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(54) **SYSTEMS AND METHODS FOR PROVIDING TARGETED CONTENT TO USERS**

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(57) **ABSTRACT**

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**G10L 15/18** (2013.01)

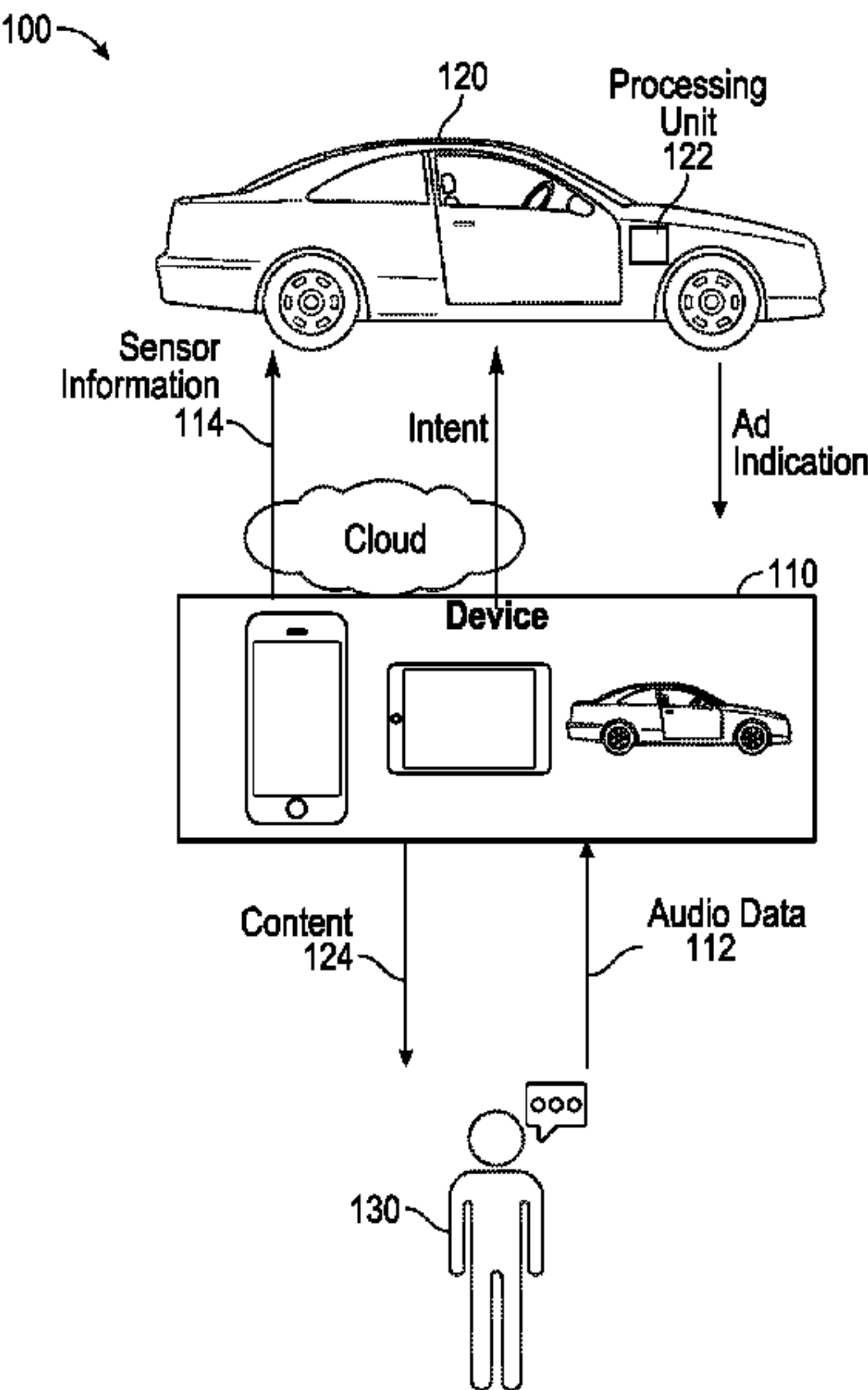
(52) **U.S. Cl.**  
CPC ..... **G06Q 30/0261** (2013.01); **G06F 16/955**  
(2019.01); **G06Q 30/0266** (2013.01); **G06Q**  
**30/0267** (2013.01); **G06Q 30/0271** (2013.01);  
**G10L 15/1815** (2013.01)

The disclosure generally pertains to systems and methods for providing targeted content to users. In an example method, audio data can be received from a device. Sensor data associated with the device may also be received, and the sensor data may include location data. Upon receiving the audio data, an intent associated with the audio data can be determined. At least one of a product, service, or entity may be determined based on the intent. Content may then be determined based on the sensor data and at least one of the product, service, or entity. The content may be associated with a vehicle. An indication of the content can then be sent to the device.

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CPC ..... G06Q 30/0261; G06Q 30/0266; G06Q  
30/0267; G06Q 30/0271; G06Q 30/0265;  
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15/18

See application file for complete search history.

**14 Claims, 5 Drawing Sheets**



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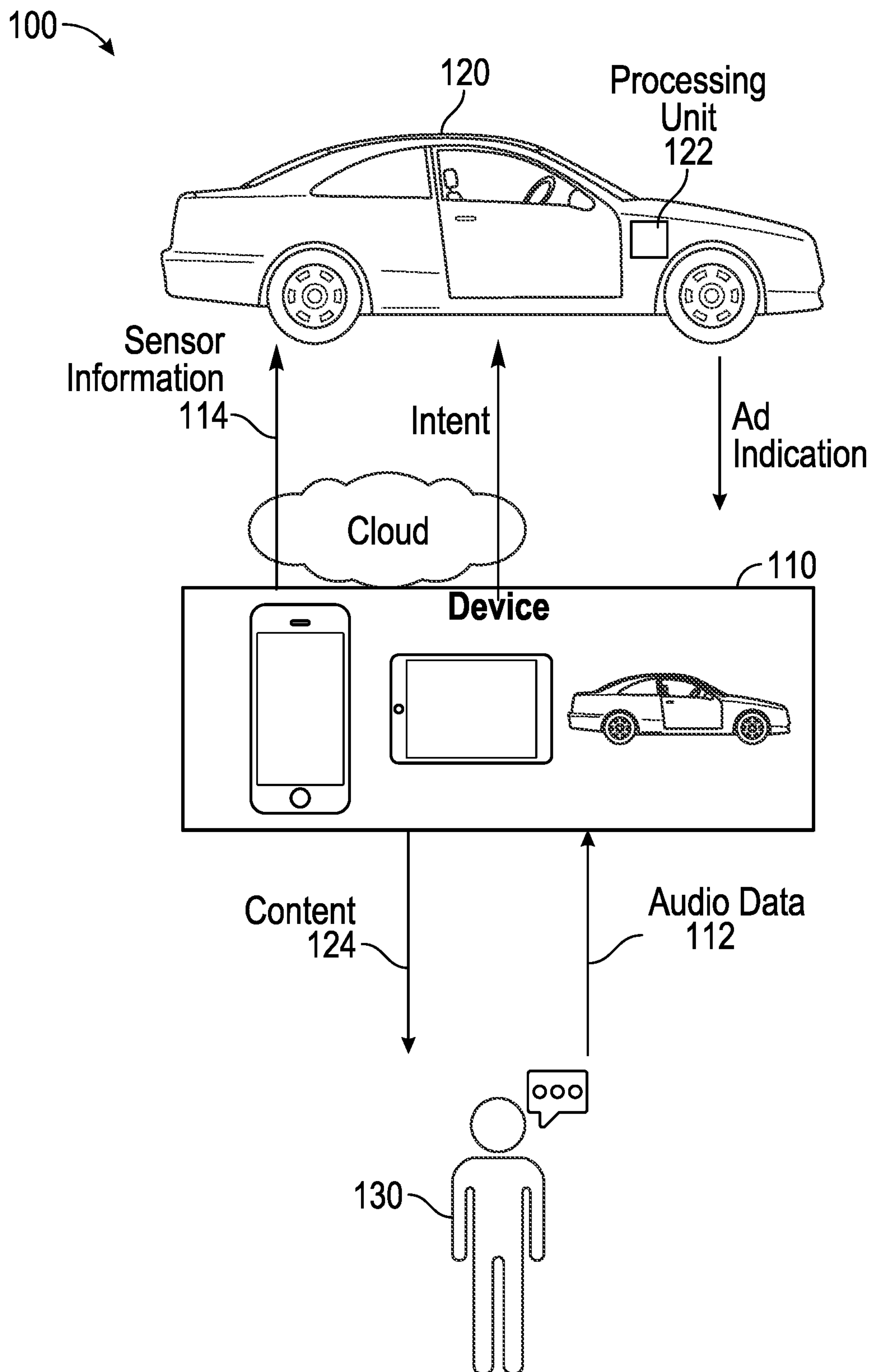
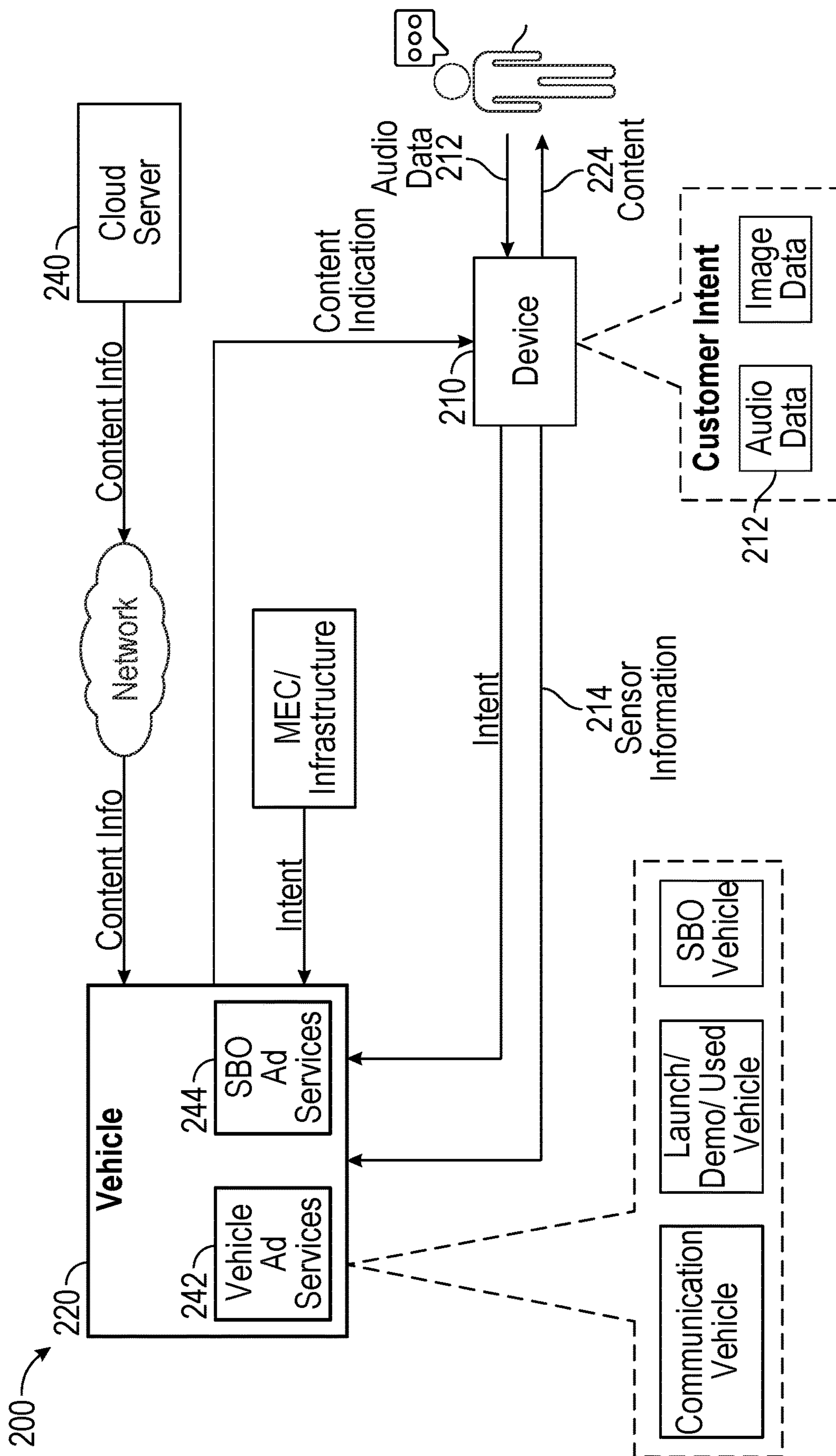
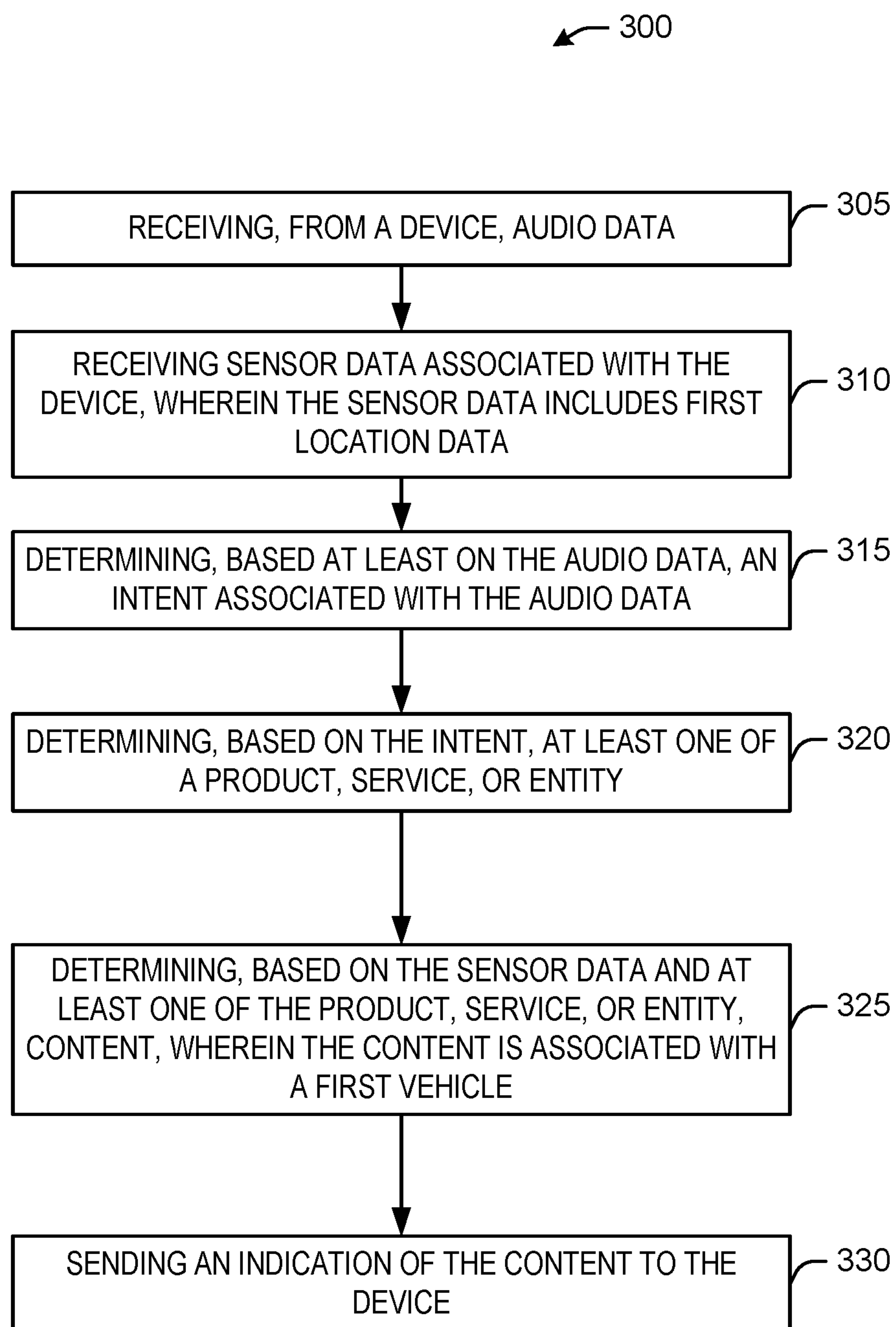


FIG. 1



**FIG. 2**

**FIG. 3**



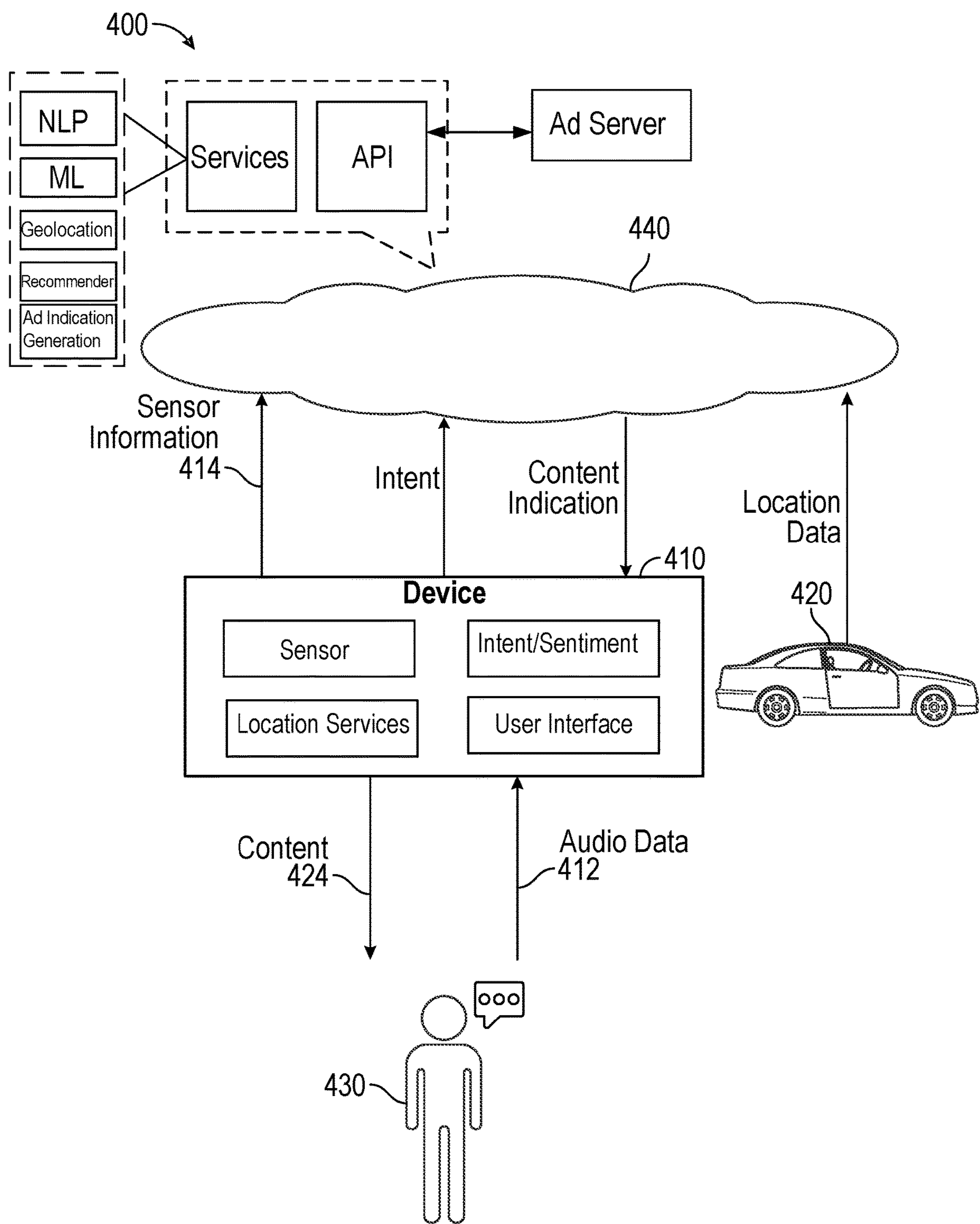


FIG. 4

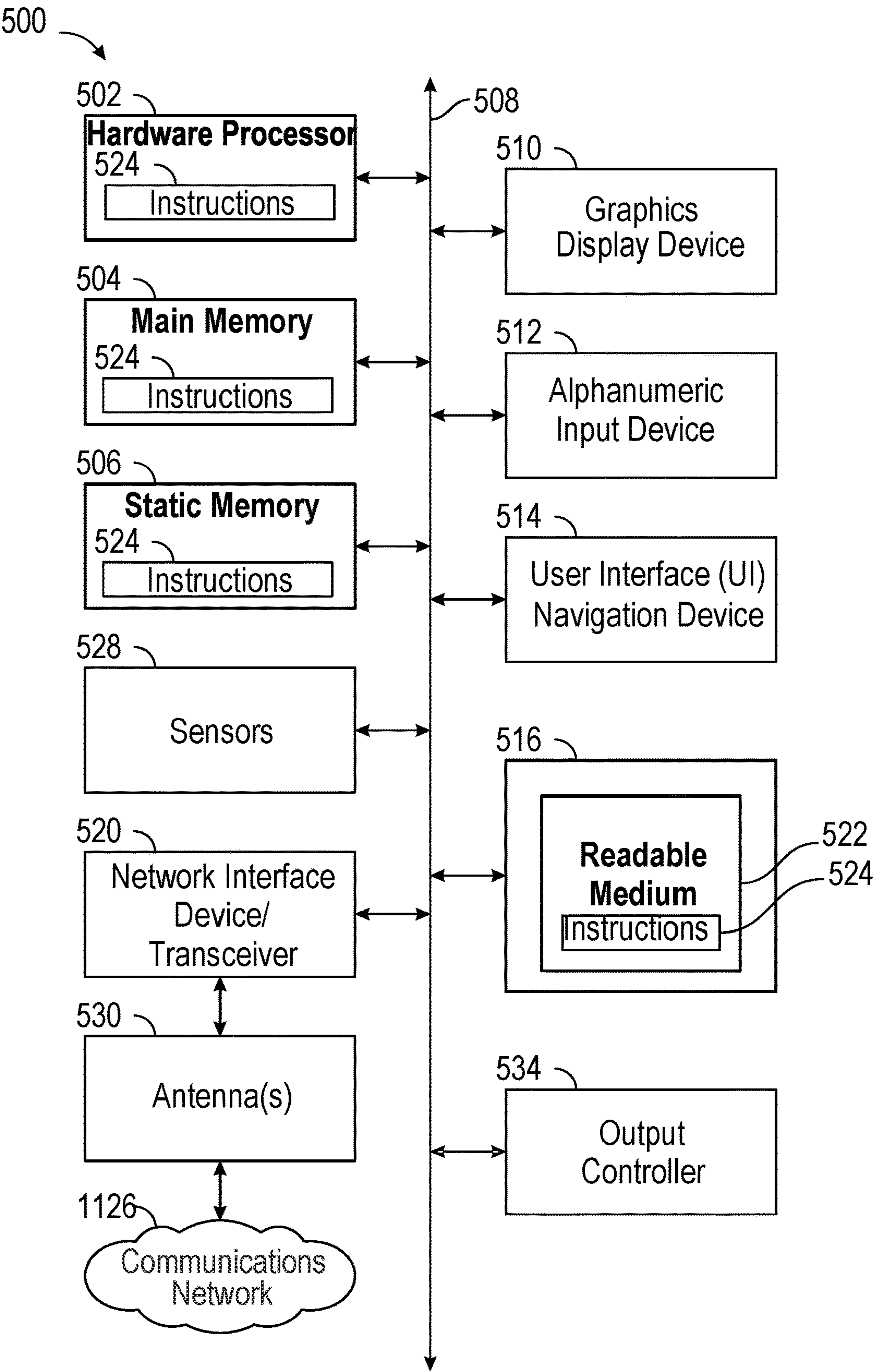


FIG. 5



## SYSTEMS AND METHODS FOR PROVIDING TARGETED CONTENT TO USERS

### BACKGROUND

Business owners may seek to advertise their businesses to users via banner content and web-based content. However, in some instances, because a user may view the content at a time where the products, services, or entities associated with the content may not be necessary to the potential user, the user may not retain the information contained in the content until such a time as the user acts on a need for said products, services, or entities. Even if the user searches for the product, service, or entity at a later time, an internet search may not return certain business owners' information viewed by the user.

### BRIEF DESCRIPTION OF THE DRAWINGS

A detailed description is set forth below with reference to the accompanying drawings. The use of the same reference numerals may indicate similar or identical items. Various embodiments may utilize elements and/or components other than those illustrated in the drawings, and some elements and/or components may not be present in various embodiments. Elements and/or components in the figures are not necessarily drawn to scale. Throughout this disclosure, depending on the context, singular and plural terminology may be used interchangeably.

FIG. 1 illustrates an example system for determining targeted content in accordance with an embodiment of the disclosure.

FIG. 2 illustrates an example implementation of an advertising service in accordance with an embodiment of the disclosure.

FIG. 3 depicts a flow chart of an example method of sending content to an interested user in accordance with the disclosure.

FIG. 4 illustrates an example system for determining targeted content in accordance with an embodiment of the disclosure.

FIG. 5 depicts a block diagram of an example machine upon which any of one or more techniques (e.g., methods) may be performed, in accordance with an embodiment of the disclosure.

### DETAILED DESCRIPTION

#### Overview

In terms of a general overview, certain embodiments described in this disclosure are directed to systems and methods for providing targeted content to users. In an example method, audio data can be received from a device. Sensor data, which may be indicative of a location of the device approximate to the time that the audio data is received by the device, may also be received. Upon receiving the audio data, an intent associated with the audio data can be determined. At least one of the products, services, or entities may be determined based on the intent. Targeted content, such as an advertisement, may then be determined based on the sensor data and at least one of the products, services, or entities. The content may be associated, for example, with a vehicle at a location proximate to the device location, as may be determined through the sensor data. An indication of the content can then be sent to the device.

### Illustrative Embodiments

The disclosure will be described more fully hereinafter with reference to the accompanying drawings, in which example embodiments of the disclosure are shown. This disclosure may, however, be embodied in many different forms and should not be construed as limited to the example embodiments set forth herein. It will be apparent to persons skilled in the relevant art that various changes in form and detail can be made to various embodiments without departing from the spirit and scope of the present disclosure. Thus, the breadth and scope of the present disclosure should not be limited by any of the above-described example embodiments but should be defined only in accordance with the following claims and their equivalents. The description below has been presented for the purposes of illustration and is not intended to be exhaustive or to be limited to the precise form disclosed. It should be understood that alternate implementations may be used in any combination desired to form additional hybrid implementations of the present disclosure. For example, any of the functionality described with respect to a particular device or component may be performed by another device or component.

Furthermore, while specific device characteristics have been described, embodiments of the disclosure may relate to numerous other device characteristics. Further, although embodiments have been described in language specific to structural features and/or methodological acts, it is to be understood that the disclosure is not necessarily limited to the specific features or acts described. Rather, the specific features and acts are disclosed as illustrative forms of implementing the embodiments.

Certain words and phrases are used herein solely for convenience and such words and terms should be interpreted as referring to various objects and actions that are generally understood in various forms and equivalencies by persons of ordinary skill in the art. For example, the word "customer" may be used interchangeably with the word "user." Either word as used herein refers to any individual whose intent is being determined. The word "device" may be any of various devices, such as, for example, a user device such as a smartphone or a tablet, a smart vehicle, and a computer. The word "vehicle" may be used interchangeably with the phrase "business vehicle."

It must also be understood that words such as "implementation," "scenario," "case," and "situation" as used herein are an abbreviated version of the phrase "in an example" ("implementation," "scenario," "case," "approach," and "situation") in accordance with the disclosure. Furthermore, the word "example" as used herein is intended to be non-exclusionary and non-limiting in nature.

FIG. 1 illustrates an example system 100 for determining targeted content in accordance with an embodiment of the disclosure. A device 110 may be used to receive audio data 112 and to determine sensor information 114. In some embodiments, the device 110 may be a user device, such as a smartphone, a tablet, a laptop, a wearable device, or other user devices. In other embodiments, the device 110 may be an integral component of a vehicle that a user is either driving or a vehicle that the user is a passenger in. In some embodiments, the audio data 112 may include content that is being spoken or expressed by a user 130. In some embodiments, the sensor information 114 may include content associated with the device 110, for example, image data or location data associated with the device 110.

In some embodiments, the audio data 112 may be locally processed at the device 110 or may be remotely processed at



a server. In some embodiments, the audio data **112** may be processed using natural language programming (NLP). In some embodiments, an intent of the user **130** may be identified based on the audio data **112**. The intent and the sensor information **114** may then be transmitted to a nearby business vehicle **120** having a processing unit **122**. In some embodiments, the business vehicle **120** may be considered to be nearby if it is within a predetermined distance of the device **110**. For example, business vehicles **120** may be considered to be nearby or proximate if they are within half a mile of the device **110**. In other embodiments, the business vehicle **120** may be considered to be nearby if it was within the predetermined distance from the device **110** within a predefined period of time. For example, if the business vehicle **120** was within the predetermined distance of the device **110** within the past ten minutes, then the business vehicle **120** may be considered to be nearby.

In some embodiments, the processing unit **122** may then determine a product, a service, and/or an entity associated with the intent of the user **130**. For example, if the intent of the user **130** is to paint their house, then the determined products, services, and/or entities may include house painting businesses, house painting services, paints, and paint materials. In some embodiments, the processing unit **122** may determine if a business associated with the business vehicle **120** matches the intent of the user

The processing unit **122** may then identify content **124** based on the sensor information **114** and the determined products, services, and/or entities. For example, in the instance above, the content **124** may include advertisements for house painting businesses, house painting services, paints, and paint materials. In some embodiments, the content **124** may be associated with the business vehicle **120**.

In other embodiments, the content **124** may be associated with another vehicle at a location proximate to the device **110**. In some embodiments, proximity may refer to the other vehicle being within a predetermined distance of the device **110**. For example, the other vehicle may be considered to be nearby or proximate if it is within half a mile of the device **110**. In other embodiments, the other vehicle may be considered to be nearby if it was within the predetermined distance from the device **110** within a predefined period of time. For example, if the other vehicle was within the predetermined distance from the device **110** in the past ten minutes, then the another vehicle may be considered proximate.

In some embodiments, an indication of the content **124** may be generated and then sent to the device **110**. In some embodiments, indications of the content **124** may include web links associated with the product, service, and/or entity, QR codes associated with the product, service, and/or entity, and any other means of providing the user **130** with access to the product, service, and/or entity. In such an embodiment, the web links, QR codes, and other means of providing the user **130** with access to the product, service, and/or entity are directly sent to the device **110**. In other embodiments, indications of the content **124** may be in the form of a cookie that may be stored at device **110** until such time as the user **130** searches for content associated with the product, service, and/or entity. In such an embodiment, the cookie may be sent to the device **110** and the content **124** may not be presented to the user **130** until the user **130** actively searches for content associated with the product, service, and/or entity or until the user **130** seeks to access information associated with the product, service, and/or entity. In such an embodiment, the user **130** may be associated with an anonymous ID.

In some embodiments, the device **110** and the business vehicle **120** are configured to communicate via a network, such as, for example, a computer (a server computer, a cloud computer, etc.) and/or a cloud storage device.

The network may include any one, or a combination of networks, such as, for example, a local area network (LAN), a wide area network (WAN), a telephone network, a cellular network, a cable network, a wireless network, and/or private/public networks such as the Internet. Further, a variety of direct communication protocols and network-based communications technologies, such as, for example, TCP/IP, Bluetooth®, near-field communication (NFC), Wi-Fi, Wi-Fi Direct, Ultra-Wideband (UWB), cellular, ZigBee®, machine-to-machine communication, and/or man-to-machine communication.

FIG. 2 illustrates an example implementation of an advertising service **200** in accordance with an embodiment of the disclosure. An advertising service **200** may involve a user device **210**. As depicted in FIG. 2, the user device **210** may be a smartphone. Although not depicted in FIG. 2, the user device **210** may be a vehicle computer in a vehicle. In some embodiments, the user device **210** may be used to collect audio data **212** and/or other sensor information **214** if a user **230** has approved the collection of such audio data **212** and/or other sensor information **214**. In some embodiments, the collection of audio data **212** may be performed with the assistance of a voice assistant.

In some embodiments, the user's **230** intent may be determined based on the audio data **212**. For example, the user **230** may be talking about obtaining a new electric vehicle or painting their house. Audio data **212** associated with the user's **230** speech may then be collected and used for processing. In some embodiments, the audio data **212** is collected and processed locally at the user device **210** or remotely at a cloud server, for example, cloud server **240**, to determine the user's intent. The user's **230** intent or sentiment may further be determined based at least in part on the audio data **212** and image collected at the device **210**. For example, NLP may be applied to determine that the user **230** is intending to buy a new electric vehicle or paint their house. In one embodiment, the audio data **212** may be processed at an audio processing module configured to determine the contents of the audio data **212**. For example, the audio processing module may parse or segment the audio data **212** to identify words, phrases, and other expressions that may be indicative of the user's **230** intent. In some embodiments, an unidentifiable or an untaggable hashed identification (ID) may be generated in connection with the user's **230** determined intent.

In some embodiments, the user's **230** intent may further be determined based at least in part on mobile-edge computing (MEC) or infrastructure. In some embodiments, the user's **230** intent may further be determined based at least in part on cameras at roadside units or Remote Side Units (RSUs). For example, the user's **230** body positioning, conversations, and/or orientation may be captured by a camera at the MEC or an RSU, and this information may be used to determine the user's **230** intent based on posture analysis and/or NLP. As an example, if the camera at the MEC or the RSU detects the user **230** leaning towards and observing a particular vehicle for a period of time, the MEC or RSU may generate a query for devices in the surrounding area, and may continue to send queries to surrounding devices if no historical interest is detected at the devices. If the MEC or RSU is unable to establish a link to surrounding devices, the MEC or RSU may be able to query cloud server **240** for IDs associated with proximate devices. The IDs



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associated with proximate devices may refer to device IDs or account IDs associated with the proximate devices.

In some embodiments, the user's **230** intent may be inferred by the business vehicle **220**. For example, if the user **230** is standing in front of the business vehicle **220**, at least one camera at the business vehicle **220** may determine the user's **230** intent by evaluating the user's **230** body positioning, conversations, and/or orientation. The user's **230** intent may be determined at a processing unit of the business vehicle **220** or remotely at the cloud server **240**.

Thus, in addition to the user's **230** intent being determined at the business vehicle **220** or at the cloud server **240**, it is possible that the user's **230** intent may be determined at device **210** or the MEC. For example, the business vehicle **220** may receive the user's **230** intent directly via a network as a Network-to-Vehicle link. The business vehicle **230** may also receive the user's **230** intent directly via device **210**, for example, a smartphone. The business vehicle **220** may also receive the user's **230** intent directly from the MEC wireless as Infrastructure-to-Vehicle communications via wireless communications protocol, for example, PCS, Bluetooth®, Wi-Fi, and other wireless communications protocols. In such embodiments, only an anonymized ID associated with the device **210**, location data associated with the device **210**, and the user's **230** intent may be transmitted from the device **210**.

In some embodiments, a notification of the determined intent may be sent from the device **210** to a business vehicle **220**. In some embodiments, the business vehicle **220** may be a commercial vehicle, a launch vehicle, a demo vehicle, a used vehicle, a vehicle owned by a small business owner, or a Ford vehicle. The business vehicle **220** may include vehicle advertisement services **242** and small business owner (SBO) advertisement services **244**. Vehicle advertisement services **242** may include dealership information, vehicle inventory, vehicle features, location-based grouping information, targeted advertisement databases, and other information. SBO advertisement services **244** may include location services, local transaction information, location-based grouping information, advertisement databases associated with SBOs, and other SBO features.

In some embodiments, the determined intent may be used to generate an indication of content **224**. Information relating to content **224** may be transmitted to business vehicle **220** from cloud server **240** through a network. The business vehicle **220** may then transmit an indication of the content **224** to the device **210**. The indication may be transmitted to the device **210** via a Vehicle-to-Network (V2N), a Vehicle-to-Infrastructure (V2I), a Vehicle-to-Everything (V2X), or a Vehicle-to-Pedestrian (V2P) communication. In some instances, the indication may take the form of a cookie to be stored at the device, and the content **224** may then later be displayed at a device **110**, for example, a smartphone or a laptop, when the user **230** searches for content related to the content **224**. In some instances, the indication may include SBO information or Direct-to-Customer information. In some embodiments, the device **210** may query the user **230** if the user **230** is interested in storing cookies relating to content **224**. If the user **230** indicates interest, the indication of the content **224** may then be transmitted to the device **210**. In some embodiments, if the device **210** is a vehicle, the content **224** may be presented to the user **230** via an infotainment system of the vehicle in real time. The content **224** may directly present an offer of services associated with the product, service, and/or entity, or the content **224** may take the form of an advertisement that the user **230** may click to reach an offer of services. The user **230** may then indicate

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interest in the offer of services, or the offer of services may be automatically associated with the user **230**. In some instances, where the infotainment system of the vehicle is connected to other accounts owned by the user **230**, the indication of the content **224**, for example, a cookie, may be sent to the other accounts owned by the user **230**. Subsequently, when the user **230** uses a device, for example, device **110** as depicted in FIG. 1, that is connected to the other accounts, the indication of the content **224** is automatically implemented to assist the user **230** in locating the previously-generated offer of services.

In some embodiments, device **210** may determine a present location of the device **210** and transmit requests to a nearby business vehicle **220** for content **224**. If the business vehicle **220** is seeking to send out content **224**, then an indication of the content **224** is transmitted from the business vehicle **220** to the device **210**.

In some embodiments, the cloud server **240** may store hash IDs associated with the content **224**, location information associated with the device **210** and the business vehicle **220**, zoning information, for example, a city or street that the device **210** and the business vehicle **220** are in, a user profile data or a user account data, a user's historical interests, a user's cookie history, and other relevant information.

In some embodiments, an overall analysis of data collected, including the number of indications of the content **224** sent to users, the timing of indications of content **224** sent to users, and other information may be provided to business owners who advertise through the advertising service **200**.

In some embodiments, if the intent of the user **230** is determined to be to purchase a new vehicle, the indication of content **224** may be configured such that the content **224** may provide information associated with various vehicles for purchase and relevant information, for example, local dealership information, inventory at local dealerships, features of certain types of vehicles, comparisons between multiple vehicles, and other information.

FIG. 3 depicts a flow chart **300** of an example method of sending content to a user in accordance with the disclosure. The flow chart **300** illustrates a sequence of operations that can be implemented in hardware, software, or a combination thereof. In the context of software, the operations represent computer-executable instructions stored on one or more non-transitory computer-readable media such as a memory, that, when executed by one or more processors, perform the recited operations. Generally, computer-executable instructions include routines, programs, objects, components, data structures, and the like that perform particular functions or implement particular abstract data types. The order in which the operations are described is not intended to be construed as a limitation, and any number of the described operations may be carried out in a different order, omitted, combined in any order, and/or carried out in parallel. Some or all of the operations described in the flow chart **300** may be carried out by the business vehicle **120** either independently or in cooperation with other devices such as, for example, user device **110**, and cloud elements (such as, for example, the cloud storage server **240**).

At block **305**, audio data may be received from a device. In some embodiments, the audio data may be received from a user device associated with a user, such as a mobile phone. In other embodiments, the audio data may be received from a vehicle computer associated with a vehicle that the user is in. The audio data may include words and/or sounds expressed by the user.



At block **310**, sensor data associated with the device may be received. In some embodiments, the sensor data may include image data and/or location data associated with the device, which may be the user device or a vehicle computer. In some optional embodiments, the audio data and the sensor data may be received via a wireless communications protocol, for example, Bluetooth®, Wi-Fi, Wi-Max, LTE, or ZigBee®.

At block **315**, an intent of the user may be determined based at least on the audio data. In some instances, the intent of the user may be determined by applying NLP to the audio data. In some embodiments, NLP may be applied at the device to determine the intent. In other embodiments, NLP may be applied at a location remote to the device to determine the intent.

At block **320**, at least one of a product, service, or entity may be determined based on the intent of the user. As an example, if a user's intent was determined to be associated with plumbing, then products, services, and/or entities associated with plumbing may be determined. In some embodiments, the determination of the product, service, or entity may be additionally based at least in part on a user profile or a user account associated with the device. In such embodiments, the user profile data or the user account data may include an age of the user, a sex of the user, a current address of the user, the user's prior views of products, services, and/or entities, the user's previous purchases, etc. The user profile or the user account may include additional information associated with the user.

At block **325**, content may be determined based on the sensor data and at least one of the product, service, or entity. The content may be associated with a business vehicle at a location proximate to the device. In some embodiments, a business vehicle's proximity to the device may be determined based at least in part on a predetermined distance between the business vehicle's detected location and the device. For example, the content may be associated with a business vehicle at a location not more than half a mile away from the device. In some embodiments, the business vehicle's proximity may be further determined based at least in part on a most recent time that the business vehicle was within a predetermined distance from the device. For example, the content may only be determined if the business vehicle was within the predetermined distance from the device less than ten minutes ago.

At block **330**, an indication of the content may be sent to the device. In some embodiments, the indication may be configured to be stored at the device. For example, the indication may be in the form of a cookie, which may be stored at the device. In other embodiments, the indication may be in the form of a web link associated with the product, service, or entity, which enables presentation of the content at the device. In some embodiments, prior to the indication of the content being sent to the device, the indication of the content may be generated. In some embodiments, the indication may be generated at the business vehicle, for example, the business vehicle **120**. In other embodiments, the indication may be generated at an advertisement server, for example, the cloud server **240**.

FIG. **4** illustrates an example system **400** for determining targeted content in accordance with an embodiment of the disclosure. A device **410** may be used to receive audio data **412** and to determine sensor information **414**. In some embodiments, the device **410** may be a user device, such as a smartphone, a tablet, a laptop, or other user devices. In other embodiments, the device **410** may be a vehicle computer of a vehicle that a user is either driving or a vehicle that

the user is a passenger in. In some embodiments, the device **410** may include at least one sensor, such as a microphone, a camera, a Lidar sensor, or any other applicable sensors. The device **410** may further include location service features, for example, a Global Positioning System (GPS), at least one gyro sensor, and any other features that may assist in determining a location of the device **410**. The device **410** may additionally include an intent/sentiment determination module, which may be used to interpret the audio data **412** and determine a user's **430** intent. In some embodiments, the device **410** may further include a user interface. The user interface may include a display screen, at least one speaker, at least one haptic sensor, and other features that may aid the user **430** in interacting with the device **410**. In some embodiments, the audio data **412** may include content that is being spoken or expressed by the user **430**. In some embodiments, the sensor information **414** may include content associated with the device **410**, for example, location data associated with the device **410**.

In some embodiments, the audio data **412** and the sensor information **414** may be transmitted from the device **410** to a cloud server **440**. The cloud server **440** may include an API (Application Programming Interface) and/or a variety of services, such as a recommender service, a geolocation service, a NLP service, a Machine Learning (ML) service, an ad indication generation service, and other services that may assist the cloud server **440**. In some embodiments, the API may be configured to communicate with an ad server for determining an advertisement that is associated with the user's **430** intent. The audio data **412** may then be processed at the cloud server **440**. In some embodiments, the audio data **412** may be processed using natural language programming (NLP). In some embodiments, an intent of the user **430** may be determined at the device **410** based on the audio data **412**. In some embodiments, the cloud server **440** may then determine a product, a service, and/or an entity associated with the intent of the user **430**. For example, if the intent of the user **430** is to paint a house, then the determined products, services, and/or entities may include house painting businesses, house painting services, paints, and paint materials.

The cloud server **440** may then identify content **424** based on the sensor data **414** and the determined products, services, and/or entities. For example, in the instance above, the content **424** may include advertisements for house painting businesses, house painting services, paints, and paint materials. In some embodiments, the content **424** may be associated with a vehicle **420** at a location proximate to the device **410**, for example, a location determined by the sensor information **114** in FIG. **1**. In some embodiments, proximity may refer to the vehicle **420** being within a predetermined distance of the device **410**. For example, the vehicle **420** may be considered to be nearby or proximate if it is within half a mile of the device **410**. In other embodiments, the vehicle **420** may be considered to be nearby if it was within the predetermined distance from the device **410** within a predefined period of time. For example, if the vehicle **420** was within the predetermined distance from the device **410** in the past ten minutes, then the vehicle **420** may be considered proximate. The cloud server **440** may therefore be configured to receive location data from vehicle **420** and other vehicles that are connected to the cloud server **440** in order to know which vehicles are proximate to the device **410**.

In some embodiments, an indication of the content **424** may be identified or generated by the cloud server **440**. In some embodiments, indications of the content **424** may



include web links associated with the product, service, and/or entity, QR codes associated with the product, service, and/or entity, and any other means of providing the user **430** with access to the product, service, and/or entity. In other embodiments, indications of the content **424** may be in the form of a cookie that may be transmitted to and stored at device **410** until such time as the user **430** searches for content associated with the product, service, and/or entity. In such an embodiment, the content **424** may not be presented to the user **430** until the user **430** actively searches for content associated with the product, service, and/or entity.

In some embodiments, the device **410** and the vehicle **420** are configured to communicate with the cloud server **440** via a network, such as, for example, a computer (a server computer, a cloud computer, etc.) and/or a cloud storage device.

The network may include any one, or a combination of networks, such as, for example, a local area network (LAN), a wide area network (WAN), a telephone network, a cellular network, a cable network, a wireless network, and/or private/public networks such as the Internet. The network may support any of various communications technologies, such as, for example, TCP/IP, Bluetooth®, near-field communication (NFC), Wi-Fi, Wi-Fi Direct, Ultra-Wideband (UWB), cellular, ZigBee®, machine-to-machine communication, and/or man-to-machine communication.

FIG. 5 depicts a block diagram of an example machine **500** upon which any of one or more techniques (e.g., methods) may be performed, in accordance with one or more example embodiments of the present disclosure. In other embodiments, the machine **500** may operate as a standalone device or may be connected (e.g., networked) to other machines. In a networked deployment, the machine **500** may operate in the capacity of a server machine, a client machine, or both in server-client network environments. In an example, the machine **500** may act as a peer machine in peer-to-peer (P2P) (or other distributed) network environments. The machine **500** may be a personal computer (PC), a tablet PC, a set-top box (STB), a personal digital assistant (PDA), a mobile telephone, a wearable computer device, a web appliance, a network router, a switch or bridge, or any machine capable of executing instructions (sequential or otherwise) that specify actions to be taken by that machine, such as a base station. In some embodiments, the machine **500** may be the device **110**, as depicted in FIG. 1. In other embodiments, the machine **500** may be the business vehicle **120**, as depicted in FIG. 1. Further, while only a single machine is illustrated, the term “machine” shall also be taken to include any collection of machines that individually or jointly execute a set (or multiple sets) of instructions to perform any one or more of the methodologies discussed herein, such as cloud computing, software as a service (SaaS), or other computer cluster configurations.

Examples, as described herein, may include or may operate on logic or a number of components, modules, or mechanisms. Modules are tangible entities (e.g., hardware) capable of performing specified operations when operating. A module includes hardware. In an example, the hardware may be specifically configured to carry out a specific operation (e.g., hardwired). In another example, the hardware may include configurable execution units (e.g., transistors, circuits, etc.) and a computer readable medium containing instructions where the instructions configure the execution units to carry out a specific operation when in operation. The configuring may occur under the direction of the execution units or a loading mechanism. Accordingly, the execution units are communicatively coupled to the computer-readable

medium when the device is operating. In this example, the execution units may be a member of more than one module. For example, under operation, the execution units may be configured by a first set of instructions to implement a first module at one point in time and reconfigured by a second set of instructions to implement a second module at a second point in time.

The machine (e.g., computer system) **500** may include a hardware processor **502** (e.g., a central processing unit (CPU), a graphics processing unit (GPU), a hardware processor core, or any combination thereof), a main memory **504** and a static memory **506**, some or all of which may communicate with each other via an interlink (e.g., bus) **508**. The machine **500** may further include a graphics display device **510**, an alphanumeric input device **512** (e.g., a keyboard), and a user interface (UI) navigation device **514** (e.g., a mouse). In an example, the graphics display device **510**, the alphanumeric input device **512**, and the UI navigation device **514** may be a touch screen display. The machine **500** may additionally include a storage device (i.e., drive unit) **516**, a network interface device/transceiver **520** coupled to antenna(s) **530**, and one or more sensors **528**, such as a global positioning system (GPS) sensor, a compass, an accelerometer, or other sensor. The machine **500** may include an output controller **534**, such as a serial (e.g., universal serial bus (USB), parallel, or other wired or wireless (e.g., infrared (IR), near field communication (NFC), etc.) connection to communicate with or control one or more peripheral devices (e.g., a printer, a card reader, etc.)).

The storage device **516** may include a machine readable medium **522** on which is stored one or more sets of data structures or instructions **524** (e.g., software) embodying or utilized by any one or more of the techniques or functions described herein. The instructions **524** may also reside, completely or at least partially, within the main memory **504**, within the static memory **506**, or within the hardware processor **502** during execution thereof by the machine **500**. In an example, one or any combination of the hardware processor **502**, the main memory **504**, the static memory **506**, or the storage device **516** may constitute machine-readable media.

While the machine-readable medium **522** is illustrated as a single medium, the term “machine-readable medium” may include a single medium or multiple media (e.g., a centralized or distributed database, and/or associated caches and servers) configured to store the one or more instructions **524**.

Various embodiments may be implemented fully or partially in software and/or firmware. This software and/or firmware may take the form of instructions contained in or on a non-transitory computer-readable storage medium. Those instructions may then be read and executed by one or more processors to enable performance of the operations described herein. The instructions may be in any suitable form, such as but not limited to source code, compiled code, interpreted code, executable code, static code, dynamic code, and the like. Such a computer-readable medium may include any tangible non-transitory medium for storing information in a form readable by one or more computers, such as but not limited to read only memory (ROM); random access memory (RAM); magnetic disk storage media; optical storage media; a flash memory, etc.

The term “machine-readable medium” may include any medium that is capable of storing, encoding, or carrying instructions for execution by the machine **500** and that cause the machine **500** to perform any one or more of the techniques of the present disclosure, or that is capable of storing,



encoding, or carrying data structures used by or associated with such instructions. Non-limiting machine-readable medium examples may include solid-state memories and optical and magnetic media. In an example, a massed machine-readable medium includes a machine-readable medium with a plurality of particles having resting mass. Specific examples of massed machine-readable media may include non-volatile memory, such as semiconductor memory devices (e.g., electrically programmable read-only memory (EPROM), or electrically erasable programmable read-only memory (EEPROM)) and flash memory devices; magnetic disks, such as internal hard disks and removable disks; magneto-optical disks; and CD-ROM and DVD-ROM disks.

The instructions **524** may further be transmitted or received over a communications network **526** using a transmission medium via the network interface device/transceiver **520** utilizing any one of a number of transfer protocols (e.g., frame relay, internet protocol (IP), transmission control protocol (TCP), user datagram protocol (UDP), hypertext transfer protocol (HTTP), etc.). Example communications networks may include a local area network (LAN), a wide area network (WAN), a packet data network (e.g., the Internet), mobile telephone networks (e.g., cellular networks), plain old telephone (POTS) networks, wireless data networks (e.g., Institute of Electrical and Electronics Engineers (IEEE) 802.11 family of standards known as Wi-Fi®, IEEE 802.16 family of standards known as WiMax®, IEEE 802.15.4 family of standards, and peer-to-peer (P2P) networks, among others. In an example, the network interface device/transceiver **520** may include one or more physical jacks (e.g., Ethernet, coaxial, or phone jacks) or one or more antennas to connect to the communications network **526**. In an example, the network interface device/transceiver **520** may include a plurality of antennas to wirelessly communicate using at least one of single-input multiple-output (SIMO), multiple-input multiple-output (MIMO), or multiple-input single-output (MISO) techniques. The term “transmission medium” shall be taken to include any intangible medium that is capable of storing, encoding, or carrying instructions for execution by the machine **500** and includes digital or analog communications signals or other intangible media to facilitate communication of such software. The operations and processes described and shown above may be carried out or performed in any suitable order as desired in various implementations. Additionally, in certain implementations, at least a portion of the operations may be carried out in parallel. Furthermore, in certain implementations, less than or more than the operations described may be performed.

Some embodiments may be used in conjunction with various devices and systems, for example, a personal computer (PC), a desktop computer, a mobile computer, a laptop computer, a notebook computer, a tablet computer, a server computer, a handheld computer, a handheld device, a personal digital assistant (PDA) device, a handheld PDA device, an on-board device, an off-board device, a hybrid device, a vehicular device, a non-vehicular device, a mobile or portable device, a consumer device, a non-mobile or non-portable device, a wireless communication station, a wireless communication device, a wireless access point (AP), a wired or wireless router, a wired or wireless modem, a video device, an audio device, an audio-video (A/V) device, a wired or wireless network, a wireless area network, a wireless video area network (WVAN), a local area network (LAN), a wireless LAN (WLAN), a personal area network (PAN), a wireless PAN (WPAN), and the like.

Some embodiments may be used in conjunction with one way and/or two-way radio communication systems, cellular radio-telephone communication systems, a mobile phone, a cellular telephone, a wireless telephone, a personal communication system (PCS) device, a PDA device which incorporates a wireless communication device, a mobile or portable global positioning system (GPS) device, a device which incorporates a GPS receiver or transceiver or chip, a device which incorporates an RFID element or chip, a multiple input multiple output (MIMO) transceiver or device, a single input multiple output (SIMO) transceiver or device, a multiple input single output (MISO) transceiver or device, a device having one or more internal antennas and/or external antennas, digital video broadcast (DVB) devices or systems, multi-standard radio devices or systems, a wired or wireless handheld device, e.g., a smartphone, a wireless application protocol (WAP) device, or the like.

Some embodiments may be used in conjunction with one or more types of wireless communication signals and/or systems following one or more wireless communication protocols, for example, radio frequency (RF), infrared (IR), frequency-division multiplexing (FDM), orthogonal FDM (OFDM), time-division multiplexing (TDM), time-division multiple access (TDMA), extended TDMA (E-TDMA), general packet radio service (GPRS), extended GPRS, code-division multiple access (CDMA), wideband CDMA (WCDMA), CDMA 2000, single-carrier CDMA, multi-carrier CDMA, multi-carrier modulation (MDM), discrete multi-tone (DMT), Bluetooth®, global positioning system (GPS), Wi-Fi, Wi-Max, ZigBee®, ultra-wideband (UWB), global system for mobile communications (GSM), 2G, 2.5G, 3G, 3.5G, 4G, fifth generation (5G) mobile networks, 3GPP, long term evolution (LTE), LTE advanced, enhanced data rates for GSM Evolution (EDGE), or the like. Other embodiments may be used in various other devices, systems, and/or networks.

In the above disclosure, reference has been made to the accompanying drawings, which form a part hereof, which illustrate specific implementations in which the present disclosure may be practiced. It is understood that other implementations may be utilized, and structural changes may be made without departing from the scope of the present disclosure. References in the specification to “one embodiment,” “an embodiment,” “an example embodiment,” “an example embodiment,” etc., indicate that the embodiment described may include a particular feature, structure, or characteristic, but every embodiment may not necessarily include the particular feature, structure, or characteristic. Moreover, such phrases are not necessarily referring to the same embodiment. Further, when a particular feature, structure, or characteristic is described in connection with an embodiment, one skilled in the art will recognize such feature, structure, or characteristic in connection with other embodiments whether or not explicitly described.

Implementations of the systems, apparatuses, devices, and methods disclosed herein may comprise or utilize one or more devices that include hardware, such as, for example, one or more processors and system memory, as discussed herein. An implementation of the devices, systems, and methods disclosed herein may communicate over a computer network. A “network” is defined as one or more data links that enable the transport of electronic data between computer systems and/or modules and/or other electronic devices. When information is transferred or provided over a network or another communications connection (either hardwired, wireless, or any combination of hardwired or wireless) to a computer, the computer properly views the



connection as a transmission medium. Transmission media can include a network and/or data links, which can be used to carry desired program code means in the form of computer-executable instructions or data structures and which can be accessed by a general purpose or special purpose computer. Combinations of the above should also be included within the scope of non-transitory computer-readable media.

Computer-executable instructions comprise, for example, instructions and data which, when executed at a processor, such as the processor 502, cause the processor to perform a certain function or group of functions. The computer-executable instructions may be, for example, binaries, intermediate format instructions, such as assembly language, or even source code. Although the subject matter has been described in language specific to structural features and/or methodological acts, it is to be understood that the subject matter defined in the appended claims is not necessarily limited to the described features or acts described above. Rather, the described features and acts are disclosed as example forms of implementing the claims.

A memory device, such as the memory 504, can include any one memory element or a combination of volatile memory elements (e.g., random access memory (RAM, such as DRAM, SRAM, SDRAM, etc.)) and non-volatile memory elements (e.g., ROM, hard drive, tape, CDROM, etc.). Moreover, the memory device may incorporate electronic, magnetic, optical, and/or other types of storage media. In the context of this document, a “non-transitory computer-readable medium” can be, for example but not limited to, an electronic, magnetic, optical, electromagnetic, infrared, or semiconductor system, apparatus, or device. More specific examples (a non-exhaustive list) of the computer-readable medium would include the following: a portable computer diskette (magnetic), a random-access memory (RAM) (electronic), a read-only memory (ROM) (electronic), an erasable programmable read-only memory (EPROM, EEPROM, or Flash memory) (electronic), and a portable compact disc read-only memory (CD ROM) (optical). Note that the computer-readable medium could even be paper or another suitable medium upon which the program is printed, since the program can be electronically captured, for instance, via optical scanning of the paper or other medium, then compiled, interpreted or otherwise processed in a suitable manner if necessary, and then stored in a computer memory.

Those skilled in the art will appreciate that the present disclosure may be practiced in network computing environments with many types of computer system configurations, including in-dash vehicle computers, personal computers, desktop computers, laptop computers, message processors, handheld devices, multi-processor systems, microprocessor-based or programmable consumer electronics, network PCs, minicomputers, mainframe computers, mobile telephones, PDAs, tablets, pagers, routers, switches, various storage devices, and the like. The disclosure may also be practiced in distributed system environments where local and remote computer systems, which are linked (either by hardwired data links, wireless data links, or by any combination of hardwired and wireless data links) through a network, both perform tasks. In a distributed system environment, program modules may be located in both the local and remote memory storage devices.

Further, where appropriate, the functions described herein can be performed in one or more of hardware, software, firmware, digital components, or analog components. For example, one or more application specific integrated circuits

(ASICs) can be programmed to carry out one or more of the systems and procedures described herein. Certain terms are used throughout the description, and claims refer to particular system components. As one skilled in the art will appreciate, components may be referred to by different names. This document does not intend to distinguish between components that differ in name, but not function.

It should be noted that the sensor embodiments discussed above may comprise computer hardware, software, firmware, or any combination thereof to perform at least a portion of their functions. For example, a sensor may include computer code configured to be executed in one or more processors and may include hardware logic/electrical circuitry controlled by the computer code. These example devices are provided herein for purposes of illustration and are not intended to be limiting. Embodiments of the present disclosure may be implemented in further types of devices, as would be known to persons skilled in the relevant art(s).

At least some embodiments of the present disclosure have been directed to computer program products comprising such logic (e.g., in the form of software) stored on any computer-usable medium. Such software, when executed in one or more data processing devices, causes a device to operate as described herein.

While various embodiments of the present disclosure have been described above, it should be understood that they have been presented by way of example only, and not limitation. It will be apparent to persons skilled in the relevant art that various changes in form and detail can be made therein without departing from the spirit and scope of the present disclosure. Thus, the breadth and scope of the present disclosure should not be limited by any of the above-described example embodiments but should be defined only in accordance with the following claims and their equivalents. The foregoing description has been presented for the purposes of illustration and description. It is not intended to be exhaustive or to limit the present disclosure to the precise form disclosed. Many modifications and variations are possible in light of the above teaching. Further, it should be noted that any or all of the aforementioned alternate implementations may be used in any combination desired to form additional hybrid implementations of the present disclosure. For example, any of the functionality described with respect to a particular device or component may be performed by another device or component. Further, while specific device characteristics have been described, embodiments of the disclosure may relate to numerous other device characteristics. Further, although embodiments have been described in language specific to structural features and/or methodological acts, it is to be understood that the disclosure is not necessarily limited to the specific features or acts described. Rather, the specific features and acts are disclosed as illustrative forms of implementing the embodiments. Conditional language, such as, among others, “can,” “could,” “might,” or “may,” unless specifically stated otherwise, or otherwise understood within the context as used, is generally intended to convey the information that certain embodiments could include, while other embodiments may not include, certain features, elements, and/or steps. Thus, such conditional language is not generally intended to imply that features, elements, and/or steps are in any way required for one or more embodiments.

That which is claimed is:

1. A method comprising:

receiving, by a first vehicle from a device of a second vehicle, audio data, wherein the audio data includes audio content indicative of an intent of a user of the



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device, and wherein the device of the second vehicle is located in the second vehicle;

generating, by a sensor system associated with the device, sensor data, wherein the sensor system includes at least one of a microphone, a camera, a Lidar sensor, a global positioning system (GPS), mobile-edge computing (MEC), one or more remote side units (RSUs), one or more gyro sensors, a compass, or an accelerometer, and wherein the sensor data includes first location data;

receiving, by the first vehicle from the sensor system, the sensor data;

receiving, by the first vehicle, account data associated with the device, wherein the account data includes an identification (ID) associated with the user of the device;

determining, by the first vehicle, based at least on the audio data, the intent associated with the audio data;

determining, by the first vehicle, based on the intent and the first location data, at least one of a product, service, or entity;

determining, by the first vehicle, based on the sensor data, the at least one of the product, service, or entity, and the account data, content, wherein the content is associated with the first vehicle;

sending, via Vehicle-to-Network (V2N), Vehicle-to-Infrastructure (V2I), Vehicle-to-Everything (V2X), or Vehicle-to-Pedestrian (V2P) communication of the first vehicle, an indication of the content to the device of the second vehicle, wherein the indication of the content includes at least one of a cookie or a web link associated with the at least one of the product, service, or entity; and

presenting the content to the user, responsive to the user searching for the content, wherein the user searches for the content anonymously using the ID.

2. The method of claim 1, wherein the device of the second vehicle is either a mobile device or a component of the second vehicle.

3. The method of claim 1, wherein the first location data is associated with a first location, and wherein the content is further determined based at least in part on a second location associated with the first vehicle being within a threshold distance of the first location.

4. The method of claim 1, wherein the intent is determined based at least on the audio data using natural language processing (NLP).

5. The method of claim 1, wherein the first location data comprises a first location of the device of the second vehicle, and wherein a route associated with the first vehicle includes the first location of the device of the second vehicle.

6. A first device of a first vehicle, comprising:

at least one memory device that stores computer-executable instructions; and

at least one processor configured to access the at least one memory device, wherein the at least one processor is configured to execute the computer-executable instructions to:

receive audio data from a second device of a second vehicle, wherein the audio data includes audio content indicative of an intent of a user of the second device, and wherein the second device is located in the second vehicle;

receive sensor data associated with the second device by the first vehicle, wherein the sensor data includes first location data;

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receive account data associated with the second device, wherein the account data includes an identification (ID) associated with the user of the second device;

determine, based at least on the audio data, the intent associated with the audio data;

determine, based on the intent and the first location data, at least one of a product, service, or entity;

determine, based on the sensor data, the at least one of the product, service, or entity, and the account data, content, wherein the content is associated with the first vehicle;

automatically send, by a Vehicle-to-Network (V2N), Vehicle-to-Infrastructure (V2I), Vehicle-to-Everything (V2X), or Vehicle-to-Pedestrian (V2P) communication of the first device of the first vehicle, an indication of the content to the second device of the second vehicle, wherein the indication of the content includes at least one of a cookie or a web link associated with the at least one of the product, service, or entity; and

present the content to the user, responsive to the user searching for the content, wherein the content is anonymously accessible by the user, via the indication of the content, using the ID.

7. The first device of claim 6, wherein the second device is either a mobile device or a component of the second vehicle.

8. The first device of claim 6, wherein the first location data is associated with a first location, and wherein the content is further determined based at least in part on a second location associated with the first vehicle being within a threshold distance of the first location.

9. The first device of claim 6, wherein the intent is determined based at least on the audio data using natural language processing (NLP).

10. The first device of claim 6, wherein the first location data comprises a first location of the second device, and wherein a route associated with the first vehicle includes the first location of the second device.

11. A non-transitory computer-readable medium storing computer-executable instructions which, when executed by a processor, cause the processor to perform operations comprising:

receiving, by a first vehicle from a device of a second vehicle, audio data, wherein the audio data includes audio content indicative of an intent of a user of the device of the second vehicle, and wherein the device of the second vehicle is located in the second vehicle;

receiving, by the first vehicle, sensor data associated with the device, wherein the sensor data includes first location data;

receiving, by the first vehicle, account data associated with the device, wherein the account data includes an identification (ID) associated with the user of the device;

determining, by the first vehicle, based at least on the audio data, the intent associated with the audio data;

determining, by the first vehicle, based on the intent and the first location data, at least one of a product, service, or entity;

determining, by the first vehicle, based on the sensor data, the at least one of the product, service, or entity, and the account data, content, wherein the content is associated with the first vehicle;

automatically sending, by a Vehicle-to-Network (V2N), Vehicle-to-Infrastructure (V2I), Vehicle-to-Everything (V2X), or Vehicle-to-Pedestrian (V2P) device of the

first vehicle, an indication of the content to the device of the second vehicle, wherein the indication of the content includes at least one of a cookie or a web link associated with the at least one of the product, service, or entity; and

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presenting the content to the user, responsive to the user searching for the content, wherein the content is anonymously accessible by the user, via the indication of the content, using the ID.

12. The non-transitory computer-readable medium of claim 11, wherein the device of the second vehicle is either a mobile device or a component of the second vehicle. 10

13. The non-transitory computer-readable medium of claim 11, wherein the first location data is associated with a first location, and wherein the content is further determined based at least in part on a second location associated with the first vehicle being within a threshold distance of the first location. 15

14. The non-transitory computer-readable medium of claim 11, wherein the intent is determined based at least on the audio data using natural language processing (NLP). 20

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