

# IOT BASED SMART HELMET FOR CONSTRUCTION

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## **Abstract:**

A smart helmet is a special idea which makes motor cycle driver safer than before. It is a way to stop starting of vehicles without wearing helmets or even if the driver is drunk. In addition, it has a great feature of detecting accidents and informs it to specific people via SMS when accident occurs with the help of GSM based tracking system. We want to implement all the sensors within the helmet, which will send the information to the module connected with the bike engine wirelessly. This smart helmet system will have two modules, one on the helmet and another on bike. Using Mems sensor connected with the helmet that should be displayed the value in LCD . GSM modules are connected to bike. These two modules communicate wirelessly using arduino as micro controller.

## **I. Introduction**

A traffic accident is defined as any vehicle accident occurring on a public highway (i.e., originating on, terminating on, or involving a vehicle partially on the highway). These

accidents therefore include collisions between vehicles and animals, vehicles and pedestrians, or vehicles and fixed obstacles. In higher-income countries, 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 less developed countries, road traffic accidents were the most significant cause of injuries, ranking eleventh among the most important causes of lost years of healthy life. In Indian road system, widening of the road is not an alternative solution to avoid traffic in such a city. The problems with state drunk driving control systems can be solved in many ways. The most effective will follow several principles: They will invest authority and responsibility in people and organizations at all levels, local to national, because drunken driving control requires action at all levels. They will operate in the public eye, using the media to report on problems and solutions, because ultimate decisions on priorities and resources to control drunk driving must have public support. They will not promise instant solutions based on a single action but rather will take steady steps towards long-term improvement.

## II. Existing Method

In existing system, a similar proposed work that has been put forward earlier which is based on the principle of pressure sensing that is wearing a helmet creates a pressure on the helmet and a data signal is passed to the transmitter which redirects the bike ignition control to turn on. However, the technology has certain drawbacks:

Pressure can be created inside the helmet by putting any dummy material inside it. Thus, the rider instead of wearing a helmet can create the required pressure by putting any dummy material inside the helmet. Hence the basic purpose of starting the bike by wearing the helmet can be easily bypassed.

### DRAWBACKS:

- Rate of accident is not reduced
- Police intervention is needed
- It does not equip with option to send message if accident occurs.

## III. Proposed Method

The aim of our smart helmet is to provide the safety to the bike rider and give information of the accident to the family member. This is done by using the GSM module. The MEMS sensor sense the wearing the helmet properly and give signal to the Arduino. In case of the helmet should not wear properly the alert message will be send to the corresponding mobile number.

### Block Diagram

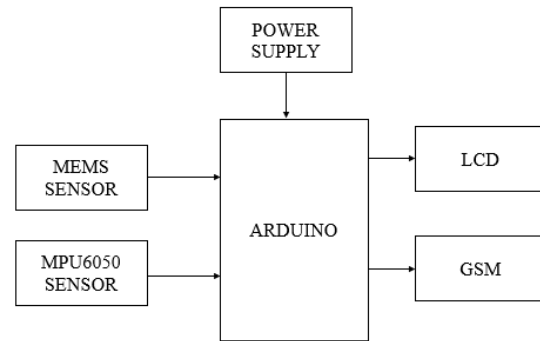


Fig1: Block Diagram

## IV. Hardware Requirements

### A) Arduino:

Arduino uno is a microcontroller board which inbuilt has an IC that is ATmega328P which is Main Microcontroller. In this we have 14 digital pins, 6 Analog Pins, 16MHz Crystal Oscillator and a Reset Button.



Fig2: Arduino

### B) Power Supply: Transformer:



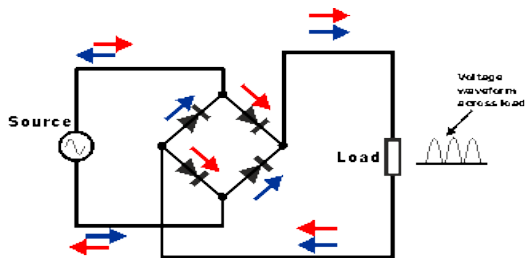
Fig3: Transformer

Transformer is a device which reduces A.C current into required D.C current.

**Bridge Rectifier:**



**Fig4: Bridge rectifier**



**Fig5: Bridge rectifier circuit**

A diode bridge is a technique of four diodes in a bridge circuit arrangement that provides equal polarity of output for mutually polarity of input. While used in its maximum shared application, for transformation of an alternating-current input into a direct-current output, it is called as a bridge rectifier.

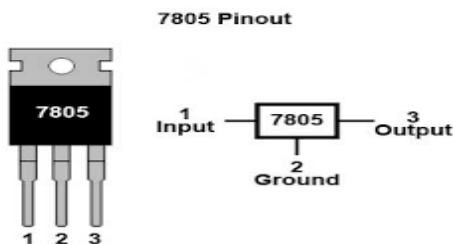
**Capacitor:**



**Fig6: Capacitor**

A capacitor could be a passive two terminal electrical component that stores current in a electric field. The result of this can be termed as capacitance.

**Regulator:**

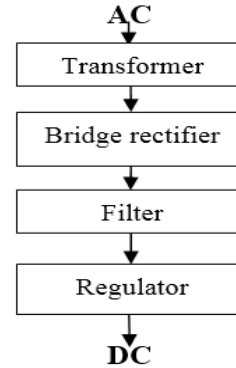


**Fig7: Regulator**

A voltage regulator IC keeps the output voltage at a continuous value. 7805 IC is one of the IC

of 78xx family. It maintains fixed linear regulators which is used to maintain fluctuations.

**Flow chart of power supply:**

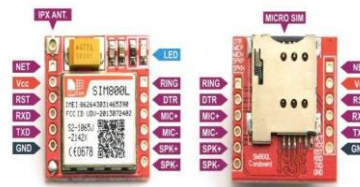


All the above components are used to convert AC voltage to DC voltage.

**C) GSM Module:**

GSM speaks to Global System for Mobile Communications. It is a standard set made by the European Telecommunications Standards Institute (ETSI) to depict traditions for second time (2G) automated cell frameworks used by PDAs.

A Modem is a gadget which modulates and demodulates signals as per communication requirements. It converts an analogue carrier signal to digital signal and also converts such a carrier signal to required information.

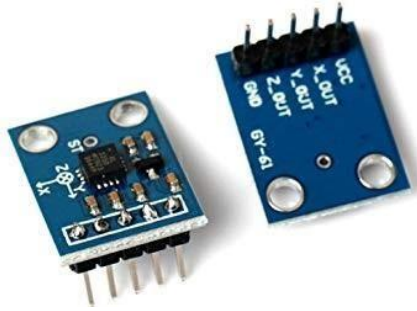


**Fig8: GSM**

**E) MEMS Sensor:**

MEMS are low-cost, and high accuracy inertial sensors and these are used to serve an extensive range of industrial applications. This sensor uses a chip-based technology namely micro-electro-mechanical-system. These sensors are used to detect as well as measure the external stimulus

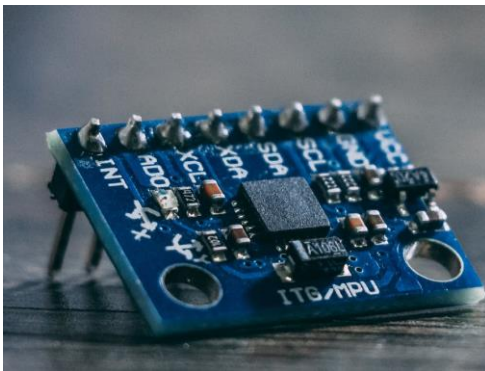
like pressure, after that it responds to the pressure which is measured pressure with the help of some mechanical actions.



**Fig9: MEMS Sensor**

**F) MPU6050 Sensor:**

MPU6050 is a Micro Electro-mechanical system (MEMS), it consists of three-axis accelerometer and three-axis gyroscope. It helps us to measure velocity, orientation, acceleration, displacement and other motion like features. MPU6050 consists of Digital Motion Processor (DMP), which has property to solve complex calculations. MPU6050 consists of a 16-bit analog to digital converter hardware.

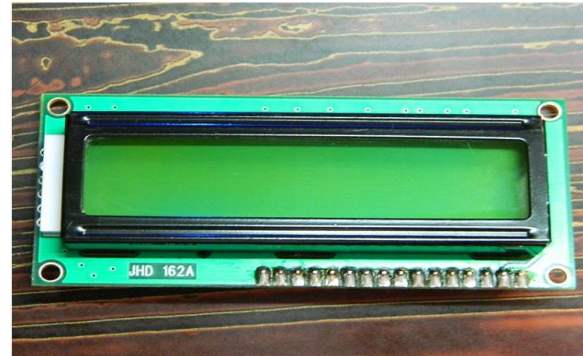


**Fig10: MPU6050 Sensor**

**G) LCD:**

LCD (Liquid Crystal Display) is the innovation utilized in scratch pad shows and other littler PCs. Like innovation for light-producing diode (LED) and gas-plasma, LCDs permit presentations to be a lot slenderer than innovation for cathode beam tube (CRT). LCDs expend considerably less

power than LED shows and gas shows since they work as opposed to emanating it on the guideline of blocking light.



**Fig11: LCD**

**VI. Software Requirements**

**A) Arduino IDE:**

The Arduino IDE software is an open-source software, where we can have the example codes for the beginners. In the Present world there are lot of versions in the Arduino IDE in which present usage is Version 1.0.5. It is very easy to connect the PC with Arduino Board.

**VII. Advantages**

- Detection of accident in remote area can be easily detected and medical services provided in short time.
- Simply avoiding drunken drive by using alcohol detector.
- It will reduce 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.

**VIII. 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.

**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. In this project, in case of the helmet should wear properly the alert message will be send to the corresponding mobile number.

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