not have to manually provide the WI-FI® settings when configuring the user-specified action.

At operation **420**, the configuration module **230** links the user-specified action to an identifier. For example, the configuration module **230** stores the user-specified action in association with the identifier such that provided the identifier, the instruction module **240**, or another module, can identify the user-specified action using the identifier (e.g., via a lookup in a database). In further example embodiments, the configuration module **230** can generate a machine-readable visual representation (e.g., a QR code) that encodes the identifier (discussed further below in connection with FIG. **8**). In other embodiments, the configuration module **230** can encode the identifier using other automated identification schemes (e.g., RFID tags, NFC tags, smart tags, or audio based tags).

At operation **430**, the communication module **210** receives an indication of the identifier from the second user device of the second user. In some embodiments, the operation **410** and the operation **420** are performed at a first time and the operation **430** and subsequent operations are performed at a second time occurring after the first time. That is to say, the first user can configure the user-specified action in advance of the second user device providing an indication of the identifier corresponding to the user-specified action.

In various embodiments, the second user device includes components operable to detect a variety of identifiers. In various embodiments, the second user device includes RFID tag reader components, NFC smart tag detection components, optical reader components (e.g., an optical sensor to detect one-dimensional bar codes such as Universal Product Code (UPC) bar codes, multi-dimensional bar codes such as a QR code, Aztec code, Data Matrix, Dataglyph, MaxiCode, PDF417, Ultra Code, Uniform Commercial Code Reduced Space Symbology (UCC RSS)-2D bar code, and other optical codes), acoustic detection components (e.g., microphones to identify tagged audio signals), or a suitable combination thereof. In a specific example, the second user uses the second user device to scan a QR code being displayed on the first user device. Once the second user device extracts the identifier from the QR code, the second user device transmits an indication of the identifier, such as a network message including the identifier, to the communication module **210**.

In response, after the communication module **210** receives the indication of the identifier, at operation **440**, the instruction module **240** identifies the user-specified action linked to the identifier. For instance, the instruction module **240** performs a lookup of the user-specified action using the identifier.

At operation **450**, the data module **250** accesses the data of the first user to be used when the user-specified action is performed. As discussed above, in some instances, the first user provides data associated with the user-specified action when configuring the user-specified action and the data module **250** simply accesses the data along with the user-specified action. In other instances, the first user provides instructions for retrieving data associated with the user-specified action when configuring the user-specified action. In these instances, the data module **250** retrieves the data associated with the user-specified action according to the instructions provided by the first user. For example, the instructions can comprise a particular type of data to access such as a current geolocation of the user. In this example, the data module **250** queries the first user device, or another specified storage location, to retrieve the data to be used when performing the user-specified action.

At operation **460**, the presentation module **220** or the instruction module **240** generates a user interface that includes an option to perform the user-specified action using the data of the first user. In alternative embodiments, the instruction module **240** automatically performs the user-specified action on behalf of the second user in response to receiving the indication of the identifier. In various embodiments, the instruction module **240** augments, adapts, or otherwise modifies the option to perform the user-specified action according to various analyses and according to user-specified rules or conditions provided by the first user during the configuration of the user-specified action.

In an embodiment, the data module **250** accesses user data of the second user stored on the second user device or another storage location (e.g., a third party server such as a server hosting a social network service). For instance, the user data can comprise device type, device model, data download or upload speeds, demographic information of the second user (e.g., age, gender, marital status, or socio-economic status), social networks the second user is a member of, frequently used apps, browser history, and so forth. In these embodiments, the instruction module **240** augments the options (e.g., makes certain options unavailable to the second user) or the user interface including the options (e.g., emphasize a particular option over other options) based on an analysis of the user data of the second user. For instance, the instruction module **240** modifies the user interface or the option to perform the user-specified action according to the user-specified rules or conditions corresponding to the user-specified action. In a specific example, the instruction module **240** can provide access or restrict access to certain user-specified actions based on a social network relationship between the first user and the second user on a particular social networking site (e.g., certain actions are accessible to friends of the first user and unavailable to other users).

In a specific example, the instruction module **240** determines a device capability to perform certain actions based on the user data of the second user. The instruction module **240** identifies a particular user-specified action from among the multiple user-specified actions according to the device capability. The instruction module **240** or the presentation module **220** generates the user interface to include an option to perform the particular user-specified action. As a concrete example, if the user data indicates that the second user is a member of a particular social network service, the instruction module **240** identifies a particular user-specified action associated with the particular social network service and an option to perform the particular user-specified action is included in the user interface. In this way, the instruction module **240** dynamically adapts the user interface according to the device capability of the second user device.

In another example, the instruction module **240** infers a user preference based on an analysis of the user data of the second user, the user preference being indicative of a preference to perform certain actions. The instruction module **240** identifies a particular user-specified action from among the multiple user-specified actions according to the user preference. Subsequently, the instruction module **240** generates the user interface to include an option to perform the particular user-specified action. As a concrete example, if the user data indicates that the second user frequently uses a particular app, the instruction module **240** identifies a particular user-specified action associated with the particular app and an option to perform the particular user-specified action is included in the user interface. As such, the instruction module **240** augments the user interface according to inferred preferences of the second user.

Turning now to FIGS. **5** and **6**, example user interface diagrams depicting example user interfaces for providing an option to perform guided personal identity based actions are shown. Although user interfaces described herein (e.g., FIGS. **5**, **6**, **9**, **11**, **14**, and **15**) depict specific example user interfaces and user interface elements, these are merely non-limiting examples, and many other alternate user interfaces and user interface elements can be generated by the presentation module **220** and presented to the user. It will be noted that alternate presentations of the displays described herein include additional information, graphics, options, and so forth; other presentations include less information, or provide abridged information for easy use by the user.

FIG. **5** depicts an example user interface **500** that includes user interface elements **510** and **520** that cause a particular user-specified action to be performed when activated (e.g., clicked or tapped on a touch screen display). In some embodiments, the user interface **500** is a browser user interface operating on a computer or mobile device. Similarly, FIG. **6** depicts an example user device **600** (e.g., smart phone) displaying an example user interface **610** that includes user interface elements **620** and **630** that cause a particular user-specified action to be performed when activated (e.g., clicked or tapped on a touch screen display).

Referring back to FIG. **4**, at operation **470**, the presentation module **220** causes presentation of the generated user interface on the second user device. For instance, the presentation module **220** can transmit the user interface and an instruction to present the user interface to the second user device.

In further embodiments, the communication module **210** receives a selection of the option to perform the user-specified action from the second user device. The instruction module **240** performs (or causes performance of) the user-specified action in response to receiving the selection of the option from the second user device. The data module **250** stores an indication of the selection of the option in association with the second user device and the identifier (e.g., stored in the database(s) **134**). At a later time, the communication module **210** receives a subsequent indication of the identifier from the second user device. The presentation module **220** generates the user interface, in part, according to the stored indication of the selection. For instance, if a particular user-specified action has previously been performed, the instruction module **240** can omit an option to perform the user-specified action from subsequent user interface presentations.

In still further embodiments, the data module **250** stores a history of identifiers for a particular user. For example, for each indication of an identifier the communication module **210** receives, the data module **250** stores the identifier in association with an identification of the second user. The data module **250** accesses a history of identifiers for a particular user and the presentation module **220** can generate a user interface including the history of identifiers for the particular user. In these embodiments, the user interface is operable to perform the user-specified action corresponding to respective identifiers included in the history of identifiers. In this way, a particular user can revisit particular user-specified actions previously performed or stored.

In yet further embodiments, the instruction module **240** determines that the second user device is detecting the identifier from a machine-readable visual representation of the identifier being displayed on the first user device in real time. For instance, the first user device can communicate an indication, to the communication module **210**, indicating that the first user device is currently displaying a particular machine-readable visual representation.

In some embodiments, the first user device and the second user device are geo-enabled devices operable to communicate a geolocation to the communication module **210**. In other embodiments, the instruction module **240** derives an approximate location using an Internet Protocol (IP) location service or another similar service. The instruction module **240** can then infer that the second user device is detecting the machine-readable visual representation from the first user device by comparing the geolocations of the first user device and the second user device to determine that the

devices are within a distance of each other (e.g., a distance short enough for the second user device to detect the machine-readable visual representation being displayed on the first user device).

Based on the determination that the second user device is detecting the identifier from a machine-readable visual representation of the identifier being displayed on the first user device in real time, the instruction module **240** causes an interaction between the second user device and the first user device in real time. In an example, the interaction comprises automatically establishing a peer-to-peer communication session between the first user device and the second user device (e.g., a WI-FI® peer-to-peer session or a BLUETOOTH® pairing).

FIGS. **7**A and **7**B are swim-lane diagrams illustrating various communications between devices performing a method for guided personal identity based actions. At operation **710**, a first user device **702** provides configuration data for a guided personal identity based action to the personal identity system **160**. The configuration data can comprise a user specification of an action and data to be used when the action is performed.

As described above, at the operation **410**, the configuration module **230** receives a user-specified action from the first user device **702**. For instance, the configuration data includes the user-specified action. In various embodiments, the personal identity system **160** provides user interfaces configured to receive the configuration data to the first user device **702**.

At the operation **420**, the configuration module **230** links the user-specified action to an identifier. As further described in connection with FIGS. **8** and **9**, the personal identity system **160** can generate a machine-readable visual representation that encodes the identifier. In some embodiments, the machine-readable visual representation is generated at the first user device **702**.

Subsequently, at operation **712**, the first user device **702** receives and stores the identifier representation. Although FIG. **7**A shows the first user device **702** providing the configuration data, another device of the first user can provide the configuration data to the personal identity system **160** and a different device of the first user can store the identifier representation. That is to say, in some embodiments, the device that provides the configuration data can be different from the device that stores the identifier representation.

In various embodiments, the above operations of FIG. **7**A are performed at a first time and subsequent operations of FIGS. **7**A and **7**B are performed at a second time after the first time (e.g., the identifier representation is configured during a first session and subsequently displayed during a later session). At operation **714**, the first user device **702** displays the identifier representation. For instance, the identifier representation is displayed on a display screen of the first user device **702** such that another device can detect the identifier representation.

At operation **716**, a second user device **704** detects the identifier from the identifier representation. For instance, the identifier representation comprises a QR code and a camera sensor of the second user device **704** detects and decodes the signal corresponding to the identifier representation being displayed on the first user device **702**.

At operation **718**, the second user device **704** provides an indication of the identifier to the personal identity system **160**. For instance, once the second user device **704** decodes the identifier representation to extract the identifier, the second user device **704** sends a request for the user-specified action corresponding with the identifier to the personal identity system **160**.

As described above in connection with FIG. **4**, at the operation **430**, the communication module **210** receives an indication of the identifier from the second user device **704**. At the operation **440**, the instruction module **240** identifies the user-specified action linked to the identifier (e.g., via a lookup).

In continuing with the discussion in connection with FIG. **7**A, FIG. **7**B shows additional operations. At operation **450**, the data module **250** accesses the data of the first user to be used when the user-specified action is performed.

At operation **720**, the first user device **702** provides data to the personal identity system **160**. In other embodiments, the data for the user-specified action is stored by the personal identity system **160** (e.g., stored in the database(s) **134**).

As described above in connection with FIG. **4**, at the operation **460**, the presentation module **220** or the instruction module **240** generates a user interface that includes an option to perform the user-specified action using the data of the first user. At the operation **470**, the presentation module **220** causes presentation of the generated user interface on the second user device **704**.

At operation **722**, the second user device **704** presents the generated user interface. The presentation of the generated user interface on the second user device **704** is an interactive presentation allowing the user of the second user device **704** to provide input, such as by selecting an option to perform the user-specified action.

At operation **724**, the second user device **704** receives a selection of an option to perform the user-specified action. In some instances, the second user device **704** receives multiple selections of options to perform multiple user-specified actions.

At operation **726**, the communication module **210** or the instruction module **240** receives an indication of the selection to perform the user-specified action. For instance, the second user device **704** sends a request to the personal identity system **160** to perform a particular user-specified action. In other embodiments, the user-specified action is performed locally on the second user device **704** without further communication with the personal identity system **160**.

At operation **728**, the instruction module **240** performs the selected action. In performing the selected action the instruction module **240** can cause the exchange of data between any of the first user device **702** at operation **730**, the second user device **704** at operation **732**, the personal identity system **160**, or a third party server (not shown).

FIG. **8** is a flow diagram illustrating further example operations for guided personal identity based actions. After the communication module **210** receives the user-specified action at the operation **410** and the configuration module **230** links the user-specified action to the identifier at the operation **420**, the additional example operations of FIG. **8** are performed in some example embodiments.

At operation **810**, the configuration module **230** generates a machine-readable visual representation (e.g., a QR code) that encodes the identifier. For instance, the configuration module **230** generates an image file that includes the machine-readable visual representation.

At operation **820**, the configuration module **230** transmits the generated machine-readable visual representation (e.g., an image file) to the first user device to be stored by the first user device and subsequently displayed on a user interface of the first user device. For example, the first user device

stores multiple machine-readable visual representations corresponding to different user-specified actions or sets of user-specified actions. The first user of the first user device can display a particular machine-readable visual representation when the first user desires another user to perform the user-specified actions corresponding to the particular machine-readable visual representation.

Similar to the operation **430** discusses above, at operation **830**, the communication module **210** receives the indication of the identifier in response to the second user device physically detecting in real time the identifier from the machine-readable visual representation being displayed on the first user device. For instance, the second user device scans a QR code being displayed by the first user device. Subsequently, the personal identity system **160** performs the operation **440** and subsequent operations of the example method **400** as discussed in connection with FIG. **4** above.

FIG. **9** is a user interface diagram **900** depicting an example user interface **910** for displaying a machine-readable visual representation **920** (e.g., a QR code) that encodes an identifier. In some embodiments, the machine-readable visual representation **920** includes text, an image, or an animation, such as element **930**, representative of the user-specified action associated with the machine-readable visual representation **920**. In an embodiment, multiple machine-readable visual representations are stored on a particular user device. In this embodiment, a user **940** can scroll through or otherwise navigate the multiple machine-readable visual representations via a touch-based gesture **950** (e.g., a swipe performed by sliding a finger or pointing instrument in a particular direction across a display).

The following discussion in connection with FIGS. **10** and **11** is again directed to configuration of a particular guided personal identity based action. FIG. **10** is a flow diagram illustrating further example operations for configuring guided personal identity based actions. Prior to the operations of the method **400** discussed above, the personal identity system **160** performs the operations of FIG. **10** in some example embodiments. At operation **1010**, the configuration module **230** or the presentation module **220** causes presentation of multiple action options on a user interface of the first user device. For instance, the personal identity system **160** can provide a user interface that includes predefined actions and includes fields for inputting data associated with the predefined actions.

In further embodiments, the configuration module **230** determines the action options to include in the user interface based on user data of the first user. For instance, the configuration module **230** can retrieve data indicating a particular social network service the first user is a member of from the user device, a third party server, or another source. Based on the data of the first user indicating the first user is a member of the particular social network service, the configuration module **230** determines a particular action option associated with the particular social network service and includes the particular action option in the user interface to be presented on the first user device.

At operation **1020**, the communication module **210** receives a selection of an action option from among the multiple action options. The first user, or another operator configuring a particular guided personal identity based action, can provide selections of action options along with data associated with the action option to configure the particular guided personal identity based action. Subsequently, at the operation **410**, the communication module **210** receives the user-specified action (e.g., the user-specified action indicated by the selection of the action option receive at the operation **1020**).

FIG. **11** is a user interface diagram **1100** depicting an example user interface **1110** for configuration of guided personal identity based actions. A user interface element **1120** allows the user to provide data associated with a particular action. In this example, the user can provide WI-FI® settings data for an action directed to establishing a WI-FI® connection (e.g., network login credentials). In further embodiments, the user can specify conditions or rules (discussed above in connection with FIG. **4**) for the action (e.g., a condition of being a contact of the user on a social network server prior performing the action). A user interface element **1130** allows the user to generate and save a QR code for the user-specified action configured using the user interface **1110**. A user interface element **1140** allows the user to share the QR code with other users (e.g., via a social messaging service communication, an email, or an SMS message). A user interface element **1150** provides the user an option to generate additional QR codes for additional user-specified actions.

The following discussion in connection with FIGS. **12-15** is directed to analytics associated with guided personal identity based actions. At the operation **430**, the communication module **210** receives the indication of the identifier from the second user device. Subsequently, the additional operations of FIGS. **12** and **13** are performed in some example embodiments as discussed below.

FIG. **12** is a flow diagram illustrating example operations for performing analytics in association with a particular identifier. At operation **1210**, the analytics module **260** updates an identifier metric corresponding to the identifier. The identifier metric may include an access count incremented each time an indication of the identifier is received. For instance, each time a QR code is scanned, the access count is incremented. In some embodiments, as further discussed in connection with FIG. **13**, contextual data associated with instances of a scan are stored and can be subsequently used for various analyses (e.g., scans from a particular country or region, scans during a particular time of day, scans from particular device types, or scans from users with particular demographics).

At operation **1220**, the presentation module **220** causes presentation of the identifier metric on a user interface of the first user device. The identifier metric or other metrics calculated by the analytics module **260** can be presented using a variety of visual and textual formats.

FIG. **13** is a flow diagram illustrating example operations for performing analytics in association with a particular identifier. In response to receiving the indication of the identifier from the second user device, at operation **1310**, the data module **250** retrieves context attributes from the second user device. For example, the context attributes comprise device type, device model, a time stamp, geolocation, or other sensor data of the second user device.

At operation **1320**, the data module **250** stores the context attributes in association with the identifier. For instance, the data module **250** can store the context attributes in the database(s) **134**.

At operation **1330**, the analytics module **260** identifies a characteristic corresponding to the identifier by analyzing the context attributes stored in association with the identifier. For instance, the analytics module **260** can identify a particular characteristic comprising a high density clustering of scans with a certain geolocation (e.g., many scans in a particular geographic vicinity). Such a characteristic can be of interest to the user who configured the scan. In some

embodiments, the first user can specify rules or conditions based on the characteristics associated with analytics generated by the analytics module **260**. For example, once a particular number of scans within a certain geographic boundary is exceeded, the user-specified action is no longer available to users within the geographic boundary.

At operation **1340**, the presentation module **220** causes presentation of the characteristic on a user interface of the first user device. The presentation module **220** can generate a variety of text, graphics, images, and animations for presentation of the characteristic.

FIG. **14** is a user interface diagram **1400** depicting an example user interface **1410** for displaying a various analytics generated by the analytics module **260**. In this example, the user interface **1410** is displaying scan history data, such as history data **1420**, over time. The scan history data can include a variety of information such as a count of scans for a particular identifier for a particular date and platform.

FIG. **15** is a user interface diagram **1500** depicting an example user interface **1510** for displaying various analytics generated by the analytics module **260**. In this example, the user interface **1510** is displaying geolocation data associated with scans, such as geolocation data **1520** (e.g., latitude, longitude, altitude, and time stamp), for a particular time period.

Modules, Components, and Logic

Certain embodiments are described herein as including logic or a number of components, modules, or mechanisms. Modules can constitute either software modules (e.g., code embodied on a machine-readable medium or in a transmission signal) or hardware modules. A "hardware module" is a tangible unit capable of performing certain operations and can be configured or arranged in a certain physical manner. In various example embodiments, one or more computer systems (e.g., a standalone computer system, a client computer system, or a server computer system) or one or more hardware modules of a computer system (e.g., a processor or a group of processors) is configured by software (e.g., an application or application portion) as a hardware module that operates to perform certain operations as described herein.

In some embodiments, a hardware module is implemented mechanically, electronically, or any suitable combination thereof. For example, a hardware module can include dedicated circuitry or logic that is permanently configured to perform certain operations. For example, a hardware module can be a special-purpose processor, such as a Field-Programmable Gate Array (FPGA) or an Application Specific Integrated Circuit (ASIC). A hardware module may also include programmable logic or circuitry that is temporarily configured by software to perform certain operations. For example, a hardware module can include software encompassed within a general-purpose processor or other programmable processor. It will be appreciated that the decision to implement a hardware module mechanically, in dedicated and permanently configured circuitry, or in temporarily configured circuitry (e.g., configured by software) can be driven by cost and time considerations.

Accordingly, the phrase "hardware module" should be understood to encompass a tangible entity, be that an entity that is physically constructed, permanently configured (e.g., hardwired), or temporarily configured (e.g., programmed) to operate in a certain manner or to perform certain operations described herein. As used herein, "hardware-implemented module" refers to a hardware module. Considering embodiments in which hardware modules are temporarily configured (e.g., programmed), each of the hardware modules need not be configured or instantiated at any one instance in time. For example, where a hardware module comprises a general-purpose processor configured by software to become a special-purpose processor, the general-purpose processor may be configured as respectively different special-purpose processors (e.g., comprising different hardware modules) at different times. Software can accordingly configure a particular processor or processors, for example, to constitute a particular hardware module at one instance of time and to constitute a different hardware module at a different instance of time.

Hardware modules can provide information to, and receive information from, other hardware modules. Accordingly, the described hardware modules can be regarded as being communicatively coupled. Where multiple hardware modules exist contemporaneously, communications can be achieved through signal transmission (e.g., over appropriate circuits and buses) between or among two or more of the hardware modules. In embodiments in which multiple hardware modules are configured or instantiated at different times, communications between such hardware modules may be achieved, for example, through the storage and retrieval of information in memory structures to which the multiple hardware modules have access. For example, one hardware module performs an operation and stores the output of that operation in a memory device to which it is communicatively coupled. A further hardware module can then, at a later time, access the memory device to retrieve and process the stored output. Hardware modules can also initiate communications with input or output devices, and can operate on a resource (e.g., a collection of information).

The various operations of example methods described herein can be performed, at least partially, by one or more processors that are temporarily configured (e.g., by software) or permanently configured to perform the relevant operations. Whether temporarily or permanently configured, such processors constitute processor-implemented modules that operate to perform one or more operations or functions described herein. As used herein, "processor-implemented module" refers to a hardware module implemented using one or more processors.

Similarly, the methods described herein can be at least partially processor-implemented, with a particular processor or processors being an example of hardware. For example, at least some of the operations of a method can be performed by one or more processors or processor-implemented modules. Moreover, the one or more processors may also operate to support performance of the relevant operations in a "cloud computing" environment or as a "software as a service" (SaaS). For example, at least some of the operations may be performed by a group of computers (as examples of machines including processors), with these operations being accessible via a network (e.g., the Internet) and via one or more appropriate interfaces (e.g., an Application Program Interface (API)).

The performance of certain of the operations may be distributed among the processors, not only residing within a single machine, but deployed across a number of machines. In some example embodiments, the processors or processor-implemented modules are located in a single geographic location (e.g., within a home environment, an office environment, or a server farm). In other example embodiments, the processors or processor-implemented modules are distributed across a number of geographic locations.

Applications

FIG. **16** illustrates an example mobile device **1600** executing a mobile operating system (e.g., IOS™, ANDROID™, WINDOWS® Phone, or other mobile operating systems), consistent with some embodiments. In one embodiment, the mobile device **1600** includes a touch screen operable to receive tactile data from a user **1602**. For instance, the user **1602** may physically touch **1604** the mobile device **1600**, and in response to the touch **1604**, the mobile device **1600** may determine tactile data such as touch location, touch force, or gesture motion. In various example embodiments, the mobile device **1600** displays a home screen **1606** (e.g., Springboard on IOS™) operable to launch applications or otherwise manage various aspects of the mobile device **1600**. In some example embodiments, the home screen **1606** provides status information such as battery life, connectivity, or other hardware statuses. The user **1602** can activate user interface elements by touching an area occupied by a respective user interface element. In this manner, the user **1602** interacts with the applications of the mobile device **1600**. For example, touching the area occupied by a particular icon included in the home screen **1606** causes launching of an application corresponding to the particular icon.

Many varieties of applications (also referred to as "apps") can be executed on the mobile device **1600**, such as native applications (e.g., applications programmed in Objective-C, Swift, or another suitable language running on IOS™, or applications programmed in Java running on ANDROID™), mobile web applications (e.g., applications written in Hypertext Markup Language-5 (HTML5)), or hybrid applications (e.g., a native shell application that launches an HTML5 session). For example, the mobile device **1600** includes a messaging app, an audio recording app, a camera app, a book reader app, a media app, a fitness app, a file management app, a location app, a browser app, a settings app, a contacts app, a telephone call app, or other apps (e.g., gaming apps, social networking apps, biometric monitoring apps). In another example, the mobile device **1600** includes a social messaging app **1608** such as SNAPCHAT® that, consistent with some embodiments, allows users to exchange ephemeral messages that include media content. In this example, the social messaging app **1608** can incorporate aspects of embodiments described herein.

Software Architecture

FIG. **17** is a block diagram **1700** illustrating an architecture of software **1702**, which can be installed on any one or more of the devices described above. FIG. **17** is merely a non-limiting example of a software architecture, and it will be appreciated that many other architectures can be implemented to facilitate the functionality described herein. In various embodiments, the software **1702** is implemented by hardware such as a machine **1800** of FIG. **18** that includes processors **1810**, memory **1830**, and I/O components **1850**. In this example architecture, the software **1702** can be conceptualized as a stack of layers where each layer may provide a particular functionality. For example, the software **1702** includes layers such as an operating system **1704**, libraries **1706**, frameworks **1708**, and applications **1710**. Operationally, the applications **1710** invoke application programming interface (API) calls **1712** through the software stack and receive messages **1714** in response to the API calls **1712**, consistent with some embodiments.

In various implementations, the operating system **1704** manages hardware resources and provides common services. The operating system **1704** includes, for example, a kernel **1720**, services **1722**, and drivers **1724**. The kernel **1720** acts as an abstraction layer between the hardware and the other software layers consistent with some embodiments. For example, the kernel **1720** provides memory management, processor management (e.g., scheduling), component management, networking, and security settings, among other functionality. The services **1722** can provide other common services for the other software layers. The drivers **1724** are responsible for controlling or interfacing with the underlying hardware, according to some embodiments. For instance, the drivers **1724** can include display drivers, camera drivers, BLUETOOTH® drivers, flash memory drivers, serial communication drivers (e.g., Universal Serial Bus (USB) drivers), WI-FI® drivers, audio drivers, power management drivers, and so forth.

In some embodiments, the libraries **1706** provide a low-level common infrastructure utilized by the applications **1710**. The libraries **1706** can include system libraries **1730** (e.g., C standard library) that can provide functions such as memory allocation functions, string manipulation functions, mathematic functions, and the like. In addition, the libraries **1706** can include API libraries **1732** such as media libraries (e.g., libraries to support presentation and manipulation of various media formats such as Moving Picture Experts Group-4 (MPEG4), Advanced Video Coding (H.264 or AVC), Moving Picture Experts Group Layer-3 (MP3), Advanced Audio Coding (AAC), Adaptive Multi-Rate (AMR) audio codec, Joint Photographic Experts Group (JPEG or JPG), or Portable Network Graphics (PNG)), graphics libraries (e.g., an OpenGL framework used to render in two dimensions (2D) and three dimensions (3D) in a graphic context on a display), database libraries (e.g., SQLite to provide various relational database functions), web libraries (e.g., WebKit to provide web browsing functionality), and the like. The libraries **1706** can also include a wide variety of other libraries **1734** to provide many other APIs to the applications **1710**.

The frameworks **1708** provide a high-level common infrastructure that can be utilized by the applications **1710**, according to some embodiments. For example, the frameworks **1708** provide various graphic user interface (GUI) functions, high-level resource management, high-level location services, and so forth. The frameworks **1708** can provide a broad spectrum of other APIs that can be utilized by the applications **1710**, some of which may be specific to a particular operating system or platform.

In an example embodiment, the applications **1710** include a home application **1750**, a contacts application **1752**, a browser application **1754**, a book reader application **1756**, a location application **1758**, a media application **1760**, a messaging application **1762**, a game application **1764**, and a broad assortment of other applications such as a third party application **1766**. According to some embodiments, the applications **1710** are programs that execute functions defined in the programs. Various programming languages can be employed to create one or more of the applications **1710**, structured in a variety of manners, such as object-oriented programming languages (e.g., Objective-C, Java, or C++) or procedural programming languages (e.g., C or assembly language). In a specific example, the third party application **1766** (e.g., an application developed using the ANDROID™ or IOS™ software development kit (SDK) by an entity other than the vendor of the particular platform) may be mobile software running on a mobile operating system such as IOS™, ANDROID™, WINDOWS® PHONE, or another mobile operating system. In this example, the third party application **1766** can invoke the API

calls **1712** provided by the operating system **1704** to facilitate functionality described herein.

Example Machine Architecture and Machine-Readable Medium

FIG. **18** is a block diagram illustrating components of a machine **1800**, according to some embodiments, able to read instructions from a machine-readable medium (e.g., a machine-readable storage medium) and perform any one or more of the methodologies discussed herein. Specifically, FIG. **18** shows a diagrammatic representation of the machine **1800** in the example form of a computer system, within which instructions **1816** (e.g., software, a program, an application, an applet, an app, or other executable code) for causing the machine **1800** to perform any one or more of the methodologies discussed herein can be executed. In alternative embodiments, the machine **1800** operates as a standalone device or can be coupled (e.g., networked) to other machines. In a networked deployment, the machine **1800** may operate in the capacity of a server machine or a client machine in a server-client network environment, or as a peer machine in a peer-to-peer (or distributed) network environment. The machine **1800** can comprise, but not be limited to, a server computer, a client computer, a personal computer (PC), a tablet computer, a laptop computer, a netbook, a set-top box (STB), a personal digital assistant (PDA), an entertainment media system, a cellular telephone, a smart phone, a mobile device, a wearable device (e.g., a smart watch), a smart home device (e.g., a smart appliance), other smart devices, a web appliance, a network router, a network switch, a network bridge, or any machine capable of executing the instructions **1816**, sequentially or otherwise, that specify actions to be taken by the machine **1800**. Further, while only a single machine **1800** is illustrated, the term "machine" shall also be taken to include a collection of machines **1800** that individually or jointly execute the instructions **1816** to perform any one or more of the methodologies discussed herein.

In various embodiments, the machine **1800** comprises processors **1810**, memory **1830**, and I/O components **1850**, which can be configured to communicate with each other via a bus **1802**. In an example embodiment, the processors **1810** (e.g., a Central Processing Unit (CPU), a Reduced Instruction Set Computing (RISC) processor, a Complex Instruction Set Computing (CISC) processor, a Graphics Processing Unit (GPU), a Digital Signal Processor (DSP), an Application Specific Integrated Circuit (ASIC), a Radio-Frequency Integrated Circuit (RFIC), another processor, or any suitable combination thereof) include, for example, a processor **1812** and a processor **1814** that may execute the instructions **1816**. The term "processor" is intended to include multi-core processors that may comprise two or more independent processors (also referred to as "cores") that can execute instructions contemporaneously. Although FIG. **18** shows multiple processors, the machine **1800** may include a single processor with a single core, a single processor with multiple cores (e.g., a multi-core processor), multiple processors with a single core, multiple processors with multiples cores, or any combination thereof.

The memory **1830** comprises a main memory **1832**, a static memory **1834**, and a storage unit **1836** accessible to the processors **1810** via the bus **1802**, according to some embodiments. The storage unit **1836** can include a machine-readable medium **1838** on which are stored the instructions **1816** embodying any one or more of the methodologies or functions described herein. The instructions **1816** can also reside, completely or at least partially, within the main memory **1832**, within the static memory **1834**, within at least one of the processors **1810** (e.g., within the processor's cache memory), or any suitable combination thereof, during execution thereof by the machine **1800**. Accordingly, in various embodiments, the main memory **1832**, the static memory **1834**, and the processors **1810** are considered machine-readable media **1838**.

As used herein, the term "memory" refers to a machine-readable medium **1838** able to store data temporarily or permanently and may be taken to include, but not be limited to, random-access memory (RAM), read-only memory (ROM), buffer memory, flash memory, and cache memory. While the machine-readable medium **1838** is shown in an example embodiment to be a single medium, the term "machine-readable medium" should be taken to include a single medium or multiple media (e.g., a centralized or distributed database, or associated caches and servers) able to store the instructions **1816**. The term "machine-readable medium" shall also be taken to include any medium, or combination of multiple media, that is capable of storing instructions (e.g., instructions **1816**) for execution by a machine (e.g., machine **1800**), such that the instructions, when executed by one or more processors of the machine **1800** (e.g., processors **1810**), cause the machine **1800** to perform any one or more of the methodologies described herein. Accordingly, a "machine-readable medium" refers to a single storage apparatus or device, as well as "cloud-based" storage systems or storage networks that include multiple storage apparatus or devices. The term "machine-readable medium" shall accordingly be taken to include, but not be limited to, one or more data repositories in the form of a solid-state memory (e.g., flash memory), an optical medium, a magnetic medium, other non-volatile memory (e.g., Erasable Programmable Read-Only Memory (EPROM)), or any suitable combination thereof. The term "machine-readable medium" specifically excludes non-statutory signals per se.

The I/O components **1850** include a wide variety of components to receive input, provide output, produce output, transmit information, exchange information, capture measurements, and so on. In general, it will be appreciated that the I/O components **1850** can include many other components that are not shown in FIG. **18**. The I/O components **1850** are grouped according to functionality merely for simplifying the following discussion, and the grouping is in no way limiting. In various example embodiments, the I/O components **1850** include output components **1852** and input components **1854**. The output components **1852** include visual components (e.g., a display such as a plasma display panel (PDP), a light emitting diode (LED) display, a liquid crystal display (LCD), a projector, or a cathode ray tube (CRT)), acoustic components (e.g., speakers), haptic components (e.g., a vibratory motor), other signal generators, and so forth. The input components **1854** include alphanumeric input components (e.g., a keyboard, a touch screen configured to receive alphanumeric input, a photo-optical keyboard, or other alphanumeric input components), point based input components (e.g., a mouse, a touchpad, a trackball, a joystick, a motion sensor, or other pointing instruments), tactile input components (e.g., a physical button, a touch screen that provides location and force of touches or touch gestures, or other tactile input components), audio input components (e.g., a microphone), and the like.

In some further example embodiments, the I/O components **1850** include biometric components **1856**, motion components **1858**, environmental components **1860**, or position components **1862**, among a wide array of other com-

ponents. For example, the biometric components **1856** include components to detect expressions (e.g., hand expressions, facial expressions, vocal expressions, body gestures, or eye tracking), measure biosignals (e.g., blood pressure, heart rate, body temperature, perspiration, or brain waves), identify a person (e.g., voice identification, retinal identification, facial identification, fingerprint identification, or electroencephalogram based identification), and the like. The motion components **1858** include acceleration sensor components (e.g., an accelerometer), gravitation sensor components, rotation sensor components (e.g., a gyroscope), and so forth. The environmental components **1860** include, for example, illumination sensor components (e.g., a photometer), temperature sensor components (e.g., one or more thermometers that detect ambient temperature), humidity sensor components, pressure sensor components (e.g., a barometer), acoustic sensor components (e.g., one or more microphones that detect background noise), proximity sensor components (e.g., infrared sensors that detect nearby objects), gas sensor components (e.g., machine olfaction detection sensors, gas detection sensors to detect concentrations of hazardous gases for safety or to measure pollutants in the atmosphere), or other components that may provide indications, measurements, or signals corresponding to a surrounding physical environment. The position components **1862** include location sensor components (e.g., a Global Positioning System (GPS) receiver component), altitude sensor components (e.g., altimeters or barometers that detect air pressure from which altitude may be derived), orientation sensor components (e.g., magnetometers), and the like.

Communication can be implemented using a wide variety of technologies. The I/O components **1850** may include communication components **1864** operable to couple the machine **1800** to a network **1880** or devices **1870** via a coupling **1882** and a coupling **1872**, respectively. For example, the communication components **1864** include a network interface component or another suitable device to interface with the network **1880**. In further examples, communication components **1864** include wired communication components, wireless communication components, cellular communication components, Near Field Communication (NFC) components, BLUETOOTH® components (e.g., BLUETOOTH® Low Energy), WI-FI® components, and other communication components to provide communication via other modalities. The devices **1870** may be another machine or any of a wide variety of peripheral devices (e.g., a peripheral device coupled via a Universal Serial Bus (USB)).

Moreover, in some embodiments, the communication components **1864** detect identifiers or include components operable to detect identifiers. For example, the communication components **1864** include Radio Frequency Identification (RFID) tag reader components, NFC smart tag detection components, optical reader components (e.g., an optical sensor to detect one-dimensional bar codes such as a Universal Product Code (UPC) bar code, multi-dimensional bar codes such as a Quick Response (QR) code, Aztec Code, Data Matrix, Dataglyph, MaxiCode, PDF417, Ultra Code, Uniform Commercial Code Reduced Space Symbology (UCC RSS)-2D bar codes, and other optical codes), acoustic detection components (e.g., microphones to identify tagged audio signals), or any suitable combination thereof. In addition, a variety of information can be derived via the communication components **1864**, such as location via Internet Protocol (IP) geolocation, location via WI-FI® signal triangulation, location via detecting a BLUETOOTH® or NFC beacon signal that may indicate a particular location, and so forth.

Transmission Medium

In various example embodiments, one or more portions of the network **1880** can be an ad hoc network, an intranet, an extranet, a virtual private network (VPN), a local area network (LAN), a wireless LAN (WLAN), a wide area network (WAN), a wireless WAN (WWAN), a metropolitan area network (MAN), the Internet, a portion of the Internet, a portion of the Public Switched Telephone Network (PSTN), a plain old telephone service (POTS) network, a cellular telephone network, a wireless network, a WI-FI® network, another type of network, or a combination of two or more such networks. For example, the network **1880** or a portion of the network **1880** may include a wireless or cellular network, and the coupling **1882** may be a Code Division Multiple Access (CDMA) connection, a Global System for Mobile communications (GSM) connection, or another type of cellular or wireless coupling. In this example, the coupling **1882** can implement any of a variety of types of data transfer technology, such as Single Carrier Radio Transmission Technology (1×RTT), Evolution-Data Optimized (EVDO) technology, General Packet Radio Service (GPRS) technology, Enhanced Data rates for GSM Evolution (EDGE) technology, third Generation Partnership Project (3GPP) including 3G, fourth generation wireless (4G) networks, Universal Mobile Telecommunications System (UMTS), High Speed Packet Access (HSPA), Worldwide Interoperability for Microwave Access (WiMAX), Long Term Evolution (LTE) standard, others defined by various standard-setting organizations, other long range protocols, or other data transfer technology.

In example embodiments, the instructions **1816** are transmitted or received over the network **1880** using a transmission medium via a network interface device (e.g., a network interface component included in the communication components **1864**) and utilizing any one of a number of well-known transfer protocols (e.g., Hypertext Transfer Protocol (HTTP)). Similarly, in other example embodiments, the instructions **1816** are transmitted or received using a transmission medium via the coupling **1872** (e.g., a peer-to-peer coupling) to the devices **1870**. The term "transmission medium" shall be taken to include any intangible medium that is capable of storing, encoding, or carrying the instructions **1816** for execution by the machine **1800**, and includes digital or analog communications signals or other intangible media to facilitate communication of such software.

Furthermore, the machine-readable medium **1838** is non-transitory (in other words, not having any transitory signals) in that it does not embody a propagating signal. However, labeling the machine-readable medium **1838** "non-transitory" should not be construed to mean that the medium is incapable of movement; the medium should be considered as being transportable from one physical location to another. Additionally, since the machine-readable medium **1838** is tangible, the medium may be considered to be a machine-readable device.

Language

Throughout this specification, plural instances may implement components, operations, or structures described as a single instance. Although individual operations of one or more methods are illustrated and described as separate operations, one or more of the individual operations may be performed concurrently, and nothing requires that the operations be performed in the order illustrated. Structures and functionality presented as separate components in example configurations may be implemented as a combined structure

or component. Similarly, structures and functionality presented as a single component may be implemented as separate components. These and other variations, modifications, additions, and improvements fall within the scope of the subject matter herein.

Although an overview of the inventive subject matter has been described with reference to specific example embodiments, various modifications and changes may be made to these embodiments without departing from the broader scope of embodiments of the present disclosure. Such embodiments of the inventive subject matter may be referred to herein, individually or collectively, by the term "invention" merely for convenience and without intending to voluntarily limit the scope of this application to any single disclosure or inventive concept if more than one is, in fact, disclosed.

The embodiments illustrated herein are described in sufficient detail to enable those skilled in the art to practice the teachings disclosed. Other embodiments may be used and derived therefrom, such that structural and logical substitutions and changes may be made without departing from the scope of this disclosure. The Detailed Description, therefore, is not to be taken in a limiting sense, and the scope of various embodiments is defined only by the appended claims, along with the full range of equivalents to which such claims are entitled.

As used herein, the term "or" may be construed in either an inclusive or exclusive sense. Moreover, plural instances may be provided for resources, operations, or structures described herein as a single instance. Additionally, boundaries between various resources, operations, modules, engines, and data stores are somewhat arbitrary, and particular operations are illustrated in a context of specific illustrative configurations. Other allocations of functionality are envisioned and may fall within a scope of various embodiments of the present disclosure. In general, structures and functionality presented as separate resources in the example configurations may be implemented as a combined structure or resource. Similarly, structures and functionality presented as a single resource may be implemented as separate resources. These and other variations, modifications, additions, and improvements fall within a scope of embodiments of the present disclosure as represented by the appended claims. The specification and drawings are, accordingly, to be regarded in an illustrative rather than a restrictive sense.

What is claimed is:

1. A system comprising:

hardware processing circuitry configured to perform operations comprising:

receiving an action from a first device of a first user;

generating a machine-readable code that visually represents an identifier of the action and includes a graphical element representing the action;

causing presentation of the machine-readable code on the first device;

determining that a second device of a second user has interacted with the machine-readable code presented on the first device; and

in response to determining that the second device has interacted with the machine-readable code presented on the first device:

analyzing one or more preferences of the second user to determine that the second user frequently uses a particular application;

in response to determining that the second user frequently uses the particular application based on the one or more preferences, identifying a particular user-specified action from among multiple user-specified actions associated with the particular application;

generating a user interface on the second device to include an additional option to perform the particular user-specified action; and

emphasizing a first of one or more options presented in the user interface over a second option of the one or more options based on a device type or device model of the second device.

2. The system of claim **1**, the operations comprising:

presenting, in the user interface, an option to automatically include a current location of the second device in a message transmitted to the first device; and

disabling one or more options presented in the user interface to make one or more options unavailable to the second user based on a device type or device model of the second device.

3. The system of claim **1**, wherein the operations further comprise:

causing the machine-readable code to be presented on the first device in response to detecting a swipe gesture along a particular direction across a display of the first device that navigates through multiple machine-readable codes.

4. The system of claim **1**, wherein the operations further comprise:

determining a device type or device model of the second device.

5. The system of claim **4**, wherein the operations further comprise:

emphasizing a first of one or more options presented in the user interface over a second option of the one or more options based on the device type or device model of the second device.

6. The system of claim **1**, wherein the operations further comprise:

updating a metric corresponding to the machine-readable code in response to determining that the second device of the second user has interacted with the machine-readable code presented on the first device; and

causing the metric to be presented on the first device of the first user.

7. The system of claim **1**, wherein the particular user-specified action comprises multiple user-specified actions received from the first device, each of the multiple user-specified actions pertains to the first user and uses data of the first user when performed, the operations further comprising identifying the first user and the second user on a social network and forming a relationship between the first user and the second user on the social network in response to determining based on the data that the first user and the second user are not connected on the social network.

8. The system of claim **1**, wherein the operations further comprise:

generating a metric that includes an access count incremented each time an interaction with the machine-readable code is detected.

9. The system of claim **1**, wherein the operations further comprise:

associating contextual data with each instance of an interaction with the machine-readable code, the contextual data comprising a representation of a geographical location from which the interaction is detected, a time of day during which the interaction is detected, or a device type used to interact with the machine-readable code.

10. The system of claim 1, wherein the operations further comprise:

identifying a characteristic corresponding to the identifier by analyzing contextual data associated with each instance of an interaction with the machine-readable code; and

causing presentation of the identified characteristic on the first device of the first user.

11. The system of claim 1, wherein the operations further comprise:

identifying a density of clusterings of scans within a certain geolocation based on contextual data comprising a representation of a geographical location from which an interaction with the machine-readable code is detected;

based on the density, determining that a number of scans within the certain geolocation has reached a threshold; and

in response to determining that the number of scans within the certain geolocation has reached a threshold, disabling performance of the action in the certain geolocation.

12. The system of claim 1, wherein the operations further comprise displaying a geographical location from which an interaction with the machine-readable code is detected including a latitude, longitude, altitude and time stamp for a particular time period on the first device of the first user.

13. A method comprising:

receiving an action from a first device of a first user;

generating a machine-readable code that visually represents an identifier of the action and includes a graphical element representing the action;

causing presentation of the machine-readable code on the first device;

determining that a second device of a second user has interacted with the machine-readable code presented on the first device; and

in response to determining that the second device has interacted with the machine-readable code presented on the first device:

in response to determining that the second device has interacted with the machine-readable code presented on the first device:

analyzing one or more preferences of the second user to determine that the second user frequently uses a particular application;

in response to determining that the second user frequently uses the particular application based on the one or more preferences, identifying a particular user-specified action from among multiple user-specified actions associated with the particular application;

generating a user interface on the second device to include an additional option to perform the particular user-specified action; and

emphasizing a first of one or more options presented in the user interface over a second option of the one or more options based on a device type or device model of the second device.

14. A non-transitory computer readable storage medium comprising instructions that when executed by hardware processing circuitry cause the hardware processing circuitry to perform operations, the operations comprising:

receiving an action from a first device of a first user;

generating a machine-readable code that visually represents an identifier of the action and includes a graphical element representing the action;

causing presentation of the machine-readable code on the first device;

determining that a second device of a second user has interacted with the machine-readable code presented on the first device; and

in response to determining that the second device has interacted with the machine-readable code presented on the first device:

analyzing one or more preferences of the second user to determine that the second user frequently uses a particular application;

in response to determining that the second user frequently uses the particular application based on the one or more preferences, identifying a particular user-specified action from among multiple user-specified actions associated with the particular application;

generating a user interface on the second device to include an additional option to perform the particular user-specified action; and

emphasizing a first of one or more options presented in the user interface over a second option of the one or more options based on a device type or device model of the second device.

15. The non-transitory computer readable storage medium of claim 14, wherein the operations further comprise:

presenting, in the user interface, an option to automatically include a current location of the second device in a message transmitted to the first device; and

disabling one or more options presented in the user interface to make one or more options unavailable to the second user based on a device type or device model of the second device.

16. The non-transitory computer readable storage medium of claim 14, wherein the operations further comprise:

disabling one or more options presented in the user interface to make one or more options unavailable to the second user based on a device type or device model of the second device.

17. The non-transitory computer readable storage medium of claim 14, wherein the operations further comprise:

presenting, in the user interface, an option to automatically include a current location of the second device in a message transmitted to the first device.

18. The non-transitory computer readable storage medium of claim 14, wherein the operations further comprise:

updating a metric corresponding to the machine-readable code in response to determining that the second device of the second user has interacted with the machine-readable code presented on the first device; and

causing the metric to be presented on the first device of the first user.

19. The non-transitory computer readable storage medium of claim 14, wherein the particular user-specified action comprises multiple user-specified actions received from the first device, each of the multiple user-specified actions pertains to the first user and uses data of the first user when performed, the operations further comprising identifying the first user and the second user on a social network and forming a relationship between the first user and the second user on the social network in response to determining based on the data that the first user and the second user are not connected on the social network.

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