A Real-Time GPS Vehicle Tracking System Displayed on a Google-Map-Based Website

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Abstract

This paper proposes a real-time vehicle tracking system using a global positioning system (GPS) technology module to receive the location of the vehicle, to forward into microcontroller and to connect internet by a general packet radio service (GPRS) technology for displaying a real time on the website map developed by Google Map which allows inspection of vehicles at all times. There are 3 parts of this project. The first part is a program developed in C language for controlling the hardware. Employing PHP and AJAX language will be developed for the Google Map API to help a map construction on the website. The second part is the hardware, there are the GPS and GPRS modules, the GPS module will locate the vehicles via the satellite, and the GPRS module will assemble all data and send it to the website by the microcontroller. The final part is the interface using RS232 for connecting between the GPS and GPRS modules. With the Google Map on a real-time website, vehicles can be monitored and located very effectively. This includes paths and/or vehicles directions. However, the small error is at approximately 5 meters in the wrong location due to the limitation of hardware and the ratio of map reference.

Keywords: real-time, vehicle tracking, GPS, GPRS, Google Map, website

1. Introduction

Nowadays, vehicles are essential to transport products or goods in many organizations or firms, but there are many problems of using the vehicles for their business such as the delay of the deliveries, driving out of paths, or even stealing oil and products. Therefore, GPS and GPRS are important technologies for monitoring such problems. However, it still is not easy to implement them for monitoring and tracking vehicles on the website using Google map. Recently, the GPS technology has been presented in many researches. For example, the paper [1] has presented a vehicle warning system be responsive to vehicle speed and position as determined by GPS. The paper [2] has proposed an object locator system for obtaining information about the location of an individual, animal or moveable object. The paper [3] has presented a vehicle navigation of train, collision avoidance and control system. The paper [4] has proposed an estimating GPS time at cellular terminals based on timing of information from base stations and satellites. However, no papers have demonstrated the GPS and GPRS technologies for a real-time vehicle tracking based on the Google map.

In this paper, a real-time vehicle tracking system proposes the use of a global positioning system (GPS) technology module to receive the location of the vehicle, to forward into microcontroller and to connect internet by a general packet radio service (GPRS) technology for displaying a real time on the website map developed by Google Map which allows inspection of vehicles at all times. There are 3 parts of this project. The first part is a program developed in C language for controlling the hardware. Employing PHP and AJAX language will be developed for the Google Map API to help a map construction on the website. The second part is the hardware, there are the GPS and GPRS modules, the GPS module will locate the vehicles via the satellite, and the GPRS module will assemble all data and send it to the website by the microcontroller. The final part is the interface using RS232 for connecting between the GPS and GPRS modules. With the Google Map on a real-time website, vehicles can be monitored and located very effectively. This includes paths and/or vehicles directions. However, the small error is at approximately 5 meters

in the wrong location due to the limitation of hardware and the ratio of map reference.

2. Proposed System

Figure 1 shows a proposed system of the real-time GPS vehicle tracking system displayed on a Google-Map-based website consisting of five processes as follows. For the first process, the GPS module will connect the satellites and then it will be received the position (latitude and longitude) from the satellites. In the second process, the GPRS module will connect the cellular antennas and then it will send the position to the database servers shown in the third process. For the fourth process, the proposed website based on Google Map will display the vehicle tracking using the data from the database servers containing the GPS position. In the last process, the people can access the website for monitoring the vehicle objects.

3. Experimental Results

For the overall results, the small error for tracking vehicles is at approximately 5 meters in the wrong location due to the limitation of hardware and the ratio of map reference. Figure 2 shows an example of the real-time GPS vehicle tracking based on Google Map. As shown in Figure 2, there are two positions which are two different times from 19:46 to 19:58.

Figure 2 An example of the real-time GPS vehicle tracking based on Google Map (from 19:46 to 19:58).

4. Conclusion

The real-time vehicle tracking system has been presented through the use of the global positioning system (GPS) technology module to receive the location of the vehicle, to forward into microcontroller and to connect internet by a general packet radio service (GPRS) technology for displaying a real time on the website map developed by Google Map which allows inspection of vehicles at all times. There are 3 parts of this project. The first part is a program developed in C language for controlling the hardware. Employing PHP and AJAX language will be developed for the Google Map API to help a map construction on the website. The second part is the hardware, there are the GPS and GPRS modules, the GPS module will locate the vehicles via the satellite, and the GPRS module will assemble all data and send it to the website by the microcontroller. The final part is the interface using RS232 for connecting between the GPS and GPRS modules. With the Google Map on a real-time website, vehicles can be monitored and located very effectively. This includes paths and/or vehicles directions. However, the small error is at approximately 5 meters in the wrong location due to the limitation of hardware and the ratio of map reference.

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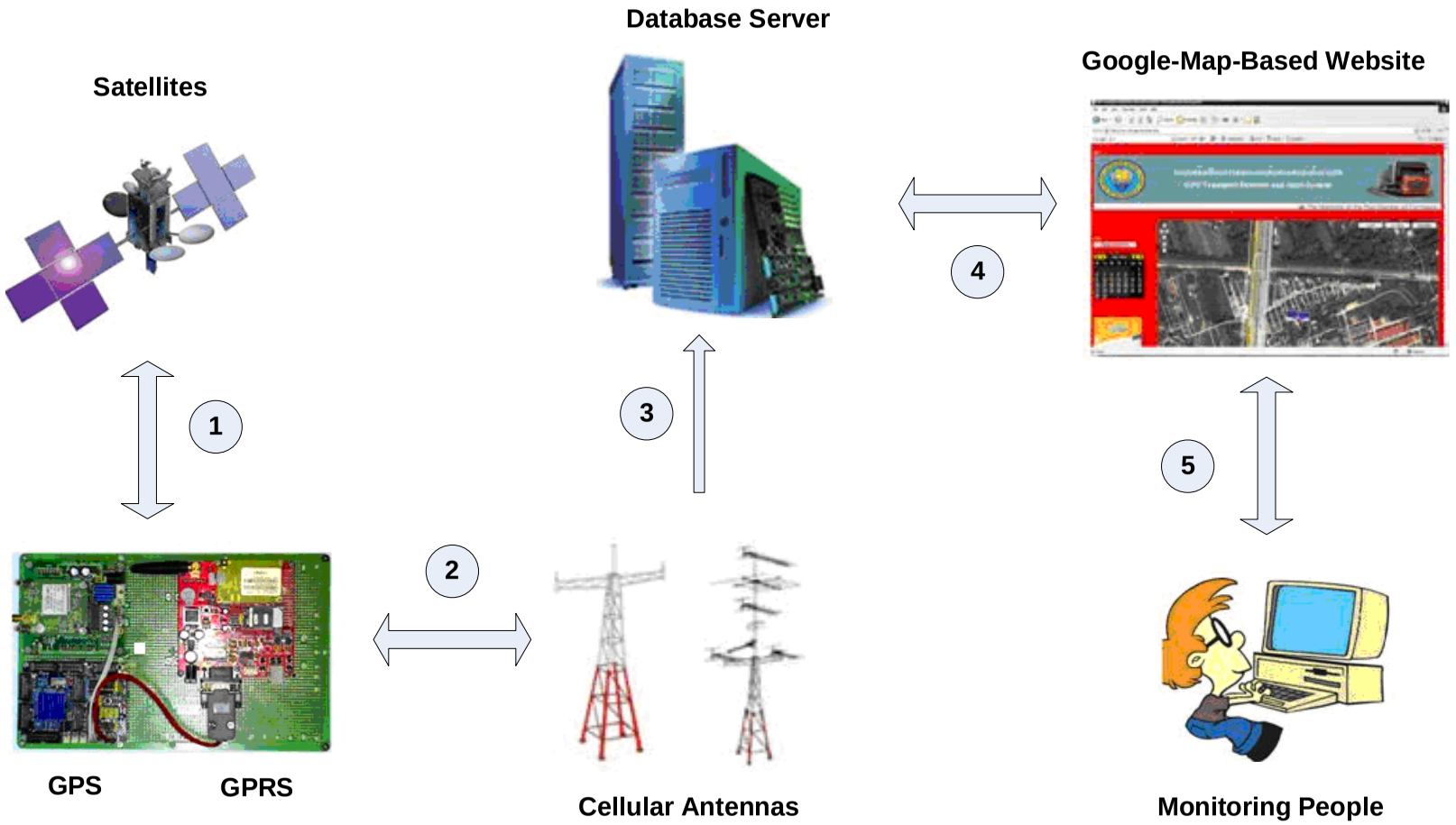

Figure 1 The real-time GPS vehicle tracking system displayed on a Google-Map-based website.