

“Automated control system for Air Pollution detection in vehicle with advance tracking system”

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ABSTRACT

Security in travel is primary concern for everyone. This Project describes a design of effective alert system that can monitor an automotive / vehicle / car condition in traveling. This is designed to inform about an accident that is occurred to a vehicle to the family members of the traveling persons. This project uses a vibration sensor which can detect the abrupt vibration when an accident is occurred. A buzzer alert will also be given. This sends a signal to microcontroller. This Project presents an automatic vehicle accident alert system using GPS and GSM modems. The system can be interconnected with the car and alert the owner on his mobile phone. This detection and messaging system is composed of a GPS receiver, Microcontroller and a GSM Modem. GPS Receiver gets the location information from satellites in the form of latitude and longitude. SMS sent to the pre-defined mobile number can be checked in an android application to get the location name directly instead of values. In case of accident then the vehicle should stop and immediately the information will be available in the webserver using IoT module connected to the controller. This is designed with ARM7TDMI processor. A smoke sensor is included to detect the pollution caused from the vehicle in that case also the car stops and the location details will be sent to the predefined mobile numbers and then IoT module will update the information. A buzzer alert will also be given. This is an autonomous vehicle which is driven by itself using obstacle sensor to avoid damage. A temperature sensor is also interfaced to detect the raise in temperature so that controller will intimate with a buzzer alert and the updated through IoT module. In this project, vehicle owner can send a SMS to move the car in case if it is stopped by any of the above reasons this is to move the car to service station if it is nearby. This is only for shorter distances only. After some time car stops automatically.

Keywords: .Sensors , GPS, GSM , IoT, ARM7TDMI processor.

INTRODUCTION

There is a drastic increase in the number of vehicles in these days which also cause a steep rise in the number of accidents with a lot of people losing their lives. Rapid development of economic construction and people's living standard continues to improve well as road traffic accidents take place frequently, which causes huge loss of life and property to the country and people. The development of a transportation system has been the generative power for human beings to have the highest civilization above creature in the earth. Despite many efforts taken by different organizations all around the world by various programs to warn against careless driving, accidents have taken place every day. However, many lives could have been saved if the emergency service could get the crash information and proper help provided at time.

According to the World Health Organization, more than a million people in the world die each year because of transportation-related accidents. India's road accident records 16 % of the world's road accident deaths, whereas India has only 1 % of the world's road vehicles. It is due to the increase in the number of vehicles without a subsequent increase in the road facilities required for it. In most of the accident cases, the victims lose their lives because of the unavailability of medical facilities at the right time. This project is custom made for the heavily populated countries like India.

Accident warning System is used to save the person's life by making the medical facilities arriving in time.

1.1 BASIC TERMINOLOGY

The main objective of this work is to reduce the human death rate in road accident. The system gives a quick assistance to the people who got the accident. The accident detection and reporting system for the vehicle can gain the attention because the system will save the life and give medical treatment on time. The system consists of ARM7 micro-controller unit, smog sensor, obstacle sensor, vibrational sensor, GPS device, GSM module, IOT module, Temperature sensor. An Accelerometer is used to detect the acceleration. It is the main sensor used to detect the accident. Once the accident is detected, GPS collect the current position values which include latitude (N or S), longitude (E or W), date and time. The location values are given to microcontroller. Controller gives this information to GSM module. By using GSM module we can send the message to family members or EMS. Here the serial communication interface UART is used for the communication between the microcontroller, GSM and GPS module. The RS232 communication standard is used for the electrical signal characteristics such as voltage levels. This communication enables point to point data transfer. A high performance 16/32 bit microcontroller is used. ARM 7 microcontroller used to process all the signal and store real time signal from the various sensor. Through Temperature sensor we can measure temperature in vehicle and which is display on LCD continuously. Motor stop automatically when alcohol is detected through alcohol sensor. Gas sensor is used for gas leakage detection and red LED blink when gas is detected. All the data on these sensor and GPS data are stored in memory card for analysis of accident cause.

The total system is placed inside a vehicle which is not visible to others. We can implement robust package design so that system is safe from water and dust.

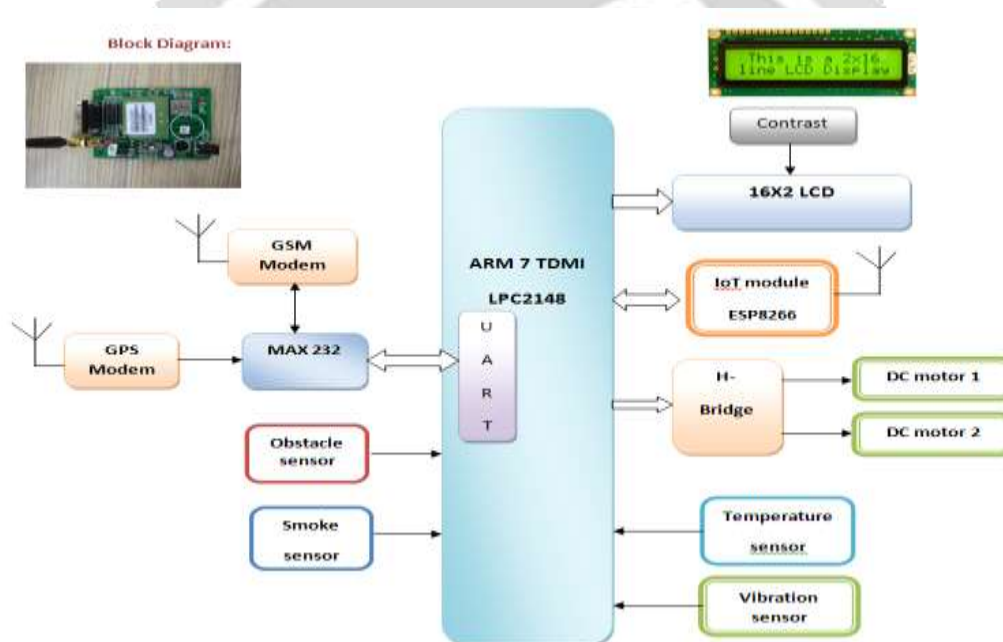


Fig : Basic block diagram

1.2 ANALYSIS

The system consists of ARM7 micro-controller unit, Smoke detector , GPS device, GSM module, DC motor, Buzzer, Temperature sensor, Obstacle detector sensor and Vibrational sensor . The wireless system design for Pollution detection and reporting is mainly based on ARM, sensors and GPS. When vehicle meets an over pollution, at that time the over pollution will be detected by sensors. IR sensor can be used as a obstacle detector of vehicle during and before dash. According to this project when a vehicle meets with an Over pollution , a MQ02 smoke sensor will detects the Gas and sends it to ARM controller. Then ARM controller stops vehicle and send message to owner with latitude and longitude values. Simultaneously Temperature sensor works that means if temperature of vehicle exceeds threshold value that is 40⁰C then sensor sends information to controller and controller stops vehicle also sends message to owner. ESP8266 IoT send information on thing view application which work on things speak channel ID. This module used to send information on thing view application which work on things speak channel site. first of all we want to make oone free channel on Things speaks side which provide us free cloud space then by using that channel id in our program we can sends our sensor related data on net. Things view enables you to visualize your Things

speaks channels in an easy way ,just enter the channel ID and you are ready to go. For public channels the application will respect your windows setting : color ,timescale ,chart Type and number of results. The current version support line and column charts, the spline charts displayed as line charts .Thing speaks is an open source “ Internet of Things” platform to store and retrieve data from things using HTTP over internet.with things speak we can create sensor logging application , location tracking application and a social network of things with status update. ARM 7 microcontroller sends the signal to GPS module to collect the current position co-ordinates values which contains longitude (N or S), latitude (E or W), time and date. After that the microcontroller sends the alert message to family member or emergency medical service (EMS) through GSM modem which contains GPS parameter values. Here the serial communication interface UART is used for the communication between the microcontroller, GSM and GPS module. The RS232 communication standard is used for the electrical signal characteristics such as voltage levels. This communication enables point to point data transfer. The GPS module continuously transmits serial data (RS232 protocol) in the form of sentences according to NMEA standards.

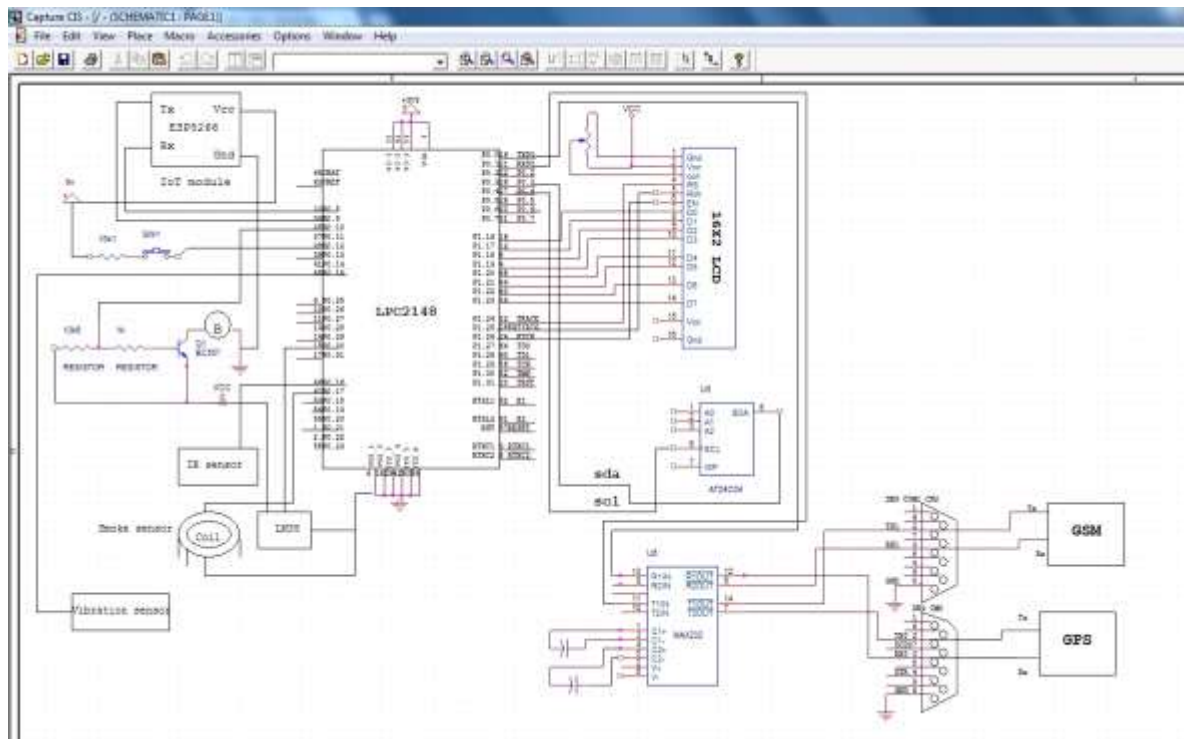


fig: Schematic diagram

To communicate over UART for GPS, you just need three basic signals which are namely, RXD (receive), TXD (transmit) and GND (common ground). So to interface UART with LPC2148, we just need these basic signals. To receive data from satellite to LPC2148 primer board by using GPS module through UART0. Text message may be sent through the modem by interfacing only three signals of the serial interface of modem with microcontroller i.e. TxD, RxD and GND. In this scheme RTS and CTS signals of serial port interface of GSM Modem are connected with each other. The SMS message in text mode can contain only 140 characters at the most. Due to this alert message we can provide immediate take against any problem. Through Temperature sensor we can measure temperature in vehicle and which is display on LCD continuously. The ARM7 LPC2148 board uses the ADC pin for reading temperature from temperature sensor LM35. The 10 bit ADC used for reading the temperature from LM35.

1.3 RESULT

The mobile number of the user should be included in the software programming in order to receive the over pollution, temperature and accident location values from the GSM modem. The below snapshot indicates the message alerts of accident when wireless system is tested at two different locations near to one another. Hence, there is a small variation in the coordinates, the initial value of latitudes and longitudes are same but the fractional value changes with small difference.

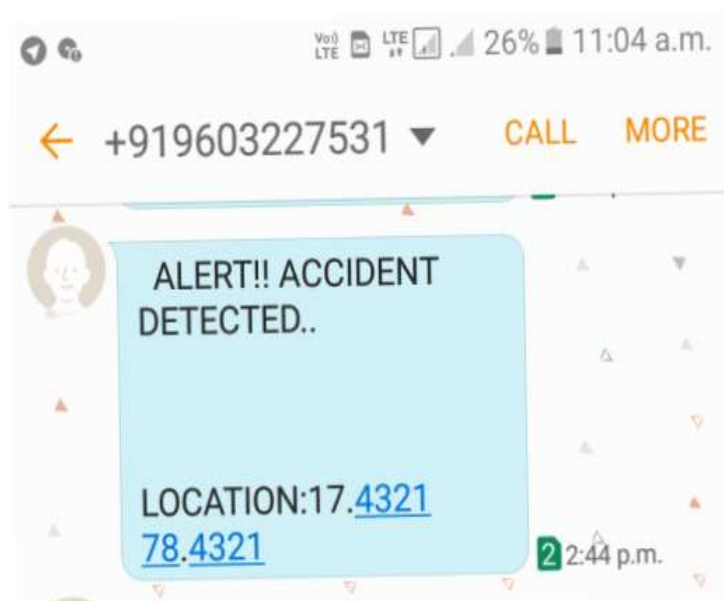


Fig : Snapshot of accident detection message

Here one, when over temperature occurs then the message alerts of High Temperature when wireless system is tested at two different locations near to one another.

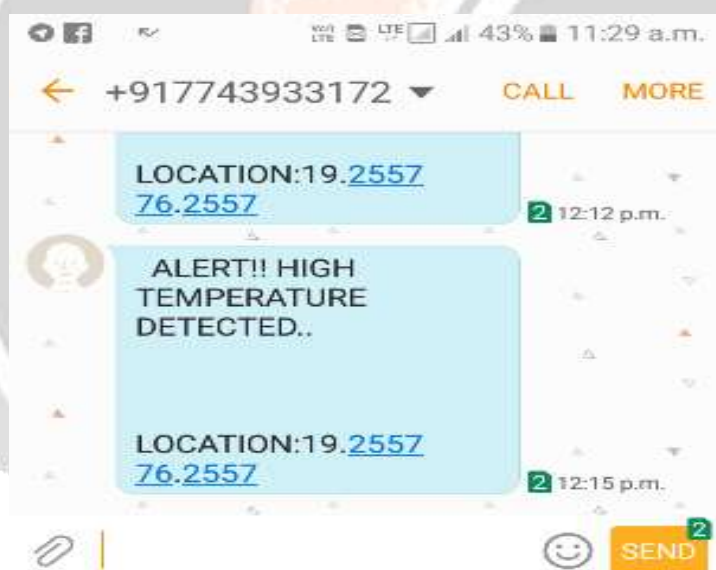


Fig: Snapshot of High temperature message .

1.4 CONCLUSION

Nowadays thousands of vehicles are running on the road every day, out of which number of the vehicles creates pollution, so there are many victims of these pollutants. To reduce it, the concept of wireless system is developed in the vehicle. This system presents a new vision for the vehicles industry to minimize the rate of pollution and improves the performance of vehicle. An innovative wireless system using sensor and GPS has been developed for vehicle accident detection and reporting. This vehicle accident detection and reporting systems provide crucial information to emergency responders in the earliest possible time. The crucial time between the accident and getting victim medical attention can often be the difference between life and death. This system provides better safety rather than no safety. Thus we can make use of the available technology to the benefit of the people by saving the lives of the people and helping the owners of the vehicle to keep track of their vehicles.

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