TITLE OF THE INVENTION

System and Method for Wireless Communication Between Mobile Devices

CROSS-REFERENCE TO RELATED APPLIATIONS

**[0001]** [Not Applicable]

Drop if not applicable

application is solid
- few faults, but good overall

Good Job

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## BACKGROUND OF THE INVENTION

**[0002]** The present invention generally relates to a system for communicating between mobile devices. More particularly, the present invention relates to a system for communicating between mobile devices that are being transported in vehicles.

**[0003]** With technology advancing at a blistering pace, it is a wonder that communication among drivers has been so difficult in recent history. In fact, prior technology made communication among drivers difficult or impossible.

**[0004]** For example, CB (Citizens Band) Radio has been popular with drivers for decades and is still in wide use today. However, CB Radio has a limited range and can only be used to communicate with other drivers who have CB Radio equipment. Although there is still use of CB radio today, its use by drivers other than professional truckers peaked in popularity in the 70s and 80s. However, the recent rise in near-constant communication through smartphones has reawakened the social spirit that drove the CB pioneers to reach out to each other while on the lonely road.

**[0005]** The present invention is a downloadable application for your smartphone that allows you to transform your smartphone to an incredible, social driving experience that provides driver-to-driver, hands-free communication in a limitless number of ways chosen by the driver. Unlike traditional CB radio, which only has a range of up to 4 miles, the present invention uses the driver's cell phone carrier. Thus, the effective range of communication between drivers is potentially infinite, and only occasionally limited by lack of cell phone coverage in an area.

**[0006]** Standard cell phone communication systems have a major shortcoming for use by drivers. Namely, the fact that a user must have the phone number of the person they want to call. This means that a standard cell phone user cannot communicate generally with other drivers on the road like with CB Radio systems.

**[0007]** However, CB Radio systems also have their drawbacks. In addition to being limited to a relatively small communication area as mentioned previously, CB Radio systems broadcast signals to anyone and everyone within the communication area. Therefore, if a driver wants to speak to a specific person or group of people, this cannot be accomplished using CB Radio.

## BRIEF SUMMARY OF THE INVENTION

**[0008]** One or more of the embodiments of the present invention provide systems for communicating between mobile devices based on the distance between the mobile devices, wherein the systems include a first mobile device, a second mobile device, and a server. The mobile devices have GPS capabilities and communicate with the server through standard telecommunications systems and the Internet. The server uses GPS coordinates from the mobile devices to determine the distance between the first mobile device and the second mobile device. If the distance between the mobile devices is smaller than some predefined distance, then the server establishes communication between the mobile devices. This is accomplished by receiving audio signals from both mobile devices, combining the audio signals into a single VOIP signal, and transmitting the single VOIP signal to both mobile devices.

**[0009]** One or more of the embodiments of the present invention provide systems for communicating between mobile devices based on whether the mobile devices are being transported in the same direction along the same road, wherein the systems include a first mobile device in a first vehicle, a second mobile device in a second vehicle, and a sever. The mobile devices have GPS capabilities and communicate with the server through standard telecommunications systems and the Internet. The server uses GPS coordinates from the mobile devices to determine the roads on which the first and second vehicles are located by comparing the GPS coordinates to a database of roads associated with GPS coordinates. The server uses GPS coordinates from the mobile devices to determine the directions of the first and second vehicles by receiving multiple GPS measurements from each mobile device. If the first vehicle is traveling in the same direction along the same road as the second vehicle, then the server establishes communication between the first and second mobile devices. This is accomplished by receiving audio signals from both mobile devices, combining the audio signals into a single VOIP signal, and transmitting the single VOIP signal to both mobile devices.

**[0010]** One or more of the embodiments of the present invention provide systems for communicating between mobile devices based on descriptive characteristics, wherein the systems include a first mobile device in a first vehicle, a second mobile device in a second vehicle, and a server. When a first user inputs into a first mobile device descriptive data that represents descriptive characteristics associated with a vehicle transporting the second mobile device and the relative location of the second mobile device, the server establishes communication between the first and second mobile devices. This is accomplished by receiving audio signals from both mobile devices, combining the audio signals into a single VOIP signal, and transmitting the single VOIP signal to both mobile devices.

## BRIEF DESCRIPTION OF THE DRAWINGS

**[0011]** Figure 1 illustrates a system for establishing communication between mobile devices according to an embodiment of the present invention.

**[0012]** Figure 2 illustrates a flowchart of an embodiment of a method for establishing communication between mobile devices according to an embodiment of the present invention.

**[0013]** Figure 3 illustrates a system for establishing communication between mobile devices according to an embodiment of the present invention.

**[0014]** Figure 4 illustrates a flowchart of an embodiment of a method for establishing communication between mobile devices according to an embodiment of the present invention.

**[0015]** Figure 5 illustrates a system for establishing communication between mobile devices according to an embodiment of the present invention.

**[0016]** Figure 6 illustrates a flowchart of an embodiment of a method for establishing communication between mobile devices according to an embodiment of the present invention.

**[0017]** Figure 7 illustrates a system for establishing communication between mobile devices according to an embodiment of the present invention.

**[0018]** Figure 8 illustrates a flowchart of an embodiment of a method for establishing communication between mobile devices according to an embodiment of the present invention.

**[0019]** Figure 9 illustrates a user interface for a mobile device according to an embodiment of the present invention.

**[0020]** Figure 10 illustrates a private mode user interface for a mobile device according to an embodiment of the present invention.

**[0021]** Figure 11 illustrates a user profile interface for a mobile device according to an embodiment of the present invention.

**[0022]** Figure 12 illustrates a user preferences interface for a mobile device according to an embodiment of the present invention.

**[0023]** Figure 13 illustrates a map of mobile devices in communication based on the distance between the mobile devices according to an embodiment of the present invention.

**[0024]** Figure 14 illustrates a map of mobile devices in communication based on whether the mobile devices are being transported in the same direction along the same road according to an embodiment of the present invention.

**[0025]** Figure 15 illustrates a map of mobile devices in communication based on a first user providing a description of a second user's vehicle according to an embodiment of the present invention.

**[0026]** Figure 16 illustrates a file stored on a server for establishing communication between mobile devices according to an illustrative embodiment of the invention.

## DETAILED DESCRIPTION OF THE INVENTION

**[0027]** Figure 1 illustrates a system 100 for establishing communication between mobile devices according to an embodiment of the present invention. The system 100 establishes communication between mobile devices based on the geographic distance between the mobile devices. When two or more mobile devices are communicating using the system 100, the mobile devices are said to be in a proximity mode communication group. The system 100 for establishing communication between mobile devices includes a plurality of mobile devices 110, a plurality of cellular towers 120, and a server 130. In the present embodiment, the plurality of mobile devices 110 are smartphones with GPS capabilities. The plurality of mobile devices 110 include a first mobile device 112, a second mobile device 114, and a third mobile device 116. The plurality of cellular towers include a first cellular tower 122 and a second cellular tower 124. The server 130 includes a data storage unit 132. The data storage unit 132 stores a first GPS data 134, a second GPS data 136, and a proximity data 138. In the present embodiment, the proximity data 138 represents a predefined geographic distance and is a default value stored at the server 130.

**[0028]** The first mobile device 112 and the second mobile device 114 communicate wirelessly with cellular tower 122 over a standard telecommunications network, such as 3G or 4G. The third mobile device 116 communicates wirelessly with cellular tower 124 over a standard telecommunications network, such as 3G or 4G. The plurality of cell towers 120 communicate with the server 130 through the Internet 140.

**[0029]** In operation, the first mobile device 112 generates the first GPS data 134, which represents the geographic location of the first mobile device 112. The first GPS data 134 is communicated wirelessly from the first mobile device 112 to the first cellular tower 122. The first GPS data 134 is then communicated over the Internet 140 to the server 130, and the first GPS data 134 is stored in the data storage unit 132. The second mobile device 114 generates the second GPS data 136, which represents the geographic location of the second mobile device 114. The second GPS data 136 is communicated wirelessly from the second mobile device 114 to the first cellular tower 122. The second GPS data 136 is then communicated over the Internet 140 to the server 130, and the second GPS data 136 is stored in the data storage unit 132.

**[0030]** The server 130 calculates the distance between the first mobile device 112 and the second mobile device 114 using the first GPS data 134 and the second GPS data 136. Then the server 130 compares the distance between the first mobile device 112 and the second mobile device 114 with the distance represented by the proximity data 138. If the distance represented by the proximity data 138 is larger than the distance between the first mobile device 112 and the second mobile device 114, then the server 130 establishes communication between the first mobile device 112 and the second mobile device 114. This is accomplished by receiving a first audio signal from the first mobile device 112 and a second audio signal from the second mobile device 114, combining the first audio signal and second audio signal into a single VOIP signal, and transmitting the single VOIP signal to both the first mobile device 112 and the second mobile device 114. The first mobile device 112 and the second mobile device 114 are said to be in a communication group when the same VOIP signal is transmitted to both devices.

**[0031]** In another embodiment, the proximity data 138 is input by a user into the first mobile device 112 through a user interface (see Figure 12). The proximity data 138 is communicated from the first mobile device 112 to the server 130 and stored in the data storage unit 132. In operation, the user of the first mobile device 112 inputs into the first mobile device 112 the proximity data 138 representing a geographic distance. The first mobile device 112 generates the first GPS data 134, which represents the geographic location of the first mobile device 112. The proximity data 138 and the first GPS data 134 are communicated wirelessly to cellular tower 122 and are then communicated over the Internet 140 to the server 130. The proximity data 138 and the first GPS data are then stored in the data storage unit 132. The second mobile device 114 generates the second GPS data 136, which represents the geographic location of the second mobile device 114. The second mobile device 114 sends a second GPS data 136 to the server 130, and the second GPS data 136 is stored in the data storage unit 132.

**[0032]** The server calculates the distance between the first mobile device 112 and the second mobile device 114 using the first GPS data 134 and the second GPS data 136. Then the server 130 compares the distance between the first mobile device 112 and the second mobile device 114 with the distance represented by the proximity data 138. If the distance represented by the proximity data 138 is larger than the distance between the first mobile device 112 and the second mobile device 114, then the server 130 establishes communication between the first mobile device 112 and the second mobile device 114. This is accomplished by receiving a first audio signal from the first mobile device 112 and a second audio signal from the second mobile device 114, combining the first audio signal and second audio signal into a single VOIP signal, and transmitting the single VOIP signal to both the first mobile device 112 and the second mobile device 114.

**[0033]** In another embodiment, after communication is established between the first mobile device 112 and the second mobile device 114, the first mobile device 112 repeatedly communicates the first GPS data 134 to the server 130, and the second mobile device 114 repeatedly communicates the second GPS data 136 to the server 130. The server repeatedly calculates the distance between the first mobile device 112 and the second mobile device 114 and compares this distance to the distance represented by the proximity data 138. If the distance between the first mobile device 112 and the second mobile device 114 is larger than the distance represented by the proximity data 138, then the server halts communication between the first mobile device 112 and the second mobile device 114 by no longer combining the first audio signal and second audio signal into a single VOIP signal that is transmitted to both the first mobile device 112 and the second mobile device 114.

**[0034]** In another embodiment, once the system 100 establishes communication between the first mobile device 112 and the second mobile device 114, the communication is not terminated when the distance between the first mobile device 112 and the second mobile device exceeds the distance represented by the proximity data 138.

**[0035]** In another embodiment, the proximity data 138 represents a fixed distance less than ten meters.

**[0036]** In another embodiment, the system 100 for establishing communication between mobile devices is not limited to establishing communication between a first mobile device and a second mobile device, but can be used to establish communication among up to one hundred mobile devices.

**[0037]** In another embodiment, the system 100 for establishing communication between mobile devices does not add any more mobile devices to the communication group once a maximum number of mobile devices are in the communication group. The maximum number of mobile devices is represented by user preference data (see Figure 12). In the present embodiment, the maximum number of mobile devices may range from two to one hundred. In a preferred embodiment, user preference data is obtained from a mobile device that is the leader of the communication group. By default, the leader of the communication group is the first mobile device to join the communication group. The server establishes the leader by storing a leadership data that is associated with an identifier data of the mobile device (see Figure 15). The identifier data represents unique information that allows a server to identify the mobile device, such as a MAC address or IP address.

**[0038]** In another embodiment, the plurality of mobile devices 110 include any mobile device capable of communicating over a cellular telecommunications network, such as a computer, tablet computer, Android phone, iPhone, Windows phone, or iPad.

**[0039]** In another embodiment, the first mobile device 112 is integrated through an onboard vehicle communication system. The onboard vehicle communication system provides the user of the first mobile device 112 with a hands-free user interface that allows the user to safely input data into the first mobile device 112 while operating a vehicle.

**[0040]** Figure 2 illustrates a flowchart 200 of an embodiment of a method for establishing communication between mobile devices according to an embodiment of the present invention. The method of flowchart 200 establishes communication between mobile devices based on the geographic distance between the mobile devices. When two or more mobile devices are communicating using the method of flowchart 200, the mobile devices are said to be in a proximity mode communication group. First, at step 210, first identifier data is received from a first mobile device. In the present embodiment, the identifier data represents unique information that allows a server to identify the mobile device, such as a MAC address or IP address. Next, in step 215, proximity data is received from the first mobile device, stored at the server, and associated with the identifier data of the first mobile device. The proximity data represents a predefined geographic distance. In an alternative embodiment, the proximity data is a default value that is already stored at the server. In step 220, the first mobile device generates a first GPS data, which represents the geographic location of the first mobile device. The first GPS data is received from the first mobile device.

**[0041]** In parallel with the previous steps, in step 225, second identifier data is received from a second mobile device. In step 230, the second mobile device generates a second GPS data, which represents the geographic location of the second mobile device. The second GPS data is received from the second mobile device. Then, in step 235, the first GPS data and second GPS data are used to calculate the distance between the first mobile device and the second mobile device, and this distance is compared to the distance represented by the proximity data. At step 240, a decision is made. If the distance between the first mobile device and the second mobile device is greater than the distance represented by the proximity data, then the flowchart proceeds to step 245 where communication is not established between the first mobile device and the second mobile device. However, if the distance between the first mobile device and the second mobile device is less than the distance represented by the proximity data, then the flowchart proceeds to step 250 where a first voice data is received from the first mobile device and a second voice data is received from the second mobile device. Next, in step 255, the first voice data and the second voice data are combined into a single VOIP signal. Finally, in step 260, the single VOIP signal is transmitted to both the first mobile device and the second mobile device. The first mobile device and the second mobile device are said to be in a communication group when the same VOIP signal is transmitted to both devices.

**[0042]** Figure 3 illustrates a system 300 for establishing communication between mobile devices according to an embodiment of the present invention. The system 300 establishes communication between mobile devices based on the geographic distance between the mobile devices. When two or more mobile devices are communicating using the system 300, the mobile devices are said to be in a proximity mode communication group. The system 300 for establishing communication between mobile devices includes a first mobile device 310, a second mobile device 312, a cellular tower 320, and a server 330. In the present embodiment, the first mobile device 310 and the second mobile device 312 are smartphones. The server 330 includes a data storage unit 332. The data storage unit 332 stores a first identifier data 333, a second identifier data 334, a first GPS data 335, a second GPS data 336, a communication group data 337, and a proximity data 338. In the present embodiment, the first identifier data 333 and the second identifier data 334 represent unique information that allows the server 330 to identify the mobile devices, such as a MAC address or IP address. In the present embodiment, the communication group data 337 represents whether any mobile devices are communicating with each other through the server 330 by, for example, associating the first identifier data 333 with the second identifier data 334 when the first mobile device 310 is in communication with the second mobile device 312. The communication group data 337 further identifies a leader of the communication group. In the present embodiment, the leader of the communication group is the first mobile device to join the communication group. In the present embodiment, the proximity data 338 represents a geographic distance where, for example, communication is only established between the first mobile device 310 and the second mobile device 312 when the distance between the mobile devices is less than the distance represented by the proximity data 338. OK

**[0043]** The first mobile device 310 communicates with the cellular tower 320 through a first wireless connection 340. The second mobile device 312 communicates with the cellular tower 320 through a second wireless connection 342. In the present embodiment, the wireless connections 340 and 342 represent standard mobile telecommunications technology, such as 3G or 4G signals. The cellular tower 320 communicates with the server 330 over an Internet connection 350.

**[0044]** In operation, the first identifier data 333 and first GPS data 335 are communicated wirelessly from the first mobile device 310 to the cellular tower 320. The first identifier data 333 and first GPS data 335 are then communicated over the Internet 350 to the server 330, and the first identifier data 333 and first GPS data 335 are stored in the data storage unit 332. The first identifier data 333 is associated with the first GPS data 335 such that the first GPS data represents the geographic location of the first mobile device 310. The second identifier data 334 and second GPS data 336 are communicated wirelessly from the second mobile device 312 to the cellular tower 320. The second identifier data 334 and second GPS data 336 are then communicated over the Internet 350 to the server 330, and the second identifier data 334 and second GPS data 336 are stored in the data storage unit 332. The second identifier data 334 is associated with the second GPS data 336 such that the second GPS data 336 represents the geographic location of the second mobile device 312. The server calculates the distance between the first mobile device 310 and the second mobile device 312 using the first GPS data 335 and the second GPS data 336. Then the server 330 compares the distance between the first mobile device 310 and the second mobile device 312 with the distance represented by the proximity data 338. If the distance represented by the proximity data 338 is larger than the distance between the first mobile device 310 and the second mobile device 312, then the server 330 establishes communication between the first mobile device 310 and the second mobile device 312. This is accomplished by receiving a first audio signal from the first mobile device 310 and a second audio signal from the second mobile device 312, combining the first audio signal and second audio signal into a single VOIP signal, and transmitting the single VOIP signal to both the first mobile device 310 and the second mobile device 312. The communication group data 337 is altered by the server to represent that the first mobile device 310 is in communication with the second mobile device 312 by associating the first identifier data 333 with the second identifier data 334. The communication group data 337 is further altered by the server to represent that the first mobile device 310 is the leader of the communication group.

**[0045]** In another embodiment, the system for establishing communication between mobile devices 300 further includes a third mobile device, and the server 330 further stores a third identifier data and a third GPS data. The third mobile device is wirelessly connected to the cellular tower 320. In operation, communication is established between the first mobile device 310 and second mobile device 312, and the communication group data 337 associates the first identifier data 333 with the second identifier data 334 as in the previous embodiment. The third identifier data and third GPS data are communicated wirelessly from the third mobile device to the cellular tower 320, from the cellular tower 320 to the server 330 through the Internet 350, and stored in the data storage unit 332.

**[0046]** The server accesses the communication group data 337 and identifies the identifier data associated with any mobile device in communication with another mobile device. In the present embodiment, the first mobile device 310 is in communication with the second mobile device 312, so the server 330 identifies the first identifier data 333 and the second identifier data 335. The server 330 then identifies the leader of the communication group. In the present embodiment, the first mobile device 310 is the leader of the communication group. If the distance between the third mobile device and the leader of the communication group is smaller than the distance represented by the proximity data 338, then the third mobile device is added to the communication group.

**[0047]** The server 330 calculates the distance between the first mobile device 310 and the third mobile device using the first GPS data 335 and the third GPS data. If the distance between the first mobile device 310 and the third mobile device is smaller than the distance represented by the proximity data, then communication is established between the first mobile device 310, the second mobile device 312, and the third mobile device. This is accomplished by receiving a first audio signal from the first mobile device 310, receiving a second audio signal from the second mobile device 312, receiving a third audio signal from the third mobile device, combining the first audio signal, second audio signal, and third audio signal into a single VOIP signal, and transmitting the single VOIP signal to the first mobile device 310, the second mobile device 312, and the third mobile device. The communication group data 337 is altered by the server to represent that the first mobile device 310, the second mobile device 312, and the third mobile device are in communication with one another by associating the first identifier data 333, the second identifier data 334, and the third identifier data with one another.

**[0048]** In another embodiment, the system 300 for establishing communication between mobile devices is not limited to establishing communication between a first mobile device and a second mobile device, but can be used to establish communication among up to one hundred mobile devices.

**[0049]** In another embodiment, the system 300 for establishing communication between mobile devices does not add any more mobile devices to the communication group once a maximum number of mobile devices are in the communication group. The maximum number of mobile devices is represented by user preference data (shown in Figure 12). In the present embodiment, the maximum number of mobile devices may range from two to one hundred. In a preferred embodiment, user preference data is obtained from a mobile device that is the leader of the communication group. By default, the leader of the communication group is the first mobile device to join the communication group. The server establishes the leader by storing a leadership data that is associated with an identifier data of the mobile device (see Figure 15). The identifier data represents unique information that allows a server to identify the mobile device, such as a MAC address or IP address.

[0050] In another embodiment, the first mobile device 310 is any mobile device capable of communicating over a cellular telecommunications network, such as a computer, tablet computer, Android phone, iPhone, Windows phone, or iPad.

[0051] In another embodiment, the first mobile device 310 is integrated through an onboard vehicle communication system. The onboard vehicle communication system provides the user of the first mobile device 310 with a hands-free user interface that allows the user to safely input data into the first mobile device 310 while operating a vehicle.

[0052] Figure 4 illustrates a flowchart 400 of an embodiment of a method for establishing communication between mobile devices according to an embodiment of the present invention. The method of flowchart 400 establishes communication between mobile devices based on the geographic distance between the mobile devices. When two or more mobile devices are communicating using the method of flowchart 400, the mobile devices are said to be in a proximity mode communication group. Each communication group is associated with a position. The position is determined by the GPS coordinates of a mobile device that is the leader of the communication group. In the present embodiment, the leader of the communication group is the first mobile device to join the communication group. Additionally, each leader is associated with a proximity distance, such that mobile devices may only join the communication group if they are within the proximity distance. In the present embodiment, the proximity distance is represented by data entered into a user interface of the leader mobile device (see Figure 12). In an alternative embodiment, the proximity distance is a default distance represented by data stored on a server.

**[0053]** First, at step 410, first identifier data and first GPS data are received from a first mobile device. The identifier data represents unique information that allows a server to identify the first mobile device, such as a MAC address or IP address. The first GPS data represents the geographic location of the first mobile device and is generated by a GPS system in the first mobile device. Next, in step 420, the first GPS data is used to calculate the distance between the first mobile device and all leaders of all communication groups.

**[0054]** If the first mobile device is not within the proximity distance of any leader, then the flowchart proceeds to step 430. At step 430, a new communication group is formed with the first mobile device as the leader of the communication group. This is accomplished by associating communication group data with the first identifier data, where the communication group data represents whether a mobile device is in a communication group and whether a mobile device is the leader of the communication group.

**[0055]** If the first mobile device is within the proximity distance of one leader, then the flowchart proceeds to step 440. At step 440, the first mobile device is added to the communication group of the one leader that is nearby. This is accomplished by receiving voice data from the first mobile device, from the leader, and from all other mobile devices in the communication group, combining the voice data into a single VOIP signal, and transmitting the single VOIP signal to the first mobile device, to the leader, and to all other mobile devices in the communication group.

**[0056]** If the first mobile device is within the proximity distance of two or more leaders, then the flowchart proceeds to step 450. At step 450, a list of all nearby communication groups is provided to the user of the first mobile device through a user interface, and the user selects one of the communication groups. At step 460, the first mobile device is added to the selected communication group. This is accomplished by receiving voice data from the first mobile device and from all other mobile devices in the selected communication group, combining the voice data into a single VOIP signal, and transmitting the single VOIP signal to the first mobile device and all other mobile devices in the selected communication group.

**[0057]** In another embodiment, at step 450, instead of providing the user with a list of nearby communication group leaders, the user may be provided with a geographical map which includes indicators of the geographic position of each nearby communication group leader. This is accomplished by transmitting the GPS coordinates of each nearby communication group leader to the first mobile device. The user interface of the first mobile device displays a map with indicators at the locations associated with the GPS coordinates. The user may select a communication group by touching one of the displayed indicators.

**[0058]** Figure 5 illustrates a system 500 for establishing communication between mobile devices according to an embodiment of the present invention. The system 500 establishes communication between mobile devices based on whether the mobile devices are being transported along the same road. When two or more mobile devices are communicating using the system 500, the mobile devices are said to be in a mutual road mode communication group. The system 500 for establishing communication between mobile devices includes a first mobile device 510 inside of a first vehicle 512, a second mobile device 514 inside of a second vehicle 516, a cellular tower 520, and a server 530.

In the present embodiment, the first mobile device 510 and the second mobile device 514 are smartphones. The server 530 includes a data storage unit 532. The data storage unit 532 stores a first identifier data 560, a first GPS data 561, a first road data 562, a first direction data 563, a second identifier data 564, a second GPS data 565, a second road data 566, and a second direction data 567.

**[0059]** In the present embodiment, the first mobile device 510 and the second mobile device 514 are smartphones with GPS capabilities. The first identifier data 560 represents unique information that allows the server 530 to identify the first mobile device 510, and the second identifier data 564 represents unique information that allows the server 530 to identify the second mobile device 514, such as a MAC address or IP address. The first GPS data 561 is generated by the GPS system of the first mobile device 510 and includes two sets of GPS coordinates, one measured shortly after the other. The second GPS data 565 is generated by the GPS system of the second mobile device 514 and includes two sets of GPS coordinates, one measured shortly after the other. The first road data 562 represents the road that the first vehicle 512 is located on, and the second road data 566 represents the road that the second vehicle 516 is located on. The first direction data 563 represents the direction the first vehicle 512 is traveling, and the second direction data 567 represents the direction the second vehicle 516 is traveling.

**[0060]** The first mobile device 510 communicates with the cellular tower 520 through a first wireless connection 540. The second mobile device 514 communicates with the cellular tower 520 through a second wireless connection 542. In the present embodiment, the wireless connections 540 and 542 represent standard mobile

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telecommunications technology, such as 3G or 4G signals. The cellular tower 520 communicates with the server 530 over an Internet connection 550.

**[0061]** In operation, the first GPS data 561 is communicated wirelessly from the first mobile device 510 to the cellular tower 520. The first GPS data 561 is then communicated over the Internet 550 to the server 530, and the first GPS data 561 is stored in the data storage unit 532. The second GPS data 565 is communicated wirelessly from the second mobile device 514 to the cellular tower 520. The second GPS data 565 is then communicated over the Internet 550 to the server 530, and the second GPS data 565 is stored in the data storage unit 532.

Show the database?

**[0062]** The server 530 accesses a road database that associates road data representing the names of roads with the GPS coordinates that represent the locations of the roads. The server 530 uses the first GPS data 561 and the road database to determine which road the first vehicle 512 is located on. The server stores the first road data 562 which represents the road the first vehicle 512 is located on, and the server 530 associates the first road data 562 with the first identifier data 560. The server 530 uses the second GPS data 565 and the road database to determine which road the second vehicle 516 is located on. The server stores the first road data 566 which represents the road the second vehicle 516 is located on, and the server 530 associates the second road data 566 with the second identifier data 564.

a little vague, but OK

**[0063]** The server 530 uses the two sets of GPS coordinates included in the first GPS data 561 to determine the direction that the first vehicle 512 is traveling. This is accomplished by determining the location associated with each set of GPS coordinates. The direction of the second set relative to the location of the first set is the direction that the first vehicle 512 is traveling. For example, if the location represented by the second set of GPS coordinates is east of the location associated with the first set of GPS coordinates, then the first vehicle 512 is traveling east. The server 530 stores the first direction data 563, which represents the direction the first vehicle 512 is traveling, and the server 530 associates the first direction data 563 with the first identifier data 560. The server 530 repeats this process for the second GPS data 565 to determine the direction the second vehicle 516 is traveling, and the server 530 associates the second direction data 567 with the second mobile device 514.

**[0064]** If the road represented by the first road data 562 is the same road represented by the second road data 566, and if the direction represented by the first direction data 563 is the same direction represented by the second direction data 567, then the server 530 establishes communication between the first mobile device 510 and the second mobile device 514. This is accomplished by receiving a first audio signal from the first mobile device 510 and a second audio signal from the second mobile device 514, combining the first audio signal and second audio signal into a single VOIP signal, and transmitting the single VOIP signal to both the first mobile device 510 and the second mobile device 514. The first mobile device 510 and the second mobile device 514 are said to be in a communication group when the same VOIP signal is transmitted to both devices.

**[0065]** In another embodiment, the server 530 establishes communication between the first mobile device 510 and the second mobile device 514 when the road represented by the first road data 562 is the same road represented by the second road data 566, regardless of whether the direction represented by the first direction data 563 is the same direction represented by the second direction data 567.

**[0066]** In another embodiment, the system 500 for establishing communication between mobile devices further requires the first mobile device 510 and the second mobile device 514 to be within a predefined distance of each other. This is accomplished by the systems and methods shown in Figures 1-4.

**[0067]** In another embodiment, the system 500 for establishing communication between mobile devices is not limited to establishing communication between a first mobile device and a second mobile device, but can be used to establish communication among up to one hundred mobile devices.

**[0068]** In another embodiment, the system 500 for establishing communication between mobile devices does not add any more mobile devices to the communication group once a maximum number of mobile devices are in the communication group. The maximum number of mobile devices is represented by user preference data (shown in Figure 12). In the present embodiment, the maximum number of mobile devices may range from two to one hundred. In a preferred embodiment, user preference data is obtained from a mobile device that is the leader of the communication group. By default, the leader of the communication group is the first mobile device to join the communication group. The server establishes the leader by storing a leadership data that is associated with an identifier data of the mobile device (see Figure 15).

**[0069]** In another embodiment, the first mobile device 510 is any mobile device capable of communicating over a cellular telecommunications network, such as a computer, tablet computer, Android phone, iPhone, Windows phone, or iPad.

[0070] In another embodiment, the first mobile device 510 is integrated through an onboard vehicle communication system in the first vehicle 512. The onboard vehicle communication system provides the user of the first mobile device 510 with a hands-free user interface that allows the user to safely input data into the first mobile device 510 while operating the first vehicle 512.

[0071] Figure 6 illustrates a flowchart 600 of an embodiment of a method for establishing communication between mobile devices according to an embodiment of the present invention. The method of flowchart 600 establishes communication between mobile devices based on whether the mobile devices are being transported along the same road. When two or more mobile devices are communicating using the method of flowchart 600, the mobile devices are said to be in a mutual road mode communication group.

[0072] First, at step 610, two sets of GPS coordinates of a first mobile device are received from the first mobile device located in a first vehicle. The two sets of GPS coordinates are generated by a GPS system in the first mobile device and are measured one after the other with a short amount of time, such as 1-10 seconds, between measurements. At step 620, the GPS coordinates from the first mobile device are used to determine a first road that the first vehicle is located on and a first direction that the first vehicle is headed. The first road is determined by accessing a database that stores road data indicating the GPS coordinates associated with various roads and determining whether the any of the GPS coordinates from the first mobile device fall on a road. The first direction is determined by comparing the geographic locations represented by the two sets of GPS coordinates. The direction of the second set relative to the location of the first set is the direction that the first vehicle is traveling. For example, if the location represented by the second set of GPS coordinates is east of the location associated with the first set of GPS coordinates, then the first vehicle is traveling east.

**[0073]** At step 630, two sets of GPS coordinates of a second mobile device are received from the second mobile device located in a second vehicle. The two sets of GPS coordinates are generated by a GPS system in the second mobile device and are measured one after the other with a short amount of time, such as 1-10 seconds, between measurements. At step 640, the GPS coordinates from the second mobile device are used to determine a second road that the second vehicle is located on and a second direction that the second vehicle is headed. The second road is determined by accessing a database that stores road data indicating the GPS coordinates associated with various roads and determining whether the any of the GPS coordinates from the second mobile device fall on a road. The second direction is determined by comparing the geographic locations represented by the two sets of GPS coordinates. The direction of the second set relative to the location of the first set is the direction that the second vehicle is traveling. For example, if the location represented by the second set of GPS coordinates is east of the location associated with the first set of GPS coordinates, then the second vehicle is traveling east.

**[0074]** At step 650, if the first road is the same as the second road, and if the first direction is the same as the second direction, then the flowchart proceeds to step 670, and communication is established between the first mobile device and the second mobile device. This is accomplished by receiving a first audio signal from the first mobile device and a second audio signal from the second mobile device, combining the first audio signal and second audio signal into a single VOIP signal, and transmitting the single VOIP signal to both the first mobile device and the second mobile device. However, if either the first road or the first direction is different from the second road or second direction, then the flowchart proceeds to step 660 and no connection is established between the first mobile device and the second mobile device.

**[0075]** In another embodiment, at step 650, the flowchart proceeds to step 670 if the first road is the same as the second road, regardless of whether the first direction is the same as the second direction.

**[0076]** In another embodiment, the flowchart 600 of a method for establishing communication between mobile devices further requires the first mobile device and the second mobile device to be within a predefined distance of each other. This is accomplished by the systems and methods shown in Figures 1-4.

**[0077]** Figure 7 illustrates a system 700 for establishing communication between mobile devices according to an embodiment of the present invention. The system 700 establishes communication between mobile devices when a user inputs data representing a descriptive characteristic associated with another user. When two or more mobile devices are communicating using the system 700, the mobile devices are said to be in a shout-out mode communication group. The system 700 for establishing communication between mobile devices includes a first mobile device 710 inside of a first vehicle 712, a second mobile device 714 inside of a second vehicle 716, a cellular tower 720, and a server 730. In the present embodiment, the first mobile device 710 and the second mobile device 714 are smartphones with GPS capabilities. The server 730 includes a data storage unit 732. The data storage unit 732 stores a first identifier data 733, a second identifier data 734, a first profile data 735, a second profile data 736, a first GPS data 737, and a second GPS data 738.

**[0078]** In the present embodiment, the first identifier data 733 represents unique information that allows the server 730 to identify the first mobile device 710, and the second identifier data 734 represents unique information that allows the server 730 to identify the second mobile device 714, such as a MAC address or IP address. In the present embodiment, the first profile data 735 represents descriptive information associated with a vehicle of a first user of the first mobile device 710, such as the make and model of the first vehicle 712, and the second profile data 736 represents descriptive information associated with a vehicle of a second user of the second mobile device 714, such as the make and model of the second vehicle 716 (see Figure 11). The profile data may include multiple entries of data, each entry representing a different descriptive characteristic of the user. For example, one entry may comprise the make of the vehicle transporting the mobile device, while another entry may comprise the model of the vehicle transporting the mobile device. The first GPS data 737 is generated by a GPS system in the first mobile device and represents the geographic location of the first mobile device. The second GPS data 738 is generated by a GPS system in the second mobile device 710 and represents the geographic location of the second mobile device 714.

**[0079]** The first mobile device 710 communicates with the cellular tower 720 through a first wireless connection 740. The second mobile device 714 communicates with the cellular tower 720 through a second wireless connection 742. In the present embodiment, the wireless connections 740 and 742 represent standard mobile telecommunications technology, such as 3G or 4G signals. The cellular tower 720 communicates with the server 730 over an Internet connection 750.

**[0080]** In operation, the first identifier data 733, the first profile data 735, and the first GPS data 737 are communicated wirelessly from the first mobile device 710 to the cellular tower 720 and over the Internet 750 to the server 730 where they are stored in the data storage unit 732. In the present embodiment, the server 730 also stores data in the data storage unit 732 that associates the first profile data 735 and the first GPS data 737 with the first identifier data 733. The second identifier data 734, the second profile data 736, and the second GPS data 738 are communicated wirelessly from the second mobile device 714 to the cellular tower 720 and over the Internet 750 to the server 730 where they are stored in the data storage unit 732. In the present embodiment, the server 730 also stores data in the data storage unit 732 that associates the second profile data 736 and the second GPS data 738 with the second identifier data 734.

**[0081]** The first user of the first mobile device 710 inputs an input data that represents a description of another user, such as the make and model of a nearby vehicle on the road, through a first user interface of the first mobile device 710. The input data may represent a single descriptive aspect, such as the make of a vehicle, or it may represent multiple descriptive aspects, such as the make, model, color, and relative position of a vehicle. The input data can be entered using a keyboard of the first mobile device 710 or by saying voice commands into a microphone of the first mobile device 710. In order to receive voice commands, the first mobile device 710 is in a "listening" state where it continuously receives audio data through its microphone. The first mobile device 710 has stored speech files associated with certain command words and certain processes associated with each speech file. The first mobile device 710 repeatedly compares the audio data received through its microphone with the stored speech files. When the received audio data represents a command that is represented by the speech files, the first mobile device 710 executes the command associated with the speech file. For example, when a user says, "Shout-out red Toyota near ahead," the first mobile device will attempt to communicate with a mobile device located in a red Toyota that is ahead of the first vehicle 712 but in near proximity.

**[0082]** The input data is communicated from the first mobile device 710 through the first wireless connection 740 to the cellular tower 720 and over the Internet 750 to the server 730. If the input data includes the relative position of a vehicle, such as "near ahead," the server attempts to locate a mobile device that fits the description of the relative position. The server 730 determines the location of the first mobile device using the first GPS data 737. For "near ahead" and "near behind" commands, the server determines whether a mobile device is within one hundred meters ahead or behind of the first mobile device 710. This is accomplished by determining the road and direction associated with all mobile devices within one hundred meters of the first mobile device 710 (see Figures 5-6). For "far ahead" and "far behind" commands, the server determines whether a mobile device is one hundred meters to one mile ahead or behind of the first mobile device 710. This is accomplished by determining the road and direction associated with all mobile devices one hundred meters to one mile from the first mobile device 710 (see Figures 5-6).

**[0083]** The server 730 also determines whether data associated with any mobile device represents the vehicle make, vehicle model, and vehicle color represented by the input data. This is accomplished by determining whether the second profile data 736 associated with the second mobile device 714 represents the same descriptive characteristics as the input data. If the server determines that the input data represents the same descriptive characteristics that are represented by the second profile data 736, then the server 730 establishes communication between the first mobile device 710 and the second mobile device 714. This is accomplished by receiving a first audio signal from the first mobile device 710 and a second audio signal from the second mobile device 714, combining the first audio signal and second audio signal into a single VOIP signal, and transmitting the single VOIP signal to both the first mobile device 710 and the second mobile device 714.

**[0084]** In another embodiment, if the input data represents descriptive characteristics associated with more than one other mobile device, the user interface of the first mobile device 710 provides the user with a list of matching mobile devices. The user can choose from the list which mobile device to connect to.

**[0085]** In another embodiment, the first profile data 735 is input into the first mobile device 710 by a user through a user profile interface (shown in Figure 11).

**[0086]** In another embodiment, if the user of the first mobile device 710 attempts to communicate with the user of the second mobile device 714 through the shout-out mode, and if the second mobile device 714 is already in a communication group of some other mode (for example, proximity mode, mutual road mode, or private mode), then the second mobile device 714 is removed from the other communication group and a shout-out mode communication group is established between the first mobile device 710 and the second mobile device 714.

**[0087]** In another embodiment, the first mobile device 710 is any mobile device capable of communicating over a cellular telecommunications network, such as a computer, tablet computer, Android phone, iPhone, Windows phone, or iPad.

**[0088]** In another embodiment, the first mobile device 710 is integrated through a vehicle onboard communication system in the first vehicle 712. The onboard vehicle communication system provides the user of the first mobile device 710 with a hands-free user interface that allows the user to safely input data into the first mobile device 710 while operating a vehicle.

**[0089]** Figure 8 illustrates a flowchart 800 of an embodiment of a method for establishing communication between mobile devices according to an embodiment of the present invention. The method of flowchart 800 establishes communication between mobile devices when a user inputs data representing a descriptive characteristic associated with another user. When two or more mobile devices are communicating using the method of flowchart 800, the mobile devices are said to be in a shout-out mode communication group.

**[0090]** First, at step 810, first identifier data, first profile data, and first GPS data are received from a first mobile device. In the present embodiment, the first identifier data represents unique information that allows for identification of the first mobile device, such as a MAC address or IP address. In the present embodiment, the first profile data represents descriptive information associated with a first user of the first mobile device, such as the make and model of the first user's vehicle (see Figure 11). The first profile data may include multiple entries of data, each entry representing a different descriptive characteristic of the first user. For example, in the present embodiment, the first profile data includes the make, model, and color of the first user's vehicle.

**[0091]** In step 820, second identifier data, second profile data, and second GPS data are received from a second mobile device. In the present embodiment, the second identifier data represents unique information that allows for identification of the second mobile device, such as a MAC address or IP address. In the present embodiment, the second profile data represents descriptive information associated with a second user of the second mobile device, such as the make and model of the second user's vehicle (see Figure 11). The second profile data may include multiple entries of data, each entry representing a different descriptive characteristic of the second user. For example, in the present embodiment, the second profile data includes the make, model, and color of the second user's vehicle.

**[0092]** In step 830, the first profile data and the first GPS data are associated with the first identifier data, and the second profile data and second GPS data are associated with the second identifier data. Next, at step 840, descriptive data is received from the first mobile device. In the present embodiment, the descriptive data represents descriptive information associated with any user of a mobile device, such as the make, model, and color of a user's vehicle as well as the relative position of the user's vehicle to the first user's vehicle.

**[0093]** In step 850, if the descriptive characteristics represented by the descriptive data are also representative of the second user's vehicle, then the flowchart proceeds to step 870 where communication is established between the first mobile device and the second mobile device. In order to determine this, first the locations of the first mobile device and the second mobile device are determined using the first GPS data and the second GPS data. If the location of the second user's vehicle relative to the location of the first user's vehicle is represented by the descriptive data, then the make, model, and color of the second user's vehicle represented by the second profile data must be compared with the descriptive characteristics represented by the descriptive data. If the descriptive data represents the same vehicle make, model, and color represented by the second profile data, then the descriptive characteristics represented by the descriptive data are also representative of the second user's vehicle.

**[0094]** On the other hand, if either the relative location of the second user's vehicle or the vehicle make, model, or color represented by the second profile data are different from the descriptive characteristics represented by the descriptive data, then the descriptive data is not representative of the second user's vehicle, and the flowchart proceeds to step 860 where communication is not established between the first mobile device and the second mobile device

**[0095]** In another embodiment, prior to step 810, the proximity data representing a predefined proximity distance is input through a user interface into the first mobile device and is received along with the first identifier data, first profile data, and first GPS data in step 810.

**[0096]** In another embodiment, the second mobile device may already be in communication with one or more other mobile devices, and in step 890, communication is established among the first mobile device, the second mobile device, and any other device already in communication with the second mobile device. This is accomplished by receiving audio signals from each device, combining the audio signals into a single

VOIP signal, and transmitting the voice signal to the first mobile device, the second mobile device, and any other device that was already in communication with the second mobile device.

**[0097]** In another embodiment, if the user of the first mobile device attempts to communicate with the user of the second mobile device through the shout-out mode, and if the second mobile device is already in a communication group of some other mode (for example, proximity mode, mutual road mode, or private mode), then the second mobile device is removed from the other communication group and a shout-out mode communication group is established between the first mobile device 710 and the second mobile device.

**[0098]** Figure 9 illustrates a user interface 900 for a mobile device 910 according to an embodiment of the present invention. The user interface includes a display 915 and a microphone 955. The display 915 includes a proximity mode button 920, a mutual road mode button 925, a shout-out mode button 930, a private mode button 935, a user profile button 940, a user preferences button 945, and a voice control button 950.

**[0099]** The display 915 is a touch-sensitive display for selecting one of the buttons 920-950. The proximity mode button 920 initiates a process for establishing communication between mobile devices based on the distance between the mobile devices as described by the embodiments of the methods and systems of Figures 1-4. The mutual road mode button 925 initiates a process for establishing communication between mobile devices based on whether the mobile devices are being transported along the same road as described by the embodiments of the methods and systems of Figures 5-6. The shout-out mode button 930 initiates a process for establishing communication between mobile devices based on descriptive characteristics of the mobile devices as described by the embodiments of the methods and systems of Figures 7-8. The private mode button 935 initiates a process for establishing communication between mobile devices through specific invitations as described by the embodiments of the system of Figure 10. The user profile button 940 initiates a process for inputting data representative of descriptive characteristics associated with a user of the mobile device 910 as described by the embodiments of the system of Figure 11. The user preferences button 945 initiates a process for inputting data representative of user preferences as described by the embodiments of the system of Figure 12. The voice control button 950 initiates a process where the mobile device receives voice data through the microphone 955. The voice data can include spoken commands to initiate the processes that are also initiated by pressing the buttons 920-945. For example, saying "RoadShout Geo" would initiate the process for establishing communication between mobile devices based on the distance between the mobile devices as described by the embodiments of the methods and systems of Figures 1-4. Rather than pressing any of the buttons 920-945, a user could press the voice control button 950 and speak a voice command associated with any of the buttons 920-945.

**[00100]** In another embodiment, instead of having a Voice Control button 950, the mobile device is constantly in a listening mode where it receives voice data through the microphone. Anytime a user speaks a voice command associated with any of the buttons 920-945, the mobile device initiates the corresponding process.

**[00101]** Figure 10 illustrates a private mode user interface 1000 for a mobile device 1010 according to an embodiment of the present invention. The private mode user interface 1000 can be used to establish communication between two or more mobile devices by specifically inviting certain mobile devices to a communication group. The private mode user interface 1000 includes a display 1015 and a microphone 1045. The display 1015 includes an e-mail input field 1020, a send e-mail button 1025, a phone number input field 1030, a send text message button 1035, and a nearby invite button 1040. The display 1015 is a touch-sensitive display for selecting one of the buttons 1025, 1035, and 1040 and for entering data into the input fields 1020 and 1030.

**[00102]** In operation, the e-mail input field receives text data representing an e-mail address belonging to a second user. A user may enter the text data using a keyboard of the mobile device 1010. After entering an e-mail address, the user presses the send e-mail button 1025. At this point, data representing the e-mail address is wirelessly communicated to a cellular tower over the mobile device's cellular network. Then, the data is communicated over the Internet to a server. After receiving the e-mail data, the server sends a URL data over the Internet to the e-mail address represented by the e-mail data. When the second user accesses on a second mobile device the e-mail sent by the server and clicks on the URL, the server establishes communication between the mobile device 1010 and the second mobile device. This is accomplished by receiving audio data from the mobile device 1010 and from the second mobile device, combining the audio data into a single VOIP signal, and transmitting the single VOIP signal to both the mobile device 1010 and the second mobile device.

**[00103]** Further describing the operation of the private mode user interface 1000, the phone number input field 1030 receives text data representing a phone number associated with a second mobile device. A user may enter the phone number data using a keyboard of the mobile device 1010. After entering a phone number, the user presses the send text message button 1035. At this point, data representing the phone number is wirelessly communicated to a cellular tower over the mobile device's cellular network. Then, the data is communicated over the Internet to a server. After receiving the phone number data, the server sends a URL data over the Internet to the cellular tower, and the URL data is communicated in the form of a text message from the cellular tower to the second mobile device associated with the phone number. When the second user accesses the text message on the second mobile device and clicks on the URL, the server establishes communication between the mobile device 1010 and the second mobile device. This is accomplished by receiving audio data from the mobile device 1010 and from the second mobile device, combining the audio data into a single VOIP signal, and transmitting the single VOIP signal to both the mobile device 1010 and the second mobile device.

**[00104]** Further describing the operation of the private mode user interface 1000, a user may select the nearby invite button 1040. Upon selecting the nearby invite button, the server establishes communication between the mobile device 1010 and other mobile devices located within two meters of the mobile device 1010 as described by the embodiments of the systems and methods of Figures 1-4.

**[00105]** In another embodiment, the private mode user interface 1000 allows a user to establish communication with the user's Facebook friends or LinkedIn contacts. This is accomplished by providing an input field for the user to input alphanumeric data representing the user's Facebook or LinkedIn credentials. This data is then sent to the server. The server accesses the user's Facebook or LinkedIn accounts through the

Internet and retrieves contact information associated with the user's Facebook friends or LinkedIn contacts. The contact information may be e-mail addresses or phone numbers. The server then sends a URL for establishing a private mode communication group to each contact either through e-mail or text messaging.

**[00106]** Figure 11 illustrates a user profile interface 1100 for a mobile device 1110 according to an embodiment of the present invention. The user profile interface 1100 includes a display 1120. The display 1120 includes a vehicle make input field 1130, a vehicle model input field 1140, a vehicle color input field 1150, and a save button 1160. The display 1120 is a touch-sensitive display for entering data into the input fields 1130-1150 and for selecting the save button 1160.

**[00107]** In operation, the vehicle make input field 1130 receives text data representing the make of a vehicle that is used to transport the mobile device 1110, the vehicle model input field 1140 receives text data representing the model of a vehicle that is used to transport the mobile device 1110, and the vehicle color input field 1150 receives text data representing the color of a vehicle that is used to transport the mobile device 1110. A user may enter the text data using a keyboard of the mobile device 1110. When the save button 1160 is selected, the data in the vehicle make input field 1130, the data in the vehicle model input field 1140, the data in the vehicle color input field 1150, and an identifier data are wirelessly communicated to a cellular tower over the mobile device's cellular network. The identifier data represents unique information that allows a server to identify the mobile device, such as a MAC address or IP address. The data is then communicated over the Internet to a server. The server stores the data in a data storage unit and associates the vehicle data with the identifier data.

**[00108]** In another embodiment, the vehicle make input field 1130, the vehicle model input field 1140, and the vehicle color input field 1150 are dropdown menus with a predetermined list of options that a user may select from.

**[00109]** In another embodiment, the input fields 1130-1150 are not limited to a vehicle make input field 1130, a vehicle model input field 1140, and a vehicle color input field 1150, but can include any physically descriptive characteristic associated with the user of the mobile device 1110.

**[00110]** Figure 12 illustrates a user preferences interface 1200 for a mobile device 1210 according to an embodiment of the present invention. The user preferences interface 1200 includes a display 1220. The display 1220 includes a maximum member number input field 1230, a proximity distance input field 1240, a mode priority input field 1250, and a save button 1260. The display 1220 is a touch-sensitive display for entering data into the input fields 1230-1250 and for selecting the save button 1260.

**[00111]** In operation, the maximum member number input field 1230 receives alphanumerical data representing a preferred maximum number of mobile devices that are in a communication group, the proximity distance input field 1240 receives alphanumerical data representing a maximum geographical distance between two mobile devices in a communication group, and the mode priority input field 1250 receives alphanumeric data representing a ranking of each mode from highest to lowest priority. A user may enter a number into the maximum member number input field 1230 using a keyboard of the mobile device 1210. In the present embodiment, the maximum member number may range from two to one hundred. The user may then select the save button 1260. Data representing the maximum member number and identifier data associated with the mobile device such as a MAC address or IP address is wirelessly communicated to a cellular tower over the mobile device's cellular network and is then communicated over the Internet to a server. The data is stored in the server in a data storage unit, and the data representing the maximum member number is associated with the identifier data. Thus, whenever the mobile device 1210 is in charge of a communication group, the maximum number of mobile devices allowed in the communication group will be represented by the maximum member number data associated with the identifier data of mobile device 1210.

**[00112]** Further describing the operation of the user preference interface 1200, the user may enter a number into the proximity distance input field 1240 using a keyboard of the mobile device 1210. The user may then select the save button 1260. Data representing the proximity distance and identifier data associated with the mobile device such as a MAC address or IP address is wirelessly communicated to a cellular tower over the mobile device's cellular network and is then communicated over the Internet to a server. The data is stored in the server in a data storage unit, and the data representing the proximity distance is associated with the identifier data. Thus, whenever the mobile device 1210 is in charge of a proximity mode communication group, the proximity data used to determine whether a mobile device is within proximity will be the proximity data associated with the identifier data of mobile device 1210.

**[00113]** Further describing the operation of the user preference interface 1200, the user may rank the priority of the modes by entering alphanumeric data into the mode priority input field 1250. The user assigns each mode a ranking from 1 (highest priority) to 4 (lowest priority) and selects the save button 1260. Data representing the mode priorities and identifier data associated with the mobile device such as a MAC address or IP address is wirelessly communicated to a cellular tower over the mobile device's cellular network and is then communicated over the Internet to a server. The data is stored in the server in a data storage unit, and the data representing the mode priorities is associated with the identifier data. Thus, whenever the mobile device 1210 is in a communication group with a lower priority mode and becomes eligible to join a communication group with a higher priority mode, the mobile device 1210 is removed from the communication group with the lower priority mode and added to the communication group with the higher priority mode.

**[00114]** In another embodiment, the maximum member number input field 1230, the proximity distance input field 1240, and the mode priority input field 1250 are dropdown menus with a predetermined list of selectable options.

**[00115]** Figure 13 illustrates a map 1300 of mobile devices in communication based on the distance between the mobile devices according to an embodiment of the present invention. The map 1300 includes a first mobile device 1310 located in a first vehicle, a second mobile device 1320 located in a second vehicle, a separation distance 1330, and a proximity radius 1340. In the present embodiment, the separation distance 1330 represents the distance between the first mobile device 1310 and the second mobile device 1320 and is calculated using GPS coordinates from the first mobile device 1310 and the second mobile device 1320. The proximity radius 1340 represents a geographic distance from the first mobile device 1310, and the size of the radius is determined by data input by a user into the first mobile device 1310 (see Figure 12).

**[00116]** In operation, the first mobile device 1320 is the leader of an established communication group after steps 410-430 in flowchart 400 have been executed. A user of the second mobile device 1320 wishes to join a communication group and initiates the process in flowchart 400. At step 420, a server determines that the separation distance 1330 is smaller than the proximity radius 1340. Then, in step 440, the second mobile device 1320 is added to the communication group of the first mobile device 1310. This is accomplished by receiving audio signals from both the first mobile device 1310 and the second mobile device 1320, combining the audio signals into a single VOIP signal, and transmitting the single VOIP signal to both the first mobile device 1310 and the second mobile device 1320.

**[00117]** Figure 14 illustrates a map 1400 of mobile devices in communication based on whether the mobile devices are being transported in the same direction along the same road according to an embodiment of the present invention. The map 1400 includes a first mobile device 1410 in a first vehicle traveling in a first direction 1415 on a first road 1430 and a second mobile device 1420 in a second vehicle traveling in a second direction 1425 on a second road 1435.

**[00118]** In operation, the first mobile device 1410 and the second mobile device 1420 execute the mutual mode process in flowchart 600. After performing steps 610-640, it is determined that the first road 1430 is the same road as the second road 1435 and that the first direction 1415 is the same direction as the second direction 1425. Therefore, communication is established between the first mobile device 1410 and the second mobile device 1420. This is accomplished by receiving audio signals from both the first mobile device 1410 and the second mobile device 1420, combining the audio signals into a single VOIP signal, and transmitting the single VOIP signal to both the first mobile device 1410 and the second mobile device 1420.

**[00119]** Figure 15 illustrates a map 1500 of mobile devices in communication based on a first user providing a description of a second user's vehicle according to an embodiment of the present invention. The map 1500 includes a first mobile device 1510 in a first vehicle on a road 1540, a second mobile device 1520 in a second vehicle on the road 1540, a third mobile device 1530 in a third vehicle on the road 1540, a first separation distance 1515, and a second separation distance 1525. In the present embodiment, the second vehicle is a red Toyota, the third vehicle is a green Honda, the first separation distance 1515 is fifty meters, and the second separation distance 1525 is half of a mile.

**[00120]** In operation, a user of the first mobile device 1510 initiates the shout-out mode in system 700 and flowchart 800 by saying, "Shout-out red Toyota near ahead." Since the second vehicle is a red Toyota and it is located fifty meters ahead of the first mobile device, both the relative location and vehicle descriptions match the characteristics associated with the second mobile device 1520. Therefore, communication is established between the first mobile device 1510 and the second mobile device 1520.

**[00121]** In an alternative embodiment, the user of the first mobile device 1510 initiates the shout-out mode in system 700 and flowchart 800 by saying, "Shout-out green Honda far ahead." Since the third vehicle is a green Honda and it is located half of a mile ahead of the first mobile device, both the relative location and vehicle descriptions match the characteristics associated with the third mobile device 1530. Therefore, communication is established between the first mobile device 1510 and the third mobile device 1530.

**[00122]** Figure 16 illustrates a file 1600 stored on a server for establishing communication between mobile devices according to an illustrative embodiment of the invention. The file 1600 includes an identifier data 1610, a GPS data 1620, a user profile data 1630, a user preferences data 1640, a communication mode data 1650, and a group leader data 1660. The identifier data 1610 represents unique information that allows the server to identify a mobile device, such as a MAC address or IP address. The GPS data 1620 represents the geographic location of a mobile device and includes GPS coordinates from the mobile device. The user profile data 1630 represents descriptive characteristics of a user's vehicle (see Figure 11). The user preferences data 1640 represents a user's preferences regarding communicating with other mobile devices (see Figure 12). The communication mode data 1650 represents whether a mobile device is in a communication group and what type of communication group the mobile device is in (for example, proximity mode (see Figures 1-4), mutual road mode (see Figures 5-6), or shout-out mode (see Figures 7-8)). The group leader data 1660 represents whether a mobile device is the leader of a communication group.

**[00123]** In operation, the file 1600 is stored on the server, and the server associates the GPS data 1620, the user profile data 1630, the user preferences data 1640, the communication mode data 1650, and the group leader data 1660 with the identifier data 1610, such that all of the data in the file 1600 is identifiable with the mobile device identified by the identifier data 1610.

**[00124]** In another embodiment, any of the previously described systems or methods may be integrated with Google Glass in order to display to a user the location of nearby users on a real-time map display. In operation, a first user syncs a first mobile device with Google Glass. The mobile devices of other nearby users communicate GPS data to a server. The server communicates the GPS data to the first mobile device, and the locations of the nearby users are displayed to the first user through Google Glass's real-time map display.

**[00125]** In another embodiment, any of the previously described systems or methods may include voice control technology. In operation, a mobile device is in a listening mode where the mobile device continuously or periodically receives audio data through a microphone. When the mobile device receives audio data that corresponds to a predefined set of voice commands, the mobile device responds by initiating a process described in any of the previously described systems or methods. For example, a user may say "RoadShout Geo" to initiate the process described by the embodiments of Figures 1-4.

**[00126]** Prior technology made communication among drivers difficult or impossible. CB (Citizens Band) Radio has been popular with drivers for decades and is still in wide use today. Although use of CB radio by drivers other than professional truckers peaked in popularity in the 70s and 80s, the recent rise in near-constant communication through smartphones has reawakened the social spirit that drove the CB pioneers to reach out to each other while on the lonely road. The present invention is a downloadable application for your smartphone that allows you to transform your smartphone to an incredible, social driving experience that provides driver-to-driver, hands-free communication in a limitless number of ways chosen by the driver. Unlike traditional CB radio, which only has a range of up to 4 miles, the present invention uses the driver's cell phone carrier. Thus, the effective range of communication between drivers is potentially infinite, and only occasionally limited by lack of cell phone coverage in an area. — could point out some other important features

**[00127]** While particular elements, embodiments, and applications of the present invention have been shown and described, it is understood that the invention is not limited thereto because modifications may be made by those skilled in the art, particularly in light of the foregoing teaching. It is therefore contemplated by the appended claims to cover such modifications and incorporate those features which come within the spirit and scope of the invention.

## CLAIMS

1. A system for establishing communication between mobile devices, said system including:

a first mobile device;

a second mobile device; and

a server, wherein said server determines a first location of said first mobile device by receiving GPS coordinates of said first mobile device, wherein said server determines a second location of said second mobile device by receiving GPS coordinates of said second mobile device, wherein said server communicates data between said first mobile device and said second mobile device only when said second mobile device is located within a proximity zone, wherein said proximity zone comprises a geographic area having a predetermined radius surrounding said first mobile device.

2. The system of claim 1, wherein said proximity zone has a radius of two meters.

3. The system of claim 1, wherein said first mobile device and said second mobile device are located within automobiles.

4. The system of claim 1, wherein said first mobile device includes a user interface, wherein said user interface allows a user of said first mobile device to accept or reject communication with said second mobile device.

5. The system of claim 1, wherein said data communicated between said first mobile device and said second mobile device includes a VOIP signal, wherein said VOIP signal comprises a first audio data from said first mobile device and a second audio data from said second mobile device.

6. A method for establishing communication between mobile devices, said method including:

determining a first location of a first mobile device by receiving GPS coordinates of said first mobile device;

determining a second location of a second mobile device by receiving GPS coordinates of said second mobile device;

determining a proximity zone, wherein said proximity zone comprises a geographic area having a predetermined radius surrounding said first mobile device; and ✓

communicating data between said first mobile device and said second mobile device only when said second mobile device is located within said proximity zone. Based on...

7. The method of claim 6, wherein said proximity zone has a radius of two meters.

8. The method of claim 6, wherein said first mobile device and said second mobile device are located within automobiles.

9. The method of claim 6, further providing said first mobile device with a user interface, wherein said user interface allows a user of said first mobile device to accept or reject communication with said second mobile device.

10. The method of claim 6, wherein said data communicated between said first mobile device and said second mobile device includes a VOIP signal, wherein said VOIP signal comprises a first audio data from said first mobile device and a second audio data from said second mobile device.

11. A method for establishing communication between mobile devices, said method including:

providing a first mobile device in a first automobile;

providing a second mobile device in a second automobile;

determining a first road that said first automobile is located on by receiving GPS coordinates of said first mobile device;

determining a second road that said second automobile is located on by receiving GPS coordinates of said second mobile device; and

communicating data between said first mobile device and said second mobile device only when said first road is the same as said second road.

12. The method of claim 11, wherein said data communicated between said first mobile device and said second mobile device includes a VOIP signal, wherein said

VOIP signal comprises a first audio data from said first mobile device and a second audio data from said second mobile device.

13. The method of claim 11, further determining the direction that said first automobile is traveling on said first road by receiving GPS coordinates of said first mobile device and determining the direction that said second automobile is traveling on said second road by receiving GPS coordinates of said second mobile device.

14. The method of claim 13, further communicating data between said first mobile device and said second mobile device only when said first automobile is traveling in the same direction on the same road as said second automobile.

15. A method for establishing communication between mobile devices, said method including:

providing a server, wherein said server includes a data storage unit;

providing a first mobile device located in a first automobile;

receiving from said first mobile device a first descriptive data that represents a first descriptive characteristic of said first automobile;

storing said first descriptive data in said data storage unit;

providing a second mobile device;

receiving from said second mobile device a second descriptive data that represents a descriptive characteristic of an automobile; and communicating data between said first mobile device and said second mobile device when said second descriptive data represents said first descriptive characteristic of said first automobile.

16. The method of claim 15, wherein said data communicated between said first mobile device and said second mobile device includes a VOIP signal, wherein said VOIP signal comprises a first audio data from said first mobile device and a second audio data from said second mobile device.

ABSTRACT

Systems and methods are provided for communicating between mobile devices. In the aforementioned systems and methods, communication between mobile devices is facilitated when the mobile devices are within a certain distance of each other, and a plurality of mobile devices may be in communication with one another at the same time. Other embodiments of the aforementioned systems and methods facilitate communication between mobile devices when the mobile devices are being transported in the same direction along the same road. Additional embodiments facilitate communication between mobile devices when a user of one mobile device inputs descriptive characteristics of a vehicle of a user of another mobile device. In all embodiments, communication between mobile devices is established by combining audio signals from the mobile devices into a single VOIP signal that is transmitted to each mobile device.

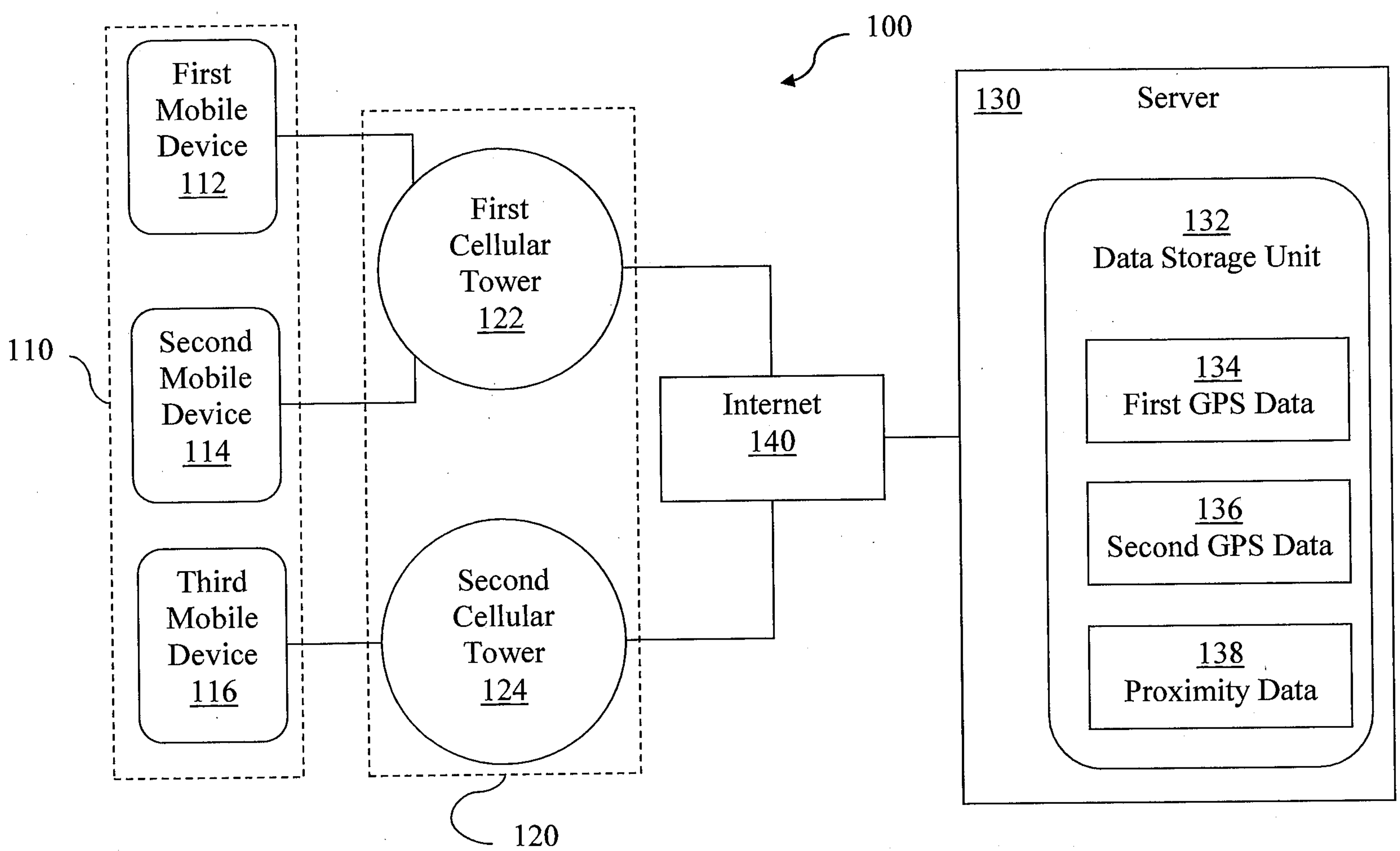
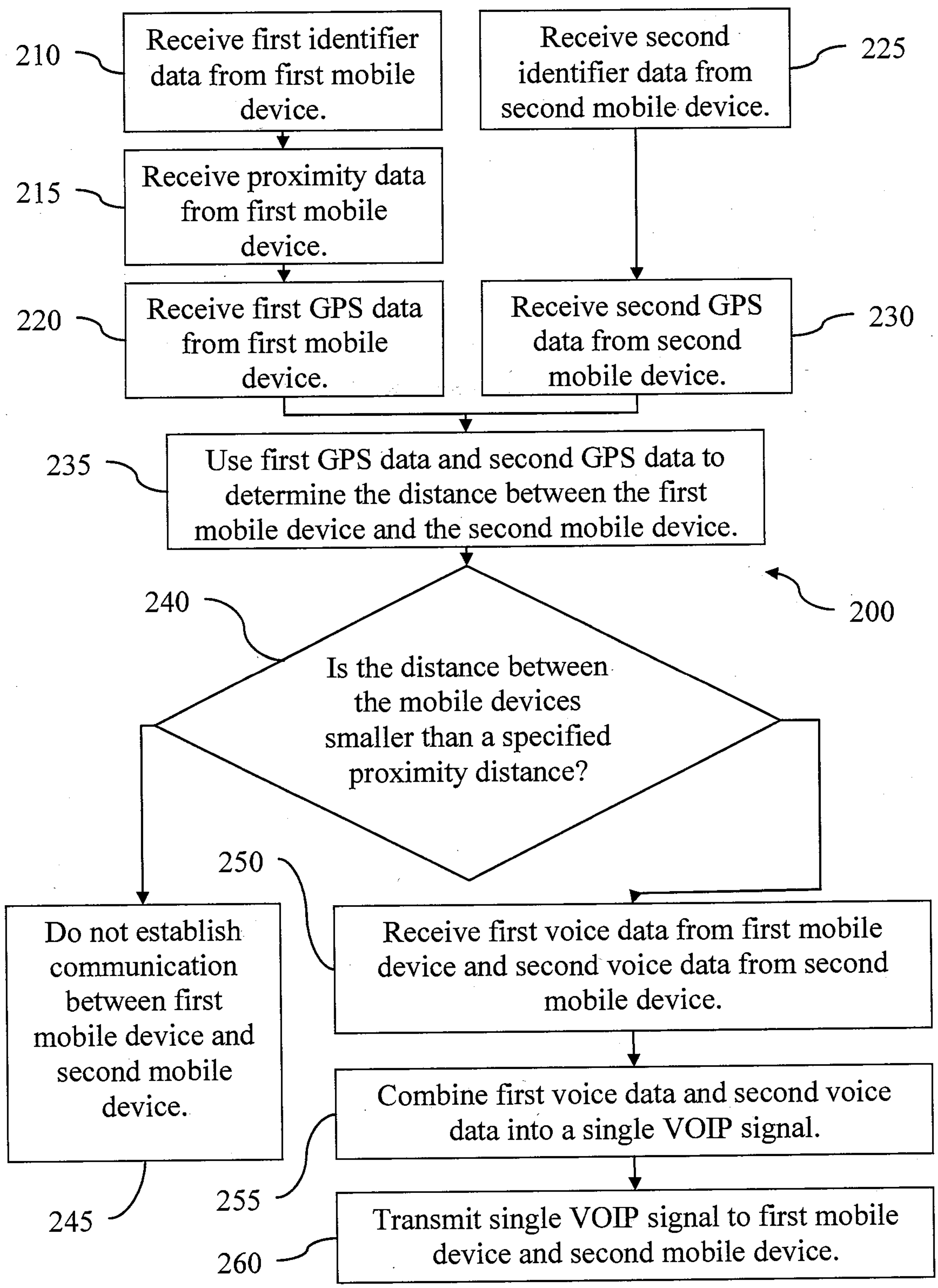

100
First Mobile Device 112
Second Mobile Device 114
Third Mobile Device 116
110
First Cellular Tower 122
Second Cellular Tower 124
120
Internet 140
130
Server
132 Data Storage Unit
134 First GPS Data
136 Second GPS Data
138 Proximity Data

FIG. 1



210
Receive first identifier data from first mobile device.
215
Receive proximity data from first mobile device.
220
Receive first GPS data from first mobile device.
Receive second identifier data from second mobile device.
225
Receive second GPS data from second mobile device.
230
235
Use first GPS data and second GPS data to determine the distance between the first mobile device and the second mobile device.
240
200
Is the distance between the mobile devices smaller than a specified proximity distance?
250
Do not establish communication between first mobile device and second mobile device.
Receive first voice data from first mobile device and second voice data from second mobile device.
Combine first voice data and second voice data into a single VOIP signal.
245
255
Transmit single VOIP signal to first mobile device and second mobile device.
260


FIG. 2

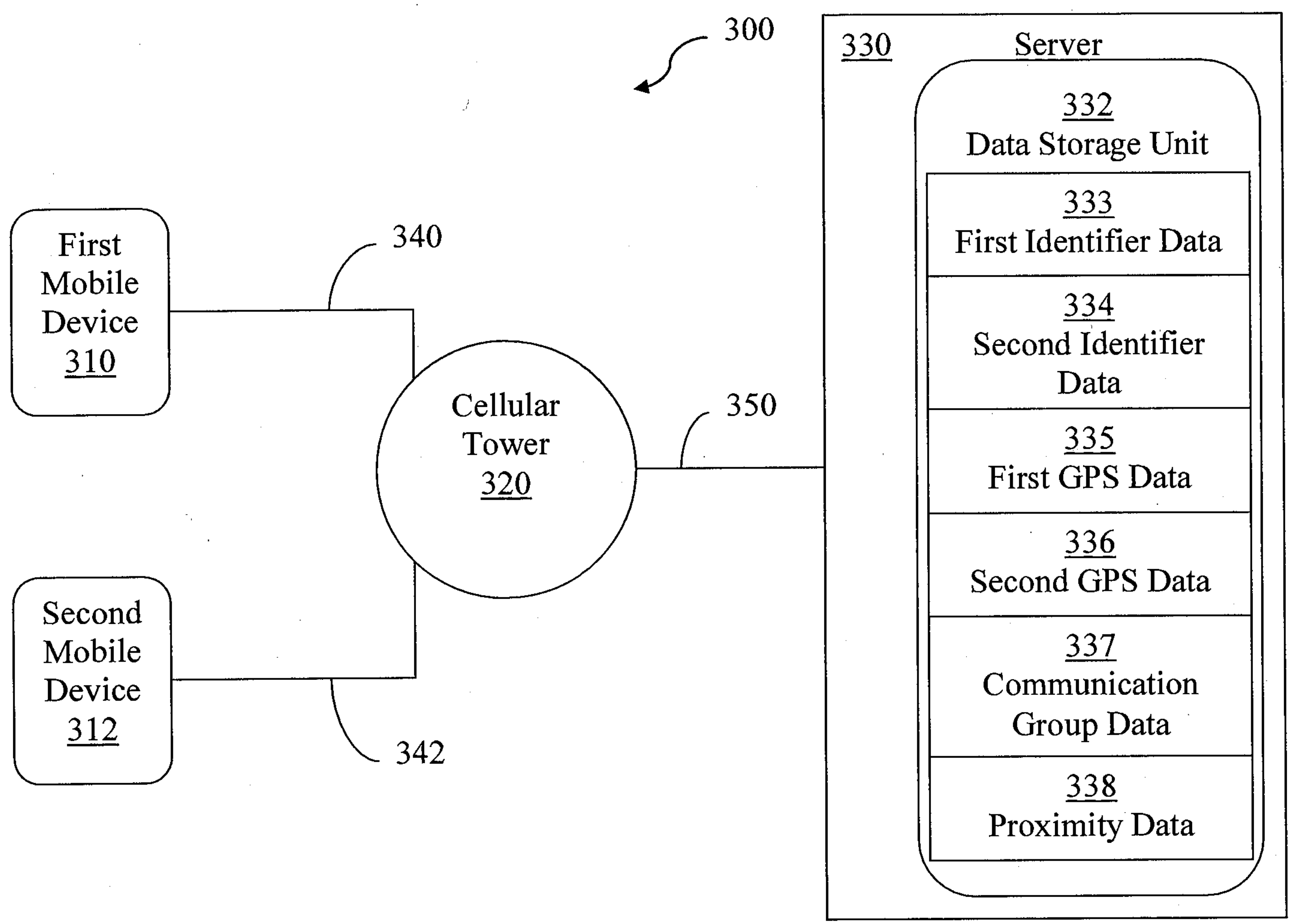

300
330
Server
332
Data Storage Unit
333
First Identifier Data
334
Second Identifier Data
335
First GPS Data
336
Second GPS Data
337
Communication Group Data
338
Proximity Data
First Mobile Device
310
Second Mobile Device
312
Cellular Tower
320
340
342
350

FIG. 3

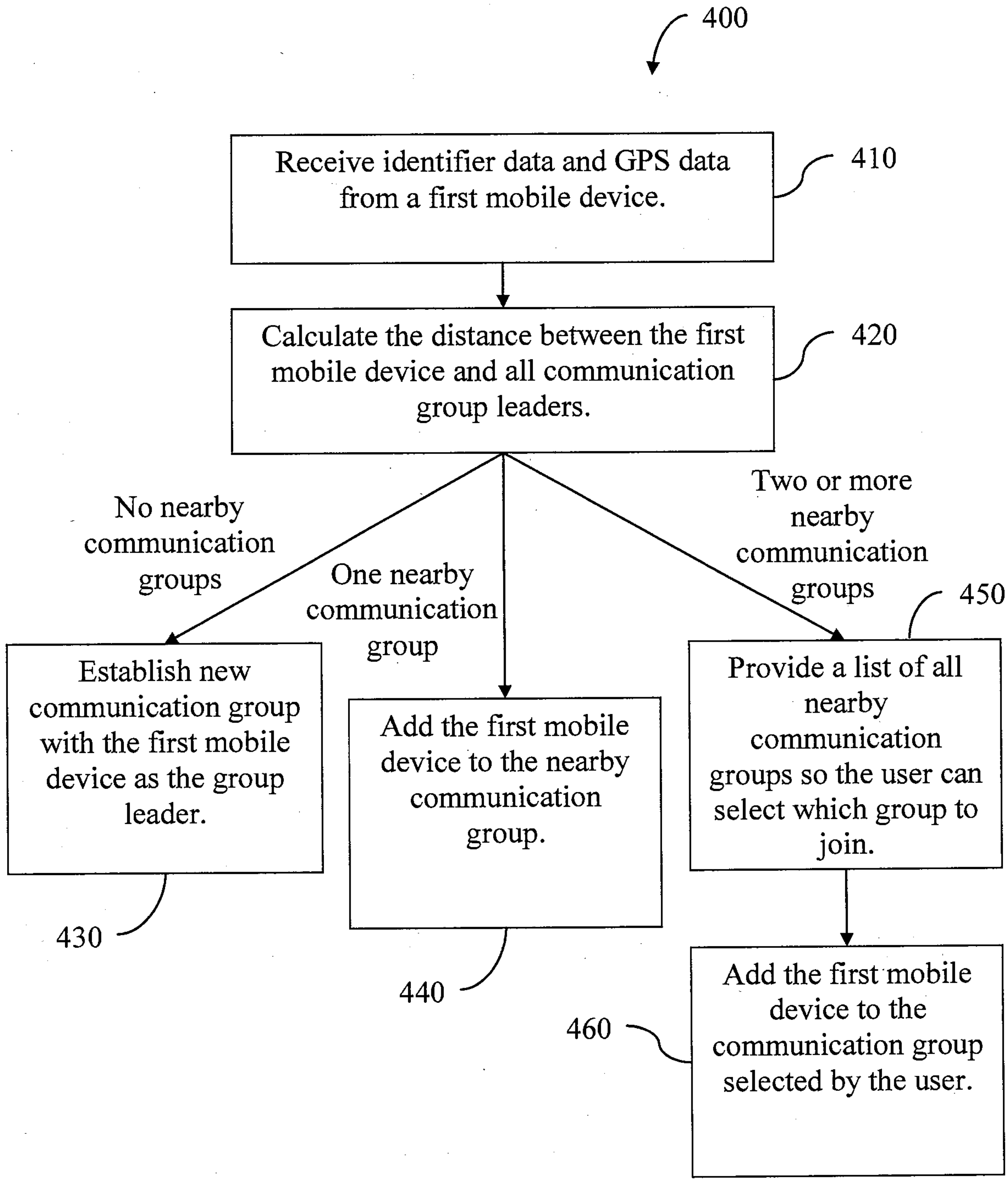

400
Receive identifier data and GPS data from a first mobile device.
410
Calculate the distance between the first mobile device and all communication group leaders.
420
No nearby communication groups
One nearby communication group
Two or more nearby communication groups
Establish new communication group with the first mobile device as the group leader.
430
Add the first mobile device to the nearby communication group.
440
Provide a list of all nearby communication groups so the user can select which group to join.
450
Add the first mobile device to the communication group selected by the user.
460

FIG. 4

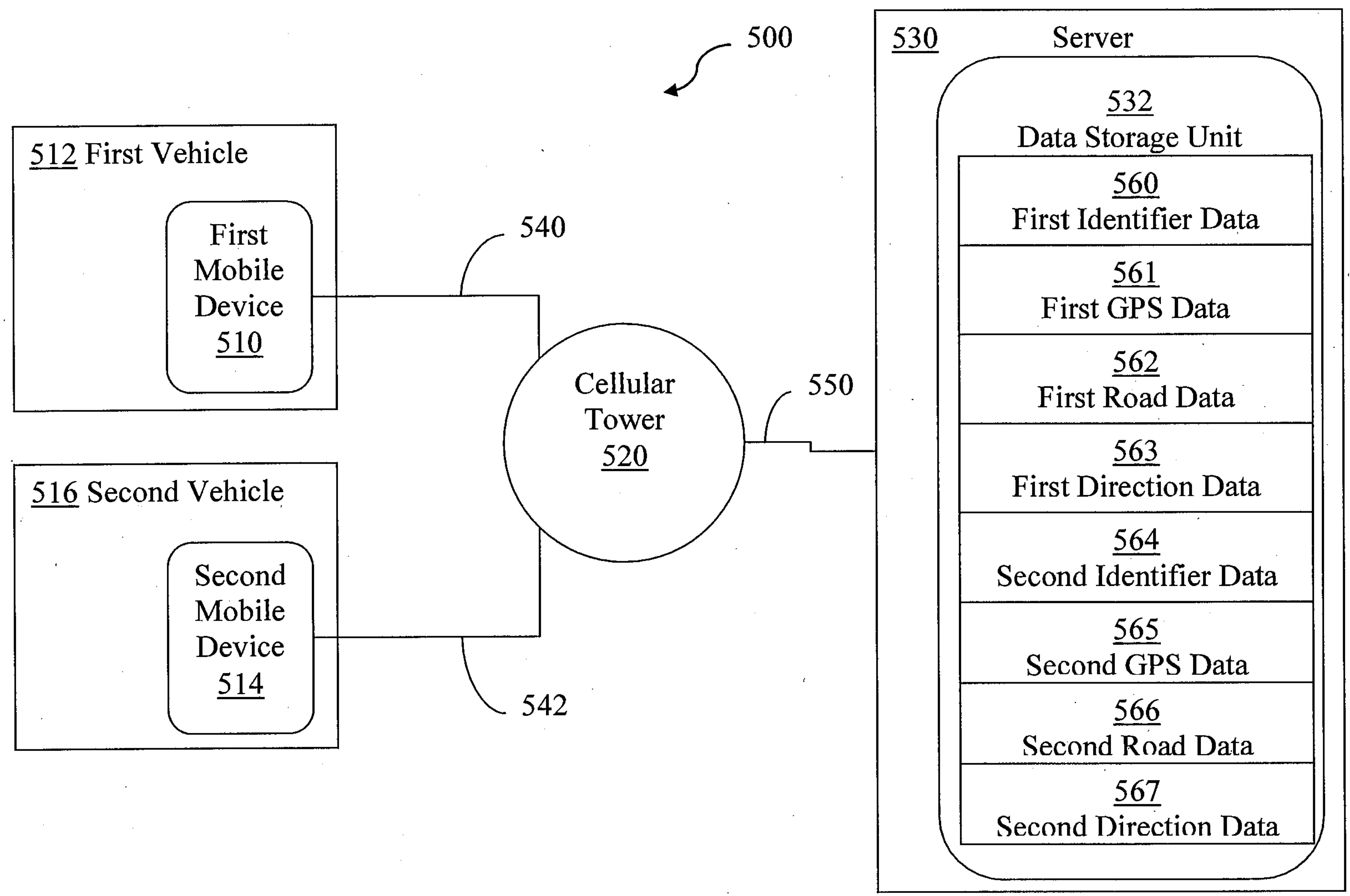

500
512 First Vehicle
First Mobile Device 510
516 Second Vehicle
Second Mobile Device 514
540
542
Cellular Tower 520
550
530 Server
532 Data Storage Unit
560 First Identifier Data
561 First GPS Data
562 First Road Data
563 First Direction Data
564 Second Identifier Data
565 Second GPS Data
566 Second Road Data
567 Second Direction Data

FIG. 5

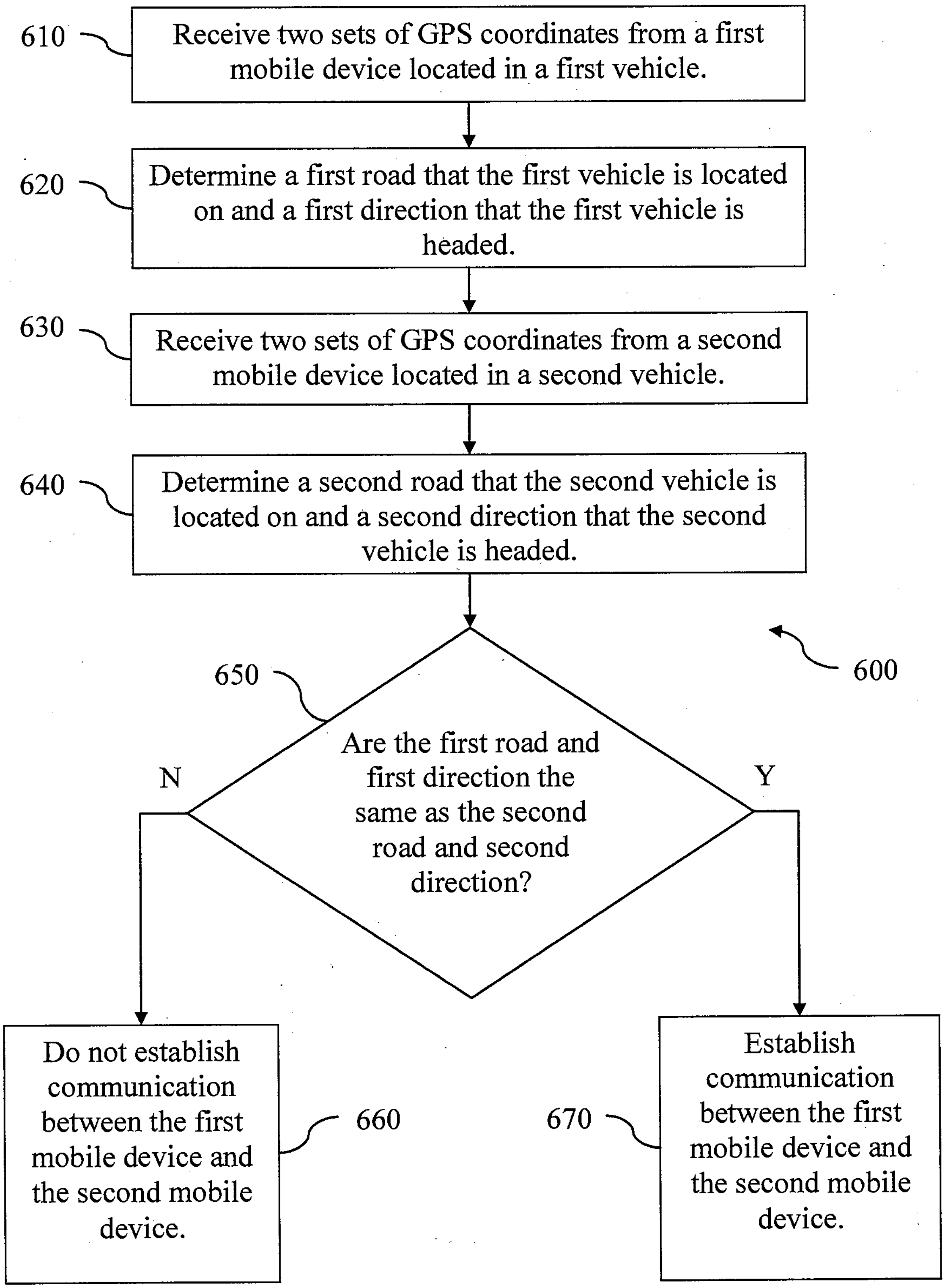

610
Receive two sets of GPS coordinates from a first mobile device located in a first vehicle.
620
Determine a first road that the first vehicle is located on and a first direction that the first vehicle is headed.
630
Receive two sets of GPS coordinates from a second mobile device located in a second vehicle.
640
Determine a second road that the second vehicle is located on and a second direction that the second vehicle is headed.
600
650
Are the first road and first direction the same as the second road and second direction?
N
Y
Do not establish communication between the first mobile device and the second mobile device.
660
670
Establish communication between the first mobile device and the second mobile device.

FIG. 6

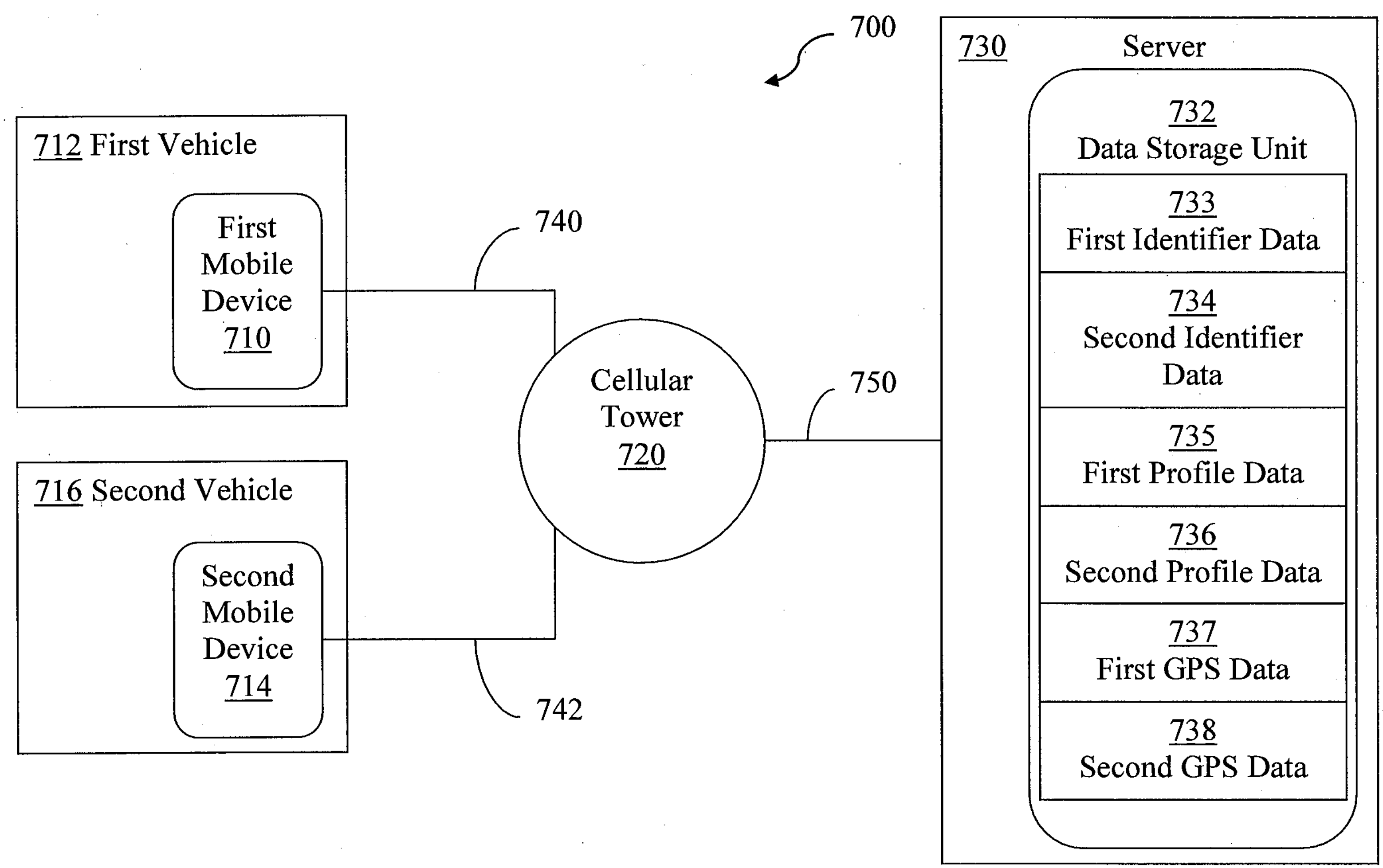

700
712 First Vehicle
First Mobile Device 710
716 Second Vehicle
Second Mobile Device 714
740
742
Cellular Tower 720
750
730
Server
732 Data Storage Unit
733 First Identifier Data
734 Second Identifier Data
735 First Profile Data
736 Second Profile Data
737 First GPS Data
738 Second GPS Data

FIG. 7

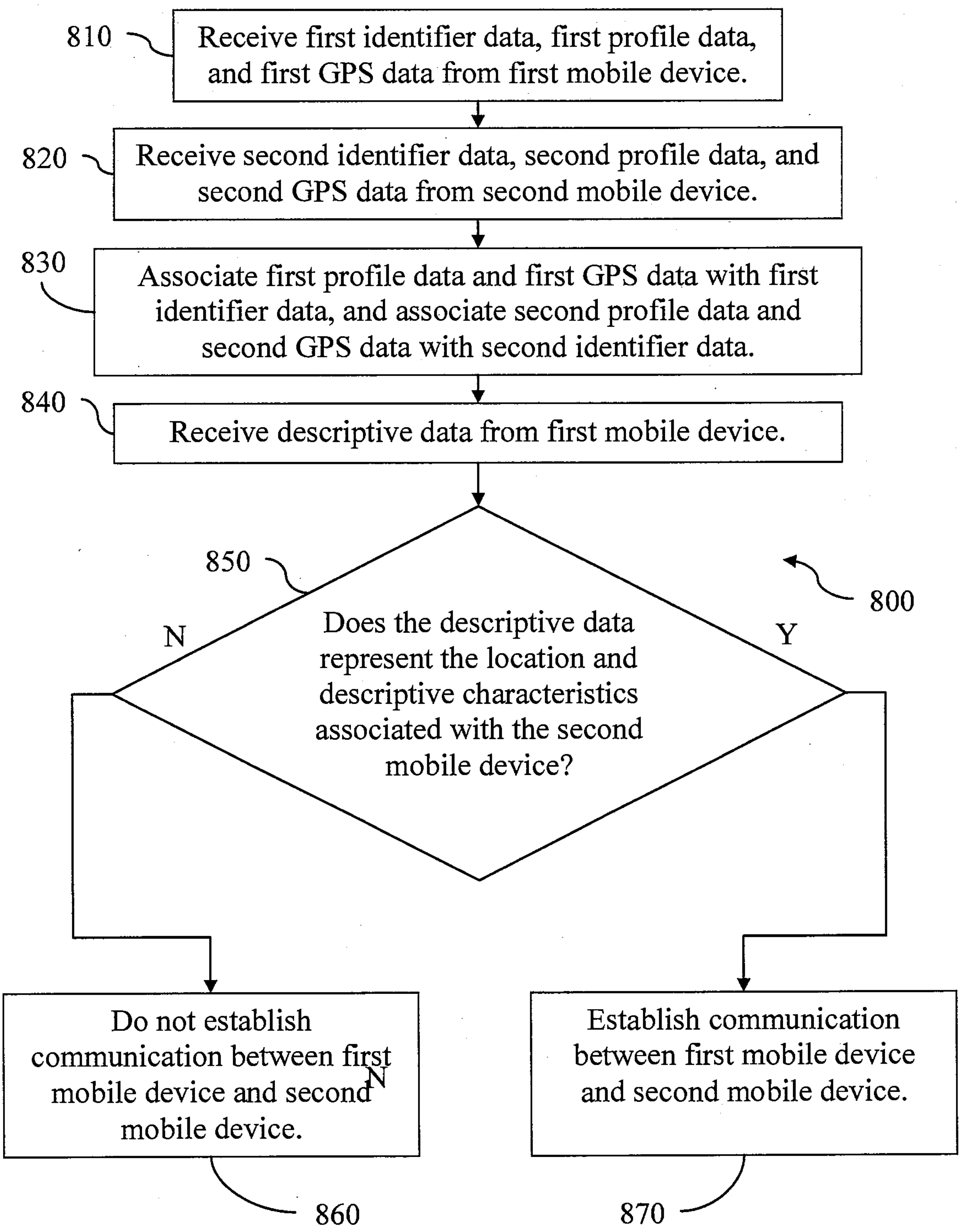

810
Receive first identifier data, first profile data, and first GPS data from first mobile device.
820
Receive second identifier data, second profile data, and second GPS data from second mobile device.
830
Associate first profile data and first GPS data with first identifier data, and associate second profile data and second GPS data with second identifier data.
840
Receive descriptive data from first mobile device.
850
800
N
Y
Does the descriptive data represent the location and descriptive characteristics associated with the second mobile device?
Do not establish communication between first mobile device and second mobile device.
N
Establish communication between first mobile device and second mobile device.
860
870

FIG. 8

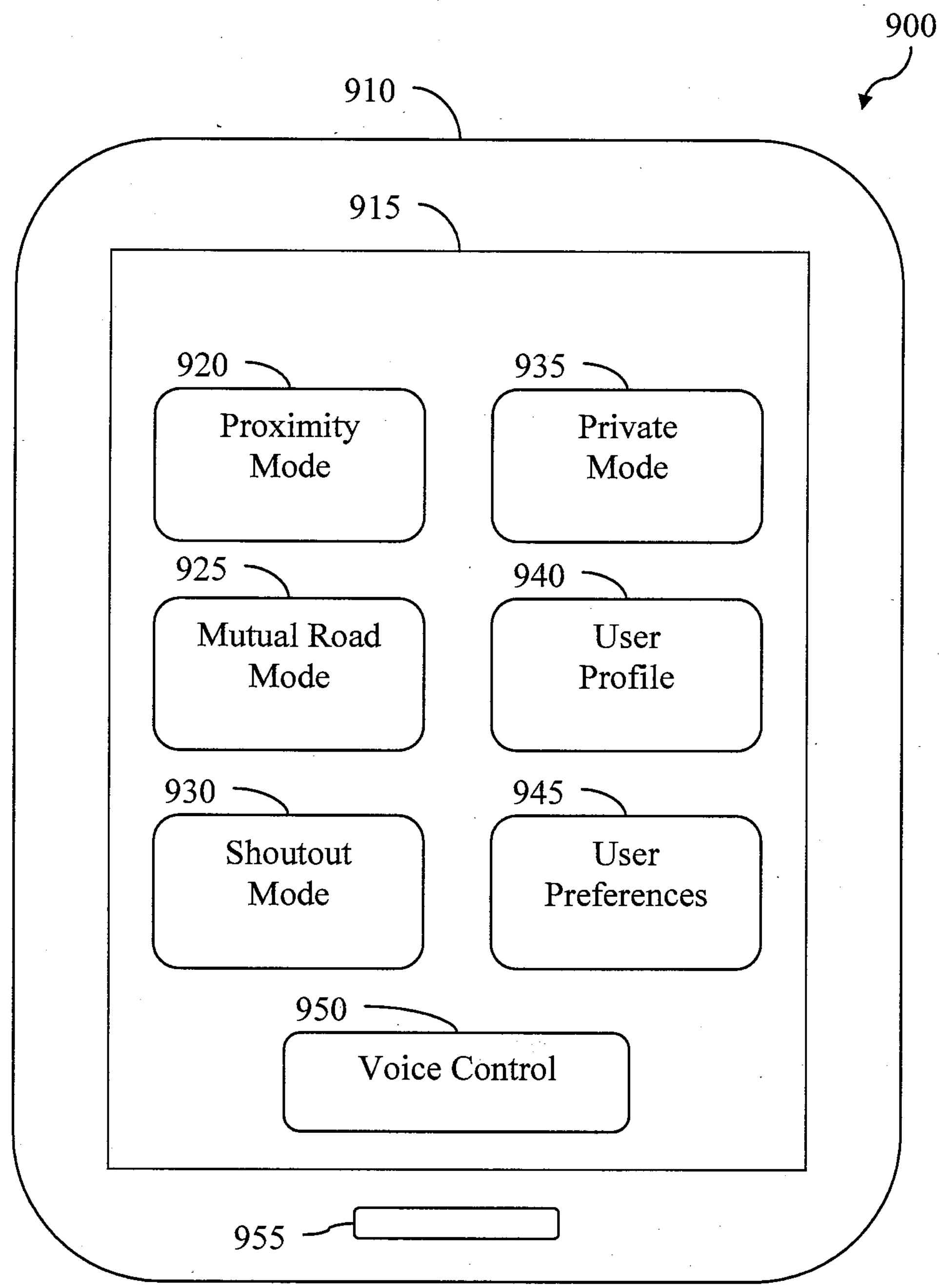

900
910
915
920
Proximity Mode
935
Private Mode
925
Mutual Road Mode
940
User Profile
930
Shoutout Mode
945
User Preferences
950
Voice Control
955

FIG. 9

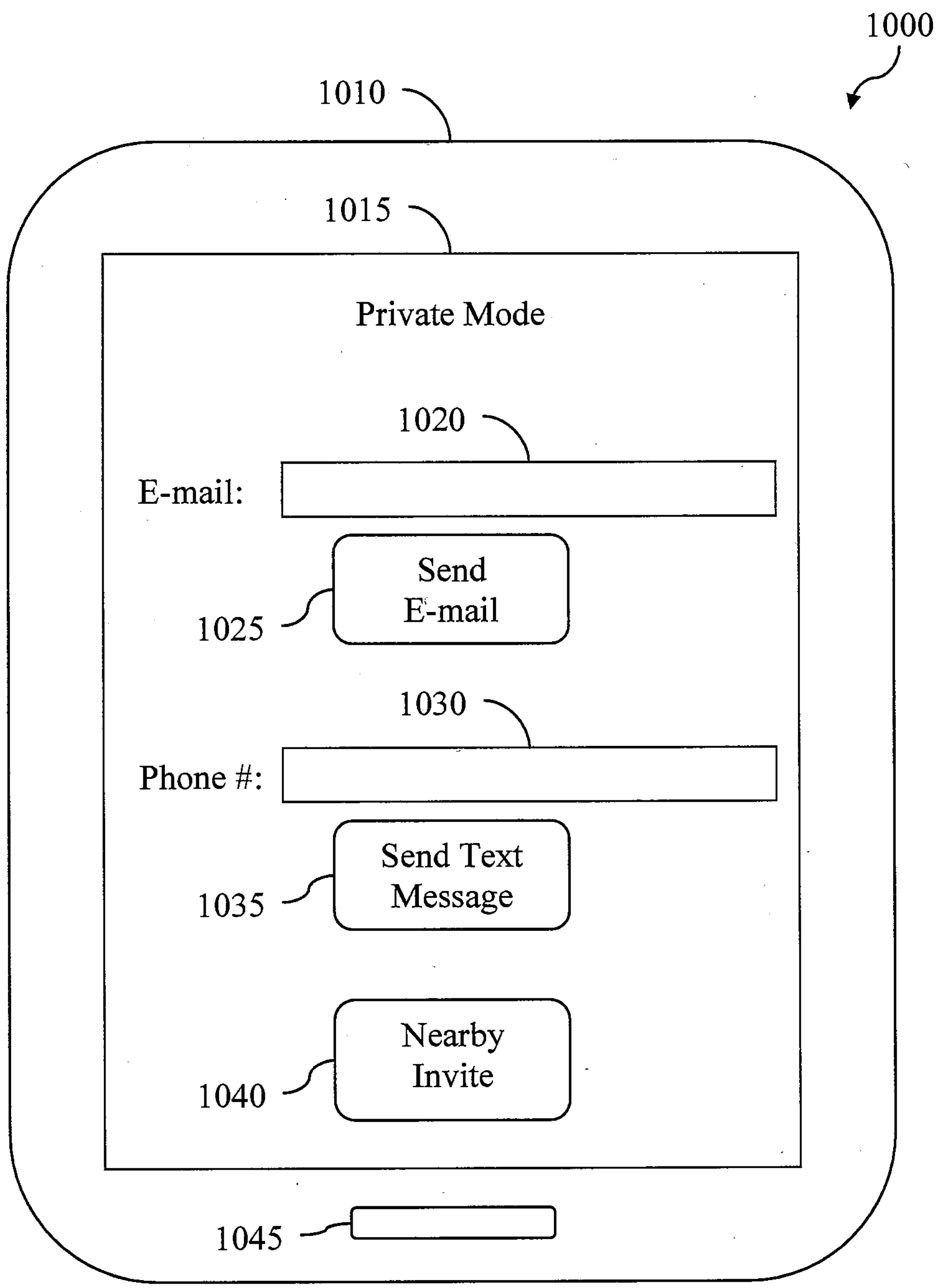

1000
1010
1015
Private Mode
1020
E-mail:
Send
E-mail
1025
1030
Phone #:
Send Text
Message
1035
Nearby
Invite
1040
1045

FIG. 10

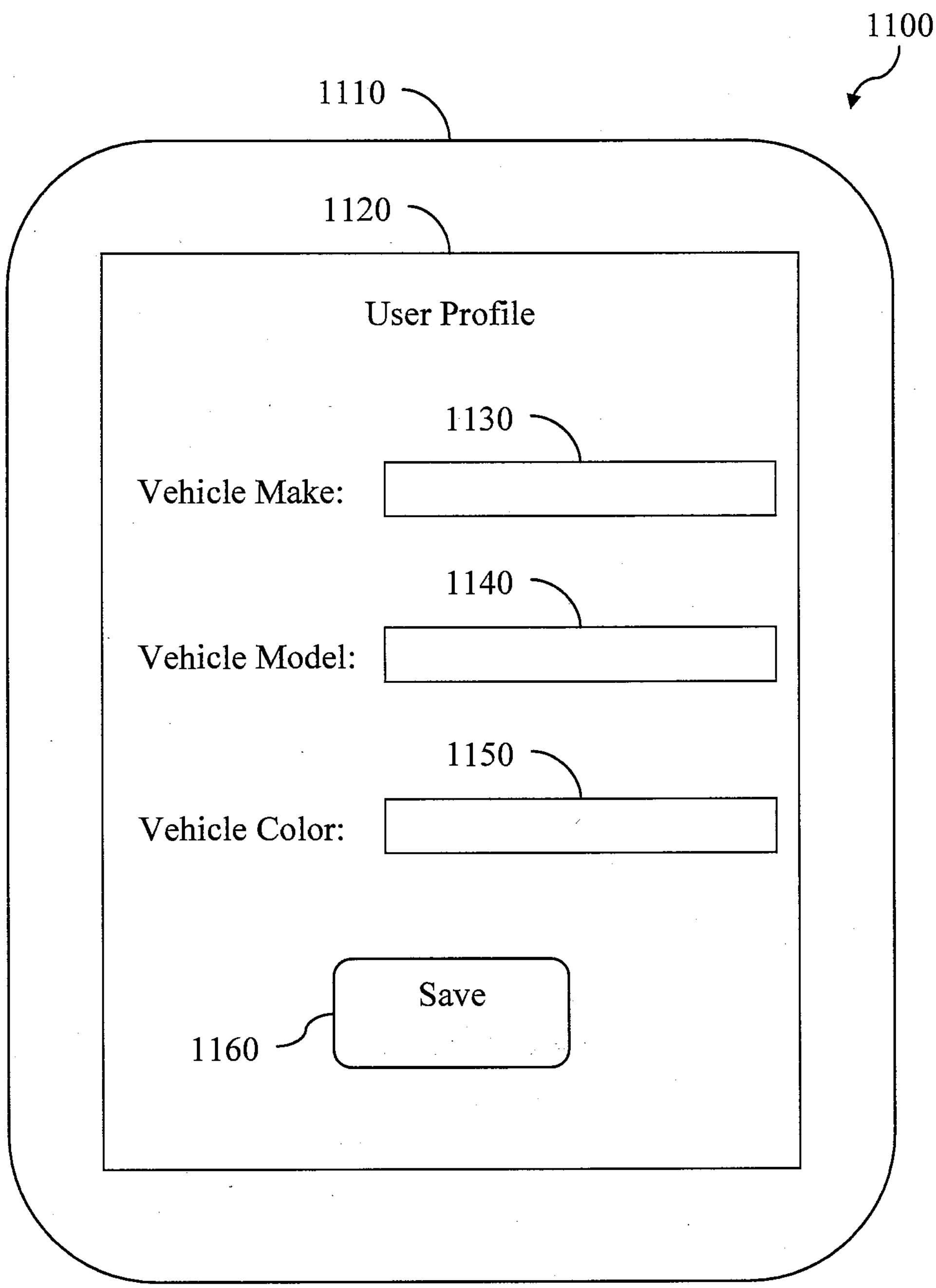

1100
1110
1120
User Profile
1130
Vehicle Make:
1140
Vehicle Model:
1150
Vehicle Color:
Save
1160

FIG. 11

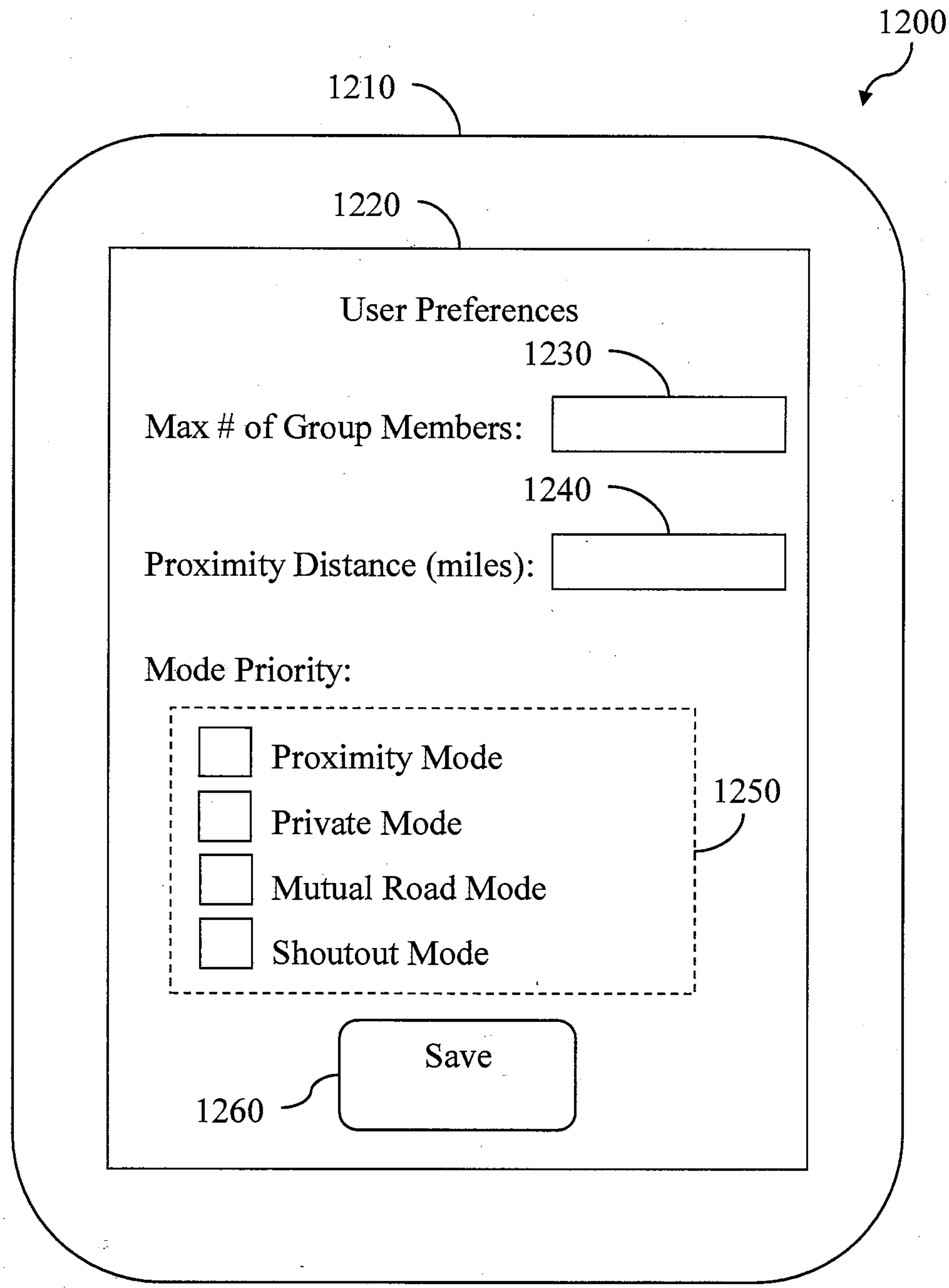

1200
1210
1220
User Preferences
1230
Max # of Group Members:
1240
Proximity Distance (miles):
Mode Priority:
Proximity Mode
Private Mode
Mutual Road Mode
Shoutout Mode
1250
Save
1260

FIG. 12

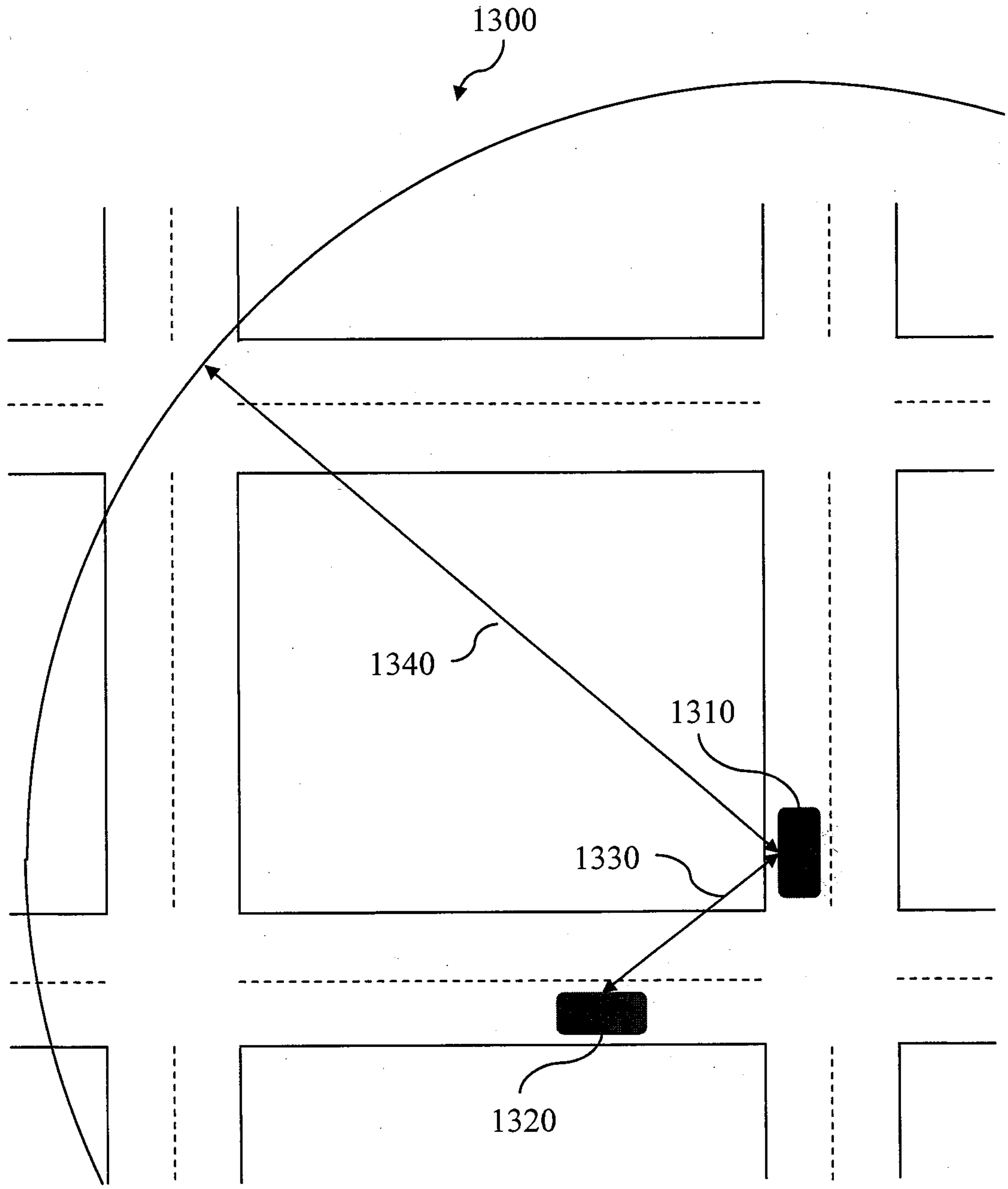



FIG. 13

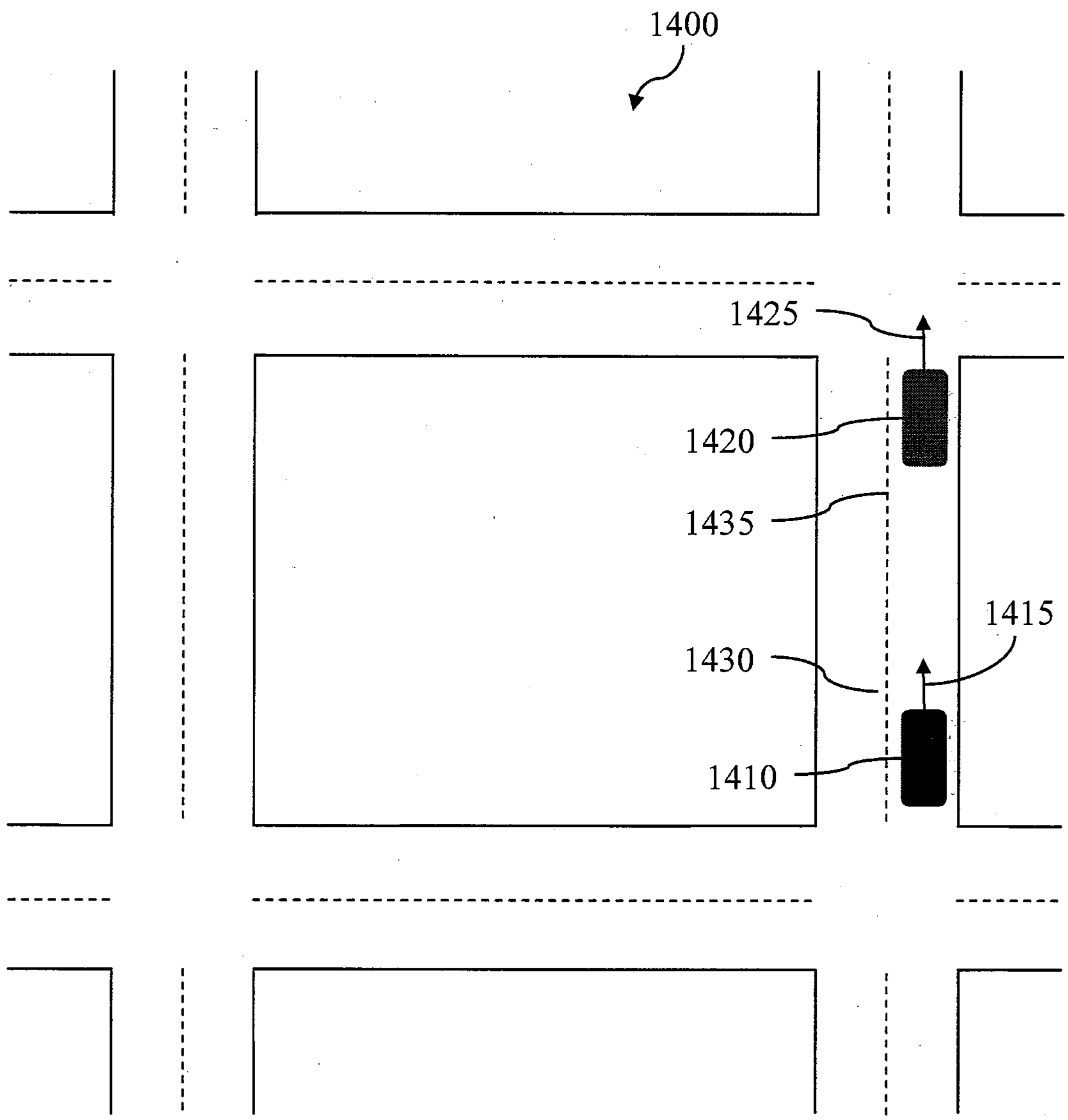



FIG. 14

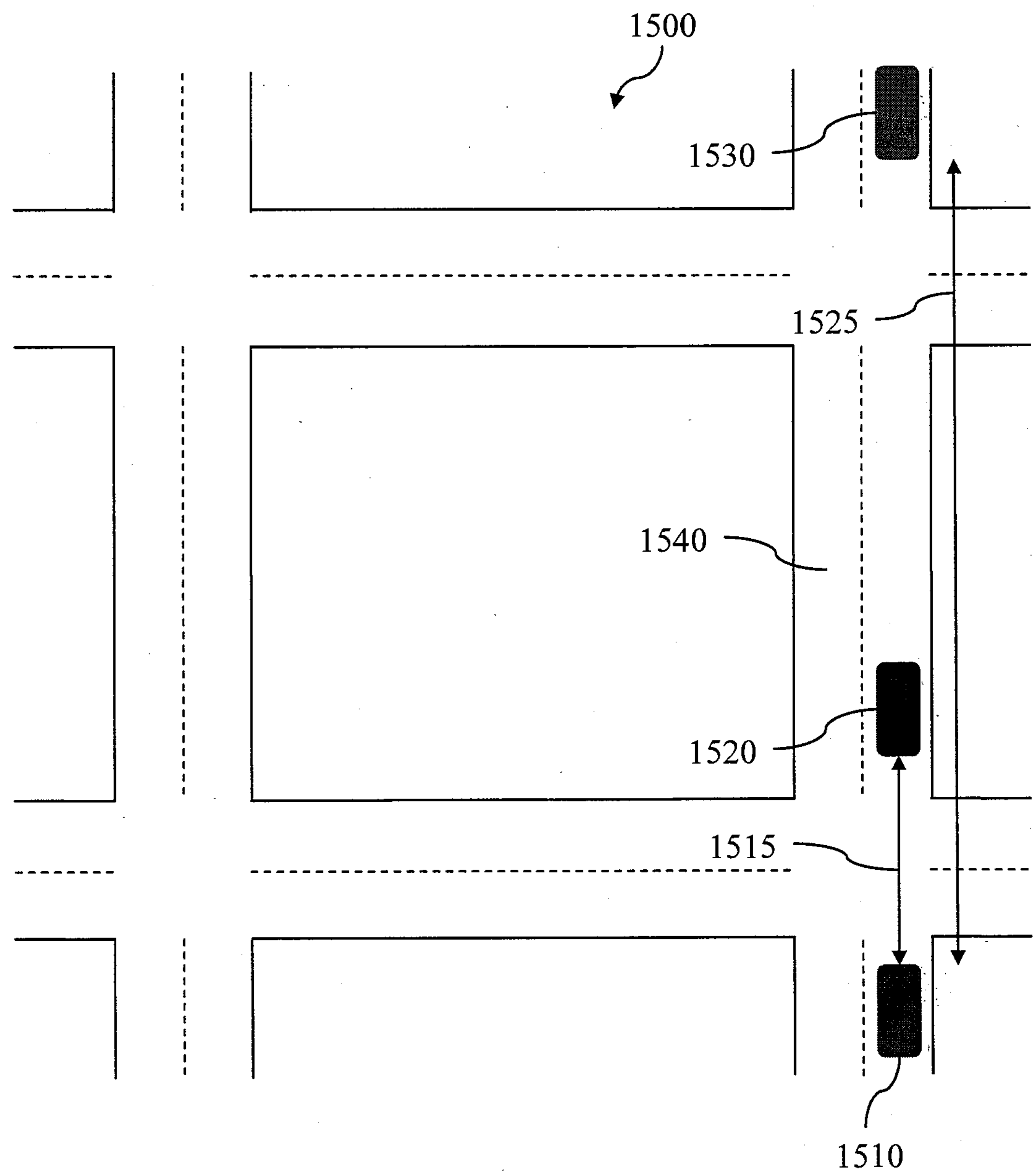



FIG. 15

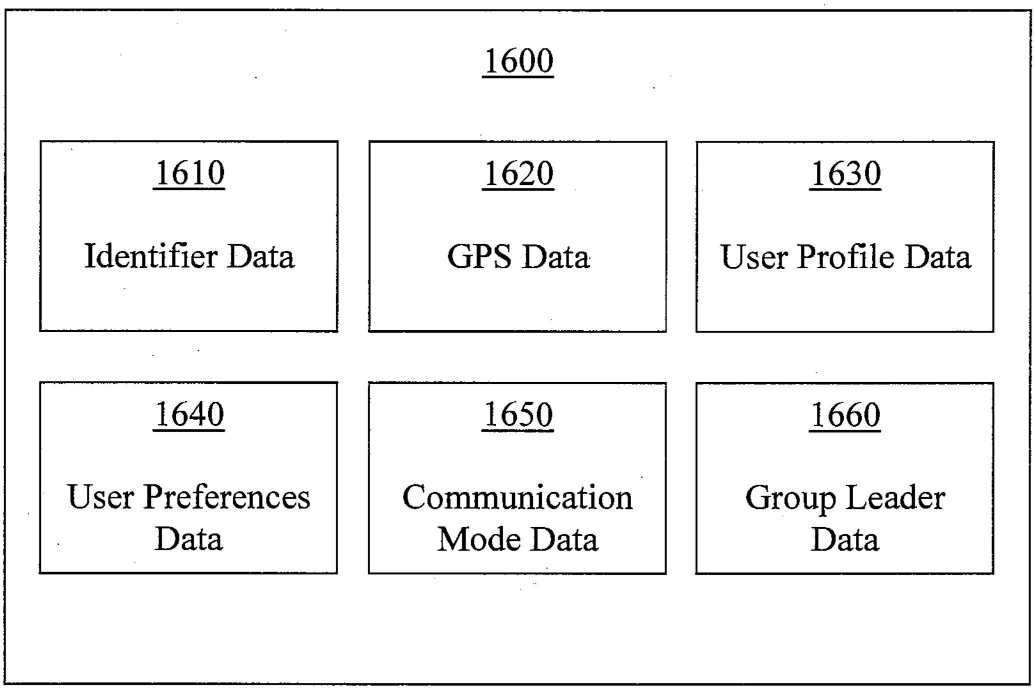

1600
1610
Identifier Data
1620
GPS Data
1630
User Profile Data
1640
User Preferences Data
1650
Communication Mode Data
1660
Group Leader Data

FIG. 16