GPS-GSM Based **Smart Device with Collision Detector**

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ABSTRACT-*Accidents on road are a global problem with ever rising trend. Accidents are random and multi-factor. Most common accidents include rash driving, not wearing safety equipments and drink and drive. Current solutions are not that modern which can help to reduce such problem .We analyzed all the problems and provide a modern method to improve all the previous method and with all safety measures. We are introducing a device which detects alcohol level and checks that rider is wearing safety equipments or not. We aim to reduce the damage caused and fatalities and enforce people to follow the rules and law. This device is also loaded with the anti-thefting technique with the help of GPS and GSM modules. This device is made by keeping in mind the safety purpose of the users and his vehicle too.*

Keyword: Collision detection, GSM-GPS, alcohol detector, accidents, MQ3 sensor, Arduino Uno.

I INTRODUCTION

Road accidents have become a very common problem nowadays. With the increase in number of automobiles, there is increase in road accidents too. Most of the time human errors are the main cause of the accidents. Most of the time accident occurs due to the following reasons:-

• Over speeding
• Rash driving
• Drunken driving
• Not using seat belts or helmet.

As from recent years it is noted that two-wheelers are accounted for the most fatal crashes. As due to fatal accidents the driver or the passenger with him has to face the severe injuries sometimes which in case results in the loss of worthless life. Most of time drinks and drive is the main issue behind the accidents for both two wheelers as well as four wheelers. Therefore the device to overcome this issue is needed.

The second and very common issue which happens is thefting of our vehicle whether it is two wheelers or four wheelers. As we all know by the time we reach to the police station to register the complaint it gets very late as our vehicle gets sold in pieces in theft market only some of us are so lucky to get it back. Sometimes the case gets more painful when we don't have insurance too. As being insured is the first and foremost step for our vehicle but somehow in some worst case if we don't have the insurance we have to face the loss. So as to overcome all these severe issues we have made this device.

This device is implemented with alcohol sensor, collision detector, GPS and GSM module, and with some micro-controllers and RF transmitter too. The first and foremost step is to check the helmet or the seat belt. Following this the alcohol detector will detect whether the rider is drunk or not if found drunk vehicle won't start and the ignition will be off too. If found safe the ignition will start and send the activation message to the registered number and in case if accident detected the emergency alert with location will be sent to the registered emergency number.

Another important operation of this device is to save the vehicle from being theft. So as soon as the

registered number will call on the number present in the GSM module will get the location and can immediately and easily track the vehicle.

II LITERATURE REVIEW

There are many solutions for the concerned problems and each has some advantages over one another.

Aditi et al [1] proposed an effective approach using GSM –GPS a helmet band. This idea claims to make bike riding safer. Unless and until the rider won't wear this band the bike will not start. It also monitor if there is any sudden variation in velocity occurs, a sms with the location of rider will be sent to the emergency defined contacts in database.

R. Nazir, et al [8] developed system includes GPS GSM, micro-controller, an alarm, message circuity and detection. The system enables detection of any accident occured and reports about the same on the coded numbers. It includes SONAR modules which puts ON the alarm whenever the distance between the user and obstacle is less.

D.Kumar, et al [2] developed a system finding occurrences of accidents and reports the location of accident to the registered(coded) number earlier coded in the coding of module.

Real time tracking with GPS and GSM and vehicle detection, reviews accident detection and location by N.sane, et al [3] . The system locates the vehicle by sending a message. This is done by system placed inside the vehicle and this helps to find the location where the accident had happened.

Hoang Dat Pham, et al [4] proposed a system to track the vehicle. Though it's useful in following areas as our personal vehicle security, fleet management and others. It is observed that the number of vehicle is also increasing rapidly.

R.Monisha et al [5] proposed a system with two separate units named as Crash Detector Embedded Unit and Android Control Unit, capable of detecting the accident through accelerometer (three axis) sensor, bumper sensor and alarm switch. Bluetooth module (HC-05) is used to send the accident notification to the victim"s android phone where an android app will get the GPS location of accident spot and compare it with all the nearby hospital"s location in order to calculate the shortest. The shortcoming with this system was that excessive battery use due to Bluetooth sensors. .

Krinshna Priya, et al [6] developed an accident detection system which sends a message to emergency help centers and traffic authorities in case of any accident occurred. It also provide with real time tracking location via message.

B. Gowshika, et al [7] developed an accident detection unit consisting of a vibration/ collision sensor fitted in the automobile itself. If the system detects any major impact it process the information through microcontroller and send a message and creates a beep sound , so the accident prone person is being identified and saved

All the mentioned projects have some flaws in them which we have tried to cope up with.

In this project we have designed a smart device for both the two wheelers and four wheelers. The main concern in our project is to reduce human errors, the damaged caused to property and the thefting of our vehicles. As materialistic casualties can be recovered but human casualties will affect a multitude of people. The project made compulsory for the users to wear helmet/seat belt to start the ignition and also check the alcohol level of the user and while driving if any mishappening occurs a short message with location coordinates will be sent to the coded number, which will help saving valuable lives. Also providing with an anti theft system we have tried to save our vehicles from being thefting and if so happens we can track it immediately by ourselves only.

III PROPOSED SYSTEM'S BLOCK DIAGRAM

This system is designed to mainly focus on avoidance of accidents due to drunken driving and thefting. Unless and until the driver is drunk the ignition will be off and message will be sent to the coded number that your driver is drunk in addition to this if somehow anyone steals your vehicle the user can immediately trace his vehicle location and can call the police and can have his vehicle back immediately.

The system consists two main parts;

1.) TRANSMITTER SIDE MODULE
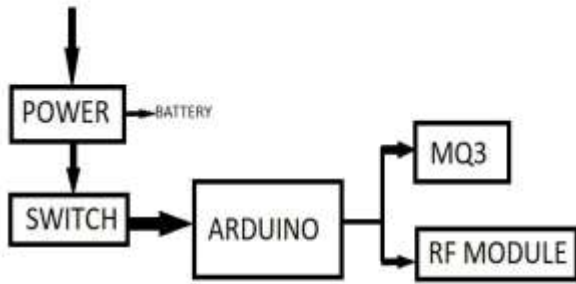
This section consists of the following parts:-

Figure 1. HELMET UNIT

a) Arduino UNO

b) MQ3 Sensor

c) RF Module

In this the alcohol sensor senses whether the driver is drunk or not and then sends the data to the arduino which will further sends the encoded signal with encoder to the transmitter and it transmits it to the receiver section.

2-RECEIVER SIDE MODULES

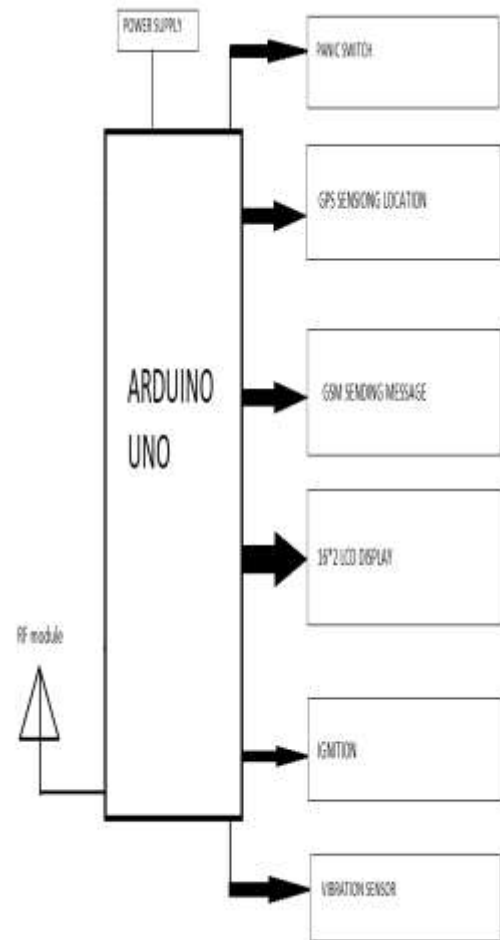(Vehicle section)

This section consists of the following parts:-

Figure 2. RECEIVER SECTION

a) Panic Switch- send alert if rider feels afraid or panicked

b) GPS GSM Module- sends the location and message to the user

c) 16*2 LCD Display- display the information

d) RF Module- used to receive signal from transmitter

e) Vibration sensor- detect any hard collision or any shear stress

In this section receiver side module or the rf transmitter receives the transmitted data and decodes it and sends it to the arduino where it performs as per the program feeded.
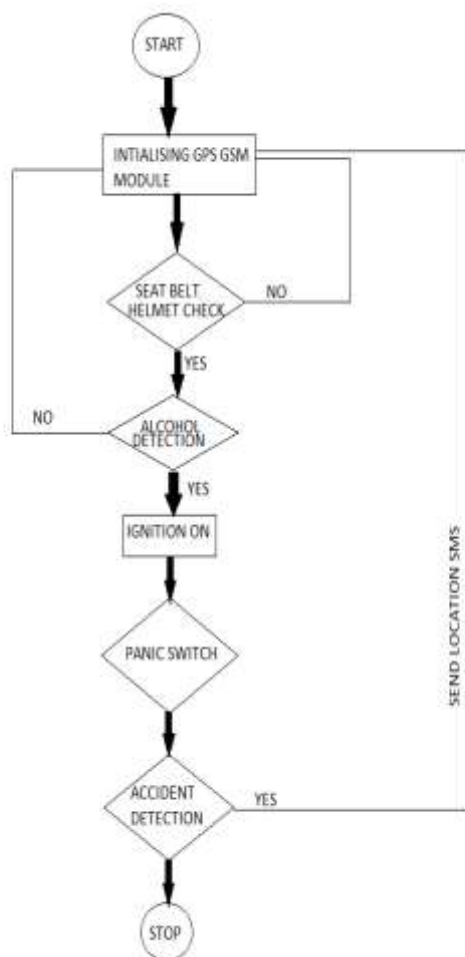
2.1. FLOW CHART

Figure 2.1   FLOW CHART

2.2. SENSING ELEMENTS:

- MQ3 SENSOR- This is an alcohol sensor which senses the alcohol in the air and sends the output as an analog voltage.

- PANIC SWITCH- Used for emergency situations wherever the person feels threatened or unsafe

- GSM GPS MODULE-it gets the location in the form of longitude and latitude; microcontroller then processes it and sends to the gsm modem.

- VIBRATION SENSOR-used to detect any strong impact on the device s.a. accidents

VI WORKING OF THE SYSTEM

In this system hardware parts which have been used are MQ3 alcohol sensor, vibration sensor, arduino UNO. SIM 800A GSM module, GPS module, PCB board etc.

So as earlier introduced in this paper that there are two sections i.e.; transmitter or helmet/seat belt and receiver or vehicle section. As the transmitter section has MQ3 sensor, when power is supplied to this section the arduino will provide 5v supply to the MQ3 and takes

output on analog input of the arduino which then be initialized for further. The MQ3 should be placed right infront of the mouth in helmet and at side of the seat belt in car. When the driver found below the set limit of alcohol as per guided by government the data will be sent to the RF encoder which encodes and transmit the encoded the data through the transmitter to the vehicle unit. The vehicle unit has also have an arduino and receiver which receives the transmitted data and have LCD display where it shows alcohol level. If and only found non-alcoholic and seat belt or helmet condition is checked then the ignition will be on. The message will also be sent by the GSM module to the emergency coded number about the activation of the vehicle. The message will also be sent if driver found alcoholic so as to be aware about the status of the driver condition.

The second thing is that if in case the vehicle will struck or met with an accident, the vibration sensor will sense and send the data to the arduino which, then with the GSM and GPS module will send the message to the emergency coded number with driver location.

The third case is that if by somehow or by bad luck the vehicle gets stolen, then the owner or the emergency coded number can immediately call on the number used in the GSM module and can get its vehicle location easily. Here the question arrives what if vehicle is not on or hence no supply to the module then there is no use of calling. So in this case as mentioned earlier, as soon as the device activates will send the message to the emergency number about the activation of the vehicle after which we can call the on the number and can get the location.

V RESULTs & CONCLUSIONS

Nowadays numbers of accidents are increasing day by day and the drink and drive case is the most common reason behind them so our device will be found more helpful to deal with these type of condition. Secondary is sometimes the driver doesn't uses the helmet or seat belt due to which when accident occurs he may face severe injuries which can be avoided if he may have used the safety features i.e. belt and helmet. So as to overcome this we have introduced a feature in our device that unless and until he will not wear the seat belt or helmet the ignition will be off. The third thing is that the case of theft, locating vehicle will become easy. The proposed system is also helpful for the rider/driver in case of emergency or during accident. This device will also help in reducing the rate of accidents due to human errors.

We will sincerely try to improve the proposed systems in future with more advanced feature like fast response time along with improvement of frequency range of receiver and transmitter. There are some compatibility issues that need to be resolved in future. In future we

will try to collaborate with automobile industries for betterment of features of the vehicles.

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