



# Smart Helmet

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## Abstract:

It is important to wear a helmet by a person, while he is driving a two-wheeler. Studies have shown that wearing a helmet can reduce your risk of a serious brain injury and death because during a fall or collision, the helmet, rather than your head and brain absorb most of the impact energy. Therefore, government has made it mandatory to wear helmet. Yet some people avoid wearing helmets. To change this, government had made it a rule and applied fine and penalties for those who break this rule. Even then people avoid using it for their comfort. So we are doing a project, so that an vehicle can be started only when the helmet is wore. In addition, it is very dangerous to drive while drunk. Therefore, this project checks whether the driver is drunk before starting a vehicle. If he is drunk then the vehicle remains off.

**Keywords:** ARDUINO, MQ3 ALCOHOL SENSOR, HC 05 BLUETOOTH MODULE

## I. INTRODUCTION

According to statistics and figures, more than 70% of fatal motorcycle accidents have occurred because of head injuries. Therefore, it makes perfect sense to wear a helmet whenever a person is riding on the roads. Even if it is for short distance, there is nothing wrong with wearing a helmet because accidents, especially on the roads do not come announced or with a forewarning. Apart from death, permanent injuries, which could debilitate a person for life, can be avoided just by wearing a helmet. Hence, it is in the interest of the motorcycle rider that they should not hesitate in wearing a helmet, however uncomfortable it might be. Studies have shown that wearing a helmet can reduce your risk of a serious brain injury and death because during a fall or collision, the helmet, rather than your head and brain absorb most of the impact energy. But just as important as wearing a helmet is wearing the right helmet. A helmet that does not fit properly or offer sufficient cushioning can give you a false sense of security while not actually providing the level of protection you need, Levy says. There are, in fact, different helmets for different activities, and each type of helmet is designed to protect your head from the impact common to a particular activity or sport. You should always wear a helmet that is appropriate for the activity you're involved in because other types of helmets may not protect you adequately."Some helmets can be worn for multiple activities, but don't assume," says Levy. "Check the manufacturer's instructions for guidelines before buying a helmet." To make the person wear the helmet compulsory, our project uses sensors and switches to monitors the person and initiates the starting of the vehicle.

## II. SYSTEM DESCRIPTION

### Helmet

The reluctance to wear helmets or to wear them correctly is often the result of a lack of knowledge. Therefore, suitable education

programs would improve the situation. Where motorcycles have been part of the transport system fore some time, education remains an issue for each new generation of riders, but other arguments and myths also develop to resist the pressure to wear helmets.



**Figure.1. Helmet**

### ARDUINO UNO

Arduino Uno is a microcontroller board based on the ATmega328P (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. You can tinker with your UNO without worrying too much about doing something wrong, worst case scenario you can replace the chip for a few dollars and start over again.



**Figure.2. ARDUINO UNO**

"Uno" means one in Italian and was chosen to mark the release of Arduino Software (IDE) 1.0. The Uno board and version 1.0

of Arduino Software (IDE) were the reference versions of Arduino, now evolved to newer releases. The Uno board is the first in a series of USB Arduino boards, and the reference model for the Arduino platform; for an extensive list of current, past or outdated boards see the Arduino index of boards. Fig 3.4 shows the diagram of Arduino Uno.

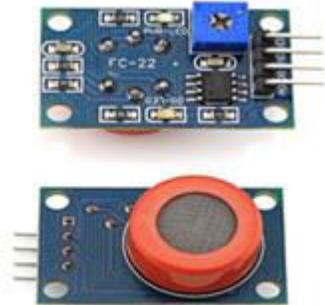
**Bluetooth Module HC-05**



**Figure.3. Bluetooth Module HC-05**

It is used for many applications like wireless headset, game controllers, wireless mouse, wireless keyboard and many more consumer applications. It has range up to <100m which depends upon transmitter and receiver, atmosphere, geographic & urban conditions. It is IEEE 802.15.1 standardized protocol, through which one can build wireless Personal Area Network (PAN).

**Alcohol Sensor (MQ-3)**



**Figure.4. Alcohol Sensor (MQ-3)**

This module is made using Alcohol Gas Sensor MQ3. It is a low cost semiconductor sensor which can detect the presence of alcohol gases at concentrations from 0.05 mg/L to 10 mg/L. The sensitive material used for this sensor is SnO<sub>2</sub>, whose conductivity is lower in clean air. It's conductivity increases as the concentration of alcohol gases increases. It has high sensitivity to alcohol and has a good resistance to disturbances due to smoke, vapor and gasoline. This module provides both digital and analog outputs. MQ3 alcohol sensor module can be easily interfaced with Microcontrollers, Arduino Boards, Raspberry Pi etc.

**BATTERY**

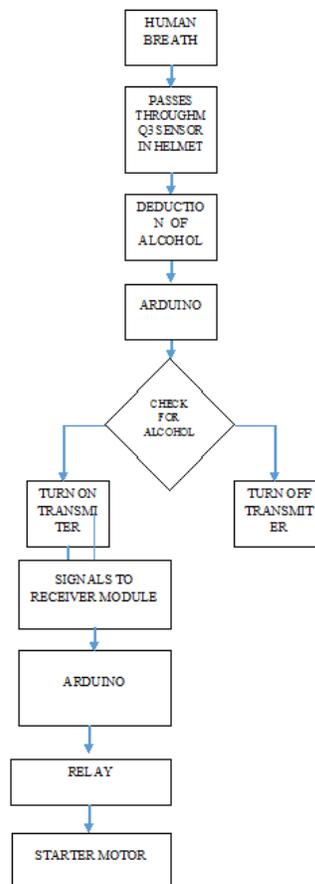


**Figure.5. Battery**

This is General purpose 9V Original HW marked Non-Rechargeable Battery for all your project and application needs. As we experienced the use of this battery in our testing lab for various purpose, we can assure you the best quality, long life and genuineness of this battery among all options available in the market at this cost. With its Universal 9V battery size and connecting points, it can be used in many DIY projects as well as household applications and they can easily be replaced and installed, the same as you would an AA battery or an AAA battery

**III. SYSTEM IMPLEMENTATION**

The helmet has a switch contact at the top of the inner side of the helmet and an alcohol deduction sensor near to the mouth side. An Arduino is used to send and receive signals from the alcohol sensor. After it process the signals it transfers the details to another Arduino through Bluetooth module. It interfaces with the power supply connecting key and the starter motor. When the person wears the helmet, his head pushes an switch up. It connects the supply from battery to Arduino. Now the Arduino sends supply to alcohol sensor. If the sensor detects alcohol, there will be no signal transfer further and the vehicle will remain off. If the sensor doesn't detect any alcohol, it sends signal to Arduino. The Arduino transfers signals to another Arduino connected with the vehicle through Bluetooth module. The Arduino placed in vehicle turns on a relay. It in turn connects key and starter motor. Now if the key is turned on and self motor switch is pressed, the vehicle gets started. This only when the helmet is weared and the person is not drunk, the vehicle gets started.



The MQ3 Alcohol Gas Sensor consist of a low cost semiconductor, whose conductivity is low in clean air. Its quality of becoming more conductive when come in contact with alcoholic gases makes it useful in detection of alcohol consumption. The sensitive material used for this sensor is SnO<sub>2</sub>, and it is sensitive to alcoholic gases. As the concentration of alcohol gases increases, the conductivity of the sensor increases and it can be used to detect the presence of alcohol gases at concentrations from 0.05 mg/L to 10 mg/L



**Figure. 6. Prototype of Safety Helmet**

#### **IV. RESULT**

In this design, we used MQ3 sensors to detect the alcohol content. Bluetooth modules are used to transfer data's between master and slave arduino. The relay connects the battery and starter motor after receiving signals from arduino.

#### **V. CONCLUSION**

The main purpose of developing this product is to avoid drunk and drive conditions leading to safer ride to drivers and also safety to the pedestrians. Accidents will be avoided. Even if accident occurs, the effects are reduced. The damage to head is minimized to the maximum range when the helmet is wore properly.

#### **VI. FUTURE WORK**

The ongoing and future work is concentrated on improvement on the security system It can be added with GPS to track locations. It can be made as a tool for payment in petrol bunks. It can be added with hands free call settings.

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