

# SMART HELMET USING ARDUINO UNO

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## ABSTRACT

A smart helmet is a type of protective headgear used by the rider which makes bike driving safer than before. The main purpose of this helmet is to provide safety for the rider. This can be implemented by using advanced features like alcohol detection, accident identification, location tracking, use as a hands free device, fall detection. This makes it not only a smart helmet but also a feature of a smart bike. It is compulsory to wear the helmet, without which the ignition switch cannot turn ON. An RF Module can be used as wireless link for communication between transmitter and receiver. If the rider is drunk the ignition gets automatically locked, and sends a message to the registered number with his current location. In case of an accident it will send a message through GSM along with location with the help of GPS module. The distinctive utility of project is fall detection; if the rider falls down from the bike it sends a message.

**Keyword :** - Smart Helmet System, Arduino, Accident, IoT

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## 1. INTRODUCTION

In recent times helmets have been made compulsory in Telangana State. Traffic accidents in India have been increased every year. As per Section 129 of Motor Vehicles Act, 1988, every single person riding a two-wheeler is required to wear protective headgear following the standards of BIS (Bureau of Indian Standards). Also drunken driving under the influence (DUI) is a criminal offence according to the Motor Vehicle act 1939, which states that the bike rider will get punishment. Currently bike riders easily escape from the law [1]. These are the three main issues which motivates us for developing this project. The first step is to identify whether the helmet is worn or not. If helmet is worn then ignition will start otherwise it remains off. For this, Force Sensing Sensor (FSR) sensor is used. The second step is alcohol detection[2].

Alcohol sensor is used as breath analyser which detects the presence of alcohol in rider's breath and if it exceeds permissible limit ignition cannot start. It will send message to the number saying that "Rider is drunk and is trying to ride the bike". MQ-3 sensor is used for this purpose. When these two conditions are satisfied then only ignition starts. The third main issue is accident and late medical help. If the rider has met with an accident, he may not receive medical help instantly, which is one of the main reasons for death. Every second people dies due to delay in medical help, or in the case where the place of accident is unmanned. In fall detection, we place accelerometer in the bike unit. By this mechanism accidents can be detected.

## 2. REQUERIMENT

### 2.1 Arduino Uno

Arduino boards available in the market like Arduino UNO, Arduino Nano, Arduino Mega, Arduino Lilypad, etc with having different specification according to their use. In this project, we are going to use Arduino UNO to

control home appliances automatically. It has ATmega328 microcontroller IC on it which runs on 16MHz clock speed. It is a powerful which can work on USART, I2C and SPI communication protocols.

This board is usually programmed using software Arduino IDE using a micro-USB cable. ATmega328 comes with preprogrammed onboard boot loader which makes it easier to upload the code without the help on external hardware. It has vast application in making electronics projects or products. The C and C++ language is used to program the board which is very easy to learn and use. Arduino IDE makes it much easier to program. It separates the code in two parts i.e., void setup () and void loop (). The function void setup () runs only one time and used for mainly initiating some process whereas void loop () consists the part of the code which should be executed continuously.



Fig -1: Arduino Uno

### 2.3 LCD

A liquid-crystal display (LCD) is a flat-panel display or other electronically modulated optical device that uses the light-modulating properties of liquid crystals combined with polarizers. Liquid crystals do not emit light directly,[1] instead using a backlight or reflector to produce images in color or monochrome.[2] LCDs are available to display arbitrary images



Fig -3: LCD

### 2.2 9 Volt Battery

The alkaline variant of the 9V battery is also referred to as 6LR61 and 006P. Other industry names for the 9V battery can be Duracell MN1604, Rayovac A1604, Energizer 522, Varta 4922, MX2400, 1604A, Radio Battery, Smoke Alarm Battery, 9V Block, and Krona.



**Fig - 4:** Battery

### 2.5 5v Relay One Channel Module

This is 1 Channel 5V Relay Board Module For Arduino PIC AVR DSP ARM. A wide range of microcontrollers such as Arduino, AVR, PIC, ARM and so on can control it.

Each one needs 15mA - 20mA driver current and Equipped with high current relay: DC 5V / 10A, AC 250V / 10A Standard interface that can be compatible with microcontroller.



### 2.6 Resistor

A resistor is a passive two-terminal electrical component that implements electrical resistance as a circuit element. In electronic circuits, resistors are used to reduce current flow, adjust signal levels, to divide voltages, bias active elements, and terminate transmission lines, among other uses. High-power resistors that can dissipate many watts of electrical power as heat may be used as part of motor controls, in power distribution systems, or as test loads for generators. Fixed resistors have resistances that only change slightly with temperature, time or operating voltage. Variable resistors can be used to adjust circuit elements (such as a volume control or a lamp dimmer), or as sensing devices for heat, light, humidity, force, or chemical activity.

## 3.METHODOLOGY

The smart helmet system mainly consists of 2 modules; helmet module and the bike module. Helmet contains switches which are connected with a microcontroller unit. Sensors like alcohol sensor, speed sensor and an RFID tag are placed on the helmet.

### 3.1 Working :

#### 1) Arduino UNO:-

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2)LCD interfacing: A liquid-crystal display (LCD) is a flat-panel display or other electronically modulated optical device that uses the light-modulating properties of liquid crystals combined with polarizers.

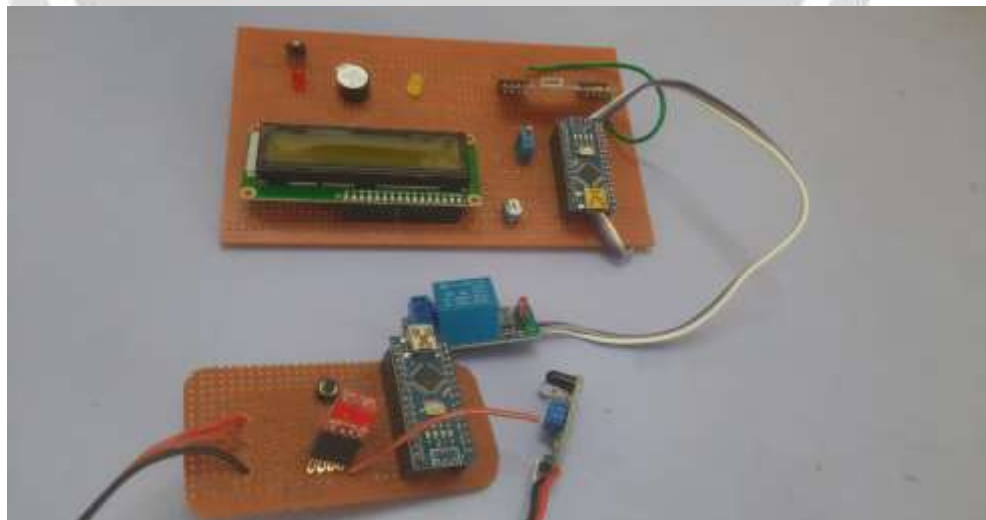
Liquid crystals do not emit light directly,<sup>[1]</sup> instead using a backlight or reflector to produce images in color or monochrome.<sup>[2]</sup> LCDs are available to display arbitrary images

3)RTC module: We used Tiny RTC I2C module which uses I2C protocol and it is useful in our project. RTC module has internal CMOS cell so it does not needs external power supply to update time and date.

4)Buzzer: Buzzer will ring at proper time when pills have to be taken.

5)LED: We have 7 boxes having an LED in each box which blinks to show us the specific box from which the pills needs to be taken at given time.

#### 4.RESULT



#### 5. CONCLUSIONS

This smart helmet has three main features and each feature has its own purpose like the purpose of first feature is to encourage or force rider to wear helmet, similarly the purpose of second feature is to prevent rider to drink and drive, and third feature is to save lives as many as possible when accidents occur.

## 6. REFERENCES

- [1] [https://create.arduino.cc/projecthub/lucifernob/helmet-for-a-life-using-arduino-and-bolt-44fb24?ref=part&ref\\_id=23573&offset=2#toc-4--software-setup-3](https://create.arduino.cc/projecthub/lucifernob/helmet-for-a-life-using-arduino-and-bolt-44fb24?ref=part&ref_id=23573&offset=2#toc-4--software-setup-3)
- [2] [https://create.arduino.cc/projecthub/lucifernob/helmet-for-a-life-using-arduino-and-bolt-44fb24?ref=part&ref\\_id=23573&offset=2](https://create.arduino.cc/projecthub/lucifernob/helmet-for-a-life-using-arduino-and-bolt-44fb24?ref=part&ref_id=23573&offset=2)
- [3] <https://www.google.com/>
- [4] <https://ugoscootersblog.com/2020/04/17/what-is-a-smart-helmet-and-how-do-they-work/>

