Implementation of GPS Bus Tracking System

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Abstract – T*he GPS Bus tracking system is designed and implemented for tracking the movement of any equipped vehicle from any location at any time. The system made of a popular technology that combines a Smartphone application with a microcontroller. The designed vehicle tracking system works using GPS and GSM/GPRS technology that is one of the most common ways for vehicle tracking System . The device is embedded inside a vehicle and a microcontroller is used to control the GPS and GSM/GPRS modules which are inbuilt in Smartphone. The vehicle tracking system uses the GPS module to get regular time intervals. The GPS module is used to transmit and update the vehicle information and location of a bus. A Smartphone application is also used for continuously monitoring the vehicle location. The Google Maps App is used to display the vehicle database on the map in the Smartphone application. The Students continuously monitor a moving vehicle on using the Smartphone application and to determine the exact distance and time for the vehicle to arrive at a given destination location. This Tracking System show the feasibility and effectiveness of the system.*

Keywords—Vehicle tracking, Global positioning system (GPS) , Global System for Mobile communication (GSM), Google Maps.

1. INTRODUCTION

The Bus monitoring system uses GPS (Global Positioning System) to identify the current location of the buses. The location calculated by the GPS is in the form of latitude and longitude. The latitude and longitude are directed to the database server through GPRS service. The location data are stored into the database server and then it is retrieved on the map server to locate and display the location to users in the graphical user interface. This Bus Tracking system that help students locate the current location of the buses and expected arrival time of the buses to their nearest bus stop. The location and time will be shown on the mobile app and also received a message when a bus nearer to passenger stops. This Bus tracking system can be accessed from a Smartphone more easily because the Smartphone has social network services. So, the system would become more efficient to users of social network and Smartphone, they allow quick monitoring of the location and status of the vehicle.

2. METHODOLOGIES

2.1 Location

The Location information is fetched from the online database which receives the data regarding the exact location from the arduino module in the bus. This helps in maintaining the uniqueness of the bus while displaying its location in the map.

2.2 Maps

The application is developed using android API which has a very simple User Interface to use it. Google maps API is the core component used in it, which is very easy to use and explore maps with simple gestures such as pinch to zoom tap to point etc.

2.3 Route Information

The Routes of all Buses are recorded by Bus In-charge. The Web Admin login the website and update the bus details regarding its routes. Now, the request made by the client for the bus information will be fetched from the database and delivered to client through server.

3. IMPLEMENTATION

The GSM/GPRS module is used to transmit and update the vehicle location and a Smartphone application is also developed for continuously monitoring the vehicle location. Users will be able to continuously monitor a moving vehicle on demand using the Smartphone application and determine the estimated distance and time for the vehicle to arrive at a given destination. Using mobile GPS there are so many advantages, more and more flexibility and scalability. Many rapid elasticity measured services, On demand self service, everywhere Network access, simply we can build up your applications within less span of time collaboration can be done in while accessing mobile services. The main advantage of the GPS Bus Tracking System is that we can back up the data we can increase storage capacity to store your valuable data.

3.1 Hardware Utilities

The hardware components such as microcontroller, GSM/GPRS module, GPS module will be used during the development of this system.

3.1.1 Microcontroller

The micro-controller is the central controller for the entire unit. The model employed in the System is the Arduino , which is an open source electronics prototyping board based on the Atmel ATMega328 8 bit micro-controller running at 16 MHz.

3.1.2 GSM/GPRS Module

The GSM/GPRS module will be used to send the raw collected data from the GPS device to the application server where the raw data will be processed and stored into the database according to the time stamps. The GSM module can be employed to calculate the accurate location of the device with the help of current GSM service provider network tower used by the GSM module.

3.1.3 GPS Module

GPS module will be utilized to obtain GPS location data.The GPS module is US Global satellite EM-406A which is based on spectacular SiRF Star chipset. It outputs positioning and timing data in NMEA 0183 and SiRF binary protocol which has positioning accuracy of 10 meters without and 5 meters with WAAS.

3.2 Software Utilities

Software will be designed to display graphical location of the buses with their estimated time of arrival. The software will be designed and will be accessible through the website address and as well as through mobile application installed in the students mobile phones.

Server to store location of the buses. The web application to track the location from web interface and a mobile application for the users to track the location using the bus numbers.

3.2.1 Web Application

The Bus tracking System web application will be designed to display the current location of the buses as well as the total distance and route covered by each individual bus to keep the track of their record.

Figure 1 *Web Admin Login page*

The Bus Tracking system web admin login page will be showing the details of username and password, then enter the details after a home screen will be displayed.

Figure 2 *Home Screen page*

In the Home Screen to enter the details of students as well as bus drivers details of all buses.

Figure 3 *Students details page*

3.2.2 Mobile Application

The bus tracking Mobile application will be designed to help students to find the current location of the bus according to the bus number .

Figure 4 *Mobile App Registration page*

A student can register in the registration page then a Dashboard page will be opened and this page will contain the details of all bus timings schedule and GPS bus tracking information.

Figure 5 *Mobile App Dashboard Screen*

Figure 6 *Bus Timing Details Screen*

The Google Maps App is used to display the vehicle database on the map in the Smartphone application. The Students continuously monitor a moving vehicle on using the Smartphone application and to determine the exact distance and time for the vehicle to arrive at a given destination location. This Tracking System show the feasibility and effectiveness of the system.
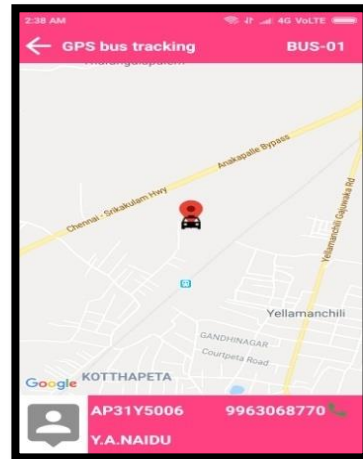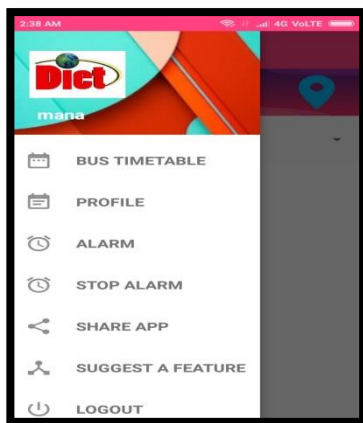

Figure 7 *Bus Tracking Screen*

4. CONCLUSION

Bus Tracking system is mor useful in large cities and it is more secured than other systems. It is completely integrated so that once it is implemented in all vehicles, then it is possible to track anytime from any ware. It has real-time capability, emerges in order to strengthen the relations among people, vehicle ans road by putting modern information technologies together and able to form a real time accurate, effective comprehensive transporting system. This system has many advantages such as large expandability and easy to use in vehicle traffic administration.
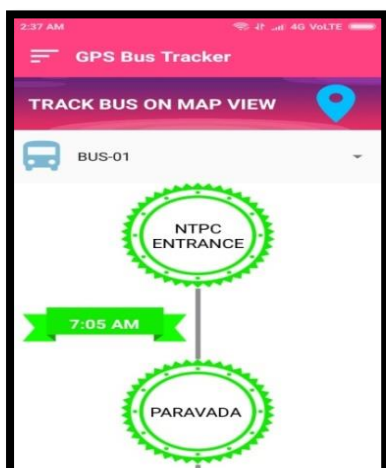
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