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(54) **GENERATING ADVERTISEMENTS BASED ON PROXIMATE COMPUTING DEVICES**

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(60) Provisional application No. 62/170,044, filed on Jun. 2, 2015.

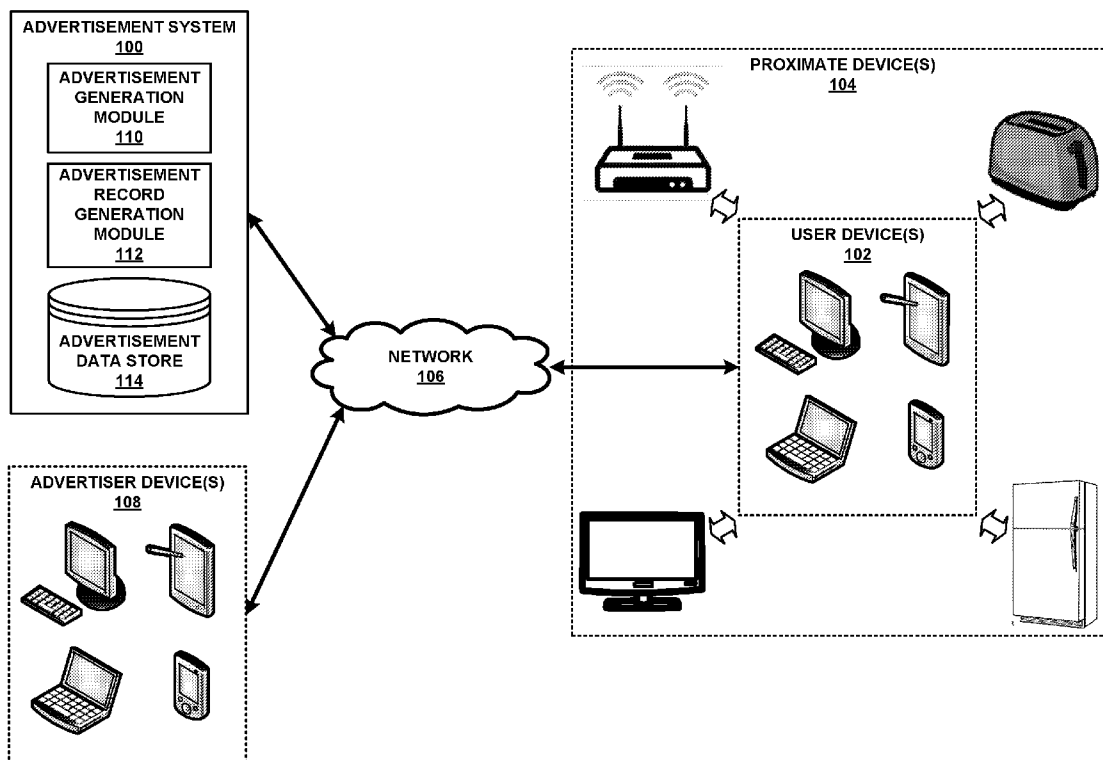
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(57) **ABSTRACT**

Techniques include identifying one or more proximate devices (e.g., networked computing devices, or networked appliances) that are located proximate to a user device (e.g., a mobile computing device, such as a smartphone, or a tablet) using a local wireless network (e.g., Wi-Fi, Bluetooth, or NFC). The techniques further include generating one or more advertisements (ads) based on the identified proximate devices, based on one or more device types (e.g., categories) associated with the devices, and/or based on one or more states of the devices. In some examples, the techniques include transmitting an indication of the identified proximate devices, their types, and/or their states to an ad system and receiving the ads from the system in response to transmitting the indication. The techniques also include displaying the ads to a user at the user device (e.g., within a software application executing on the device).



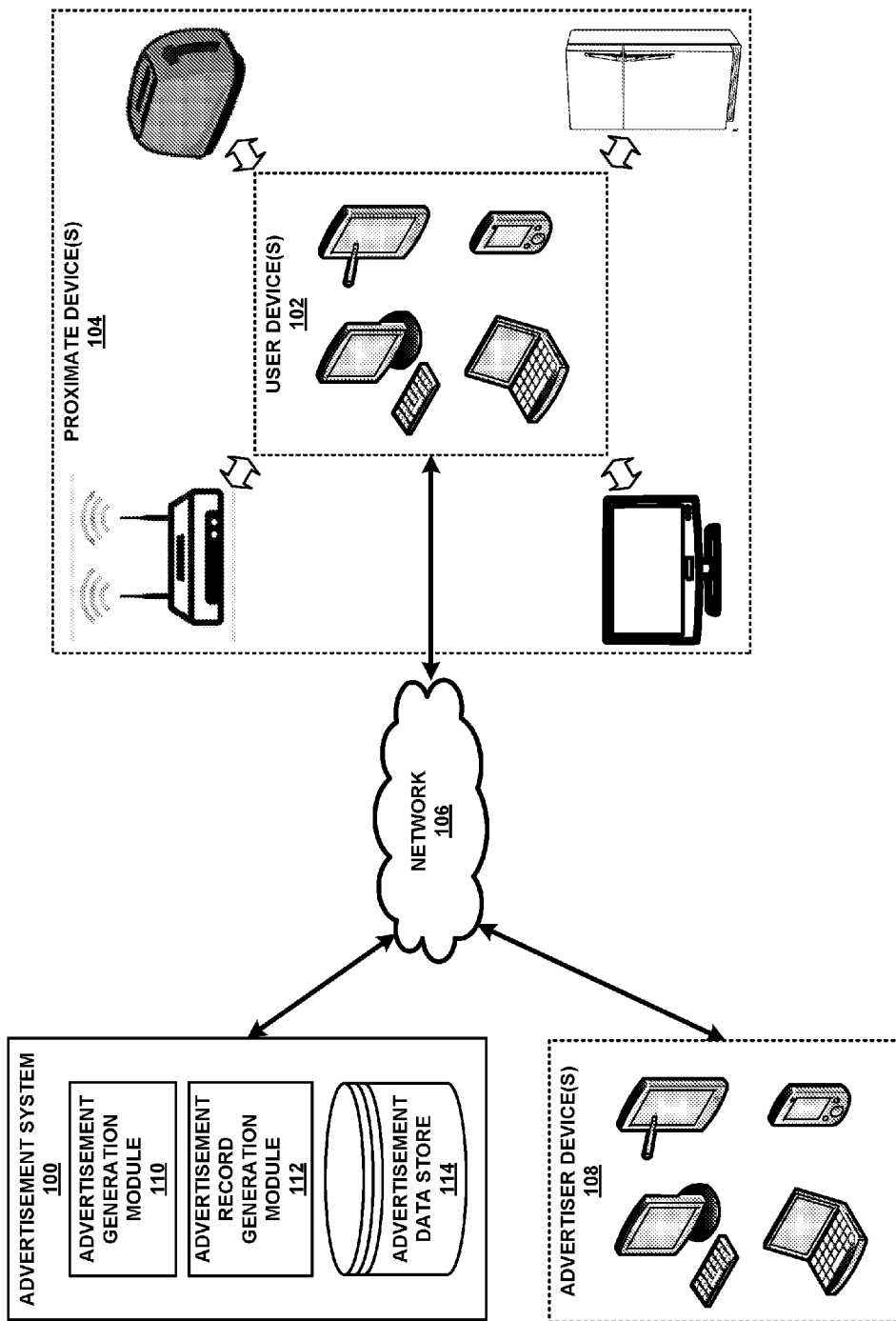


FIG. 1

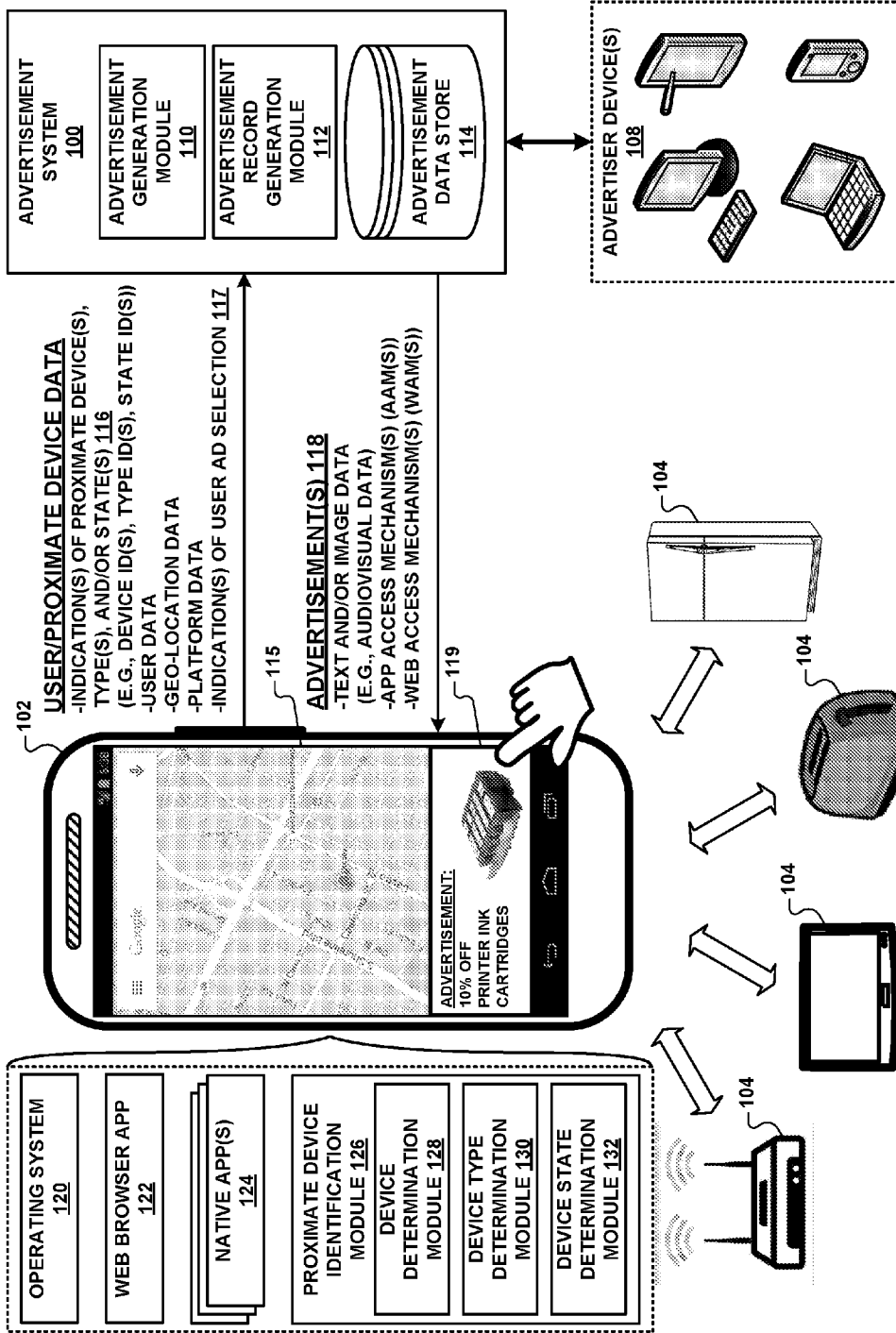


FIG. 2

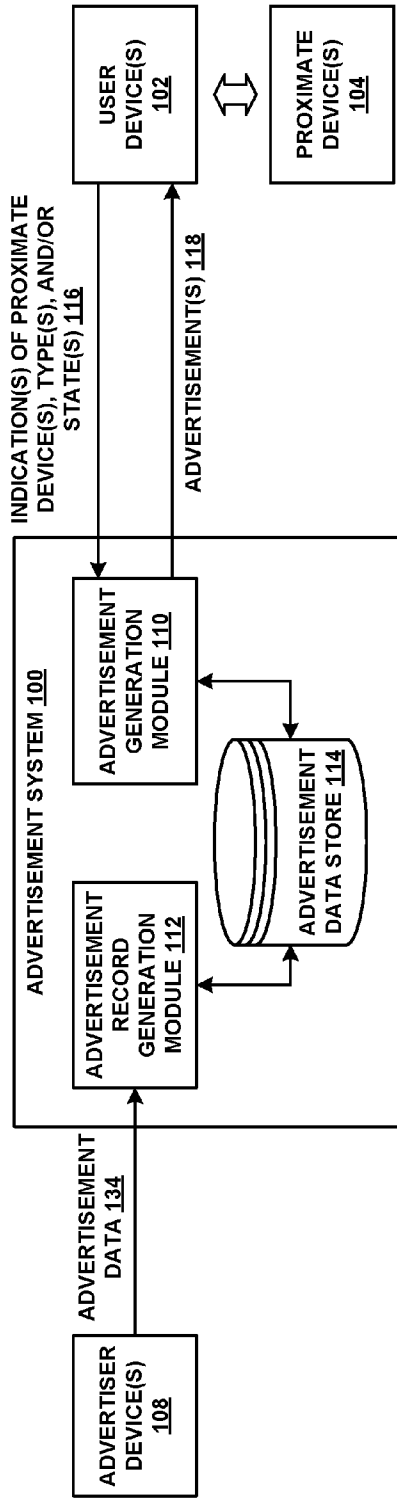


FIG. 3A

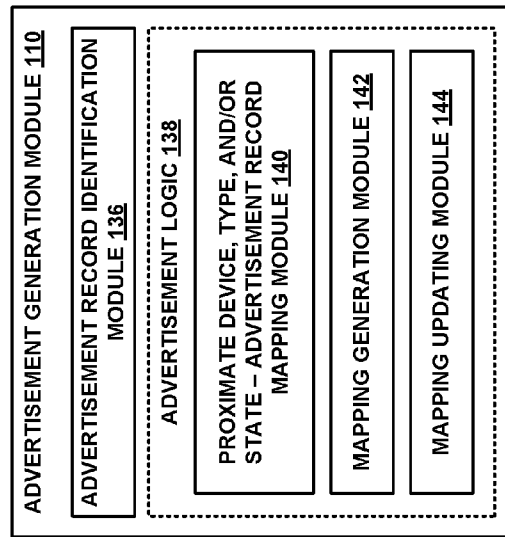


FIG. 3B

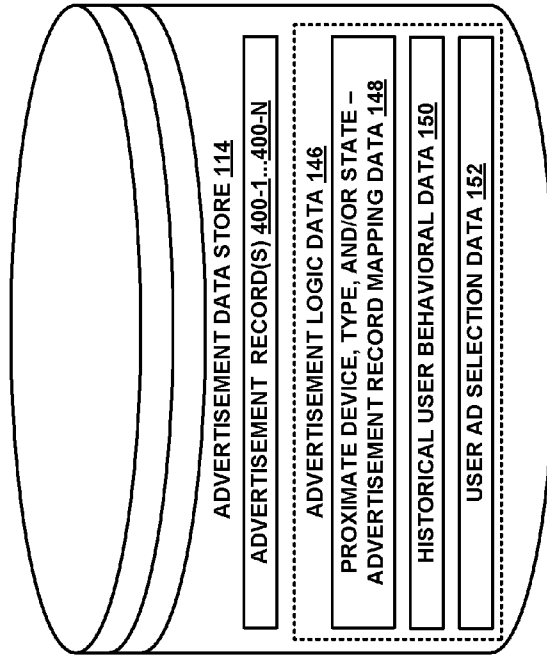
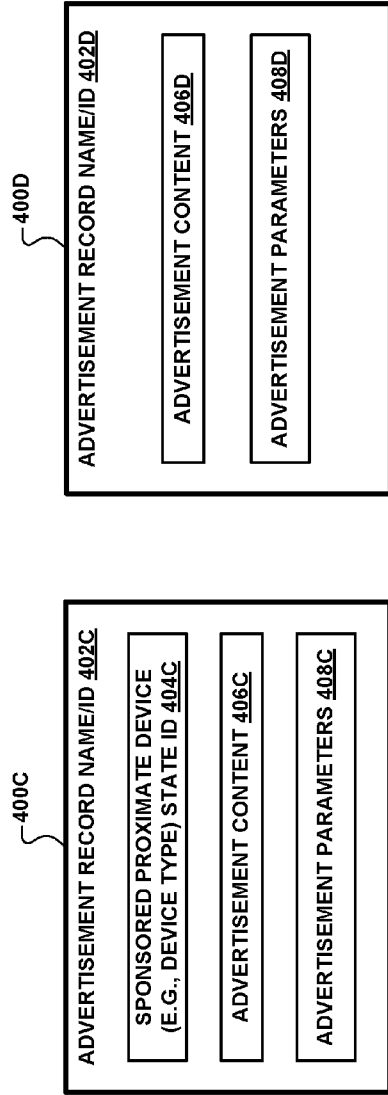
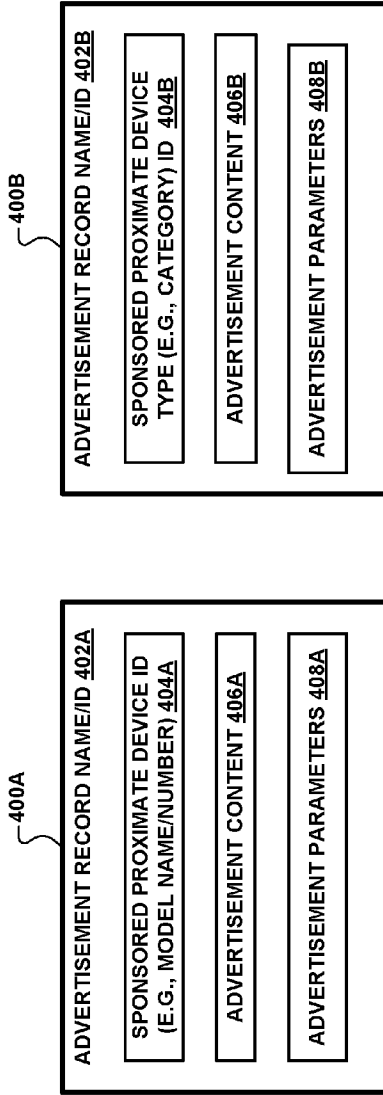


FIG. 3C



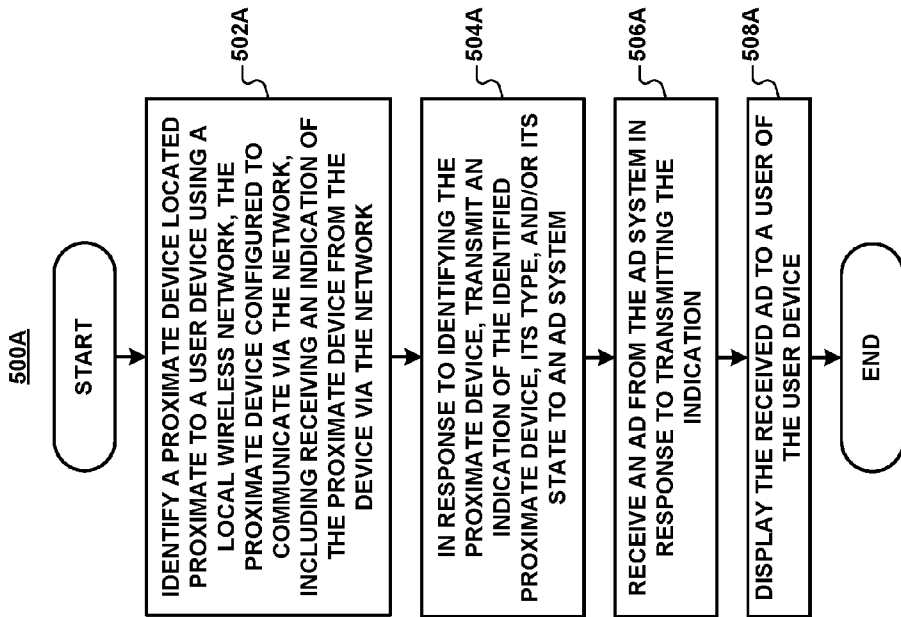


FIG. 5A

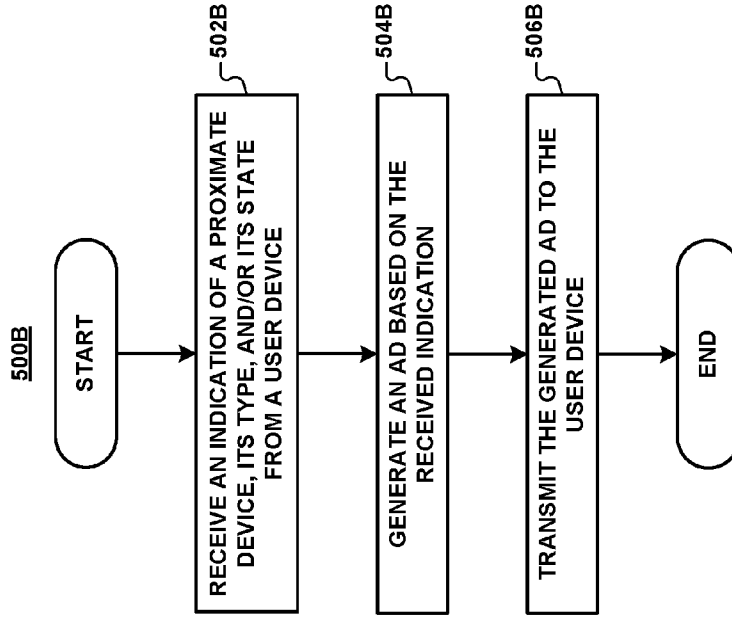
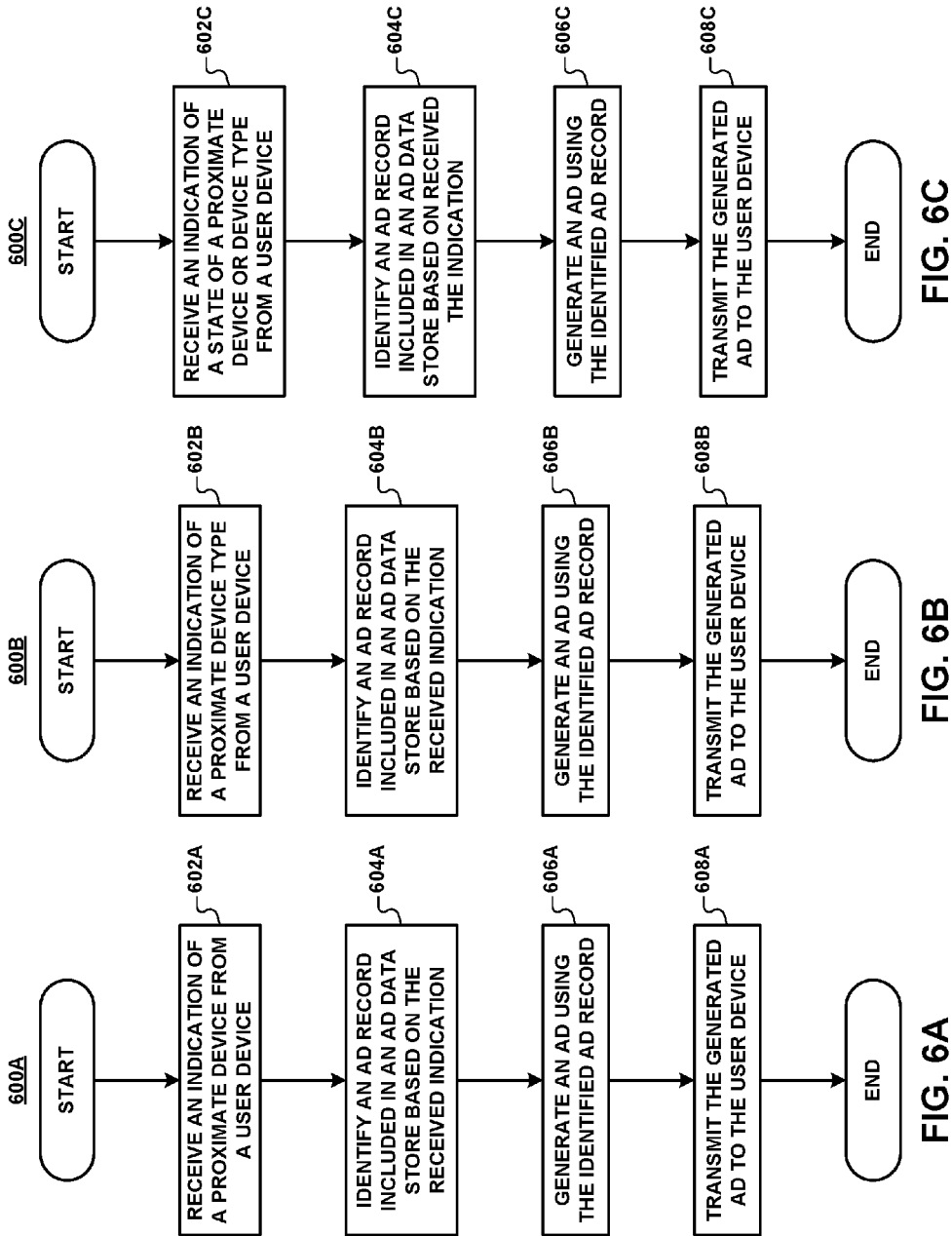


FIG. 5B



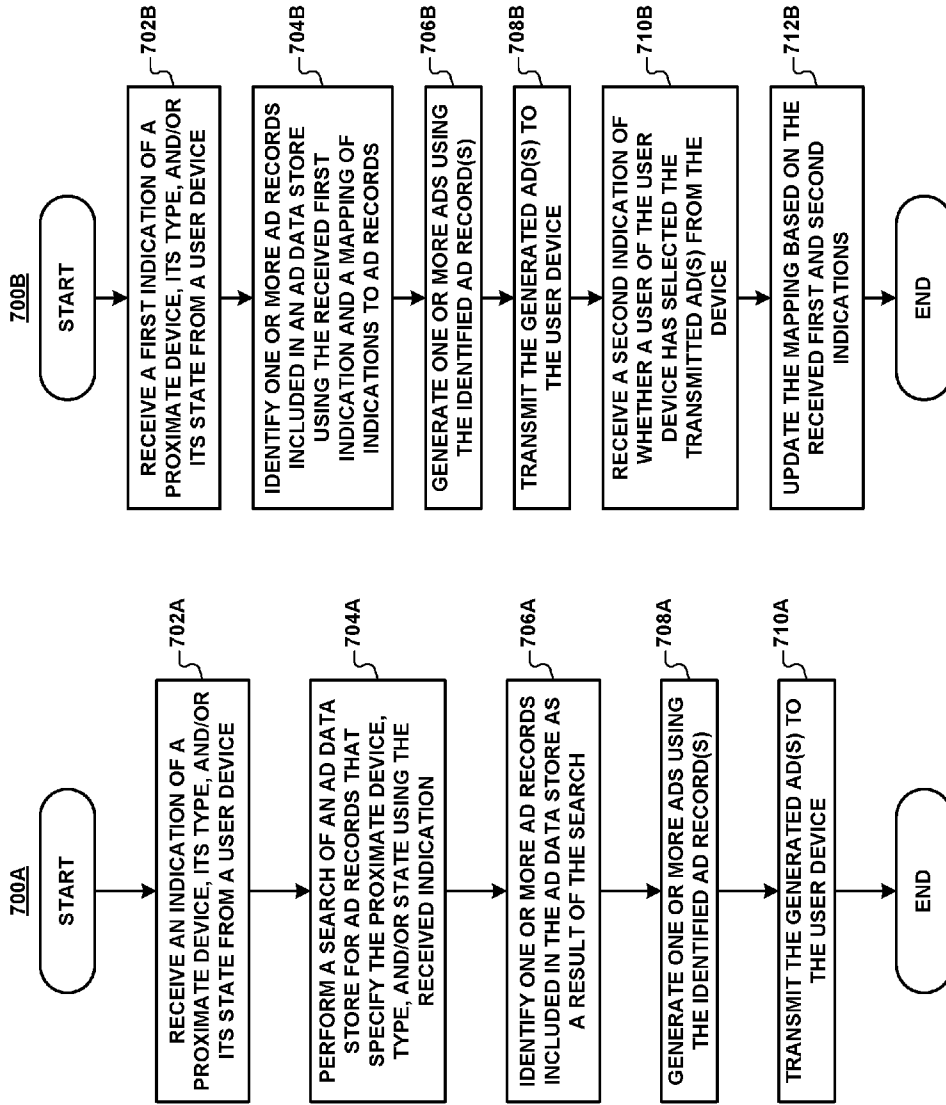


FIG. 7B

FIG. 7A

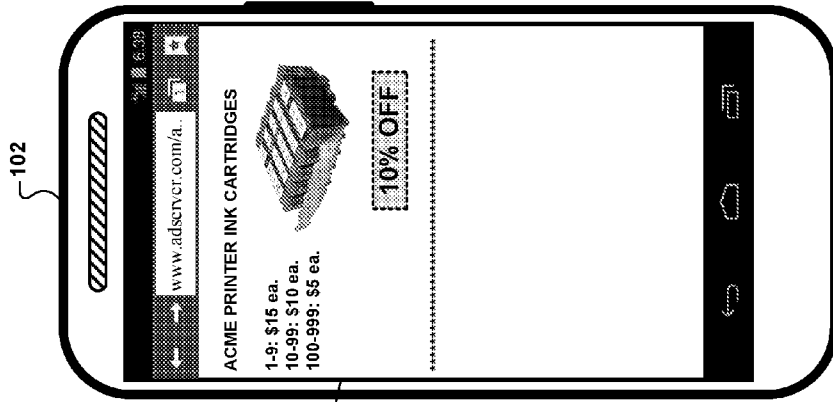


FIG. 8A

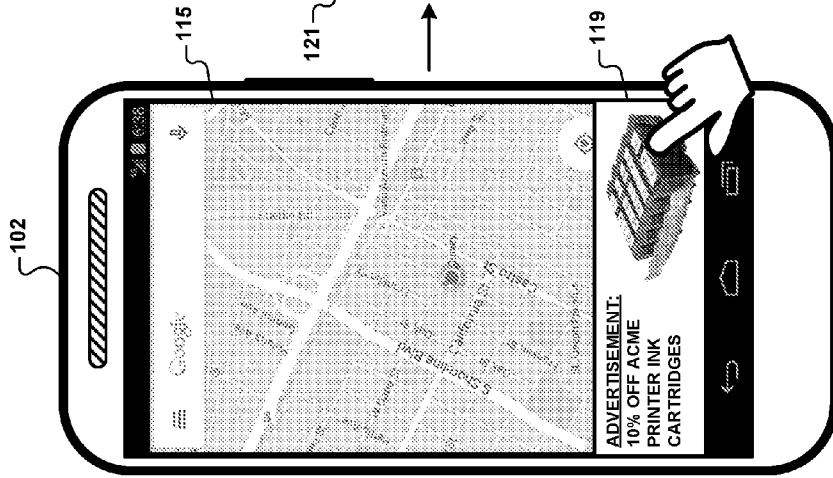


FIG. 8B

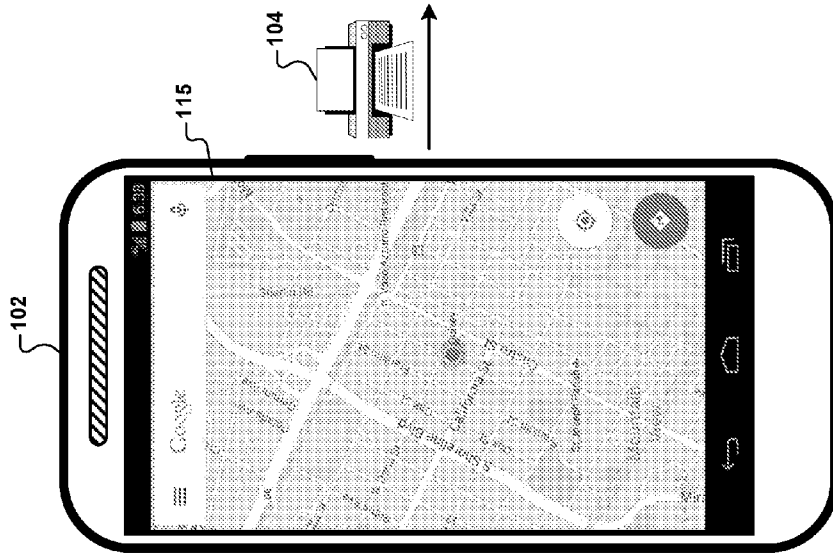


FIG. 8C

GENERATING ADVERTISEMENTS BASED ON PROXIMATE COMPUTING DEVICES

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] The present application is a continuation of U.S. patent application Ser. No. 14/982,104, filed on Dec. 29, 2015, which claims the benefit of U.S. Provisional Application No. 62/170,044, filed on Jun. 2, 2015. The entire disclosures of the applications referenced above are incorporated by reference.

FIELD

[0002] This disclosure generally relates to the field of advertisement, and more particularly to techniques for generating and displaying advertisements on user devices.

BACKGROUND

[0003] In recent years, the use of computers, tablets, smartphones, smart watches, and other stationary and mobile computing devices has grown significantly. Additionally, the presence of network connectivity among these and other devices has also increased. Today, many consumer and industrial computing devices and appliances are capable of being connected to local computer networks and even the Internet. Advertisers advertise products and services using a variety of different computing devices, including such networked and Internet-enabled devices. To efficiently and effectively advertise the products and services to users, the advertisers may advertise to targeted audiences, which may include specific groups of users or user device types.

SUMMARY

[0004] In one example, a method includes identifying, using a user device, a proximate device located proximate to the user device using a local wireless network. In this example, the proximate device is configured to communicate via the local wireless network. Also in this example, identifying the proximate device includes receiving, at the user device, an indication of the proximate device from the proximate device via the local wireless network. The method further includes, in response to identifying the proximate device, generating, using the user device, an advertisement (ad) based on the identified proximate device, and displaying the generated advertisement to a user at the user device.

[0005] In another example, a computing device includes a network interface component configured to communicate with a local wireless network, a display device, one or more memory components configured to store computer-readable instructions, and one or more processing units configured to execute the instructions. In this example, the instructions, when executed by the processing units, cause the processing units to receive an indication of a proximate device located proximate to the computing device via the local wireless network using the network interface component. Also in this example, the proximate device is configured to communicate via the local wireless network. The instructions further cause the processing units to identify the proximate device based on the received indication, in response to identifying the device, generate an ad based on the identified device, and display the ad to a user using the display device.

BRIEF DESCRIPTION OF THE DRAWINGS

[0006] The details of one or more examples are set forth in the accompanying drawings and the description below. Other features, objects, and advantages will be apparent from the description and drawings, and from the claims.

[0007] FIG. 1 depicts an example environment that includes one or more user devices, one or more proximate devices, one or more advertiser devices, and an advertisement (ad) system that communicate via a network.

[0008] FIG. 2 depicts an example user device in communication with one or more example proximate devices and an example ad system.

[0009] FIG. 3A is a functional block diagram of an example ad system.

[0010] FIGS. 3B-3C are functional block diagrams of an example ad generation module and an example ad data store.

[0011] FIGS. 4A-4D depict example ad records.

[0012] FIG. 5A is a flow diagram that illustrates an example method for generating ads based on proximate devices using a user device.

[0013] FIG. 5B is a flow diagram that illustrates an example method for generating ads based on proximate devices using an ad system.

[0014] FIGS. 6A-7B are flow diagrams that illustrate additional example methods for generating ads based on proximate devices using an ad system.

[0015] FIGS. 8A-8C depict example graphical user interfaces (GUIs) that may be generated on a user device according to the present disclosure.

DETAILED DESCRIPTION

[0016] The figures and the following description relate to example implementations by way of illustration only. It should be noted that from the following discussion, alternative implementations of the structures and methods disclosed herein will be readily recognized as viable alternatives that may be employed without departing from the scope of this disclosure.

[0017] The present disclosure generally relates to the field of advertising, and, more particularly, to techniques for generating and displaying advertisements (ads) on user devices. According to the techniques of this disclosure, a user device (e.g., a smart watch, smartphone, tablet computer, or laptop computer) may be located proximate to (e.g., nearby) one or more other devices (e.g., one or more consumer and/or industrial devices) that are capable of indicating their proximity to the user device. In other words, the proximate devices may be capable of indicating their presence near the user device to the device. For example, the proximate devices may include one or more network-connected (e.g., communicatively coupled via a computer network, or “networked”) computing devices and/or appliances. In some examples, the proximate devices may include any of networked desktop computers, printers, routers, smart televisions, gaming consoles, and wireless speakers. Additionally, or alternatively, the proximate devices may include any of networked home thermostats, light switches, refrigerators, microwaves, toasters, crock-pots, and other home and kitchen devices and appliances. In some examples, the proximate devices may be networked using any of Wi-Fi, Bluetooth, near-field communication (NFC), ZigBee, Z-Wave, radio frequency identification (RFID), and/or other short-range local wireless communication protocols, inter-

faces, and technologies. In these examples, the proximate devices may be further networked using any of Ethernet, USB, optical fiber, power line and/or other wired communication protocols, interfaces, and technologies. As a specific example, the proximate devices may include one or more devices commonly referred to as “Internet of Things” (IoT) devices that are connected to a local network and, e.g., the Internet, via a wired and/or wireless communications interface. In this disclosure, the user device may include any computing device that is capable of connecting to and interacting with one or more of the proximate devices via any of the local wireless communication protocols, interfaces, and technologies described herein. In some examples, the user device may also be capable of connecting to and interacting with other computing devices via any of the wired communication protocols, interfaces, and technologies described herein.

[0018] According to the disclosed techniques, the proximate devices may be configured to indicate their proximity to the user device via a local wireless communication protocol, interface, or technology (e.g., any of the local wireless communication protocols, interfaces, and technologies described herein). Specifically, each proximate device may be configured to transmit an indication of the device to the user device via a short-range local wireless network (e.g., Wi-Fi, Bluetooth, or NFC). A local wireless network, as used herein, may refer to any communication protocol, interface, or technology that enables two or more computing devices to exchange data wirelessly over a relatively short distance (e.g., up to 10-100 meters). Using the local wireless network, a first computing device may transmit data wirelessly to a second, different computing device. In some examples, the second computing device may also transmit data wirelessly to the first computing device using the local wireless network. As a result, the proximate device transmitting the indication of the device to the user device via the short-range local wireless network may indicate that the proximate device is located proximate to (e.g., nearby) the user device. In some examples, the proximate device may transmit the indication to the user device as part of actively communicating with the user device (e.g., the proximate device may be communicatively coupled with the user device). In other examples, the proximate device may transmit the indication to the user device as part of (e.g., in response to) the user device scanning for, or “pinging” (e.g., querying to determine a connection with, or activity of) nearby devices using a local wireless network (e.g., Wi-Fi, or Bluetooth). In still other examples, the proximate device may transmit the indication as part of a transmission (e.g., a broadcast) intended for one or more computing devices other than the user device (e.g., as part of pairing the proximate device with, or transmitting data to, the computing devices). In these examples, the user device may receive the indication as a result of the transmission (e.g., by listening for and/or receiving the transmission). In other words, in some examples, the user device may not transmit any data to the identified proximate device as part of receiving the indication of the proximate device from the proximate device. In this manner, the user device may receive the indication as a result of various types of data transmission by the proximate device, including data transmission directly to the user device, and data transmission to one or more other computing devices. As described herein, the proximate device may transmit the indication to the user

device over a local wireless network. In some examples, the proximate device may transmit the indication wirelessly using an intermediate device, such as a wireless router, a Wi-Fi adapter, or a Bluetooth adapter.

[0019] In this disclosure, one or more such indications received by the user device from one or more proximate devices that are located proximate to the user device may be referred to as a “snapshot” of the proximate devices from the standpoint of the user device. According to the disclosed techniques, upon receiving the indications (e.g., the snapshot), the user device may identify the proximate devices as located proximate to the user device. As one example, the user device may identify each proximate device as being located proximate to the user device. As another example, the user device may identify a subset of the proximate devices as being located proximate to the user device. As a specific example, the user device may identify one or more of the proximate devices as being located the most proximate (e.g., closest) to the user device.

[0020] Upon identifying the one or more proximate devices, the user device (e.g., using an ad system) may generate one or more ads based on the devices and display the ads to a user. As described herein, the ads may be specified by one or more advertisers of various products and services. As also described herein, the ads may be associated with (e.g., tailored to) the identified proximate devices, their types (e.g., device categories), and/or their specific states at the time the devices were identified. In some examples, the user device may generate the ads in response to identifying the proximate devices. In other examples, the user device may generate the ads at a later point in time after identifying the proximate devices. In still other examples, after identifying the proximate devices, the user device may generate the ads in response to another event (e.g., a user input, or a specific state of the user device), or automatically (e.g., at regular time intervals). For example, the user device may generate the ads based on a timed event (e.g., using an output of a timer of a software application, or “app,” included on the device), upon the user performing a search using the device, or in response to the user browsing and/or interacting with a web page or a state of a software app on the device. In additional examples, the user device may initially identify the proximate devices in response to the event, and subsequently generate the ads based on the identified proximate devices.

[0021] In this manner, the techniques of the present disclosure may, in some examples, enable advertisers to effectively and efficiently advertise various products and services. The techniques may also enable generating ads that are more relevant to device users compared to other techniques (e.g., ad targeting using geo-location, explicit or inferred user demographic, or user searching and/or browsing history). For example, using the techniques, advertisers may generate ads for products or services that are directly applicable, complementary, or tangentially related to computing devices or appliances located near user devices. As a result, the techniques may enable the advertisers to advertise the products or services to device users who are more likely to desire the products or services and interact with the corresponding ads. Accordingly, the techniques may enable the advertisers to advertise the products or services relatively more effectively. Additionally, by enabling the advertisers to automatically generate the ads in response to determining that the computing devices or appliances are

located near the user devices, the techniques may further enable the advertisers to advertise the products or services relatively more efficiently in terms of time and resources used to generate the corresponding ads.

[0022] FIG. 1 is a functional block diagram that illustrates an example environment including one or more user devices 102, one or more proximate devices 104, an ad system 100, and one or more advertiser devices 108 that communicate via one or more networks. As shown in FIG. 1, the ad system 100 includes an ad generation module 110, an ad record generation module 112, and an ad data store 114, which are described in greater detail below. The network 106 through which the user device(s) 102, the ad system 100, and the advertiser device(s) 108 communicate may include any type of network, such as a local area network (LAN), a wide area network (WAN), and/or the Internet. As described herein, the user device(s) 102 may communicate with the proximate device(s) 104 via any local wireless communication protocols, interfaces, or technologies (e.g., a local wireless network), including Wi-Fi, Bluetooth, and NFC.

[0023] In the example of FIG. 1, one of the user device(s) 102 identifies one or more of the proximate device(s) 104 that are located proximate to (e.g., nearby) the user device 102. For example, the user device 102 may identify the proximate devices 104 in response to the devices 104 indicating their proximity to the user device 102 (e.g., as part of actively communicating with the device 102, or with another computing device) via a local wireless network. For instance, the user device 102 may identify one or more of the (e.g., the closest) proximate device(s) 104 as being located proximate to the user device 102. In some examples, the user device 102 may further determine one or more types (e.g., categories) associated with the identified proximate devices 104, as described herein. Additionally, or alternatively, the user device 102 may determine one or more states of the identified proximate devices 104, as also described herein. In some examples, the user device 102 may transmit an indication of the identified proximate devices 104, of one or more types associated with the devices 104, and/or of one or more states of the devices 104, to the ad system 100. The ad system 100 may receive the indication of the identified proximate devices 104, their types, and/or their states from the user device 102, generate one or more ads based on the indication, and transmit the ads to the device 102. For example, as described herein, the ad system 100 (e.g., the ad generation module 110) may generate the ads based on the indication and using data included in the ad data store 114. As also described herein, the data included in the ad data store 114 may be specified by one or more advertisers via the advertiser device(s) 108. Upon receiving the ads from the ad system 100, the user device 102 may display the ads to a user (e.g., within, or adjacent to, a state of a software app executing on the device 102). Alternatively, the user device 102 may generate the ads based on the identified proximate devices 104, their types, and/or their states locally, in a similar manner as described with reference to the ad system 100, and display the ads to the user.

[0024] The ads may include any combination of text and image (and, e.g., audiovisual) data that describe an ad for a product, service, and/or business. In some examples, the ads may be associated with one or more states of one or more web-based apps (e.g., software apps that are accessible from a user device 102 via a web browser app), or one or more native apps (e.g., software apps that are installed and

executed on a user device 102). For example, the ads may specify one or more monetary discounts or other promotions associated with the states. In these examples, the ads may include one or more user selectable links that, when selected by the user, direct the user device 102 to the states in the web-based or native apps. Also in these examples, the user selectable links may indicate (e.g., using text and/or image data) to the user the corresponding states in the web-based or native apps. In other examples, the ads may specify monetary discounts or promotions that are not directly associated with states of web-based or native apps (e.g., as in the case of ads for in-store or catalog purchases).

[0025] The user device 102 may generate the ads based on the identified proximate devices 104 using any of a variety of techniques. As one example, as described herein, the user device 102 may generate the ads using the identified proximate devices 104. For example, the user device 102 may generate the ads using the identified proximate devices 104 as contextual information regarding the device 102 and/or the user. In one example, the user device 102 may generate an ad for a smart television upon determining that the device 102 is located proximate to a particular smart television model name and/or number. In another example, the user device 102 may generate an ad for printer ink cartridges upon determining that the device 102 is located proximate to a specific networked printer model name and/or number. In these examples, the identified proximate devices 104 may be indicated using so-called “device IDs” of the devices 104. In some examples, the device IDs may be represented using textual and/or numerical data.

[0026] As another example, as also described herein, the user device 102 may generate the ads using categories, or types, associated with the identified proximate devices 104, e.g., again as contextual information regarding the device 102 and/or the user. In one example, the user device 102 may generate an ad for a fitness band upon determining that the device 102 is located proximate to a particular fitness band, irrespective of its model name and/or number. In another example, the user device 102 may generate an ad for ground or whole coffee beans upon determining that the device 102 is located proximate to a networked coffee maker, again irrespective of its model name and/or number. In these examples, the types of the identified proximate devices 104 may be indicated using so-called “type IDs” generated using information associated with the devices 104 (e.g., device IDs and/or other device information). The type IDs may be represented using textual and/or numerical data in some examples.

[0027] As still another example, as further described herein, the user device 102 may generate the ads using states of the identified proximate devices 104, e.g., again as contextual information regarding the device 102 and/or the user. In other words, the user device 102 may generate an ad for a specific product, service, and/or business upon determining that the device 102 is located proximate to a particular proximate device 104 or proximate device type that indicates a given state. Using a previous example, the user device 102 may generate an ad for printer ink cartridges upon determining that the device 102 is located proximate to a (e.g., specific model of) networked printer that is nearly or completely out of printer ink. As another example, the user device 102 may generate an ad for a crock-pot upon determining that the device 102 is located proximate to a networked crock-pot (e.g., irrespective of its model) that indi-

cates a malfunction (e.g., a hardware fault). As still another example, the user device **102** may dynamically generate different ads for hot or cold food items or beverages depending on whether a (e.g., specific model, or a general type of) networked home thermostat located proximate to the device **102** indicates a particular indoor or outdoor temperature, temperature range, or ongoing mode of operation (e.g., cooling, or heating). In these examples, the states of the identified proximate devices **104** or of proximate device types may be indicated using so-called “state IDs” generated using information associated with the devices **104** or types (e.g., device IDs, type IDs, or other device information) and including textual and/or numerical data.

[0028] In some examples, the user device **102** may generate the ads by performing searches for the ads using the identified proximate devices **104**, their types, and/or their states, as described herein. In other examples, the user device **102** may generate the ads using ad logic that associates the identified proximate devices **104**, their types, and/or their states with the ads, as also described herein. For example, the ad logic may specify a mapping between each identified proximate device **104**, its type, and/or its state and one or more ads. In one example, the mapping may associate a model name and/or number (e.g., as indicated by a device ID) of the identified proximate device **104** with the one or more ads. In another example, the mapping may associate a category, or type (e.g., as indicated by a type ID), of the identified proximate device **104** with the one or more ads. In still another example, the mapping may associate a state of the identified proximate device **104** or of its device type (e.g., as indicated by a state ID) with the one or more ads. In general, the mapping may associate any combination of one or more model names and/or numbers, types, and states of one or more of the identified proximate devices **104** with one or more ads. In some examples, the mapping may be generated and/or updated manually by the advertisers or third parties (e.g., companies or organizations that operate the ad system **100**). Additionally, or alternatively, the mapping may be generated and/or updated manually and/or automatically using historical user behavioral data (e.g., data indicating past user actions with respect to one or more of the user device(s) **102**, such as browsing and/or purchasing products or services, when in proximity to one or more of the proximate device(s) **104**). In additional examples, the mapping may also be updated based on user ad selection data that indicates whether the user has selected one or more of the ads on the user device **102**.

[0029] In this manner, the ads generated by the user device **102** based on the identified proximate devices **104** may be directly applicable to the devices **104** (e.g., offering equivalent or improved products or services) and/or complimentary to the devices **104** (e.g., offering accessories, enhancements, and/or associated products and services). In some examples, the ads may be tangentially related, although not directly applicable or complimentary, to the proximate devices **104** (e.g., offering products or services that the user is likely interested in given the devices **104**, their types, and/or their states). As a specific example, the user device **102** may generate an ad for a tropical adventure vacation based on an identified proximate device **104** corresponding to smart adventure gear used in snow, irrespective of whether the user is able to use the device **104** during the advertised vacation.

[0030] As described herein, in some examples, to generate the ads, the user device **102** may use the ad system **100**. In

these examples, the ad system **100** may be a part of the user device **102**, a part of another system or device, or a stand-alone system or device. The ad system **100** may include ad content related to one or more ads. The ad content may be defined (e.g., specified) by one or more advertisers using the ad system **100** (e.g., via the advertiser device(s) **108**). As described herein, the user device **102** may transmit an indication of the identified proximate devices **104**, their types, and/or their states to the ad system **100**. The ad system **100** may receive the indication from the user device **102**, generate the ads using the indication and the ad content, and transmit the ads to the device **102**. For example, the user device **102** may transmit the indication to the ad system **100** as part of an ad request, thereby offering the system **100** an opportunity to fulfill the request (e.g., generate the ads). The ad system **100** may generate the ads in response to receiving the ad request and transmit the ads to the user device **102**.

[0031] The advertisers may generate the ad content using any of a variety of techniques. In general, the advertisers may generate the ad content by bidding via the ad system **100** to have ads for products, services, and/or businesses shown to users of user devices **102** that are located proximate to one or more sponsored proximate devices, sponsored proximate device types, and/or sponsored proximate device states. In some examples, the advertisers may bid on one or more specific proximate devices **104** (e.g., model names and/or numbers, such as the “UN65JU7500FXZA” smart television by Samsung®). In these examples, the proximate devices **104** may be indicated using device IDs. In other examples, the advertisers may bid on one or more categories, or types, of proximate devices **104** (e.g., specific or broad device types, such as “Fitbit® fitness bands,” “smart televisions,” or “kitchen appliances”). In these examples, the proximate device types may be indicated using type IDs. In still other examples, the advertisers may bid on one or more states of proximate devices **104**, or one or more states of proximate device types (e.g., a “low ink” state of a “WorkForce Pro WP-4010” Epson® networked printer, or a “cooling” state of any Nest® networked home thermostat). In these examples, the proximate device or device type states may be indicated using state IDs.

[0032] In the examples described herein, the ad system **100** may store the ad content specified by the advertisers in one or more ad records included in the ad data store **114**. In some examples, the ad system **100** (e.g., the ad generation module **110**) may generate the ads by performing searches for ad records included in the ad data store **114** that specify one or more of the identified proximate devices **104**, their types, and/or their states indicated by the user device **102**. In other examples, the advertisers may specify one or more ads for one or more products, services, and/or businesses without associating the ads with any proximate devices **104**, proximate device types, or proximate device states. In these examples, ad logic and associated (e.g., mapping) data specified by the advertisers or a third party (e.g., a company or organization that operates the ad system **100**) may be configured to associate the ads with one or more of the identified proximate devices **104**, their types, and/or their states. As described herein, the ad logic and/or the associated data may be generated and/or updated over time manually and/or automatically using any combination of user input, historical user behavioral data, and user ad selection data. In

some examples, the ad logic data, the historical user behavioral data, and/or the user ad selection data may be stored in the ad data store 114.

[0033] To generate the ads, the ad system 100 may identify ad records included in the ad data store 114 using any of a variety of techniques. In some examples, the ad system 100 may identify one or more ad records that specify the identified proximate devices 104, their types, and/or their states. The ad system 100 may then select those of the identified ad records that are associated with (e.g., that specify) the highest one or more advertiser bids (e.g., prices). In other examples, the ad system 100 may generate a score for each identified ad record. The score may indicate a likelihood of maximizing ad revenue by generating an ad using the corresponding ad record. For example, the score may be generated using any combination of the associated advertiser bid and an expected probability that a user will select the resultant ad (e.g., $\text{score} = \text{Bid_price} * \text{P}(\text{click_on_ad})$, where “Bid_price” is the advertiser bid and “P(click_on_ad)” is the expected probability). The expected probability may be calculated using historical user ad selection data (e.g., data indicating past user selections of ads while browsing and/or purchasing products or services). In these examples, the ad system 100 may select those of the scored identified ad records having the highest one or more scores. In further examples, the ad system 100 may identify one or more ad records using the identified proximate devices 104, their types, and/or their states and a mapping and select those of the identified records that are associated with the highest one or more advertiser bids or scores, in a similar manner as described above.

[0034] The techniques of this disclosure may also optionally include one or more of the following features. In some examples, the user device 102 may generate the ads in response to determining that the identified proximate devices 104 exclude one or more devices (e.g., specific model names and/or numbers), device types (e.g., broad or general device categories), and/or device states (e.g., states of particular devices or device types). As one example, the user device 102 may generate an ad for a specific model of a Fitbit® fitness band upon determining that the identified proximate devices 104 do not include that model. In this example, the user device 102 may determine that the identified proximate devices 104 include another model of a fitness band (e.g., Garmin® Vivofit). As another example, the user device 102 may generate an ad for a smart air conditioner upon determining that the identified proximate devices 104 do not include any smart air conditioners, irrespective of model name and/or number. In other examples, the user device 102 may generate the ads in response to determining that the identified proximate devices 104 include (e.g., fall into) one or more device categories (e.g., types), but exclude one or more specific devices within those categories. For example, the user device 102 may generate an ad for a particular smart kitchen appliance model (e.g., a KitchenAid® smart appliance) upon determining that the identified proximate devices 104 include one or more smart kitchen appliances, but do not include that model. In further examples, the user device 102 may generate an ad for a product, service, or business (e.g., a specific model of a wireless router) in response to determining that the identified proximate devices 104 are not in one or more particular states (e.g., a wireless router that is actively transmitting data, indicating its proper operation).

[0035] In some examples, the user device 102 may generate the ads in response to determining ownership of the identified proximate devices 104. As one example, the user device 102 may definitively determine whether the user owns or is otherwise associated with one or more of the identified proximate devices 104. For example, the user may register one or more of the proximate device(s) 104 via the user device 102. As a result, the user device 102 may store device information, such as device IDs, associated with the registered proximate devices 104 on the device 102 and/or in another network location (e.g., via cloud storage). The user device 102 may then determine whether the identified proximate devices 104 include any of the registered proximate devices 104 using the device information, thereby establishing the user’s ownership of or association with one or more of the identified proximate devices 104. As another example, the user device 102 may infer whether the user owns or is associated with one or more of the identified proximate devices 104. For example, the user device 102 may predict whether an identified proximate device 104 is owned by or associated with the user by determining any of the following: whether (and, e.g., how frequently) the user has previously interacted with the device 104 (e.g., via the user device 102); whether (and, e.g., how frequently) the user device 102 has been located proximate to the device 104; and whether the user owns or is associated with other devices that are similar to the device 104 (e.g., the user owning or being associated with a given device may make it more or less likely that the user also owns or is associated with a similar device). Upon determining the ownership or association of the identified proximate devices 104, the user device 102 may generate the ads using any of a variety of techniques. In some examples, the user device 102 may generate an ad for an identified proximate device 104 if the device 104 is owned by or associated with the user, and otherwise refrain from generating the ad. In other examples, the user device 102 may generate different ads for an identified proximate device 104 depending on whether the device 104 is owned by or associated with the user. For example, upon determining that the user device 102 is located proximate to a networked printer owned by or associated with the user, the device 102 may generate an ad for printer ink cartridges that are compatible with the printer. Alternatively, upon determining that the networked printer is not owned by or associated with the user, the user device 102 may generate an ad for a networked printer of the same or different model or brand.

[0036] In some examples, the user device 102 and ad system 100 may generate the ads by taking into consideration user privacy. As one example, upon identifying the proximate devices 104, the user device 102 may transmit a generalized version (e.g., a summary) of the indication of the devices 104 to the ad system 100. For example, after determining one or more specific model names and/or numbers (e.g., device IDs) of the identified proximate devices 104, the user device 102 may transmit data describing one or more general categories, or types (e.g., type IDs) associated with the devices 104 to the ad system 100. In other examples, upon determining one or more specific categories (e.g., specific type IDs) of the identified proximate devices 104, the user device 102 may transmit data describing one or more general categories (e.g., broader type IDs) associated with the devices 104 to the ad system 100. In still other examples, upon determining one or more states

(e.g., state IDs) of the identified proximate devices **104**, the user device **102** may transmit to the ad system **100** an indication of each state along with data describing a category (e.g., a type ID) associated with the corresponding device **104**, rather than a specific device model name and/or number (e.g., a device ID) of the device **104**. In these examples, the ad system **100** may generate the ads using the generalized version of the indication of the identified proximate devices **104**, their types, and/or their states, rather than the indication.

[0037] As another example, the user device **102** may transmit an encrypted (e.g., compressed) version of the indication of the identified proximate devices **104**, their types, and/or their states to the ad system **100**. For example, the user device **102** may transmit the indication using a Bloom filter representation. In this example, instead of indicating the identified proximate devices **104**, their types, and/or their states directly, the representation may indicate whether the devices **104** potentially include a particular device, type, and/or state, or definitively do not include the device, type, and/or state. As still another example, the user device **102** may refrain from transmitting the indication to the ad system **100** altogether. In this example, the user device **102** may select the ads from a set of ads provided by the ad system **100** using the identified proximate devices **104**, their types, and/or their states. For example, the ad system **100** may generate a set of one or more so-called “candidate” ads and transmit the set to the user device **102**. The user device **102** may then use the identified proximate devices **104**, their types, and/or their states (and, e.g., ad logic) to select the ads from (e.g., select a subset of) the set.

[0038] In general, the user device **102** may generate the ads based on the identified proximate devices **104** using any combination of the techniques, features, and considerations described herein. For example, the user device **102** may generate the ads using any of the identified proximate devices **104**, their types, their states, ad logic that associates the devices **104**, types, and/or states with the ads, absence of specific devices or general device types from the devices **104**, ownership of the devices **104**, generalized versions of indications of the devices **104**, types, and/or states, encrypted versions of the indications, and selection of the ads from sets of candidate ads. Moreover, in some examples, the user device **102** may generate the ads using any of the above-described techniques, features, and considerations in conjunction with any other information associated with the user and/or the device **102**, such as, e.g., geographic location, a time of day, and a local temperature associated with the user and/or the device **102**.

[0039] As such, the techniques described herein may enable generating targeted ads using the proximate device(s) **104** instead of, or along with, other information commonly available on the user device(s) **102** (e.g., geo-location, user demographic, user searching, browsing, and social network activity history, contacts, call, text, and chat history, and other information). In some examples, using the proximate device(s) **104** in this manner may be advantageous because other information associated with users of the user device(s) **102** and/or the device(s) **102** may be unavailable, unreliable, or inaccessible. In other examples, the proximate device(s) **104** may represent more current or instantaneous contextual user data compared to the information associated with the users and/or user device(s) **102**, which may represent older or averaged data.

[0040] In this disclosure, a software app may refer to computer software that causes a computing device to perform a task. In some examples, a software app may be referred to as an “app,” or a “program.” Example apps include word processing apps, spreadsheet apps, messaging apps, media streaming apps, social networking apps, and games. Apps can be executed on a variety of different computing devices. For example, apps can be executed on mobile computing devices, such as smartphones, tablets, and wearable computing devices (e.g., smart watches, fitness bands, and headsets, such as smart glasses). Apps can also be executed on other types of computing devices having other form factors, such as laptop and desktop computers, and other consumer electronic devices (e.g., smart home appliances, home networking devices, and home automation devices). In some examples, apps may be installed on a computing device prior to a user purchasing the device. In other examples, the user may download and install apps on the computing device after purchasing the device. A native app, as used herein, may refer to an app that is installed and executed on a user device **102**. A web-based app may refer to an app that is accessible from a user device **102** via a web browser app.

[0041] An AM, as used herein, may include any of a native app AM (hereinafter, “AAM”) and a web AM (hereinafter, “WAM”). As such, a user device **102** of this disclosure may use an AM to access the functionality provided by a native or web-based app. For example, a user of the user device **102** may select an ad that includes the AM to access the functionality of the native or web-based app. An AAM may be a string that references a native app and indicates one or more operations for a user device **102** (e.g., the app) to perform. If the user selects an ad that includes the AAM, the user device **102** may launch the native app referenced by the AAM and (e.g., cause the app to) perform the operations indicated by the AAM. In other words, the user selecting the ad may cause the user device **102** to launch the native app and set the app into a state (e.g., in which the app displays a graphical user interface (GUI), or screen) that corresponds to the operations. As a result, the native app may be configured to display one or more products, services, vendors, and/or associated monetary discounts to the user, e.g., via a display device of the user device **102**. In this manner, the AAM may specify the state of the native app. The state, in turn, may refer to the operations indicated by the AAM and/or the outcome of the native app performing the operations in response to the user selecting the ad that includes the AAM. A WAM may include a resource identifier that references a web resource (e.g., a page of a web-based app, or website). For example, the WAM may include a uniform resource locator (URL) (i.e., a web address) used with the hypertext transfer protocol (HTTP). If the user selects an ad that includes the WAM, the user device **102** may launch a web browser app and retrieve the web resource referenced by the resource identifier. Stated another way, if the user selects the ad, the user device **102** may launch the web browser app and access a state (e.g., a page) of a web-based app, or website, specified by the WAM. The state of the web-based app may be configured to display one or more products, services, vendors, and/or associated monetary discounts to the user, in a similar manner as previously described.

[0042] The user device(s) **102** may be any computing devices capable of providing indications of the proximate

device(s) 104, their types, and/or their states to the ad system 100 and receiving ads from the system 100. The user device(s) 102 may include any of smart watches, smartphones, and tablet or laptop computing devices. The user device(s) 102 may also include computing devices having other form factors, e.g., wirelessly-networked desktop computers, vehicle navigation systems, gaming devices, and smart televisions. The user device(s) 102 may use a variety of different operating systems or platforms (e.g., an operating system, or “OS,” 120, as shown in FIG. 2). In the event a user device 102 is a mobile computing device, the device 102 may operate using an OS such as ANDROID® by Google Inc., IOS® by Apple Inc., or WINDOWS PHONE® by Microsoft Corporation. In the event the user device 102 is a stationary computing device, the device 102 may use an OS such as MICROSOFT WINDOWS® by Microsoft Corporation, MAC OS® by Apple Inc., or LINUX® (LINUX is the registered trademark of Linus Torvalds in the U.S. and other countries). In general, the user device(s) 102 may interact with the ad system 100 using operating systems other than those described herein, whether presently available or developed in the future.

[0043] The user device(s) 102 may communicate with the ad system 100 via the network 106. In general, the user device(s) 102 may communicate with the ad system 100 using any app that can transmit indications of the proximate device(s) 104, their types, and/or their states to the system 100 and receive ads from the system 100. In some examples, the user device(s) 102 may include an app that is dedicated to interfacing with the ad system 100, such as an app dedicated to ads (e.g., any of one or more native apps 124, as also shown in FIG. 2). In other examples, the user device(s) 102 may communicate with the ad system 100 using a more general app, such as a web browser app (e.g., a web browser app 122, as further shown in FIG. 2). In general, an app included on a user device 102 to communicate with the ad system 100 may be configured to transmit indications of the proximate device(s) 104, their types, and/or their states to the system 100. In some examples, the same app may also be configured to display a GUI used to display ads received from the ad system 100 in response to transmitting the indications. In other examples, a different (e.g., native or web-based) app may be configured to display the GUI used to display the ads. The GUI may display the ads in a variety of different ways, depending on the information transmitted by the ad system 100 to the user device 102 as part of the ads.

[0044] The proximate device(s) 104 may be any computing devices capable of indicating their proximity to (e.g., presence near) the user device(s) 102 using a local wireless network (e.g., Wi-Fi, Bluetooth, or NFC). As described herein, the proximate device(s) 104 may include any networked computing devices and/or appliances, including desktop computers, printers, routers, televisions, gaming consoles, wireless speakers, thermostats, light switches, refrigerators, microwaves, toasters, crock-pots, and other devices and appliances.

[0045] The advertiser device(s) 108 may be any computing devices capable of receiving ad content (e.g., ad data and/or ad parameters) from users of the device(s) 108 (e.g., advertisers) and transmitting the content to the ad system 100. For example, the advertiser device(s) 108 may be any computing devices capable of receiving indications of sponsored proximate devices, sponsored proximate device types,

and/or sponsored proximate device states from the users, as well as any of ad bid prices and additional parameters, and transmitting this information to the ad system 100. In some examples, the advertiser device(s) 108 may provide a GUI that enables the users of the device(s) 108 to specify the ad content and transmit the content to the ad system 100.

[0046] FIG. 2 illustrates an example of one of the user device(s) 102 and the advertiser device(s) 108 in communication with the ad system 100. FIG. 2 also illustrates an example of the proximate device(s) 104 that are located proximate to the user device 102. Specifically, FIG. 2 depicts example interactions and data exchanged among the proximate device(s) 104, user device 102, ad system 100, and advertiser device(s) 108. As shown in FIG. 2, the user device 102 may initially identify one or more of the proximate device(s) 104. For example, the user device 102 may identify the proximate devices 104 using a proximate device identification module 126 included on the device 102. For instance, the proximate device identification module 126 may be configured to identify one or more of the proximate device(s) 104 that are located proximate to (e.g., nearby) the user device 102. In some examples, the proximate device identification module 126 may include a device determination module 128 configured to determine a model name, a model number, and/or a device ID of each of one or more of the identified proximate devices 104. In other examples, the user device 102 may further determine one or more types (e.g., categories) of the identified proximate devices 104 (e.g., via one or more type IDs associated with the types). For example, the proximate device identification module 126 may include a device type determination module 130 configured to determine the types of the identified proximate devices 104. Additionally, or alternatively, the user device 102 may determine one or more states of the identified proximate devices 104 (e.g., via one or more state IDs). For example, the proximate device identification module 126 may include a device state determination module 132 configured to determine the states. As also shown in FIG. 2, the user device 102 may transmit one or more indications of the identified proximate devices 104, their types, and/or their states 116 to the ad system 100 (e.g., as the one or more device IDs, type IDs, and/or state IDs). In some examples, the user device 102 may transmit additional information to the ad system 100 (e.g., along with the indications 116, or separately), including geo-location data, platform data, and/or other data (e.g., an IP address) associated with the user, the device 102, and/or the identified proximate devices 104.

[0047] In the example of FIG. 2, upon receiving the indications of the identified proximate devices 104, their types, and/or their states 116 from the user device 102, the ad system 100 may generate one or more ads 118 based on the indications 116. The ad system 100 may then transmit the ads 118 to the user device 102. As shown in FIG. 2, the ads 118 may include any of text and image (e.g., audiovisual) data describing advertised products, services, and/or businesses. The ads 118 may also include one or more AMs, such as one or more AAMs and/or WAMs. Upon receiving the ads 118 from the ad system 100, the user device 102 may display the ads 118 to a user of the device 102 within a GUI 119. For example, the user device 102 may display the ads 118 (e.g., the GUI 119) within, or adjacent to (e.g., as an overlay with respect to) a state of a native app 115 (e.g., any of the native app(s) 124) or a web page in a web browser app (e.g., the web browser app 122) executing on the device 102. The user

may view and/or interact with (e.g., touch, or click on) one or more of the ads **118** on the user device **102**. Upon the user selecting any of the ads **118**, the user device **102** may access the corresponding ad **118**. In some examples, upon the user selecting the ad **118**, the user device **102** may launch an app (e.g., one of the native app(s) **124** or the web browser app **122**) and set the app into a state (e.g., a native app screen, or a web page) specified by an AAM or WAM associated with (e.g., included in) the selected ad **118**. Examples of ads **118** displayed to a user of a user device **102** as part of, or adjacent to, a state of a native or web-based app are described with reference to FIGS. **8A-8C**.

[0048] As shown in FIG. **2**, the user device **102** may also include an OS **120** configured to perform any of the functions attributed to the device **102** herein. For example, the OS **120** may be configured to receive user inputs (e.g., user selections of ads **118**) from users of the user device **102** and provide user outputs (e.g., display ads **118** and app states of native and/or web-based apps) to the users. The OS **120** may be further configured to enable the user device **102** to communicate with other systems or devices (e.g., transmit indications of the proximate device(s) **104** to the ad system **100** and receive ads **118** from the system **100**). As further shown, the user device **102** may also include a web browser app **122** configured to access states of web-based apps (e.g., web pages, or web sites). As also shown, the user device **102** may further include one or more native apps **124** that may execute on the user device **102**.

[0049] FIG. **3A** is a conceptual diagram that illustrates example interactions between the user device(s) **102**, proximate device(s) **104**, ad system **100**, and advertiser device(s) **108**. As described herein, the ad system **100** of FIG. **3A** includes the ad generation module **110**, ad record generation module **112**, and ad data store **114**. As shown in FIG. **3A**, the user device(s) **102** may transmit one or more indications of the proximate device(s) **104**, their types, and/or their states **116** to the ad generation module **110**. The ad generation module **110** may generate one or more ads **118** using the indications **116** and information included in the ad data store **114** and transmit the ads **118** to the user device **102**. For example, as described herein, the ad generation module **110** may generate the ads **118** using ad data **134** (e.g., ad content and/or ad parameters) included in one or more ad records stored in the ad data store **114**. As also described herein, the ad generation module **110** may identify the ad records in the ad data store **114** using the indications **116**. As also shown in FIG. **3A**, one or more advertisers may communicate with the ad record generation module **112** via the advertiser device(s) **108** to provide the ad data **134** to the ad system **100**. The ad record generation module **112** may generate one or more ad records that include the ad data **134** and store the records in the ad data store **114**, as described herein.

[0050] FIG. **3B** is a functional block diagram of an example ad generation module **110**. The ad generation module **110** of FIG. **3B** includes an ad record identification module **136** configured to identify (e.g., perform searches for) one or more ad records included in the ad data store **114**. For example, the ad record identification module **136** may identify the ad records based on (e.g., text) matches between indications of the proximate device(s) **104**, their types, and/or their states **116** received from the user device(s) **102** and information (e.g., text) included in the records. In general, the ad record identification module **136** may identify the ad records based on matches between model names

and/or numbers, device IDs, type IDs, and/or state IDs associated with the proximate device(s) **104**, their types, and/or their states, as specified by the indication **116**, and sponsored proximate device model names and/or numbers, device IDs, type IDs, and/or state IDs included in the identified records. As shown in FIG. **3B**, in some examples, the ad generation module **110** may include ad logic **138** that enables the module **110** to identify one or more ad records included in the ad data store **114** using other techniques. For example, as also shown, the ad logic **138** may include a mapping module **140** configured to map indications of the proximate device(s) **104**, their types, and/or their states **116** to one or more ad records included in the ad data store **114**. In the example of FIG. **3B**, the ad generation module **110** may identify one or more ad records included in the ad data store **114** using one or more indications of the proximate device(s) **104**, their types, and/or their states **116** received from any of the user device(s) **102** as inputs to the mapping module **140**. In some examples, the ad generation module **110** (e.g., the mapping module **140**) may identify the ad records using mapping data **148** (e.g., a look up table, or another data structure) included in the ad data store **114**, as described with reference to FIG. **3C**. As further shown, the ad logic **138** may also include a mapping generation module **142** configured to generate the mapping data **148** and a mapping updating module **144** configured to update the data **148**. As described herein, the mapping data **148** may be generated and/or updated manually (e.g., via user inputs) and/or automatically (e.g., via historical user behavioral data and/or user ad selection data, as also described with reference to FIG. **3C**).

[0051] FIG. **3C** is a functional block diagram of an example ad data store **114**. The ad data store **114** of FIG. **3C** includes one or more ad records (e.g., ad records **400-1 . . . 400-N**, where “N” is an integer value greater or equal to **1**) that include information associated with ads **118**. Example ad records are described with reference to FIGS. **4A-4D**. As shown in FIG. **3C**, the ad data store **114** may also include ad logic data **146**. As also shown, in some examples, the ad logic data **146** may include mapping data **148** that specifies a mapping between one or more indications of the proximate device(s) **104**, their types, and/or their states **116** and one or more of the ad records included in the ad data store **114**. In other examples, the ad logic data **146** may also include information used by the mapping generation module **142** and/or the mapping updating module **144** to generate and/or update the mapping data **148**, as described herein. For example, as also shown, the ad logic data **146** may include historical user behavioral data **150** and/or user ad selection data **152** (e.g., upon the data **150**, **152** becoming available to the ad system **100**) that may be used to generate and/or update the mapping data **148**. In general, the ad data store **114** may include one or more databases, indices (e.g., inverted indices), files, or other data structures that may be used to implement the techniques of this disclosure.

[0052] FIGS. **4A-4D** illustrate example ad records **400A-400D**, respectively, that may be included in the ad data store **114**. An ad record **400**, as described herein, may include various different data related to an ad **118**. For example, as shown in FIGS. **4A-4D**, an ad record **400** may include data that identifies the record **400** among other ad records **400** included in the ad data store **114**, such as an ad record name and/or identifier (ID) **402** (e.g., ad record names/IDs **402A-402D**). As further shown, an ad record **400** may indicate a

sponsored proximate device (e.g., via an ID 404A, such as a model name and/or a model number of the device), a sponsored proximate device type (e.g., a category) (e.g., via an ID 404B), or a sponsored proximate device (or, e.g., device type) state (e.g., via an ID 404C) associated with the record 400. A sponsored proximate device, its type, or its state indicated by an ad record 400 may specify one of the proximate device(s) 104, its type, or its state, respectively, for which an advertiser (e.g., via one of the advertiser device(s) 108) has paid to have an ad 118 displayed to users of the user device(s) 102. For example, the advertiser may have paid to have the ad 118 generated and displayed to each user when the sponsored proximate device, any proximate device of the sponsored type, and/or a proximate device (or a proximate device of type) having the sponsored state is located proximate to (e.g., nearby) the corresponding one of the user device(s) 102.

[0053] As also shown in FIGS. 4A-4D, an ad record 400 may include ad content 406 (e.g., ad content 406A-406D) used to generate an ad 118 associated with the record 400. For example, the ad content 406 may include text, image, and/or other (e.g., audiovisual) data associated with the corresponding sponsored proximate device, type, and/or state and specified by an advertiser (e.g., via one of the advertiser device(s) 108) for generating the ad 118. As further shown, an ad record 400 may include one or more ad parameters 408 (e.g., ad parameters 408A-408D), which may define one or more budgets associated with generating the corresponding ad 118. The ad parameters 408 may also define timing parameters associated with generating the ad 118, such as start and stop dates and/or times of day during which the ad 118 is generated. Additionally, the ad parameters 408 may specify user and/or platform parameters associated with generating the ad 118, such as one or more user, device, and/or platform (e.g., OS) types for which the ad 118 is generated. The ad system 100 (e.g., ad record identification module 136) may identify each of the example ad records 400A-400C of FIGS. 4A-4C based on one or more (e.g., text) matches between an indication of one of the proximate device(s) 104, its type, or its state 116 received from one of the user device(s) 102 and information (e.g., a sponsored proximate device, its type, or its state) included in the corresponding one of the records 400A-400C, as described herein. The ad system 100 (e.g., the mapping module 140) may identify the example ad record 400D of FIG. 4D using the indication 116 and mapping data 148 specifying a mapping between indications of the proximate device(s) 104, their types, and/or their states 116 and the ad records 400 included in the ad data store 114, as also described herein.

[0054] FIG. 5A is a flow diagram that illustrates an example method 500A for generating one or more ads 118 based on one or more of the proximate device(s) 104 using one of the user device(s) 102. In block 502A, the user device 102 may initially identify one of the proximate device(s) 104 that is located proximate to (e.g., nearby) the device 102 using a local wireless network (e.g., Wi-Fi, Bluetooth, or NFC). In this example, the proximate device 104 may be configured to communicate via the local wireless network. Also in this example, to identify the proximate device 104, the user device 102 may receive an indication (e.g., a device ID) of the proximate device 104 from the proximate device 104 via the local wireless network. As described herein, the user device 102 may identify the proximate device 104 using

the proximate device identification module 126 included on the device 102. Specifically, as one example, the user device 102 may determine a model name, a model number, and/or a device ID of the identified proximate device 104 using the device determination module 128 included in the proximate device identification module 126. As another example, the user device 102 may determine a type (e.g., a type ID) of the identified proximate device 104 using the device type determination module 130 also included in the proximate device identification module 126. As still another example, the user device 102 may determine a state (e.g., a state ID) of the identified proximate device 104 using the device state determination module 132 also included in the proximate device identification module 126. In some examples, the user device 102 may identify one or more additional ones of the proximate device(s) 104 in a similar manner.

[0055] In response to identifying the proximate device 104, the user device 102 may generate an ad based on the identified device 104. For example, in block 504A, in response to identifying the proximate device 104, the user device 102 may transmit an indication of the device 104, its category (e.g., type), and/or its state 116 to the ad system 100. In some examples, the user device 102 may transmit indications of additional identified proximate devices 104, their categories, and/or their states 116 to the ad system 100. As described with reference to FIG. 5B, the ad system 100 may receive the indication of the identified proximate device 104, its type, and/or its state 116 from the user device 102 (e.g., as a device ID, a type ID, and/or a state ID), generate an ad 118 based on the received indication 116, and transmit the ad 118 to the device 102. Accordingly, in block 506A, the user device 102 may receive the ad 118 from the ad system 100 in response to transmitting the indication 116. In block 508A, the user device 102 may display the ad 118 to a user of the device 102. For example, the user device 102 may display the ad 118 within, or adjacent to, an app state of a native or web-based app executing on the device 102. In some examples, the user device 102 may receive additional ads 118 from the ad system 100 in response to transmitting indications of additional identified proximate devices 104, their categories, and/or their states 116 to the ad system 100. The user device 102 may display the additional ads 118 to the user.

[0056] FIG. 5B is flow diagram that illustrates an example method 500B for generating one or more ads 118 based on one or more of the proximate device(s) 104 using the ad system 100. In block 502B, the ad system 100 may initially receive an indication of one of the proximate device(s) 104, its category (e.g., type), and/or its state 116 from the user device 102. As described herein, the proximate device 104 may be located proximate to (e.g., nearby) the user device 102. In block 504B, the ad system 100 may generate an ad 118 based on the indication 116. For example, the ad system 100 may generate the ad 118 using ad data 134 (e.g., ad content 406 and/or ad parameters 408) included in one or more ad records 400 stored in the ad data store 114, as also described herein. In block 506B, the ad system 100 may transmit the generated ad 118 to the user device 102. As described with reference to FIG. 5A, the user device 102 may receive the ad 118 from the ad system 100 and display the ad 118 to a user of the device 102.

[0057] FIGS. 6A-6C are flow diagrams that illustrate other example methods 600A-600C, respectively, for generating one or more ads 118 based on one or more of the proximate

device(s) 104 using the ad system 100. In some examples, with reference to FIG. 6A, in block 602A, the ad system 100 may initially receive an indication 116 (e.g., a model name, a model number, and/or a device ID) of one of the proximate device(s) 104 from one of the user device(s) 102. In block 604A, the ad system 100 may identify an ad record 400 included in the ad data store 114 based on the received indication 116. In block 606A, the ad system 100 may generate an ad 118 using ad data 134 (e.g., ad content 406 and/or ad parameters 408) included in the identified ad record 400 and, in block 608A, transmit the generated ad 118 to the user device 102. In other examples, with reference to FIG. 6B, in block 602B, the ad system 100 may initially receive an indication 116 of a type, or general category (e.g., a device type ID indicating the type, or general category) of one of the proximate device(s) 104 from one of the user device(s) 102. In block 604B, the ad system 100 may identify an ad record 400 included in the ad data store 114 based on the received indication 116. In block 606B, the ad system 100 may generate an ad 118 using ad data 134 (e.g., ad content 406 and/or ad parameters 408) included in the identified ad record 400 and, in block 608B, transmit the generated ad 118 to the user device 102, in a similar manner as described with reference to the method 600A. Additionally, or alternatively, with reference to FIG. 6C, in block 602C, the ad system 100 may initially receive an indication 116 of a state (e.g., a state ID indicating the state) of one of the proximate device(s) 104 (or, e.g., of a type, or general category of the device 104) from one of the user device(s) 102. In block 604C, the ad system 100 may identify an ad record 400 included in the ad data store 114 based on the received indication 116. In block 606C, the ad system 100 may generate an ad 118 using ad data 134 (e.g., ad content 406 and/or ad parameters 408) included in the identified ad record 400 and, in block 608C, transmit the generated ad 118 to the user device 102, also in a similar manner as described with reference to the methods 600A.

[0058] FIGS. 7A-7B are flow diagrams that illustrate still other example methods 700A-700B, respectively, for generating one or more ads 118 based on one or more of the proximate device(s) 104 using the ad system 100. In particular, FIGS. 7A-7B illustrate example techniques for identifying ad records 400 included in the ad data store 114 based on indications of the proximate device(s) 104, their types, and/or their states 116 received from the user device(s) 102. With reference to FIG. 7A, in block 702A, the ad system 100 may initially receive an indication of one of the proximate device(s) 104, its type, and/or its state 116 from one of the user device(s) 102. In block 704A, the ad system 100 may further perform a search of the ad data store 114 that includes one or more ad records 400 based on the indication 116. Specifically, the ad system 100 may search the ad data store 114 for one or more ad records 400 that each specify (e.g., include an indication of) the proximate device 104, its type, and/or its state using the indication 116. In block 706A, the ad system 100 may identify one or more ad records 400 included in the ad data store 114 as a result of the search. For example, the ad system 100 may identify the ad records 400 using the ad record identification module 136 of the ad generation module 110. In some examples, the indication of the proximate device 104, its type, and/or its state 116 may include one or more device IDs, type IDs, and/or state IDs that specify the device 104, type, and/or state, respectively. In these examples, to identify the ad records 400, the ad

system 100 (e.g., the ad record identification module 136) may identify one or more ad records 400 included in the ad data store 114 that each specify (e.g., include) one or more of the device IDs, type IDs, and/or state IDs included in the indication 116. In block 708A, the ad system 100 may generate one or more ads 118 using (e.g., ad data 134, such as ad content 406 and/or ad parameters 408, included in) the identified ad records 400. In block 710A, the ad system 100 may further transmit the generated ads 118 (e.g., text and/or image data) to the user device 102.

[0059] FIG. 7B illustrates an alternative method 700B for generating one or more ads 118 based on one or more of the proximate device(s) 104 using the ad system 100. In block 702B, the ad system 100 may initially receive a first indication of one of the proximate device(s) 104, its type, and/or its state 116 from one of the user device(s) 102. In block 704B, the ad system 100 may identify one or more ad records 400 included in the ad data store 114 based on the first indication 116 and based on a mapping (e.g., a look up table) of one or more indications of proximate devices, proximate device types, and/or proximate device states to one or more ad records 400 included in the ad data store 114. For example, the ad system 100 may identify the ad records 400 using the mapping module 140 included as part of the ad logic 138 of the ad generation module 110, and the mapping data 148 included in the ad data store 114. Specifically, the mapping module 140 may be configured to receive the first indication of the proximate device 104, its type, and/or its state 116, which may include one or more device IDs, type IDs, and/or state IDs, from the user device 102. The mapping module 140 may be further configured to input the first indication 116 (e.g., the device IDs, type IDs, and/or state IDs) into a mapping (e.g., a look up table) specified by the mapping data 148, and retrieve indications (e.g., ad record names/IDs 402) of the ad records 400 from the mapping as a result. The mapping module 140 may also be configured to identify the ad records 400 in the ad data store 114 using the retrieved indications. As described herein, the mapping data 148 may be generated and/or updated manually (e.g., via one or more user inputs, such as using the ad data 134 received from advertisers via the advertiser device(s) 108) and/or automatically (e.g., based on historical user behavioral data 152 and/or user ad selection data 154). For example, the ad system 100 may generate and update the mapping data 148 using the mapping generation module 142 and the mapping updating module 144, respectively, included as part of the ad logic 138 of the ad generation module 110. The mapping generation module 142 may generate the mapping data 148 using any combination of user inputs and the historical user behavioral data 150, as described herein. The mapping updating module 144 may update the mapping data 148 using any of one or more user inputs and the user ad selection data 152, as also described herein.

[0060] In block 706B, the ad system 100 may generate one or more ads 118 using (e.g., ad data 134, such as ad content 406 and/or ad parameters 408, included in) the identified ad records 400. In block 708B, the ad system 100 may transmit the generated ads 118 (e.g., text and/or image data) to the user device 102. As described herein, the user device 102 may receive the transmitted ads 118 from the ad system 100 and display the ads 118 to a user of the device 102.

[0061] In block 710B, the ad system 100 may optionally receive a second indication of whether the user of the user device 102 has selected (e.g., touched, or clicked on) one or

more of the transmitted ads **118** (e.g., an indication of user ad selection) **117** from the device **102**. In this disclosure, one or more such indications of user ad selection **117** may be referred to (e.g., collectively) as user ad selection data **152**. In block **712B**, the ad system **100** (e.g., the mapping updating module **144**) may optionally update the mapping data **148** based on the received first and second indications **116**, **117**. Specifically, the ad system **100** may use the second indication **117** to modify the portion of the mapping data **148** used to identify the ad records **400** used to generate the transmitted ads **118** based on the first indication **116**. For instance, in the event the second indication **117** indicates that the user has selected a particular one of the ads **118**, the ad system **100** may retain or reinforce (e.g., strengthen) the mapping, as specified by the mapping data **148**, between the proximate device **104**, its type, and/or its state (e.g., the device IDs, type IDs, and/or state IDs) and the corresponding ad record **400**. Alternatively, in the event the second indication **117** indicates that the user has not selected a given one of the ads **118**, the ad system **100** may reduce (e.g., weaken) or remove the mapping, as specified by the mapping data **148**, between the proximate device **104**, its type, and/or its state (e.g., the device IDs, type IDs, and/or state IDs) and the associated ad record **400**. In this manner, the ad system **100** may be configured to dynamically adjust (e.g., fine-tune) the association between the proximate device(s) **104**, their types, and/or their states and the ad records **400** (i.e., the corresponding ads **118**), as defined by the mapping data **148**, based on the user ad selection data **152** received from the user device **102** and/or other ones of the user device(s) **102**. In some examples, the ad system **100** may also store the user ad selection data **152** in the ad data store **114**, e.g., for later retrieval.

[0062] FIGS. **8A-8C** illustrate example GUIs that may be generated on one of the user device(s) **102** according to the present disclosure. In particular, FIG. **8A** depicts the user device **102** displaying an app state (e.g., a screen) **115** of a native map app (e.g., one of the native app(s) **124**) executing on the device **102**. FIG. **8B**, in turn, depicts the user device **102** displaying a GUI **119** of an ad **118** associated with discounted printer ink along with the app state **115** shown in FIG. **8A**. In the example of FIG. **8B**, the user device **102** may generate the ad **118** (e.g., the GUI **119**) upon identifying one or the proximate device(s) **104**, namely, a networked printer, that is located proximate to the device **102**, as described herein. For example, the user device **102** may generate the ad **118** (e.g., the GUI **119**) based on the proximate device **104**, a category (e.g., a type) of the device **104**, and/or a state of the device **104**, as also described herein. As further shown in FIG. **8B**, a user of the user device **102** may interact with (e.g., preview and/or select) the ad **118** (e.g., touch, or click on, the GUI **119**). As shown in FIG. **8C**, upon the user selecting the ad **118** (e.g., the GUI **119**), the user device **102** may access information (e.g., text and/or image data) associated with the ad **118** (e.g., some of all of which may be included in the GUI **119**). For example, the user device **102** may access the information by opening a web page **121** via the web browser app **122** included on the device **102**, as shown in FIG. **8C**, or by launching an app state of a native app (e.g., any of the native app(s) **124** also included on the device **102**).

[0063] In additional examples, upon identifying one or more of the proximate device(s) **104** in the manner described herein, or using other techniques (e.g., geo-location), the

user device **102** (e.g., via the ad system **100**) may generate an ad **118** associated with one of the identified proximate devices **104** and display the ad **118** to a user of the user device **102**. For example, the ad **118** may specify a monetary discount or another promotion (e.g., 10% off a purchase price) associated with the identified proximate device **104** (e.g., a vending machine). The user may select the ad **118** on the user device **102**. As a result, the user device **102** (e.g., via the ad system **100**) may issue (e.g., generate) a user ID to the user. The user ID may indicate that the user has selected the ad **118** and may be set to expire after a predetermined period of a time following its issuance. The user device **102** may communicate the user ID to the identified proximate device **104** associated with the ad **118** (e.g., upon the user approaching the device **104**). The user may then redeem or take advantage of the monetary discount or promotion specified by the ad **118** at the identified proximate device **104** using the user ID.

[0064] In other examples, one or more of the identified proximate devices **104**, rather than the user device **102**, may generate the ads **118** (e.g., via the ad system **100**) and display the ads **118** to the user of the device **102**. In still other examples, the user device **102** (e.g., via the ad system **100**) may advertise and provide a monetary discount or another promotion associated with one or more particular ones of the proximate device(s) **104** (e.g., 50% off vending machine soda for a month). The monetary discount or promotion may be redeemed or taken advantage of by the user downloading and installing a specific native app (e.g., Venmo®) on the user device **102**. In further examples, the user device **102** (e.g., via the ad system **100**) may generate an ad **118** related to a device category or theme (e.g., fitness) upon determining that the user is located proximate to (e.g., the user is wearing) one of the proximate device(s) **104** associated with that category or theme (e.g., a Fitbit® fitness band).

[0065] In still other examples, the user device **102** may identify the proximate device(s) **104** using any optical communication protocols, interfaces, and technologies, such as wireless infrared communications (e.g., IrDA) and laser-based communications (e.g., using a barcode scanner included in the user device **102** and barcodes present on the proximate device(s) **104**). The user device **102** may then generate the ads **118** (e.g., via the ad system **100**) and display the ads **118** to the user of the device **102**. In further examples, the user device **102** may identify the proximate device(s) **104** using a current location of the device **102** (e.g., GPS coordinates associated with the device **102**) and a database (e.g., a data store) including an indication of one or more proximate devices **104** and their corresponding geographic locations (e.g., GPS coordinates associated with the devices **104**). The user device **102** may then generate the ads **118** and display the ads **118** to the user of the device **102**.

[0066] The modules and data stores included in the ad system **100** represent features or functionality that may be included in the system **100** as it is described in the present disclosure. For example, the ad generation module **110**, ad record generation module **112**, ad data store **114**, and the components thereof may represent features included in the ad system **100**. The modules and data stores described herein may be embodied by electronic hardware, software, firmware, or any combination thereof. Depiction of different features or functionality as separate modules or data stores does not necessarily imply whether the modules or data stores are embodied by common or separate electronic

hardware, software, or firmware components. In some examples, the features or functionality associated with one or more of the modules and data stores may be realized by common or separate electronic hardware, software, or firmware components.

[0067] The modules and data stores may be embodied by electronic hardware, software, and/or firmware components including one or more processing units, memory components, input/output (I/O) components, and interconnect components. The interconnect components may be configured to provide communication between the processing units, memory components, and I/O components. For example, the interconnect components may include one or more buses configured to transfer data between electronic components. The interconnect components may also include one or more control circuits (e.g., a memory controller and/or an I/O controller) configured to control communication between electronic components.

[0068] The processing units may include one or more central processing units (CPUs), graphics processing units (GPUs), digital signal processing units (DSPs), application specific integrated circuits (ASICs), field programmable gate arrays (FPGAs), or other processing units. The processing units may be configured to communicate with the memory components and I/O components. For example, the processing units may be configured to communicate with the memory components and I/O components via the interconnect components.

[0069] A memory component, or memory, as described herein may include any volatile or non-volatile media. For example, a memory component may include electrical media, magnetic media, and/or optical media, such as any of random access memory (RAM), non-volatile RAM (NVRAM), read-only memory (ROM), electrically-erasable programmable ROM (EEPROM), Flash memory, solid state drives (SSDs), hard disk drives (HDDs), magnetic tape drives, optical storage technology (e.g., compact disc, digital versatile disc, and/or Blu-ray Disc), and any other equivalent or similar memory components, systems, or devices. The memory components may include (e.g., store) the various types of data described herein. For example, the memory components may store data included in one or more ad records **400** of the ad data store **114**. The memory components may also include one or more instructions that may be executed by the processing units. For example, the memory components may include one or more computer-readable instructions that, when executed by the processing units, cause the units to perform the various functions attributed to the modules and data stores described herein.

[0070] The I/O components may refer to electronic hardware, software, and/or firmware that provide communication with various different devices. For example, the I/O components may provide communication between other devices and the processing units and memory components. In some examples, the I/O components may be configured to communicate with a computer network, such as the network **106**. For example, the I/O components may be configured to exchange data over a computer network using any of a variety of different physical connections, wireless connections, and protocols. The I/O components may include one or more network interface components (e.g., a network interface controller), repeaters, network bridges, network switches, routers, and firewalls. In some examples, the I/O components may include hardware, software, and/or firm-

ware configured to communicate with various human interface devices, including display screens, keyboards, pointer devices (e.g., a mouse), touchscreens, speakers, and microphones. In other examples, the I/O components may provide communication with additional devices, such as external memory (e.g., external HDDs).

[0071] In some examples, the ad system **100** may be a system of one or more computing devices (e.g., a computerized ad system) configured to implement the techniques described herein. In other words, the features or functionality attributed to the modules and data stores described herein may be implemented by one or more computing devices. Each computing device may include any combination of electronic hardware, software, and/or firmware, as described herein. Additionally, each computing device may include any combination of processing units, memory components, I/O components, and interconnect components, as also described herein. The computing devices of the ad system **100** may also include various human interface devices, including display screens, keyboards, pointing devices (e.g., a mouse), touchscreens, speakers, and microphones. The computing devices may also be configured to communicate with additional devices, such as external memory (e.g., external HDDs).

[0072] The computing devices of the ad system **100** may be configured to communicate with the network **106**. The computing devices may also be configured to communicate with one another (e.g., within the ad system **100**) via a computer network. In some examples, the computing devices may include one or more server computing devices configured to communicate with user devices, such as the user device(s) **102** or advertiser device(s) **108** (e.g., receive indications of proximate devices, their types, and/or their states **116**, ad data **134**, and associated information, and generate and transmit ads **118**). The server computing devices may also gather data from various data sources, index the data, and store the data, as well as gather, index, and/or store other documents or information. The computing devices of the ad system **100** may reside within a single machine or within multiple machines at a single geographic location, or may be distributed across a number of geographic locations.

[0073] Additionally, the various implementations of the ad system **100** described herein (e.g., using one or more computing devices that include one or more processing units, memory components, I/O components, and interconnect components) are equally applicable to any of the user device(s) **102**, proximate device(s) **104**, and advertiser device(s) **108** described herein, as well as to the various components thereof.

What is claimed is:

1. A method comprising:

identifying, using a user device, a proximate device located proximate to the user device using a local wireless network, wherein the proximate device is configured to communicate via the local wireless network, and wherein identifying the proximate device comprises receiving an indication of the proximate device from the proximate device via the local wireless network;

in response to identifying the proximate device, generating, using the user device, an advertisement (ad) based on the identified proximate device; and

displaying the generated ad to a user at the user device.

2. The method of claim 1, wherein the user device and the proximate device are communicatively coupled via the local wireless network, and wherein receiving the indication of the proximate device from the proximate device via the local wireless network comprises receiving the indication as part of the proximate device communicating with the user device.

3. The method of claim 1, wherein the proximate device is connected to the local wireless network, and wherein receiving the indication of the proximate device from the proximate device via the local wireless network comprises receiving the indication in response to the user device performing a scan for computing devices that are connected to the local wireless network.

4. The method of claim 1, wherein receiving the indication of the proximate device from the proximate device via the local wireless network comprises receiving the indication in response to the user device pinging the proximate device via the local wireless network.

5. The method of claim 1, wherein the proximate device and another computing device are communicatively coupled via the local wireless network, and wherein receiving the indication of the proximate device from the proximate device via the local wireless network comprises receiving the indication as part of the proximate device communicating with the other computing device.

6. The method of claim 1, wherein generating the ad based on the identified proximate device comprises determining, using the user device, one or more of a model name, a model number, and a device ID of the identified proximate device, and generating, using the user device, the ad based on the determined one or more of the model name, model number, and device ID.

7. The method of claim 1, wherein generating the ad based on the identified proximate device comprises determining, using the user device, a category of the identified proximate device, and generating, using the user device, the ad based on the determined category.

8. The method of claim 1, wherein generating the ad based on the identified proximate device comprises determining, using the user device, a state of the identified proximate device, and generating, using the user device, the ad based on the determined state.

9. The method of claim 1, wherein generating the ad based on the identified proximate device comprises transmitting, using the user device, an indication of one or more of the identified proximate device, a category of the identified proximate device, and a state of the identified proximate device to an ad system, and receiving, at the user device, the ad from the ad system in response to transmitting the indication.

10. The method of claim 1, wherein generating the ad based on the identified proximate device comprises:

identifying an ad record included in an ad data store based on one or more matches between an indication of one of the identified proximate device, a category of the identified proximate device, and a state of the identified proximate device and information included in the ad record;

selecting ad content from the identified ad record; and generating the ad based on the selected ad content.

11. The method of claim 1, wherein generating the ad based on the identified proximate device comprises:

identifying an ad record included in an ad data store based on an indication of one of the identified proximate device, a category of the identified proximate device, and a state of the identified proximate device and based on a mapping between at least one of a device, a device category, and a device state and one or more ad records included in the ad data store;

selecting ad content from the identified ad record; and generating the ad based on the selected ad content.

12. The method of claim 11, further comprising receiving, at the user device, an indication that the user has selected the ad on the user device, and updating, using the user device, the mapping based on the received indication.

13. The method of claim 1, wherein generating the ad based on the identified proximate device comprises determining, using the user device, that the identified proximate device does not correspond to one or more of a specific device, a specific device category, and a specific device state, and generating, using the user device, the ad based on the determination.

14. The method of claim 1, wherein generating the ad based on the identified proximate device comprises determining, using the user device, an indication of ownership associated with the identified proximate device, and generating, using the user device, the ad based on the determined indication.

15. The method of claim 14, wherein determining the indication of ownership associated with the identified proximate device comprises determining one or more of the following: whether the user has indicated ownership of the identified proximate device via a user input on the user device; whether the user has previously interacted with the identified proximate device via the user device; how frequently the user has previously interacted with the identified proximate device via the user device; whether the user device has been previously located proximate to the identified proximate device; how frequently the user device has been previously located proximate to the identified proximate device; and

whether the user is associated with one or more other devices that are similar to the identified proximate device.

16. The method of claim 1, wherein generating the ad based on the identified proximate device comprises receiving, at the user device, one or more candidate ads from an ad system, and selecting, using the user device, the ad from the one or more candidate ads based on the identified proximate device.

17. The method of claim 1, wherein the local wireless network comprises a Wi-Fi network.

18. The method of claim 1, wherein the local wireless network comprises a Bluetooth network.

19. The method of claim 1 wherein the local wireless network comprises a near-field communications (NFC) network.

20. A computing device comprising:

a network interface component configured to communicate with a local wireless network;

a display device;

one or more memory components configured to store computer-readable instructions; and

one or more processing units configured to execute the computer-readable instructions, wherein the computer-

readable instructions, when executed by the one or more processing units, cause the one or more processing units to:

receive an indication of a proximate device located proximate to the computing device via the local wireless network using the network interface component, wherein the proximate device is configured to communicate via the local wireless network;

identify the proximate device based on the received indication;

in response to identifying the proximate device, generate an advertisement (ad) based on the identified proximate device; and

display the generated ad to a user using the display device.

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