

A Novel Fender – Bender Emergency Activation and Location Tracking System

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Abstract—Due to improper communication of data between the accidental zone and the emergency help line centre there occurs a large number of accidental deaths. If the exact location and required information could be shared the valuable human life can be saved with minimum accidental impacts on the human body. Vehicle tracking is one of the technological advancements to track the activities of the vehicle[1],[2]. When an individual is riding his/her vehicle, meets with an accident, there is a chance that the individual may suffer from a serious injury or expire instantaneously if there is no one around to rescue him. The proposed system is a solution for this problem. The system acts as an accident identification and alert system. It gathers the information like geographical location of the accidental spot and vehicle details will be sent to the emergency help line, nearest police station and to the pre-registered mobile numbers in the system. The hardware of the proposed system is fitted to the vehicle in such a manner, that it monitors the system continuously or by any interrupt to sense the location and sends the data to the emergency help line which in turn alerts the rescue team to attend the casualties at the accident zone. Thus the proposed system will help the needy to reach the solution on time.

Keywords—Accelerometer, Arduino, GPS, GSM, Ultrasonic sensor, U-Slot sensor

I. INTRODUCTION

Accident has become a day to day happening everywhere. An accident sometimes leads to death and in most of the cases it results with some serious injuries. All this happens due to improper communication between the emergency centers and the mishap happened place. Here, we deal with the problem of solving this improper communication that would save the victim by informing the emergency center and other numbers with the help of GPS and GSM technology. The applicable output will be the reach of first aid vehicle that will take the victim to the hospital on time to save them from the mishaps that has occurred. The fardier à vapeur of Nicolas-Joseph Cugnot allegedly crashed into a wall in 1771. The world's first road traffic death involving a motor vehicle is alleged to have occurred on 31 August 1869 where an Irish scientist Mary Ward died when she fell from her cousin's steam car.

J. J. Leeming, The British road engineer has compared the statistics for fatality rates in Great Britain. He also has done the statistics for transport-related incidents both before and after the introduction of the motor vehicle, for journeys, including those once by water now that is being handled by the motor vehicles. He also concluded that "travel accidents may even have been more frequent a century ago than they are now, at least for men". Truck collision with house in Compstall, United Kingdom (1914)

In 1969, a British road engineer compared the circumstances around road deaths as reported in various American states before the widespread introduction of 55mph (89 km/h) speed limits and drunk-driving laws. They took into account thirty factors which might affect the death rate. These include the annual consumption of wine, of spirits and of suds beverages has been taken individually, the amount spent on road maintenance, the minimum temperature, certain of the legal measures such as the amount spent on police, police per 100,000 inhabitants, the follow-up prioritize on dangerous drivers, the quality of chauffer testing, and so on.

II. LITERATURE SURVEY

(Asmita H et.al May 2016) explained and considered the speeding and drink driving as the major aspect that causes the accident at most of the times. GPS plays a vital role that will be having the integral part of the vehicle system. This paper has utilized the capabilities of the GPS to send the accident location to an alert service centre. Accelerometer is used to monitor the speed and also to measure the impact of collision. In this it is considered that if the speed of operation is less than the critical speed mentioned then the system takes it as mishaps occurred at that instance and sends the location to the programmed numbers. This has a drink driving detector which uses M3Q gas sensor that detects and sends the information of the vehicle to police station if concentration is found^[3].

(JazimBaramy et.al March 2016) discussed the accident detection system using the Ardduino module that will be using GPS, GSM and other sensors. The GSM gets activated when the module embedded in the vehicle gets the signal from the microcontroller which is the arduino here. The GPS tracks the location of the accident by means of the space navigation system. This is the project that was specially made for the desert places and the night time accidents that is left mostly unattended due to lack of correct information of place and other things. The invention was the most useful one when installed in the vehicle. This is the one that makes the system portable, low cost and compact when assigned with the AVR and accelerometer interfaced with GPS and GSM^[4].

(Kavya K, Dr.Geetha C R June 2016) explained their success full model that will reveal and makes way for the emergence vehicle to by green corridor the traffic signals on the way by the use of radio frequency technology that will reduce the time lag on reaching the accident spot and also will reduce the time that will be taken for the reach the hospital. Since the system is fully automated the smooth flow of the emergency vehicle will be assured and the traffic congestion is avoided to a greater extent. The frequently used technique such as GPS and GSM is also used in this for detecting the spot of mishaps and sending the SMS to the

programmed numbers and also the emergency centres and police station^[5].

(KiranSawant et.al May 2016) experimented about the most leading causes of the fatality. The time of reach for the first responder and accident occurrence is being reduced. The mortality is also being increased with the technologies. The accident alert and vehicle tracking is made easy by means of this experiment that was conducted. The GPS is the one which gives the continuous input from the satellite. The ATmega16 is the microcontroller used to buffer with the position storage. This work was very carefully carried out with the working model. The higher sensitivity, accuracy and is highly beneficial for the found from the results of the experiment conducted^[6].

(Pratiksha R Shetgaonkar et.al August 2015) explained the accident detection and tracking system using the flame and smoke detector in the car. The smart car detection is the one which has a flame and smoke detection on the occurrence of any accident and the air bag get released for saving the passenger getting seriously hurt. This system also has the speed monitoring and real time traction technology that monitors the speed and also sense the malfunction if any happens. This can also be used for theft of vehicle application by logging in through the application in smart phone and knock sensor present the vehicles condition. This is the one that act as a important aid in constructing smart transport system^[7].

(Sawrabh.S.Sharma et.al March 2017) explained the time reduction between the instance of mishaps and emergency responder dispatch which is the most crucial part in the time of accident. This is also a device that uses GPS and GSM technique to plot the exact place of accident and lettering the programmed numbers about the incident happened with location in terms of latitude and longitude measures. The location will be stored in the microcontroller buffer. The GSM get activated if the shock sensor senses a shock more than the critical shock measure given. This will simultaneously stop/deactivates the GPS using the transition. The GMS will send only the last sensed position from the buffer of microcontroller. Theme of this was to track and save the valuable life of the person who travels in the vehicle^[8].

(N.Suganya, E.Vinothini February 2014) discusses the primary security in the travelling time and focused on the effective design alarm system considering the condition of the vehicle. Majorly uses the piezo-electric sensor for abrupt vibration detection for accident detection. The system is interconnected with the car alarm system that is capable of sending alert to the mobile numbers in case of any emergency situation. This uses the microcontroller for the detection and messaging purpose in combination with the GPS and ZigBee protocol for communication purpose. This has a major advantage of speed control of vehicle at the places like schools, temples, hospitals, etc and it is also associated with the safe mode button and smart car intimate system that can be used manually and automatically respectively^[9].

(Sushma.M.Ahirrao et.al) proposed a proved significant approach to rescue the wounded lives and reduce loss of lives. The emergency responder takes long time to reach the emergency place within the specified period of time by easy space navigation technique GPS. The GSM

technique is used to send message to the programmed numbers with the map link that shows exact place. LDR and Photo diode acts as a sensor that will be capable of releasing the air bag. HTTP is used for the transmission of data to use a built in cellular radio to communicate with a monitoring web services. The shorten alarm time greatly that will reduce the reach time of the emergency responder. The use of android phone and app has greatly influenced the system in the emergency situations^[10].

III. PROPOSED SYSTEM

The block diagram of the system is shown in Fig. 1. It consists of input and output devices to the microcontroller Arduino Mega.

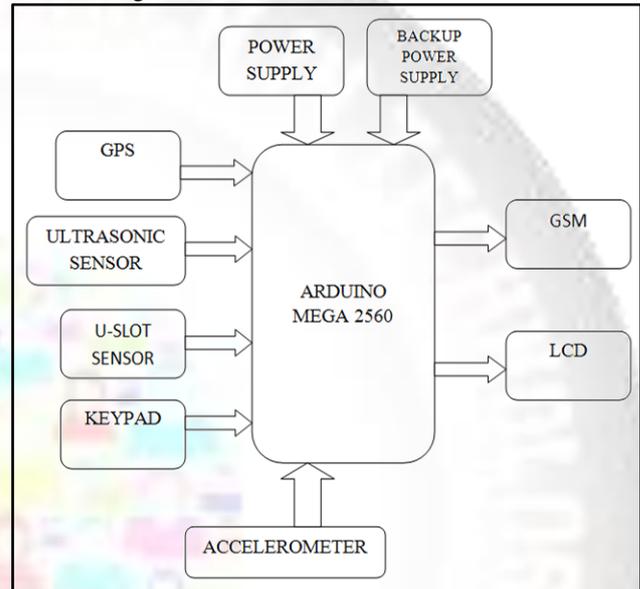


Fig. 1: Block diagram of the proposed system

The system has both input and output devices that have been connected to the arduino board for processing the input devices mostly comprises of sensors, keypad, GPS. The sensors play a vital role the three major sensors that are to be used are accelerometer, U-slot and ultrasonic each one of the sensor has their own characteristics and range of operation. The accelerometer sensor is used to measures the acceleration of the object acceleration can be defined as the rate of change of velocity so that the acceleration of the vehicle along the 3D axis can be sensed. The ultrasonic sensor is used to measure the distance between the neighboring vehicles if the distance tends to be zero then it can be said that a collision has occurred. The u slot sensor is used to detect the presence of obstacle near by the vehicle the sensors will be connected to the arduino board which continuously monitors the values from the sensors. Keypad is used as a manual alarm so that if the keypad is triggered the emergency state is activated manually. The GPS device will update the current location of the vehicle in a periodical manner in the form of latitude and longitude points.

The output of the system comprises of three major components they are GSM, IoT router, LCD display when the sensor is actuated it indicates that an accident has occurred so that it turns the buzzer ON. The GSM gets activated and SMS will be sent to the pre-defined numbers with the required informations. Now the role of IoT comes into play it will upload the accident location and the vehicle

information to the specified server. LCD display is used to show the current status of the system.

IV. SIMULATION

The simulation was done using the Proteus software and the programs were done using the arduino software. Proteus is one of the software tools that help to make out the simulation in an easy way without any difficulty and the results will be more accurate for the purposes.

The simulation is done based on the labeling method so that there will be no more wiring connection. The wiring problems are being eliminated in this simulation process. The work of the simulation has become easy due to the labeling method used. Since the simulation cannot be inserted with the sensor, we use a potentiometer for indicating the three sensors, namely, U-Slot sensor, Ultrasonic Sensor and Accelerometer.

Once an accident has occurred the whole system will get into action with a delay of 20 seconds if within this delay time the keypad is pressed the whole system will be reset this will help us to reduce the rate of false alarm to a greater extent.

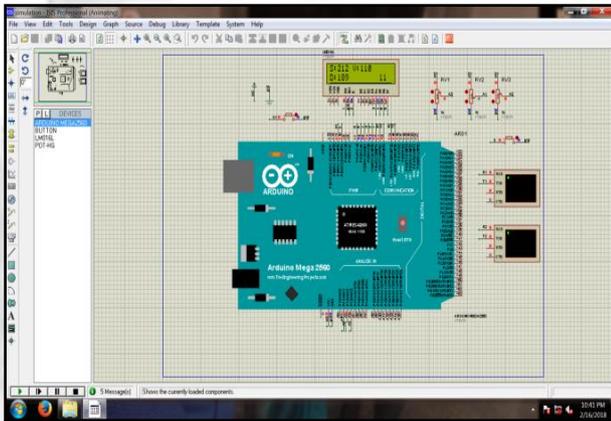


Fig. 2: Simulation Circuit

V. RESULT

The normal running condition of the system will be continuously displaying the speed, vibration level and distance of the vehicle. The LCD will be displaying this in the real time and in the simulation the virtual terminal will be displaying the details.

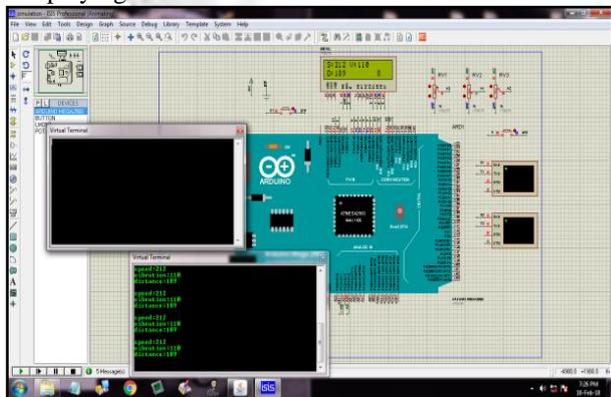


Fig. 3: Output of the system with normal running condition

The Fig. 4 displays the result as a message with the latitude and longitude specification. This will be displayed only when the accident occur to the vehicle. The message

will be sent to the compiled numbers by GPS and GSM as shown in the top virtual terminal in Fig. 3.

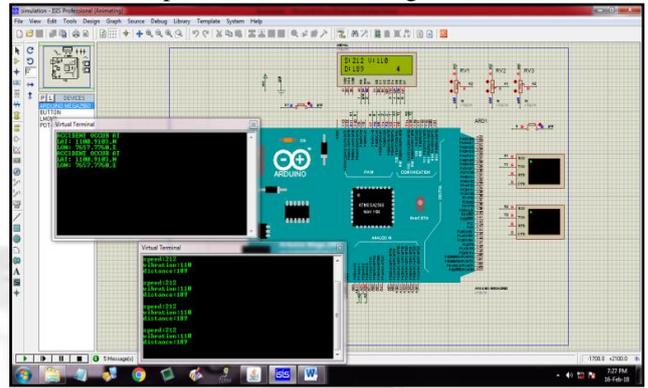


Fig. 4: Output of accident or emergency occurred condition

The Fig. 5 displays the accident or an emergency situation based message when the emergency switch is on. The emergency switch is the one that will indicate the message with the location of the vehicle when the accidents occur or for some emergency situation of the person such health disorders.

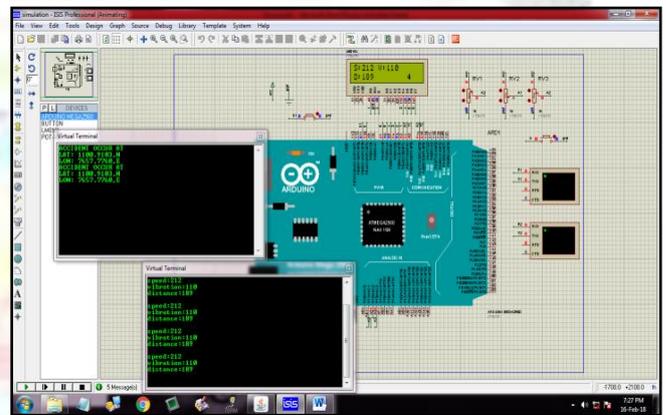


Fig. 5: Result of accident or emergency switch condition.

VI. CONCLUSION

The proposed system was successfully simulated with the help of proteus software and the results were displayed using the virtual terminal. The benefit of doing the simulation in the proteus 7.8 version software is that it supports the arduino mega and many other arduino family boards. The arduino software was used to do the programming that will be uploaded to the simulation arduino board and the result was obtained successfully as expected.

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