Identification and Prevention of Accidents Using Smart Helmet and GPS System

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Abstract. In each one hour 17 people are dying in India because of street mishaps. According to the administration report practically 1.5 lacks people are passed on street mishaps in 2017. Most of mishaps is bikes in view of person not worn helmet and consuming alcohol. So in this proposed framework if the rider isn’t worn helmet or consumes any alcoholic substance is distinguished, the bike will not start. In addition, it has a smart feature to identifying accidents and sends SMS to rescue vehicle, police headquarters and family members with location by using GSM and GPS module, thus aiding ambulance to reach the correct location. We want to integrate all the sensors inside the helmet, which will send the all the data to the receiver connected in motorcycle wirelessly. This brilliant head protector framework comprises of two modules, one is head protector(transmitter) and another one is bike (receiver). Alcohol sensor, IR sensor and ultrasonic sensor are associated inside the helmet unit and vibration sensor, GPS and GSM are connected in vehicle unit. The transmitting and receiving unit communicate wirelessly using RF transmitter and receiver, using arduino.

1. Introduction
Lately bicycle mishaps are expanded quickly. There are various clarifications behind street mishap some fundamental reasons are over speed, devouring liquor, using mobile phones while driving not wearing helmet and not properly follow a traffic rules etc. The main two reasons are riders not wearing helmet and consuming alcohol. So this project mainly concentrates these two issues. Nowadays helmet is compulsory in all the state yet numerous riders not appropriately wear a helmet and consuming alcohol more than the permissible level.
2. Existing system

There are three kinds of setback acknowledgments they are: 1) Manual location framework 2) Driver started identification framework 3) Automatic discovery framework.

As indicated by similar review if 698 accidents happen each year, about a large portion of the harmed individuals pass on because of absence of treatment in legitimate time. The explanations behind this may again be numerous, for example, late appearance of rescue vehicle, no individual at spot of mishap to offer data to the emergency vehicle.

The current framework the helmet parts comprise of just only one feature rider is wearing the head protector or not. But proposed structure add some extra features like liquor discovery utilizing MQ-3 alcohol sensor and overwhelming vehicle caution to the rider utilizing ultrasonic sensor. Another significant disadvantage of existing system is bike and helmet is wired connection. But proposed framework bike and head protector are wirelessly share the data and the person meet an any mishaps identify the location of mishaps area using GSM and GPS module and send message to enrolled mobile number like ambulance, police headquarters and relatives. So we can undoubtedly give clinical administrations to rider in brief time frame period.

3. Proposed System:

In this proposed framework if rider isn't worn the helmet the bike will not start. Similarly if person is consuming any alcohol the bike will won't start by using MQ-3 sensor. At whatever point this two condition is fulfilled the bike will start otherwise the bike never start. Ultrasonic sensor is used to calculate the distance between two vehicles. In behind any vehicle is too close to your vehicle the sensor discover the separation between two vehicles and show the rider. Additionally include another one smart feature in proposed framework. This smart feature is used to identify the specific location of mishaps happened area by sending a message to ambulance and relatives. So immediately give a medical service to the riders. In this proposed system if any accident is meet by a rider to easily identify the exact location of accident occurred area and send a message to registered mobile numbers.

3.1 Infrared Sensor

IR sensor is put inside a helmet. It is used to distinguish the person is worn the head protector or not before riding. The IR sensor involves two segments transmitter and receiver. This sensor producing an infrared light yet it is undetectable to natural eye. If transmitted light is not received by the receiver the rider is wearing head protector. Similarly the transmitted light is received by the receiver the rider is not wearing the head protector.
3.2 *MQ3 Alcohol Sensor*

MQ-3 is a one type of gas sensor. It work on voltage flexibly of 2-3.3V. It is used to check whether the rider is consuming alcohol or not before driving the bike. It can be placed in front of the mouth. As indicated by government act the Illegal utilization of liquor is 0.08mg/L at the hour of driving. The sensor faculties different atoms in liquor and recognize if the rider is devouring liquor. The sensor comprises of potentiometer to modify the conc. of gases. The sensor comprise of four pins in particular GND, VCC, Analog output and Digital output. But here we use digital output of this sensor.

3.3 *Ultrasonic Sensor*

Ultrasonic sensor is utilized to compute the separation between two vehicles at the point when any vehicle is excessively near your vehicle the sensor discover the separation between two vehicles and indicate the rider. Be that as it may, it conceivable just in the vehicle speed is more than 20km per hour. Working recurrence of this sensor is 40 KHz. It comprise of four pins VCC, TRIGGER, ECHO, GND.
3.4 Vibration Sensor

The vibration sensor is utilized to gauge the power of the vibration. It is used to detect the road mishaps based upon a range of frequency generated depending upon vibration produced due to vehicle accident. If the range of frequency is more than the threshold value then the receiver unit (bike) shows accident detected and sends a message to enrolled mobile number with latitude and longitude values using GSM and GPS module.

![Vibration Sensor](image)

Fig.5 Vibration Sensor

3.5 RF Communication Circuit

A RF module is a little electronic gadget used to communicating information to the recipient as radio waves in remotely. In any case, it is conceivable in 15-20 feet. In RF communication circuit consist of two parts one is RF transmitting part and another one is RF receiving part. An RF Transmitter is placed in helmet unit it will send the data to the RF receiver.

A RF recipient is gotten by a balanced RF communicated signal and demodulating the RF sending signal. The RF receiver module is divided into two parts such as super-heterodyne receiver and super-regenerative receiver. However, super-heterodyne beneficiary is more proficient when contrast with super-regenerative collector. Since super-heterodyne collector is elite and its offers more exactness and precise. The main advantage is high stability over a high voltage and temperature range. Super-regenerative modules are normally very low cost and low power.

![RF Transmitter](image)

Fig.6 RF Transmitter
3.6 GSM and GPS Module

GSM stands for Global System for Mobile communication. If the rider meet any mishap using a GSM module to send a message to registered mobile numbers like ambulance and relatives. This feature is very useful to locate the exact location of mishap occurred area. So rider is easily got medical services in very short time period.

GPS represents Global Positioning System. This module is used to locate the latitude and longitude values of mishaps occurred area to send a SMS to enrolled mobile number through GSM module.
4. Construction

We have already known that entire design is classified into two parts transmitter part (helmet) and receiver part (bike). The helmet unit is called transmitting part and bike unit is called receiving part. First we see transmitting part. The IR sensor is set inside the head protector that sensor is utilized to detect the rider is wearing the helmet or not and liquor sensor is set in close to rider mouth for identifying any liquor substance before riding. Ultrasonic sensor is put in behind the helmet for distinguishing separation between two vehicles.

The receiving part consists of vibration sensor, GSM and GPS module. The vibration sensor is utilized to distinguish vibration in bike. If any vibration is detected it will send the data to arduino and using GSM and GPS to send a message to rescue vehicle and family members with exact accident location.

![Fig.9 Transmitting part (Helmet Unit)](image)

![Fig.10 Receiving Part (Bike Unit)](image)
4.1 Flow Chart for Starting a Bike

![Flow Chart for Starting a Bike](image)

Fig. 11 Flow Chart for Starting a Bike

5. Output

![Sample Accident Message](image)

Fig. 12 Sample Accident Message
5.1 Design

Fig.13 Sample Accident Location Area

Fig.14 Transmitting Part (Helmet Part)
6. Advantages
1. We can easily identify where the mishap is happened, so instantly give the medical services to the riders.
2. In this system considerably avoid a two wheeler accidents using a alcohol detector.

6.1 Applications
1. We can also implement in real time safety system in bike.
2. In this framework we can additionally executed in vehicle likewise by supplanting head protector with safety belt.
3. We can integrate in small VLSI chip and the design consuming very less power.

6.2 Future Scope
1. We can add a various bioelectric sensors within the helmet to monitor the rider’s health condition.
2. We can add a OLED virtual head up display for navigation purpose and receiving messages and mobile calls.
3. We can use small camera to capture the rider activities while driving.

7. Conclusion
The main aim of this system is to ensure the riders safety. If any of the driving rules is violated in this existing framework is avoid them. The primary and compulsory rule for bike riding is worn helmet and not consuming any alcohol substances more than the permissible level. So in this system that can be achieved. Another important feature is if riders meet an any accidents and quickly give medical services to the riders and send a message to registered mobile numbers. So it will save many people lives.

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