

Real Time Vehicle Intimation System Using GPS and GSM Technology

Sruthin Balachandran V V¹, Manjukiran B²

^{1,2}Assistant Professor, Department of Electronics and Communication, AJ Institute of Engineering and Technology, Mangaluru, Karnataka, India

Abstract-- The safety of private and public vehicles is a major concern nowadays so having GPS vehicle tracking system ensures their safety while travelling. The aim of our project is to make an effective smart college bus tracking systems that sends a group message ie alert to the students waiting at the next stop. When bus start moving from one stop to the next the GPS module compares the present location with the already stored location and the system automatically sends message to all the members of next stop using GSM module. This project also describes a design of effective alarm system that can monitor an automotive / vehicle / car condition in travelling and to inform emergency about an accident that has occurred.

Key words: GSM, GPS, Arduino UNO, AT Commands, NMEA 0183 Protocol

I. INTRODUCTION

In today's connected world there is a lot of emphasis in fleet tracking using wireless communication technique. Our project deals with the design and development of an embedded system, which is used to intimate the students about the presence or absence of a college bus in that particular route, at that particular time. The project idea is based on GPS and GSM technology. The main objective of the system is to alert the passengers about the presence or absence and the approximate time that the bus would take to reach the bus stop, from where the passenger would have requested to get the intimation. Since time is one of the most influential factor in the present hectic world, the main objective of this system is to reduce the waiting time of students in the bus stop and they can spend their time efficiently and reach the bus stop just before the bus arrives, or take alternate means of transport if the bus is delayed. This helps the students in planning their journey long before and can make college bus travelling experience even more attractive. In addition, the passengers or students can send an acknowledgment back to the bus via SMS in case of an emergency. Thus, using the two-way communication of a GSM modem. An automatic accident alert device for vehicles is also introduced in this project. This design is a system which can detect accidents in significantly less time. The alert message is sent to the rescue team using GSM modem. This will help to reach the rescue service in time and save the valuable human life.

II. REVIEW ANALYSIS AND PROBLEM DEFINITION

After studying various methods adopted by various authors it is observed that numerous methods are used for vehicle tracking, monitoring and alerting system. Real time passenger information system uses variety of technologies to track the location of bus in real time and generate the prediction of bus arrival at stops along the routes. The existing system used different technology and method as per application. Zigbee have short range of data transmission and is not cost efficient too. From study and observation, we can say that the algorithm, technology of existing system can be improved for better performance and overcome the problem of existing system. Every system has its own importance; different authors have tried different methods based on applications. Still there is scope to optimize different methodologies and algorithm to make system more users friendly and wide application areas. Here by this project we aim to reduce the complexity of the algorithm by using Arduino platform, in which the interfacing of GPS and GSM is less complex. When we need more control and are actually thinking of converting the prototype into a real product, this platform is much friendly. Boards with an Atmel ATmega328, such as Arduino Uno have an inbuilt EEPROM of 1 KB that can store the data generated on a permanent basis.

III. HARDWARE

a) Arduino UNO

Arduino UNO is a microcontroller board based on the ATmega328P. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. The ATmega328 on the Uno comes preprogrammed with a bootloader that allows us to upload new code to it without the use of an external hardware programmer.

b) GSM Modem

GSM modem is similar to mobile phone without any display, keypad and speakers. This accepts a SIM (Subscriber Identity Module or Subscriber Identification Module) card, and operates over a subscription to a mobile operator. GSM

modem can accept any GSM network operator SIM card and act just like a mobile phone. A SIM card is an integrated circuit chip that is intended to securely store the International Mobile Subscriber Identity (IMSI) number and its related key, which are used to identify and authenticate subscribers on mobile telephony devices (such as mobile phones and computers). SIM is a detachable smart card containing the user's subscription information and phone book.

Table 1: AT Commands

Command	Description
AT+CMGF	Select SMS message format
AT+CMGS	Send SMS message
AT+CNMI	New SMS message indications

c) GPS Module

The Global Positioning System (GPS) is a space-based navigation system that provides location and time information in all weather conditions, anywhere on or near the Earth where there is an unobstructed line of sight to four or more GPS satellites. The system provides critical capabilities to military, civil, and commercial users around the world. The United States government created the system, maintains it, and makes it freely accessible to anyone with a GPS receiver. The GPS is made up of three parts: satellites orbiting the Earth; control and monitoring stations on Earth; and the GPS receivers owned by users. GPS satellites broadcast signals from space that are picked up and identified by GPS receivers. Each GPS receiver then provides three-dimensional location (latitude, longitude, and altitude) plus the time.

NMEA 0183 Protocol:

The NMEA protocol is an ASCII-based protocol, Records start with a \$ and with carriage return/line feed. GPS specific messages all start with \$GPxxx where xxx is a three-letter identifier of the message data that follows. NMEA messages have a checksum, which allows detection of corrupted data transfers. The module supports the following NMEA-0183 messages: GGA, GLL, GSA, GSV, RMC VTG, ZDA and DTM. The module default NMEA-0183 output is set up as GGA, GSA, GSV, RMC and default baud rate is set up as 9600bps.

IV. FLOW CHART

The logic of the entire system working is shown in below.

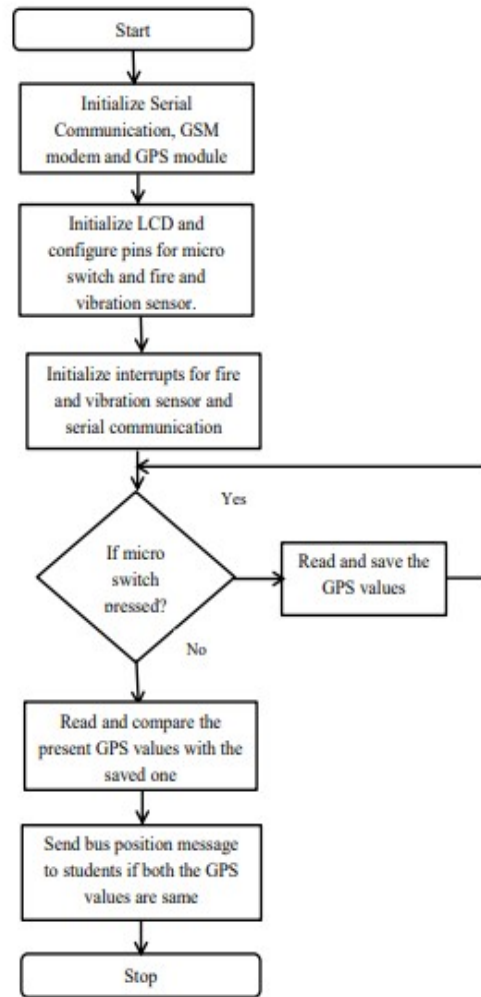


Fig.1. Flow Chart

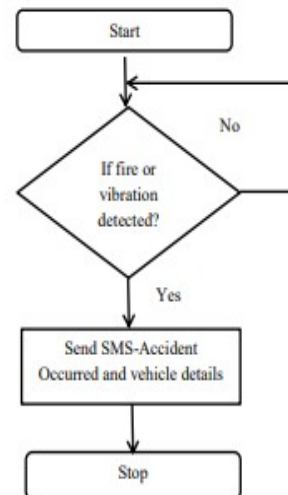


Fig.2. Flow Chart for interrupt (for vibration and fire detection)

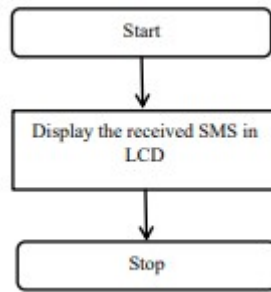


Fig.3.Flow Chart for Serial Communication Interrupt

V. CONCLUSION

This technology outdates the need of waiting at the Bus-Stop thus saving a lot of time. The system may focus on accurate arrival time prediction and real time position of vehicle also the accident alert feature plays much more important role in day to day life. On the whole this system proves to be very successful and can be easily implemented in real time.

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