

Intelligent Bus Tracking System based on GSM and GPS

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Abstract – Today most of people travel by buses and if bus gets delayed it mainly results in wastage of time of people. So in order to avoid this wastage we have proposed bus tracking system based on GPS and GSM which will provide real time location of bus to authorized user on request. In this project this system will provide position of bus in the form of text message containing longitude and latitude values. By using these values and google maps, user will get to know position of bus.

Keywords – Tracking, GPS, GSM

1. Introduction

As we know that, day by day traffic is increasing rapidly. Most of the people travel by bus as it is the convenient and cheapest source of transportation. People who mainly travel by bus are students, employees etc. So the aim of our project is to track the bus to avoid time wastage and to reduce human effort. Bus tracking system can also be used for security purpose. By using this system, parents can have an eye on the routes of school buses of their children in case if the bus gets delayed. Our system is based on GSM and GPS. GSM is used for communication with another system. Here GSM transmits the data of GPS to the authorized user as well as it will receive the data from GSM. Hence it can be concluded that as GSM is a device which is used to transmit and receive messages or data. Here we are using GPS device which receives signals from satellite and it provides location and time information in the form of longitude and latitude values in all weather conditions whenever required. GPS is a device which is more used in mobile phones to track the road maps. The whole processing of our system relays on microcontroller. Microcontroller is interfaced to GPS module and GSM modem. Microcontroller is the heart of our project. Microcontroller gets the values of latitude and longitude from GPS then it sends this information in the form of text messages using GSM. This document is set in 10-point Times New Roman. If absolutely necessary, we

suggest the use of condensed line spacing rather than smaller point sizes. Some technical formatting software print mathematical formulas in italic type, with subscripts and superscripts in a slightly smaller font size. This is acceptable.

2. System

Our methodology is based on idea of real time. When the authorised user wants the location of bus then he has to call on the number of sim which is in the tracking system. After 2 rings call will automatically be disconnected. User will receive text SMS containing latitude and longitude co-ordinates through GSM then with the help of google maps user will get the location of the bus.

2.1 Block Diagrams

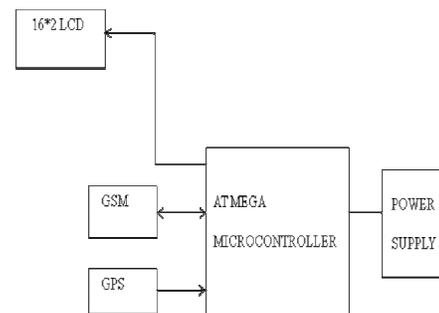


Fig. 1 Block Diagram.

GPS tracker for school bus consists of a microcontroller, GPS module, GSM module, LCD and a keypad.

GPS Modem: After GPS module connected to minimum required satellites, it will find co-ordinates of its location and sends those data to microcontroller. Microcontroller: Then the microcontroller sends data to LCD display and GSM module.

LCD Display: LCD displays shows longitude and latitude of location. GSM Modem: GSM module sends data via SMS to user.

Keypad: It is used to send any one of 4 emergency messages.

2.2 Flow Chart

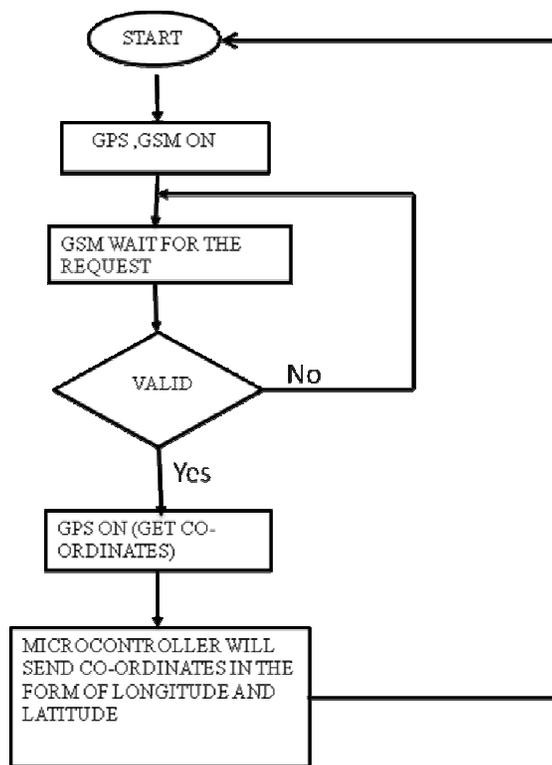


Fig. 2 Flow Chart

After power on System initializes GPS and GSM modules. As soon as initialization process is completed system will enter in wait loop and it will continuously stay in the loop until any message is received on GSM. On receiving the messages microcontroller will check the sender mobile number in its database. If mobile number found in database then microcontroller revert back an SMS to User with latitude and Longitude.

2.3 Hardware Implementation

We have used Atmega 328 microcontroller. It is a 28 pin IC and it consists of input-output ports. The microcontroller is interfaced with various hardware devices like GPS i-wave module, GSM sim 300, LCD etc. The interfacing of GSM with microcontroller is done by connecting transmitter pin of GSM to receiver pin of microcontroller and receiver pin of microcontroller connected to transmitter pin of GSM. The interfacing of GPS with microcontroller is done by connecting transmitter pin of GPS to receiver pin of microcontroller.

A GSM modem is a special type of modem which accepts a SIM card, and operates over a subscription to a mobile operator, just like a mobile phone. When a GSM modem is connected to a computer, this allows the computer to use the GSM modem to over a mobile network , While these GSM modem are most frequently used to provide mobile internet connectivity, many of them can also be used for sending and receiving SMS and MMS messages. A GSM modem can be dedicated modem device with a serial, USB or Bluetooth connection, or it can be mobile phone that provides GSM modem capabilities.

The term GSM modem is used as a generic term to refer SIM 300 is a GSM modem with a simple serial interface. SIM 300 modem can accept any GSM network operator SIM card and act just like a mobile phone with its own unique phone number. With this module one can send/receive SMS, connect to internet via GPRS and receive calls. The modem can either be connected to PC serial port directly or to any microcontroller.

In this project GSM is used for receiving and transmitting SMS for this transmit pin TXD and receive pin RXD of GSM connected to transmit pin TXD and receive pin RXD of Microcontroller.

A GPS navigation device or GPS receiver, when used for vehicle navigation commonly referred to simply as a GPS, is a device that is capable of receiving information from GPS satellites and then to accurately calculate its geographical location. The Global Positioning System (GPS) is a global navigation satellite system (GNSS) made up of a network of a minimum of 24 but currently 30 satellites placed into orbit by the U.S. Department of Defense.

A GPS device can retrieve from the GPS system location and time information in all weather conditions, anywhere on or near the Earth. A GPS reception requires an unobstructed line of sight to four or more GPS satellites. Today, most standalone GPS receivers are used in automobiles. The GPS capability of smart phones may use

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