

Smart Fleet Management Using Internet of Things

Ms Kirthana D, Mrs Vijayalaxmi R Patil

Student of M Tech-CNE, Assistant Professor Information Science and Engineering, Dr. Ambedkar Institute of Technology, Bangalore

Corresponding Author: Ms Kirthana D

Abstract: The advancement of technology has made our daily life manageable condition. With the secure technology have made today life more benefit for the people of the society. As day to day life there is increase in road accident due to rash driving, drunk and drive, drowsiness and also due to traffic rules. The aim of the paper is to provide a security for the driver in an unconditional situation by using latest technologies which provides efficient, scalable, economical, reliability. There uses certain sensors and devices to continue monitoring the activities of the driver's by using microcontroller, LCD display, IR sensor, MQ3 sensor, IR Based Eye Blink sensor, vibration sensor, L239D sensor for the accident precaution. A simple smart mobile phone containing a module along with GPS technology and an Android application, will provide alert voice message will provide a real time location when the victims is in unconditional state in which the application will send an alert voice message and the photo of the victims at the accident zone to the preregistered mobile number. The objective is to provide a protection in various platforms for the drivers' safety which helps to provide real time information by using this technique.

Keywords: GPS, GPRS, MQ3 sensor, Vibration sensor, IR Based Eye Blink sensor, L239D sensor.

Date of Submission: 05-07-2019

Date of acceptance: 21-07-2019

I. Introduction

As there is the growth in the population simultaneous increase in the vehicles. As there is increase in the vehicle there should be the strict traffic rules that have to be followed by each and every person of the world. These traffic rules will save the life of the people when they are trying to do rash driving, drunken and etc. in order to provide a safety measure to the drivers driving on the highway or in the cities some precaution has to be taken care. The objective is to provide a security for the driver when he is in the critical condition that is when met with an accident, feeling drowsiness, and drunken, rash driving. The techniques used here is very simple which is easily reliable, economical, efficient, scalable. The sensor used here is to provide an real time location information about the driver to the owner or to the preregistered mobile number through an alert voice message is send to the particular person through the GPS, GPRS and to photo of the victim who meet with an accident with the particular location is to the owner and their relatives. This can save the lives of the people by sending information to the ambulance to provide an emergency medical service and auto complaint registration can be done nearest to the hospital and the life of the victim can saved easily.

II. Related Works

Chigurupa S., Polavarap S., Kancherla Y., Nikhath K.A. [1] Has developed an android application which uses data from accelerometer sensor, GPS sensor and video recording is done with the help of camera to give rating to the driver. The safe limits it would be considered as an event and also provide a safety for the drivers before meeting with accident.

Johnson et al. proposed an approach for predicting driving style [2]. They categorized driving style into normal, aggressive and very aggressive. They collect data from various sensors (accelerometer, gyroscope, magnetometer, GPS, video) and fused related data into a single classifier based on mobile computing. Their system is known as MIROAD: A Mobile-Sensor-Platform for Intelligent Recognition of Aggressive Driving. The system can provide audible feedback if a driver's style becomes aggressive as well as the information leading up to an aggressive event.

Dai J., Tang J., Bai X., Shen Z., Xuan D., Mobile phone based drunk driving detection [3]. The proposed a highly efficient system for detection and alert of dangerous vehicle in preventing the accident basically related to drunk driving. They implemented the detection system on Android phone by giving the real time information through the voice alert message.

Amey Sawant, Vinayak Ikke, Jyoti Khandale, Nilam Chavan & Manjiri Pathak proposed, "Car Over-Speed Detection with Remote Alerting" [4]. In this, the system will check on rash driving by calculating the speed of a vehicle using the time taken to travel between the two set points at a fixed distance and then

transmit the data to the respective people. The speed limit set by the device is kept at the very location depending upon the traffic. Calculates the speed and displays that on an LCD and also transmits the same. Moreover, if the vehicle crosses the speed limit, a buzzer sounds alerting the police both at the location.

Pranoto H. Rusmin, Andrew B. Osmo, Arif S. Rohman System Engineering and Technology (ICSET) 2013, IEEE 3RD International Conference [5]: this research paper consist of sensors were it detects the drowsiness detection of the driver when he fall asleep due to lots of stress and with the help of non-invasive drowsiness detection systems by using electroencephalogram (EEG), and it will detect by using arduion controller, and vibration sensors is done.

Existing System: As in the existing system doesn't have any type of sensor in case of accident occurred information about the victims so that any emergency medical services can be provided and auto complaint registration is done. In the case when the driver is driving the vehicle when is of lack of sleepiness at that time more accident might take place which will causes the dead of the other innocent people hence there is no sensor to detect and give a right information of the victims.

Disadvantage

- There is no application for Auto Complaint registration when there is an accident has occurred.
- When the victims meet with an accident and there are in unconsciousness state at this time they can't be able to inform their state to their family members and even the present location.
- When the drivers are riding the vehicle beyond the speed and leads to a critical situation.
- When the drivers are feeling sleepy then there is no devices or the sensor are there to aware him about the situations.

III. Proposed System

To overcome the drawback of existing system we have introduces the sensors which protect the drivers in all the crucial states. In proposed system the sensors are used to provide a safety for the people as well as drivers. The microcontroller P8V51RD2 will keep hold of all the sensors and starts doing the necessary actions. The LCD display will display the message which is connected to the microcontroller. The GPS system is used in order to keep track of the driver and send the real time location for the relatives and owner of the company. The technology for capturing the real time information happening over world is through the well refined satellite GPRS. The location is sent to the preregistered mobile number and gets the current status update.

Advantages

- Feasible
- Economical
- Reliable
- Scalable

IV. Methodology

The hardware required for the implementation of the project is listed below.

- MicroController: P89V51RD2-Phillips – 5 Volt
- Power Supply: 7805 - 5 Volt
- IR Eye blink sensor: 5 Volt
- GSM: 12 Volts
- Accelerometer: ADXL335 – 5 Volt
- LCD – 5 Volt
- Vibration – 5 Volts
- Alcohol sensor: MQ3 – 5 Volt
- Relay – 12 Volt
- ADC – 5 Volt
- L293D – 12 Volts
- DC Motor – 12 Volts

The software required for the implementation is listed below

- Embedded C
- Embedded Java
- Keil Compiler
- Flash Magic
- Android SDK

- Java
- Eclipse

System Architecture: The architecture diagram is to provide a graphical representation for the user to better understand how the modules in the project are working. Figure1 shows the System Architecture. This architecture below is required to describe the system implementation and working of the project. The project is designed in such a way that the focus is on providing a security for the people driving the vehicle either in highway, street, and cities in order to save his life when he is in a critical condition.

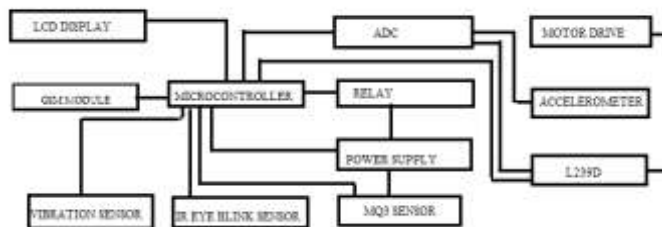


Figure1: System

Architecture

There are different sensors are used for relevant parameters to be detected through the microcontroller and sent that information to the preregistered mobile numbers while voice alert message is sent to them so that they can easily guide the driver by knowing the activity of the drivers. The outputs of the microcontrollers are the inputs for some devise which can control the speed of the vehicles. A brief on the modules developed are:

1. Automatic Control Of Rash Driving

As per the survey of the report the main cause lead to road accident is due to rash driving where many people will lost their life because of over speed of the vehicle. To control this we have applied L239D sensor fixed near the motor to control the speed of the vehicle. If it exceed the threshold speed then the vehicle is stop there itself. No more movement of the vehicle.

2. Drowsiness Detection

In this module we are detecting whether the driver is in the sleeping mode. To implement the module we have used the IR Eye Blink sensor is used in order to prevent the accident. This sensor will detect that the driver eye has been closed it will send an alert voice message to him in order to wake him up as well as to the preregistered mobile number.

3. Alcohol Detection

In this module we are using MQ3sensor to detect whether the driver is in the stable state or in unstable state in order to prevent from an accident. This sensor will sense the breath of the driver and send an alert voice message to the preregistered number.

4. Accident Detection

This module is helpful whenever there is occurrence of an accident the victim might not be in the state to inform the status about him. In this module we used vibration sensor were it send a alert voice message as well as exact location and photo of the victim is sent to the preregistered number to the beloved ones and hospital as well as to the police station about the accident.

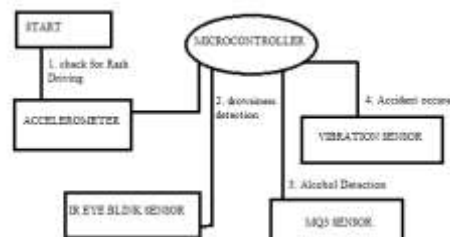


Figure 2(a): Context Analysis

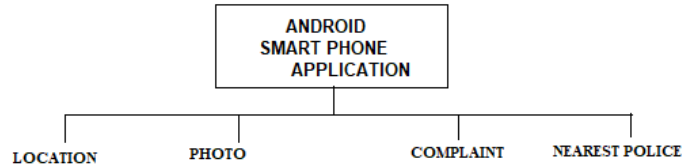


Figure2 (b):Context Analysis

Figure 2 (a&b) shows the overall application has been used in order to provide a safety for the driver and also user want to get real time information about the vehicle then user have to just enter the phone number and get all the details which are mentioned above and can also share the data to their relatives.

V. Result And Discussion

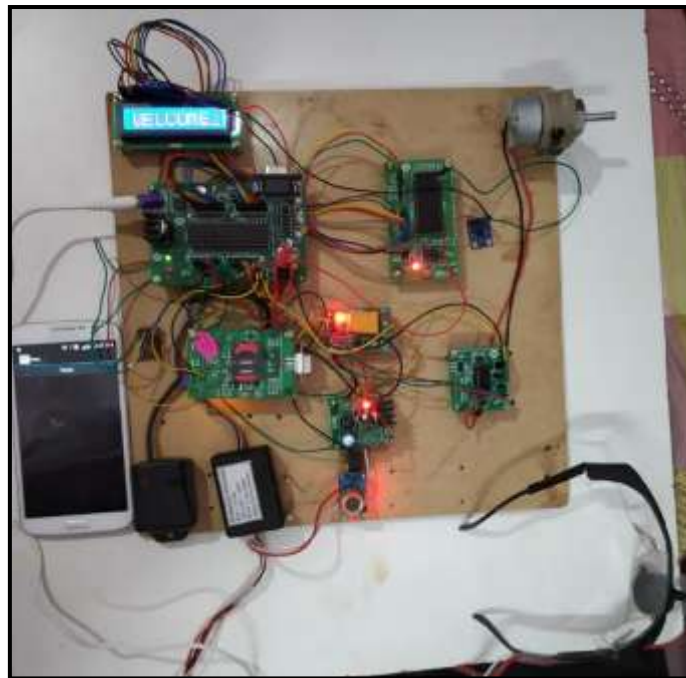


Figure3: Working view of using the system

The figure 3 shows the actual hardware setup before the actual execution of the model. The hardware start working when the adapter is connected which is of 12 volts and 2Amp.

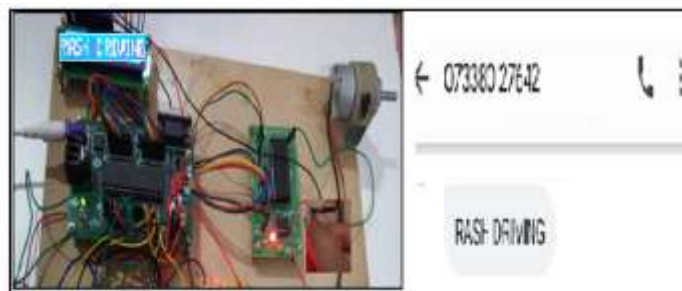


Figure4: Rash Driving

The figure 4 shows the scenario when there is rash driving is happening and the red light. As the voltage exceeds the threshold then the L293D Motor Drive control the speed of the motor. And alert voice message is sent to the driver and owner. Hence the accident can be avoided.



Figure5: Drowssiness Detection

The figure 5 show the scenario when ever the driver feel sleep during driving a vehicle and the IR based eye sensor when ever eye is closed then the output will be 1 or high and when ever eye is opened then the output will be 0 or low. As the eye of the driver is closed the vibrator sensor vibrate and the voice alert message is sent to the owner and driver in order to make him awake and vehicle is stopped.

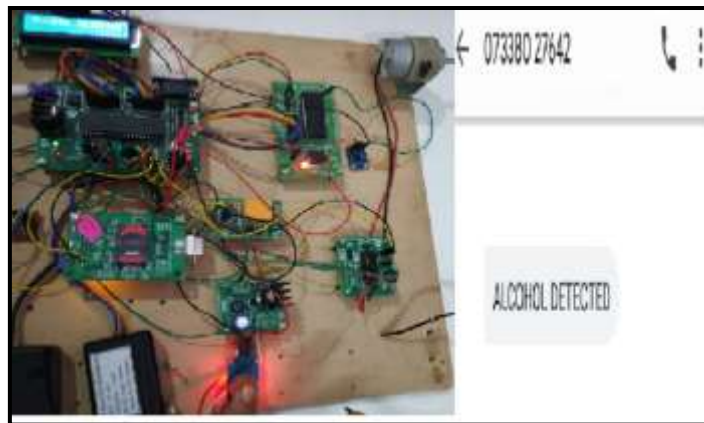


Figure6: Alcohol Detection

The figure 6 show the scenario where the drivers doing drunk and driving and then this is sensed by MQ3 sensor. As soon as the MQ3 sensor detect the alcohol automatically the vehicle stops and an voice alert message is sent to the owner and necessary action is carried out.

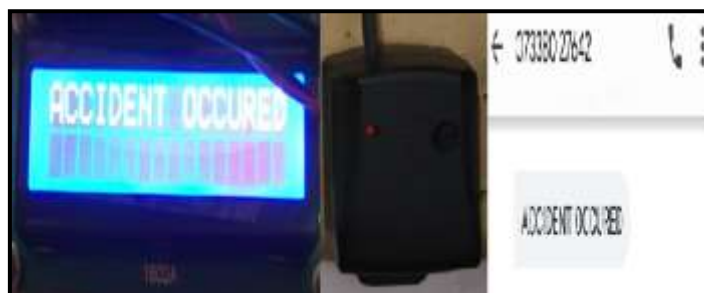


Figure7: Accident Detection

The figure 7 shows the accident has been occurred through the vibration sensor as it immediately observe or it sense any type of movement or an vibrate and the message will be sent to the particular person with the exact location is sent to them.

VI. Conclusion & Future Scope

Fleet management system works very efficiently and is more reliable, flexible, scalable and economical. It provides more security and safety for the driver's life. The vehicle owners can track the vehicles and know the real time condition of the vehicles as well as drivers activities through the GPS system. The vehicle owner can alert the driver when the driver is found drowsy or when he is rash driving. This is possible because the vehicle owner gets voice alert message. This in turn helps in avoiding accident.

In a future scope, the proposed system can provide the accurate and current information to the vehicle owners and the relatives about the drivers as well as the vehicle when the vehicle is out of range of GPS by using onboard diagnosis device.

Reference

- [1]. Chigurupa S., Polavarap S., Kancherla Y., Nikhath K.A., Integrated Computing System for measuring Driver Safety Index, International Journal of Emerging Technology and Advanced Engineering, 2012.
- [2]. Johnson, D.A., Trivedi, M.M.: Driving Style Recognition using a smartphone as a sensor platform. In: IEEE 14th International Conference on Intelligent Transportation system, October (2011).
- [3]. Dai J., Tang J., Bai X., Shen Z., Xuan D., Mobile phone based drunk driving detection, Proc. 4th Int. Conf. Pervasive Health NO PERMISSIONS, 2010.
- [4]. Amey Sawant, Vinayak Ikke, Jyoti Khandale & Nilam Chavan, "Car Over-Speed Detection with Remote Alerting", Department of Computer Engineering, PVPPCOE.
- [5]. Pranoto H. Rusmin, Andrew B. Osmo, Arif S. Rohman System Engineering and Technology (ICSET) 2013, IEEE 3RD International Conference

Ms Kirthana D" Smart Fleet Management Using Internet of Things" International Journal of Engineering Science Invention (IJESI), Vol. 08, No. 07, 2019, PP 17-22