

Accident Detection, Alert and Tracking System Based on IoT

Darwin Nesakumar A^{1*}, T Suresh², M Aarthi³, K Gomathi⁴, G Aarthi⁵, P Mugilan⁶

R.M.K. Engineering College, Department of ECE12345, Senior System Engineer, Tractors and Farm Equipment Ltd⁶

*(*Corresponding author's e-mail: darwin114@gmail.com)*

Abstract: Traffic accidents, one of the leading sources of deaths in all places. This paper gives alert before the situation is in danger and immediately shares the location where the accident occurred. The alert will be given when the driver is not in the condition to drive and location is traced) using GPS (Global Positioning System) once accident occurred. This system helps to trace the vehicle's location easily and alerts the driver when he consumed alcohol and feels sleepy and also it helps in avoiding accidents and to provide the necessary help as soon as possible after the accident happens.

Keywords: GPS, traffic accidents, vehicle's location, alert

1. Introduction

Due to on road accidents, 17 death occurs in India every hour. About 1.5 lakh people die every year. This has rose to more percentage in 2019. These rate of accidents increases every day, due to the increase in number of transportations on the road. Death rate also increases to 2.4% every year. The major reasons for the accidents are due to high speed, drink and drive, uncontrollable situations and if the vehicle hits any hard objects. 78.4% accidents are due to drivers' fault which includes speeding and consumption of alcohol. The existing system gets the information only through manual mode. Traffic police are employed to detect if the driver is consuming alcohol or not. This paper aims in reducing the accident rate by alerting the drivers by some alternate solutions. Once the accident occurred, the location was sent as a message through GPS & GSM. This helps in finding the location easily and to give immediate first aid at earliest. Here, Microcontroller plays the major role. This system contains sensors to vigilant the drivers. The sensors such as vibration sensor, Alcohol sensor and Eye blink sensor are used here. Both GPS & GSM are used to trace the location and notifies the respective numbers via text message. [1] The system is designed by Aboli Ravindra Wakure, Apurva Rajendra Patkar in the year 2015 to find and report the place where the accident occurred and to provide the immediate help. The spot is traced through GPS. GSM shows vehicle's position in terms of latitude and longitude. But this required lot of human works to enquire. [2] The emergency alert module immediately alerts the telematic Operator Server if the virtual fence is crossed by vehicle or it detects the highest alcohol level. This system also interacts with other ECU's by CAN in the vehicle. This is specified only to accidents occurred due to alcohol consumption. [3] The automatic detector includes a microcontroller based on ADU that has both GPS & GSM. The acceleration is calculated by ADU which detects the accident and notifies the emergency services to get the immediate help. This works out only for two wheelers. [4] The accident detection module alerts the drivers if they are not in the position to control the vehicle and alarm them. Once the accident occurs location is sent to the registered mobile number. This was done by Mahendra Vucha, T Kalyani, B Naresh, S Monika [5]. The current available gives

an information using arduino that is used to transfer messages to the different devices of the system. This takes place only in the presence of internet. [6] The statistics exhibits the number of accident cases increases; the proposed method yields solution.[7] Tanushree Dalai made a model for automotive which gave emergency alert. This method only recognizes when any object hits the vehicle. In view of all the models, it clearly shows that all requires some human works. Our model is more automatic and functions in a short duration of time. The alarm will be generated very instantly once the risk is identified and the location can be identified easily.

2. Materials and methods

In the uncontrolled situations and because of carelessness the driver should be alarmed once any high-risk situation is identified. This may help the drivers to manage the vehicles and thereby the accident may be significantly avoided. This is possible only when the system is working quickly. Manual mode is still used to get various information and the existing system and traffic police are employed to detect if the driver is ingesting alcohol or not. This paper utilizes WSN (Wireless Sensor Networks) for spotting accident's location and alarming the authorities regarding accidents, vehicle tracking using GPS modem. A PIC Controller, Eye Blink Sensor, Vibration Sensor, Alcohol Sensor, Power Supply, GSM, GPS, Relay and Motor are used in the making of the proposed work. The block diagram consists of different sensors used in our system, microcontroller, Buzzer, GSM, GPS, Relay, Motor and LCD Display. The block diagram of the proposed system is shown in Figure 1.

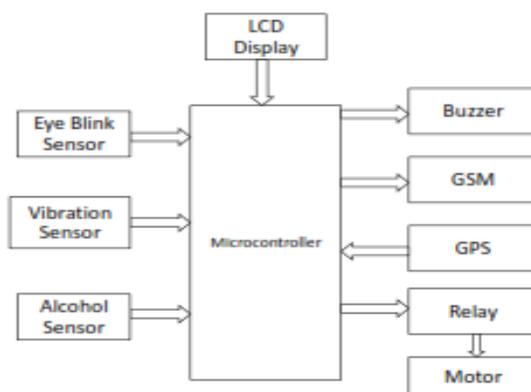


Figure 1 Block Diagram

The MCU (Microcontroller Unit) is being used as the main part to get information's. Here, the PIC MCU is used which has five ports. This has 8-bit data memory bus. It contains different types of on-chip. It has crystal oscillator which is used to trigger microcontroller. It also contains reset switch and MAX 232 which provides the interface between GPS and GSM module. Here we use PIC 16F877A Microcontroller because it has enhanced flash program memory typical of 100,000 erase/write cycles and self-reprogrammable which is under software control. They use selected oscillators and in sleep mode they save power. The ports used are bidirectional input and output pins. The ports produce digital and analog outputs respectively. This use registers USART and timers and the memories are organized. We propose, an eye blink sensor is capable of detecting whether the person is going to sleep or not and the alarm unit alerts the driver. This proposed system is an IR based that keeps the vehicle secure and gives high security to drivers. When driver attempts to drive the vehicle after consuming alcohol then vehicle won't start. The sensor detects different concentrations of alcohol. This uses semiconductor type of sensor to detect alcohol. In case if vehicle hit any obstacles then vibration sensor

detects the collision then controller get information of the location of vehicles using GPS and send it to family or ambulance number. The basic piezoelectric materials are used here. The LCD display is an electro-optical amplitude modulator is used to display the messages and alerts of the sensors. They are sharp and bright the buzzer is electronic signaling devices which alarms the driver, are used by automobiles. This sounds a warning in unlike forms of continuous or beeping or intermittent buzzing. GPS provides the location and whereas GSM provides both longitude & latitude of the vehicles position. GPS also used as a navigational tool. GPS can provide unique address for any point on the Earth. GSM uses digital technology. GSM provides International roaming; spectrum efficiency is improved and it has low-costs base stations. It accesses multiple technology and it has both uplink and downlink frequencies. The relay acts as the switch in this system ant it is operated electrically. The motor indicates the vehicle's movement. This paper focuses on automatic accident and prevention system ensures more safety, sophisticated security. This module monitors all hazards and threats. The proposed idea is user friendly. This finds useful in cab services, buses and trucks. The output of the proposed idea is shown in Figure2.

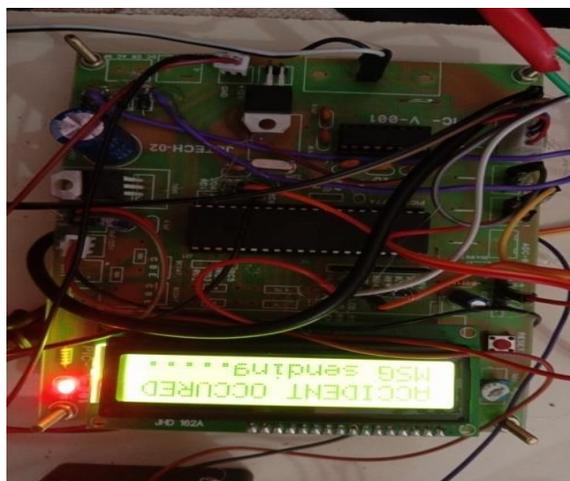


Figure 2 Accident Detection, Alert and Tracking System

3. Result and discussion

The suggested system here alerts and detects the occurrence of accident and forwards the information to the registered number. This is done after mere attempts. In worst conditions, soon after the accident occurs, the vibration sensor is activated and transfers the message. The GPS finds the location where accident happened and the GSM sends the message. If any accident occurs, the module sends data of information to the given number. These are found after several trails and it worked out well. These can be applied in all network available areas. These helps in giving the medical treatment as soon as the accident occurred as the location can be found easily.

4. Conclusion

In the proposed work, WSN is used to work more efficient than the other manual functions. Our model is fully automatic whereas the other involves manual functions. This can be able to find the system's location easily. The specifications we used will give the better results than any other models. As this is fully automatic, the system ensures good prevention, safety and more security. The system we use utilizes wireless sensors to

alert the drivers which are user friendly. Each sensor performs their own operation and gives alarm. In future it can be further enhanced by finding this usage in network less places.

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