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REAL TIME VEHICLE TRACKING SYSTEM USING GSM MODEM AND GPS MODULE

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Abstract-*The system is aimed to locate the position of the vehicle continuously, online data transmission method is implemented such that vehicle positions in the form of longitude & latitude values are monitored continuously through concern authorized mobile.Any location on Earth is described by two numbers, its* ***latitude,*** *and its* ***longitude****.these decide the position of the vehicle around the globe. This data acquired from the GPS. receiver fed to the microcontroller, which will be displayed through LCD. The same information is transmitted through GSM to the corresponding mobile number. This system permits localization of the automobile and transmitting the position(GPS coordinates) to the owner on his mobile phone as a message(SMS). The system can be interconnected with the car, which contains a GPS receiver, Microcontroller, and a GSM Modem. GPS Receiver. gets the location information from satellites in the form of latitude and longitude. The Microcontroller processes this information and this processed information is sent to the concerned mobile phone through GSM modem. The proposed project is a low-cost solution for automobile position and status, very useful in case of car theft situations, and also in car tracking system applications.*

Keywords*—Microcontrolle89C52, Global Positioning System (GPS), Global System for Mobile(GSM), Light Emitting Diode (LED), A Bump sensor, Liquid Crystal Display (LCD), Relay Keys.*

I. INTRODUCTION

With the increasing global demand for Transportation security, identification of assets, effective management of logistics and complexity of transport networks, raises the demand for Vehicle Tracking System. Vehicle Tracking System or Automatic Vehicle System (AVL)[1][3] is now one of the most popular technological changes in all over the world that are going to make our personal life and a business lot easier. As the title suggests, it supports real-time monitoring the location of the vehicle at any time. mainly, the functions of the system are supported by different technologies like the global positioning system (GPS)[2] and Global System for Mobile Communications (GSM)[5].GPS helps to navigate and find the vehicle effectively and is a reliable source in this field. As far as vehicle tracking system market in India is concerned, Which is expected to rise in the following years. In this proposed system AT89C52 microcontroller is used for interfacing various hardware peripherals. The current proposed design is an embedded system, which continuously tracks and monitor a moving vehicle and reports the status of the vehicle on request. For doing so an AT89C52 microcontroller is interfaced serially with a GSM[5] Modem and GPS Reciever. A GSM[5] modem is used to send the GPS coordinates (latitude and longitude) of the vehicle from a remote place. The GPS[2] receiver will give data on demand i.e. the GPS coordinates indicating the position of the vehicle. The GPS receiver gives many values regarding the position of the vehicle as the output, but only the NMEA data coming out is read and displayed on to the LCD. The same data is sent to the concerned or owner at the other end from where the position of the vehicle is demanded. The hardware interfaces to microcontroller are LCD display, GSM modem, and GPS receiver.In order to interface GSM[5] modem and GPS receiver to the controller, a MUX is used. The design uses RS-232 protocol for serial communication between the modems and the microcontroller. A serial driver IC is used for converting TTL voltage levels to RS-232 voltage levels. A Program has been developed which is used to locate the exact position of the vehicle and also to navigated track of the moving vehicle on Google maps.

II. LITERATURE SURVEY

A crucial and increasing demand for vehicle tracking and security due to modernization around the world in the transportation sector for various purposes is yielding many technologies to put forward a better and reliable way for vigilant support. Due to safer transportation demand, effective handling of logistics and immediate grievance support on real-time vehicle tracking is needed. Our project deals with this topic i.e, real-time vehicle tracking. A Virtuous management to make transportation safer.With our proposed project of an embedded system, we can use it for tracking and finding the position of the vehicle by using Global Positioning System (GPS)[2]. The vehicle position data i.e, in the form of latitude and longitude values, are sent to the concerned mobile phone by using Global System for Mobile (GSM)[5], by this the position of the vehicle can be known.This project also includes bump sensor which can detect the

collision occurred in the vehicle and report the status to predefined concerned mobile phone about the situation.The collision occurrence will also trigger an SOS message with latitude and longitude values i.e, GPS coordinates to the Police and Ambulance.Theft of vehicles or unauthorized access of vehicles will alert the concerned mobile phone and police including GPS coordinates with an SMS. Overspeeding of the vehicle can be detected by relays installed in the vehicle and bring this to notice through SMS to the concerned mobile.

III. PROPOSED ALGORITHM

The main aim of our proposed project is to track vehicles in real time and effectively manage the use of transportation and include safety measures in every step. In this section, we describe the block diagram of the project and the usage of software to achieve the proposed features.

3.1 Block Diagram:

In this project, we install a microcontroller interfaced with GPS[5] receiver, GSM modem, magnetic switch, and relays. Which work together to track a vehicle in real time and monitor its speed and path towards its Destination. This project also includes Anti-Theft and Overspeeding features which inform the concerned mobile phone through SMS.

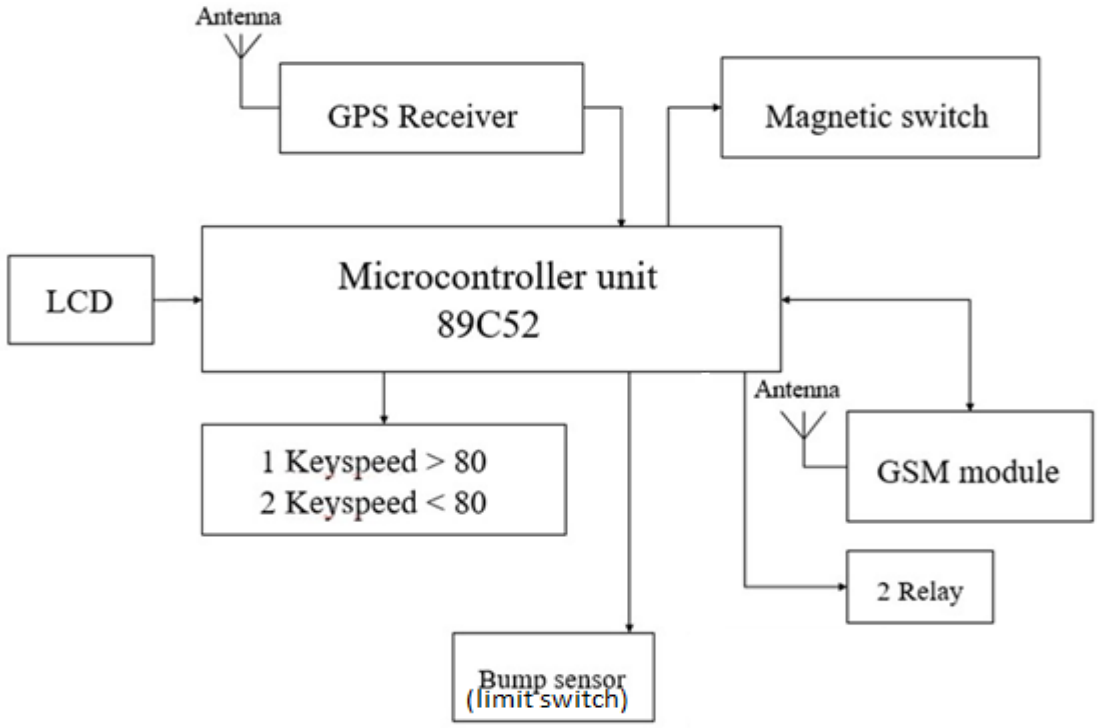

Fig 1: Block diagram of the project

Fig.1 shows the proposed block diagram, In this project a microcontroller of version ATMEL 89C52 which has 256 bytes of RAM and 8Kb of ROM. The C.P.U which has inbuilt peripherals on a single chip, The AT89C52 is a low power, high-performance CMOS 8-bit microcontroller which plays the major role in handling, processing the output and input data. A GPS receiver Pro Gin SR-91 with baud rate-9600 is used to receive latitude and longitude values and send them to the microcontroller, where the data is processed and forwarded to GSM. AT89C52 will be connected to the GSM modem with the help of RS232 transceiver chip which establishes a serial communication between the microcontroller and the GSM[5] modem. The main function of this RS232 transceiver chip is to convert the CMOS logic into TTL logic. Because the GSM[5] modem accepts only TTL logic, THE GSM[5] modem we use i.e. sim 800 will provide the full functional capability to serial devices to send SMS and data over GSM network. This GSM[5] modem supports popular "AT "command set so that user can develop application quickly. GSM modem is used to send and receive data for the microcontroller for alert messages. A seven segment LCD Display (2*16) is interfaced to the microcontroller which displays two lines with 16 alphanumerical characters. The LCD panel used in the project is having 14 pins which continuously displays the GPS co-ordinates i.e. latitude and longitude values with respect to the position of the vehicle around the Globe. A Magnetic Switch which supports the Anti-Theft feature in our proposed project is installed at the intersection of the vehicle door and chassis helps to alert the concerned mobile phone about the unauthorized access to

the vehicle. If we need to limit the speed of the vehicle to 80kmph (i.e. a safe standard speed for vehicle) a 2 Key Speed is selected in the system, which initiates a relay to control D.C motor voltage source and limit it +5V through microcontroller and for the other Scenario where speed of the vehicle is exempted the 1 Key Speed is selected in the system which directs to a second relay and drives the D.C motor of the system with a voltage of +12V commanded by microcontroller. The selection of 2 Key Speed will send an alert message to the concerned mobile phone through SMS. A feature of the proposed project initiates an alert message when the vehicle collides with any other vehicle or obstacle along with GPS coordinates to the concerned mobile phone.

3.2 Software used:

For this project, a software used is known as "Keil µVision5 IDE". The µVision5 IDE from Keil Software combines source code editing, program debugging, and complete simulation in one powerful environment. µVision5 helps to get programs working faster than ever while providing an easy to use development platform. The editor and debugger are integrated into a single application and provide the seamlessly embedded project development environment. It is very easy to work with Keil if you know how to write the programs in "C" or assembly language.

IV. RESULT ANALYSIS

The results obtained in this project were analyzed and are shown in the hardware section.

4.1 Hardware Result:
The proposed prototype model of our project is shown in fig 2 given below,

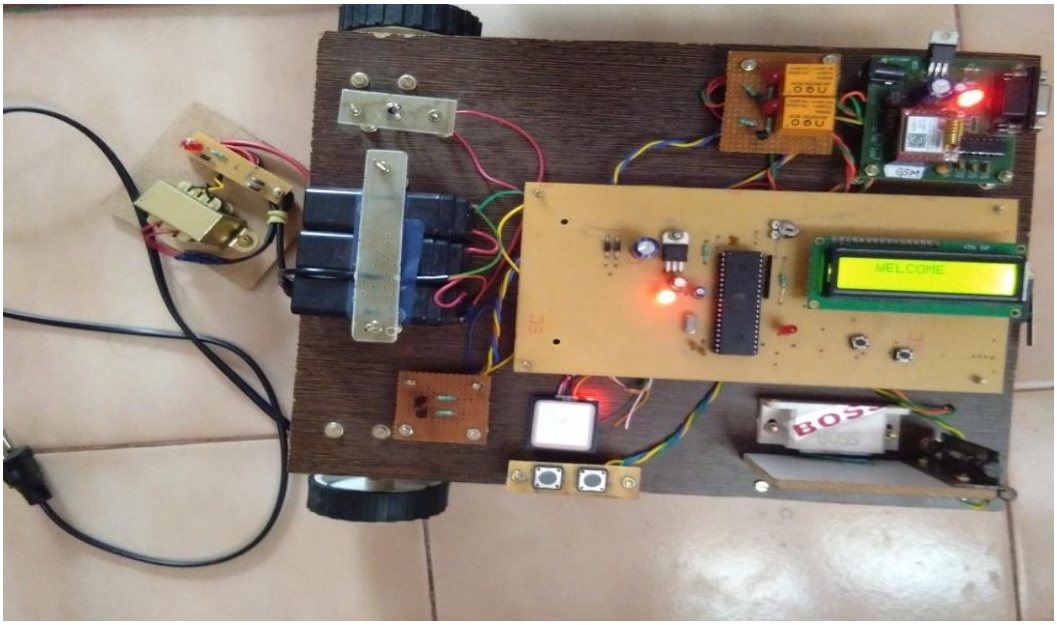

Fig 2: Proposed prototype model

The results shown below are the SMS (Alert messages) of vehicle tracking and proposed features of the project.

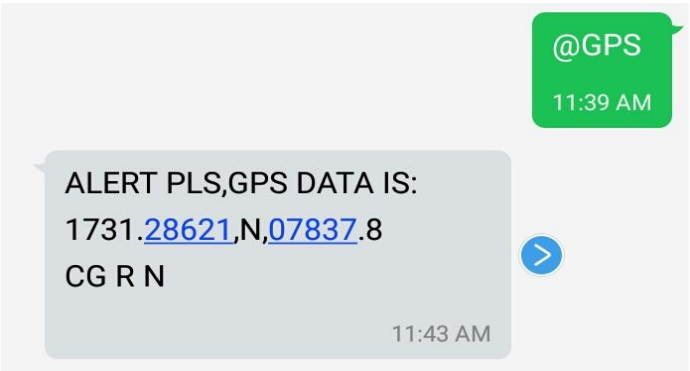

Fig 2: GSM message when GPS coordinates are requested.

As shown in fig 2 we can observe that the GSM message reply by the microcontroller for the request of GPS coordinates with respect to the predefined ''AT'' command set in the code dumped while programming.

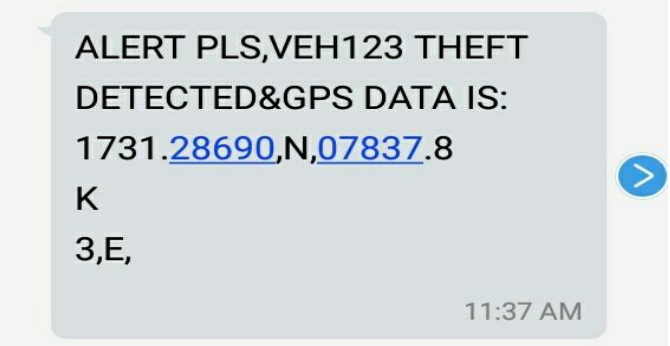

Fig 3: GSM message when un-authorized access or theft of the vehicle is detected.

As shown in fig 3 we get an alert message regarding the unauthorized access or theft of the vehicle is detected along with the GPS coordinates which indicate the position of the vehicle during the theft.

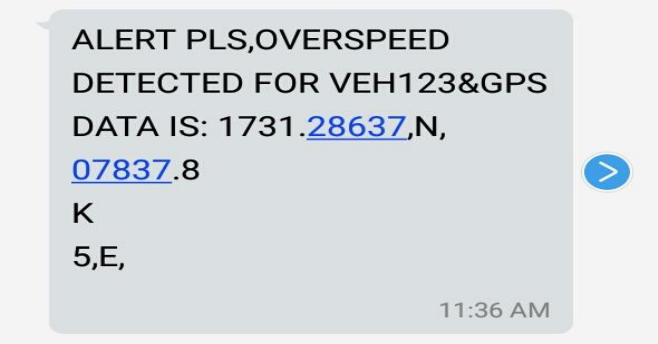

Fig 4: GSM message when overspeeding of the vehicle is detected.

As shown in fig 4 we receive an alert message informing about the overspeeding of the vehicle along with GPS coordinates.

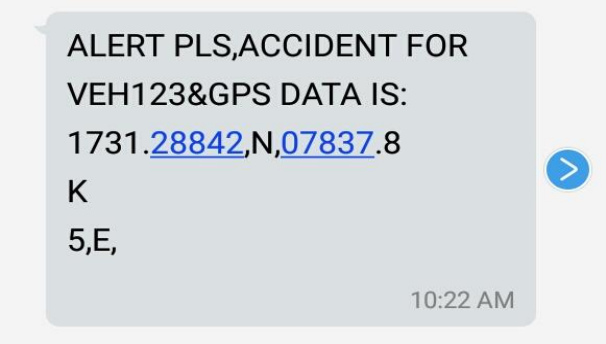

Fig 5: GSM message when an accident(collision)is detected.

As shown in fig 5, an alert message is sent when an accident(collision) occurred to the concerned mobile along with GPS coordinates.

VI. CONCLUSION

The Project titled "**Real-time vehicle tracking system using GSM modem and GPS module"** is a prototype for Vehicle Tracking system functioning with the help of Google maps and also with the help of GPS module and GSM[5] modem.The positioning is done in the form of latitude and longitude along with the exact location of the place, by making use of Google maps. The system tracks the location of the particular vehicle and sends to users mobile in the form of SMS. The received data i.e. GPS coordinates(latitude and longitude values) is used to locate the Vehicle on the Google maps and also we can see the output on the LCD as well as it will send the same data to the concerned mobile number.Finally the aim of the project i.e. to Position and navigate the vehicle with an accuracy of 10m, has been achieved successfully by using Vehicle Positioning and Navigating system.

V. FUTURE SCOPE

[1] We can reduce the size of the kit by using GPS+GSM on the same module.
[2] We can increase the accuracy of the system up to 3m by increasing the cost of the GPS receivers.
[3] We can use our kit for detection of the bomb by connecting to the bomb detector.
[4] With the help of high sensitivity vibration sensors, we can detect the accident. Whenever vehicle unexpectedly had an accident on the road with help of bump sensor we can detect the accident and we can send the location to the owner, hospital, and police.
[5] We can use our proposed project to assist the traffic. By using the vehicle tracking system in the entire vehicles and by knowing the locations of all the vehicles.
[6] If unauthorized access to our car is detected we can easily find our car around the globe. By keeping vehicle tracking system on the vehicle.

VI. ACKNOWLEDGMENT

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