

# SMART HELMET

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**Abstract:** The main objective of the project is to build a safety system which is integrated with a smart helmet. In recent times we had seen many accidents happen during riding a bike and many deaths occur. And the main reason behind that is a head injury. The main motto behind this project is to protect your head from deadliest injury rider can save their life from death. In this project, we design smart helmet. It is the helmet that works with the help transmitter and receiver circuit and the microcontroller. This is implemented using GSM technology. In that, we used a Flex sensor and an alcohol sensor. Flex sensor is used to checks if the person wearing a helmet or not and an alcohol sensor is used to detect if the person drunk or not. If any of this condition satisfies bike will not start.

**IndexTerms - Bikers safety, alcohol detection, accident detection, smart helmet.**

## I. INTRODUCTION

The thought of this project comes to do some good things towards society. Day by day the two-wheeler accidents are increasing and leads to the loss of many lives. According to a survey, there are 98 two-wheelers users without a helmet died per day. The reasons behind that are the lack of proper driving knowledge, the fault of the rider, fast riding, drunken and drive, etc. If the accidents are one issue, lack of treatment in proper time is another reason for deaths. Nearly, half injured people die due to lack of proper treatment in time. Many reasons for this like the late arrival of the ambulance, the absence of a pupil to inform the family or to provide the victim with the first aid.

This is situations happen during accidents, a thought of finding some solution we come up with this idea of giving the information about the accident as soon as possible and in Time. after all, time matters a lot. If everything is done in time we at least can save half of the lives. For that, we have added some features in a helmet for avoiding accident causes

1. We have added a flex sensor to checks the biker wearing a helmet or not until an unless bike ignition will not start.
2. We have added MQ-3 sensor to avoid drive if there is any alcohol content found in rider's breath, the bike remains off.
3. We have added the GSM/GPRS module when the biker met with an accident it gives a piece of information about the location where he is met with an accident through GSM/GPRS module to mobile numbers of family members, So we had chosen this technology to give the information by sending SMS.

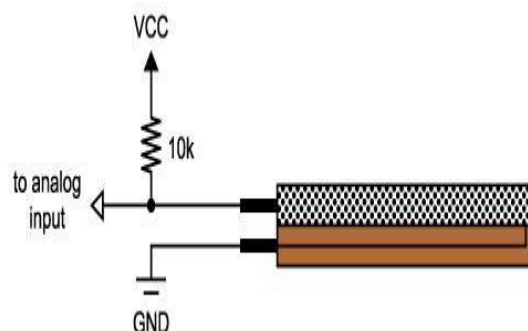
These are the three main issues which motivate us for developing this project. The first step is to identify the helmet wear or not if the helmet wear then ignition will start (bike start) otherwise it will remain off till helmet is not worn. The second step is the detection of alcohol, MQ-3 sensor is used for these. If it will find any presence of alcohol in bikers breath ignition will not start. The third step is to detect where the biker met with an accident and send the message to the registered number, the GSM/GPRS module is used for these.

The method used to carry out this project is the source of serial communication in collaboration with embedded systems. This is a very good project for industries. this project has a GPS locator which will be used as an electronic device and also has a GSM module, which is used for the communication between mobile and the embedded devices.

## II. TECHNOLOGICAL STUDY

The technics here we used is alcohol detection and accident prevention.

### 2.1 FLEX SENSOR



Flex sensor is placed inside the helmet with the Arduino where it will sense the human touched and it will detect the helmet worn or not. It will satisfy the condition and sends the signal to the bike unit. Flex sensor is available in two sizes one in 2.2" and another coming at 4.5". More you bend the sensor in the angle it will become the greater resistance. If you bend the sensor in another direction will not produce any reliable data and it may damage the sensor.

### 2.2 MQ-3 sensor



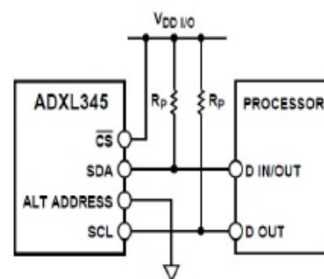
This module is made by using Alcohol gas sensor MQ-3. It is a low-cost semiconductor sensor which can detect the presence of alcohol gases concentration from 0.05 mg/L to 10 mg/L. It is also useful for detecting Benzine, CH<sub>4</sub>, Lpg, CO and gas leakage detection. Due to his high sensitivity and fast response time, measurements can be taken as soon as possible.

### 2.3 GSM/GPRS module



GSM/GPRS is used to detect where the biker met with an accident and sends the message to the registered number. GSM stands for Global System for Mobile communication and GPRS stands for Global Packet Radio Service. GSM/GPRS is an IC that connects to the GSM network using a SIM (Subscriber Identity Model) and Radio waves.

### 2.4 Accelerometer



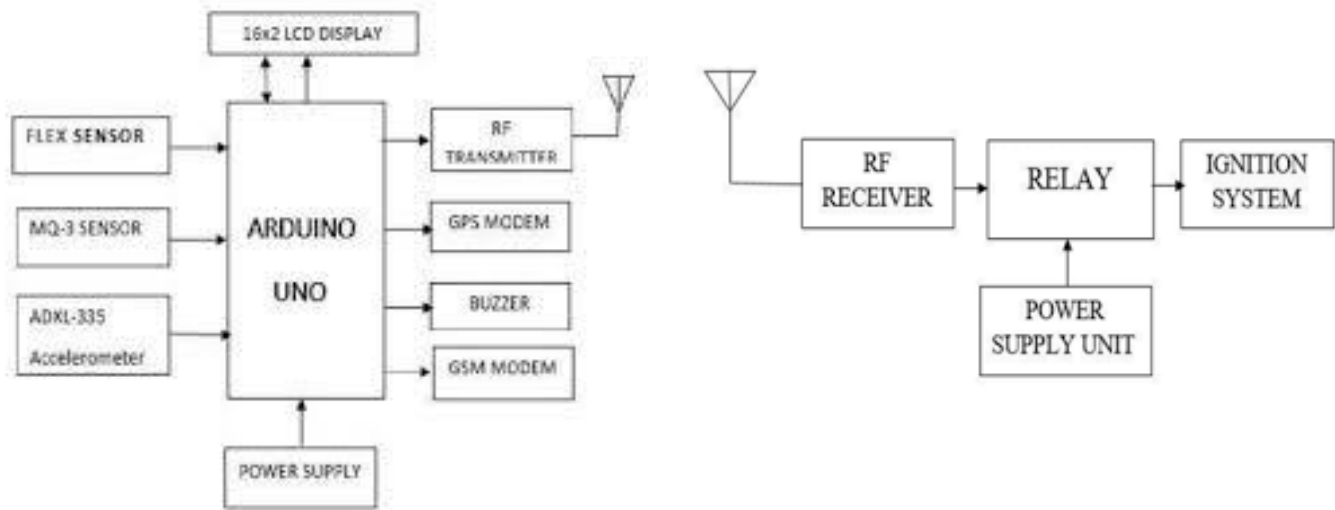
An accelerometer is an electromechanical device used to measure acceleration forces. Such forces may be static, like the continuous force of gravity or, as is the case with many mobile devices, dynamic to sense movement or vibrations. Acceleration is the measurement of the change in velocity, or speed divided by time. In this project accelerometer measures the static acceleration of the gravity. Free Fall sensing notices if the bike is falling and bike unit takes decision that accident occurs or not.

## III. METHODOLOGY

### 3.1 Block diagram

This project is consists of two units first is the helmet unit and the second is bike unit. Helmet unit is consists of a Flex sensor, MQ-3 sensor, GSM/GPRS module, Arduino, RF Transmitter and Bike unit is consists of an RF Receiver, Relay, Ignition system, Power supply unit.

Arduino UNO is fixed in the bike unit and the whole unit is controlled by Arduino UNO unit. Different functions are controlled by different sensors. The inputs from different sensors are supplied to the Arduino unit and which is analyzed by Arduino and given to the bike unit by RF Transmission

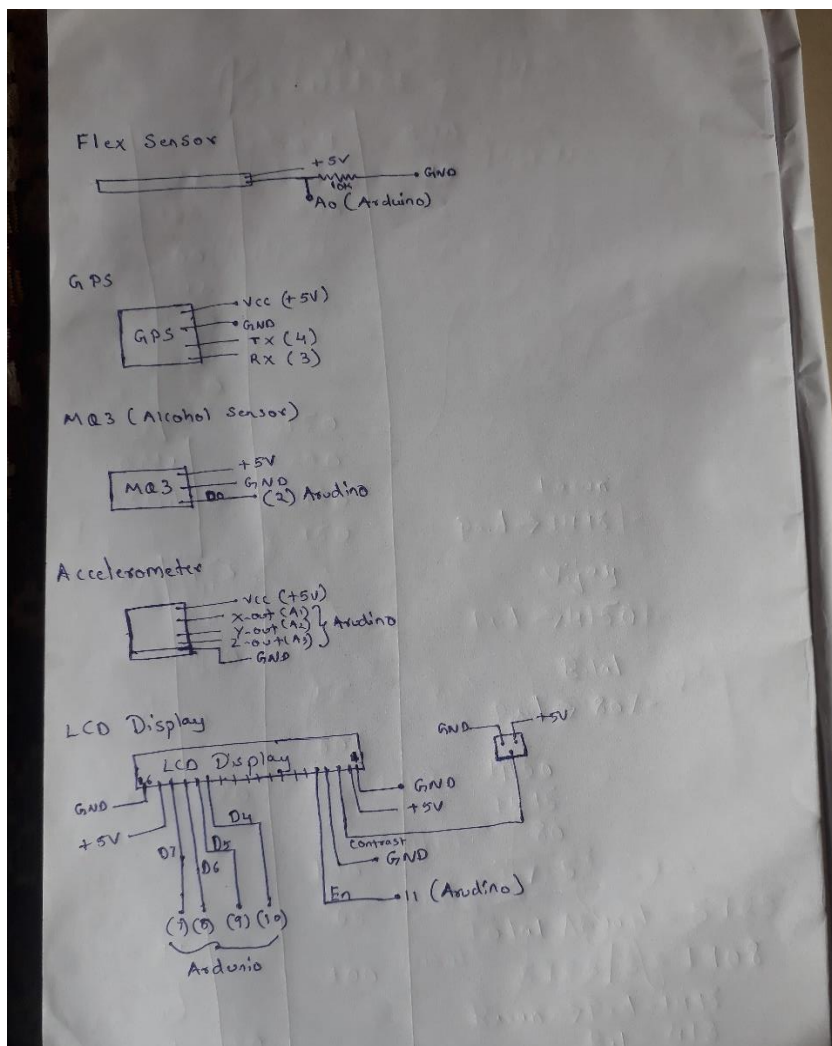


### 3.2 RF Communication circuit

The interaction between the helmet unit and the bike unit is done by using the RF module. This circuit is contained encoder and decoder circuits. Encoder circuit is used to convert parallel data into serial data, this circuit is placed at the helmet unit and Decoder circuit is placed at the bike unit it used to decode serial data. It converts this serial data into parallel data.

Flex sensor output will be given to the RF Transmitter and the will be transmitted and the flex sensor is connected to the analog pin of the Arduino. The MQ-3 sensor output is connected to the digital pin of the Arduino. Receiver pin of the Arduino is connected to the transmitter pin of the GSM.

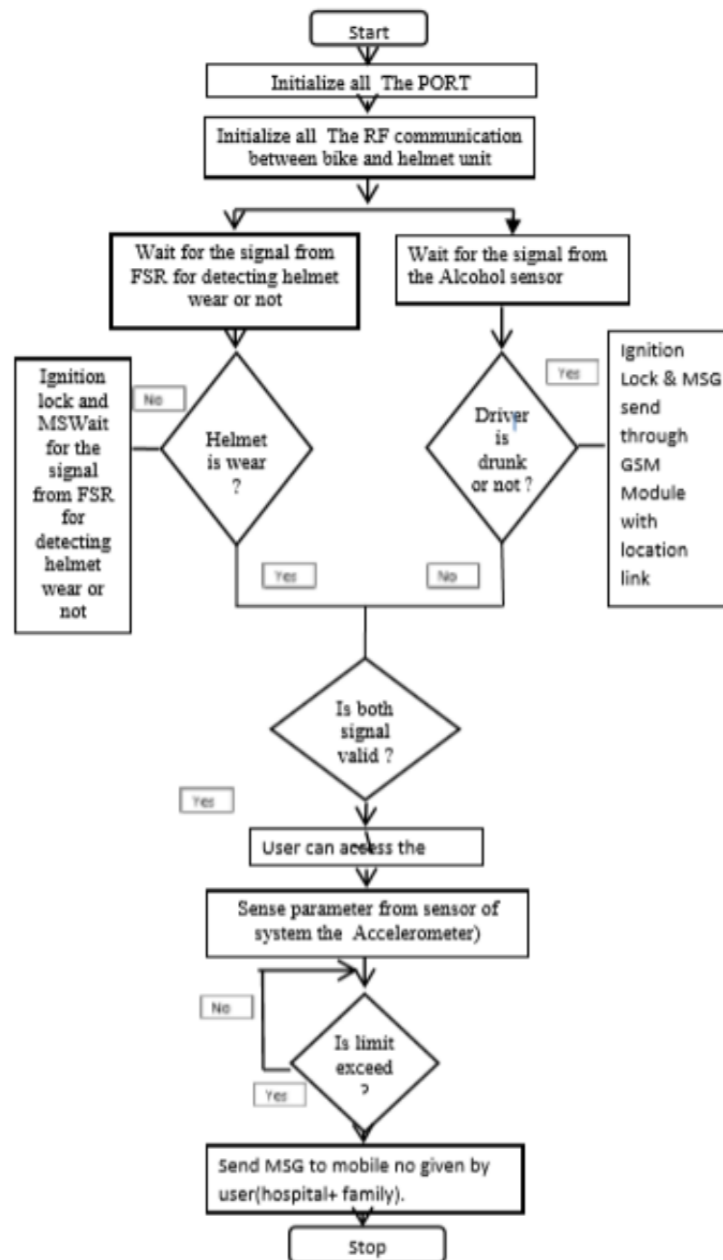
The Receiver unit is consists of the relay, Rf Receiver circuit, and power supply unit. Data which is transmitted by RF Transmitter is received by RF Receiver and decoded by decoding circuit and it is given to the digital pin of the Arduino.



**IV. CONSTRUCTION**

First, for the construction, we need to require printed circuit board was designed and the components mounted on it. Construction of our system consists of two units namely helmet unit and bike unit as we mentioned earlier. In the helmet unit, flex sensor is placed on inside upper part of the helmet where actually head touched with sensor bends and sensor surface. MQ-3(Alcohol sensor) is placed on in front of the rider's mouth so it can sense easily. The regular circuits and the battery was fixed inside the helmet RF transmitter is also placed inside the helmet.

**V. FLOWCHART**



**VI. ADVANTAGES**

- 1) Detection of an accident in a remote area can be detected easily and thus service can be provided easily and in a short time.
- 2) By using Alcohol sensor drunken drive can be easily avoided it will reduce the probability of an accident.
- 3) It is Easy to implement, cost-effective and efficient
- 4) Easily replaceable

**VII. RESULTS**

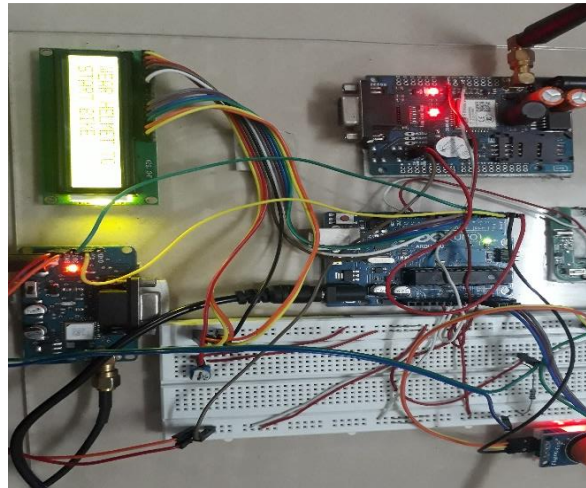


Fig 1: Helmet detection

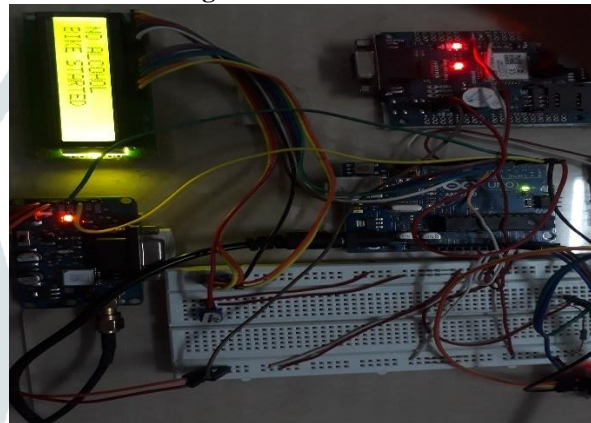


Fig 2: No Alcohol Detection

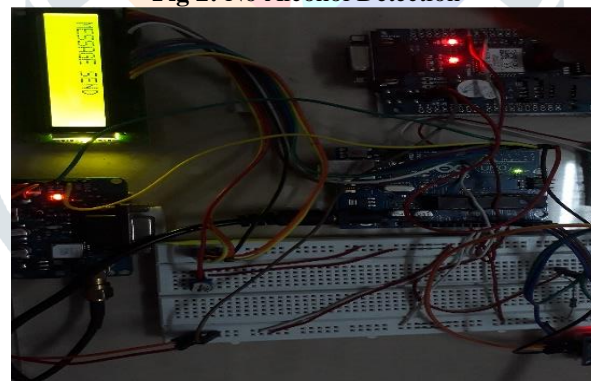


Fig 3: Message sending

### VIII. FUTURE SCOPE

1. We can fix solar panel for helmet power supply and this same power supply can be used for charging our mobile.
2. We can fix a small camera for recording of the rider's activity.
3. We can also implement various bioelectric sensors on the helmet to measures the rider's activity.

### IX. CONCLUSION

In India, people wear a helmet to save RS 100 not for safety. The present situation in our country we are not using this type of Two wheelers and this technology. To reduce the manual efforts and human errors, we need to some kind of automated system monitoring all the parameters and functioning of the connection between the two-wheelers personnel and the parents. Implementation of this type of project government saves a lot of time for the traffic police and most importantly it saves the precious life of a person.

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