# SMART HELMET FOR ALCOHOL AND ACCIDENT DETECTION

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***Abstract:*** An accident which is a specific, unexpected, unusual and unintended external action that can be occurs in a particular time and place, with marked effects. Due to Carelessness of the driver is the one of the major factor of such accidents were occurring. As we know that the traffic authorities give an instruction to the vehicle operators, but many we do not obey the rules. Nowadays most of the countries are forcing not to use the vehicles when the person is in drunken condition and the motor riders to wear the helmet. Even though the traffic authorities instruct to the citizens for their safety, but still the rules are being violated by the users. In order to overcome this, here we are introducing an intelligent system which is, Smart Helmet, which can be automatically checks whether the person is wearing the helmet and has non- alcoholic breath while driving. Here we are having a transmitter at the helmet and the receiver at the bike and there is a switch used to sure the wearing of helmet on the head. If the ON condition of the switch is to ensures the placing of the helmet in a proper manner. To detect the presence of alcohol, an alcohol sensor is placed near to the mouth of the driver in the helmet. Through ZigBee transmitter, the data to be transferred is coded ZigBee which acts as a trans receiver. Hence, ZigBee transfers the data from transmitter to receiver. The engine should not be ON if any of this two conditions is violated they are: MCU which controls the function of relay and thus the ignition, it controls the engine through a relay and a relay interfacing circuit. Another feature of this system it sends a message when accident occurs and the message will be sent by GSM to pre-registered numbers with their current location by GPS module.

***Index Terms*: Accident, Drunken Driving, Smart Helmet, GSM modem and GPS receiver.**

## 1. INTRODUCTION

A traffic accident is, if any vehicle accident that occurring on a public highway (i.e. originating on, terminating on, or involving a vehicle partially on the highway) which can be termed as a traffic accident. Accidents which includes collisions between vehicles and animals, vehicles and pedestrians, or vehicles and fixed obstacles, or vehicles and vehicles. The road traffic accidents are already among the top ten leading causes of disease burden in 1998 as measured in DALYs (disability-adjusted life years) in the sophisticated countries. In less developed countries, road traffic accidents were the most significant cause of injuries, it ranks eleventh among the important causes of lost years of healthy life. In Indian road system, to avoid traffic in such a city, the widening of the road is not an alternative solution. In many ways the problems with the state drunk and driving control systems can be solved. The most effective will follow several principles: They have to invest authority and responsibility in people and organizations at all levels, local to national, because drunk and driving control requires action at all levels. Thus, they will not promise instant solutions based on a single action, but rather will take steady steps for a long-term improvement. And they will be establishing a mechanism for identifying and solving these problems rather than attempting to apply one size fits-all methods as we know that the application of electronics in the automobile field becomes very much popular now. Because of this low prices and plenty of varieties available in the market instead of 4 wheelers people prefer motorbikes to buy. Hence Road Safety becomes a major issue of concern. So that, it becomes necessary to implement a technique which is not easy to bypass the basic rule of wearing helmet and to avoid drunk and driving. Here we designed a system before turned ON the engine of the bike which checks the two conditions. This system contains an alcohol sensor and a helmet sensing switch: A switch is used to detect whether the biker is wearing helmet or not, and alcohol sensor is used to detect the biker is drunk, the output is fed to the MCU. Both the switch and the alcohol sensor are fitted in the helmet. If any of the two conditions are violated the engine will not have turned ON. The alcohol concentration present in the driver's breath is detected by alcohol sensor. The Sensor provides an analog resistive output based on the alcohol concentration. The MCU is a microcontroller unit, which controls all the functions of other blocks in this system. MCU which takes or reads the data from the sensors and controls all the functions of the whole system by manipulating data. Alcohol sensor is connected to the MCU through an interfacing circuit and the helmet sensing switch is directly connected to the

MCU. MCU receives data from these sensors and it gives a digital data corresponding to the output of sensors to the encoder only if the two conditions are satisfied. Most of the accidents occur outside the cities are due to drunken driving and no testing methodology is adopted to avoid these fatalities in highways.

## 2. LITERATURE SURVEY

### EXISTING SYSTEM:

In olden days we do not have any such any kind of technologies for the implementation and thereby accidents occurring are more. Through this only some of the people get treatment and many lost their lives. This can be overcome by the new system.

### PROPOSED SYSTEM:

The proposed system is an intelligent helmet which ensures the safety of the biker, by making it necessary to wear the Helmet, as per the government guidelines, also to get proper and prompt medical attention, after meeting with an accident. A module is fixed in the helmet, such that, the module will sync with the module fixed on the bike. It consists of two sections:

1) Transmitter section (Helmet Unit)

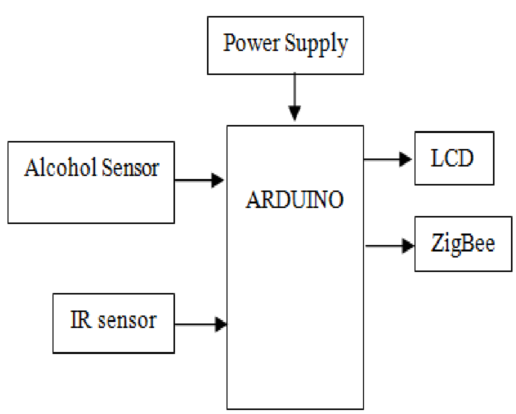
2) Receiver section (Bike Unit)

From the helmet the Data will be transmitted wirelessly to the bike. According to the various sensor input the Arduino will decide the actions of other blocks.

- ❖ Collision sensor is used for accident detection which will be placed on the bumper.
- ❖ The helmet is equipped security for bike theft and fuel thefts and also indication will be provided if bike is taken away by towing van.
- ❖ Panic switch is provided to alert relatives if rider is in danger.
- ❖ As we know that, GPS is used to determine the location of accident in terms of longitude and latitude. This data is forwarded using GSM to relatives/friends.
- ❖ Cell phone charging feature is also provided.

## 3.BLOCK DIAGRAMS:

**TX:**




**RX:**

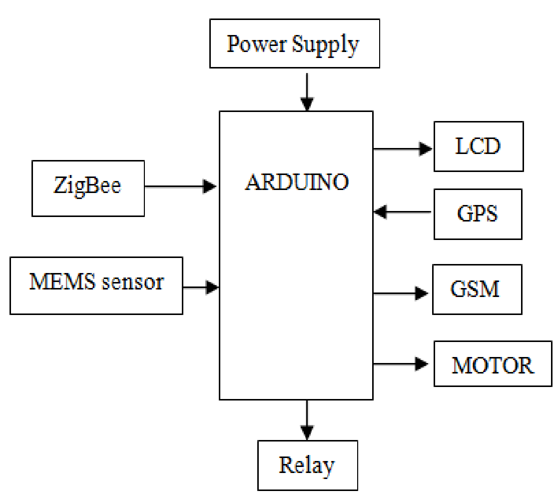



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Fig: Transmitter block

Fig: Receiver Block

## 3. HARDWARE REQUIREMENTS

**Arduino:**

**ARDUINO:**

For building of an electronic projects Arduino is used and it is an open source platform. It is consisting of both a physical programmable circuit and a piece of software i.e., IDE (integrated development and environment) which will have used in computers, used for writing and uploading the computer code to the physical board. It doesn't need any separate piece of hardware in order to load new code onto the board and it becomes quite popular. It uses a simplified code of C++ to make to learn the code easier and it provides the standard form that breaks out the functions of a micro controller into a more accessible package.


Fig: Arduino UNO board

**Arduino Board:**

Hence the Arduino Board does not have capacity to execute code by itself, without any external Power Supply. To communicate with the outside world, the Arduino board has I/O pins. It contains total 14 pins from 0 to 13 that can be used as input from Switches. Each pin has a 40mA of current passes through it. The Arduino has inbuilt program to check whether it is working or not. The Arduino board has very easy compatible interface design, for communicating with the Sensors it need only 5v supply.

**ZIGBEE MODULE:**

ZigBee is an open global standard for wireless technology which id designed to use low power digital radio signals for personal area networks. ZigBee low power consumption limits transmission distance to 10-100 meters' line of sight and depending upon power output and environmental characteristics, so that ZigBee can transmit data over long distance by passing data through a mesh network to reach the intermediate devices present at distant ones.


Fig: Performance of ZigBee

**Liquid Crystal Display (LCD):**

LCD is a technology that can be used for displays in notebook and other computers. It is the combination of two states of matter, the solid and the liquid. In general, the LCDs are used for displaying the output, while this screen utilizes liquid crystals to create a picture. In this intelligent trolley we are making use of an LCD i.e. 16x2 which means it consists of 16 characters per line and there are 2 lines and in LCD each character is display in pixel matrix of 5x7.


Fig: 16x2 LCD

**IR SENSORS**:

The IR Sensor-Single is a general purpose sensor here we are using it for detection of a person. The module consists of a IR emitter and IR receiver pair. The high precision IR receiver always detects a IR signal. The module consists of LM 358 comparator IC. The output of sensor is high whenever it matches IR frequency and low otherwise. The power consumption of this module is low. It gives a digital output.

**MEMS SENSOR:**

The MEMS accelerometers can be divided into two important micro system architectures:

1.Piezo resistive and

2.Capacitive.

Though both of these two types of accelerometers possess internal proof masses which are excited by acceleration, the differences of these two architectures lie in the transduction mechanism which is used to the movement correlation of the internal proof mass to accelerate. Motor: In some of the electronics projects you may want to control a DC Motor with an Arduino. The maximum current that can be sourced or sunk from an Arduino is 15 mA at 5v. But a DC Motor need currents very much more than that and it need voltages 6v, 12v, 24v etc., depending upon the type of motor used. Another problem is that the back EMF produced by the motor may affect the proper functioning of the Arduino. Due to these reasons we can't connect a DC Motor directly to a microcontroller.

**GSM**:

GSM stands for **Global System for Mobile** Communications. It is a standard set developed by the European Telecommunications Standards Institute (ETSI) to describe protocols for second generation (2G) digital cellular networks used by mobile phones. A Modem is a device which modulates and demodulates signals as required to meet the communication requirements. It modulates an analog carrier signal to encode digital information, and also demodulates such a carrier signal to decode the transmitted information.

**GPS:**

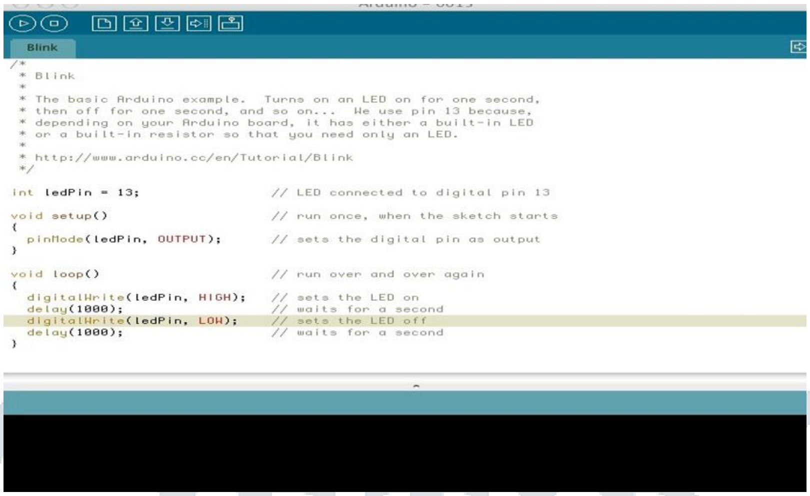
GPS is used in vehicles for the purpose of both tracking and navigationing. Tracking systems enable a base station to keep track of the vehicles without the intervention of the driver where, and a navigation system helps the driver to reach the destination. Whether navigation system or tracking system, the architecture is more or less similar. When an accident occurred in any place then GPS system tracks the position of the vehicle and sends the information to the particular person through GSM by alerting the person through SMS or by a call.

## 5.SOFTWARE REQUIREMENT

**ARDUINO IDE:** We are going to use Arduino IDE software for writing the code for the Arduino Micro controller. At the billing section we have to make a software for getting of the itemized bill, printing the bills and empty the trolley.

**ARDUINO IDE (Integrated Development and Environment):**

To program the Arduino, you also use the Arduino IDE (Integrated Development Environment), which is an open source platform of free software, which enables us to program in the language that the Arduino understands. The Arduino hardware and software are both Open Source, so that the code, the schematics, design, etc., are all open for anyone to take freely and do whatever to design which means it won't create any disturbance to anyone from taking the schematics and PCB designs of the Arduino and making their own and selling them. For this case of the Arduino the language we are making use of C. To write a computer program the IDE enables us, and it is a set of step by step instructions after that we have to upload it to the Arduino. Then the Arduino will carry out those Instructions and which interacts with the world outside. In the Arduino world, programs are known as sketches.




## 6. Advantages and Applications

**Advantages:**

- ❖ Accident detection in remote areas can be easily detected and medical services provided with in a short time.
- ❖ Avoiding drunk and drive by using alcohol detector.
- ❖ It reduces the probability of accident Operates on solar as well as battery supply.
- ❖ If helmet was stolen, then we can start the bike by the password.

**Applications:**

- ❖ It can be used in real time safety system.
- ❖ We can implement the whole circuit into small module later.
- ❖ Less power consuming safety system.
- ❖ This safety system technology can further be enhanced in car and also by replacing the helmet with seat belt.

## 7. Conclusion

The outcomes of the project have showed that the bike ignition will start if the helmet is worn. So, it will automatically decrease the effect from accident and it can avoid bike from being stolen. Arduino is good in controlling all the system and the sensors. Executing the wireless system which ZigBee Module to send signal from helmet unit to the bike unit. Due to this wireless connection is better than wired link.

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