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# Smart Helmet

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**ABSTRACT:** Accidents have become a serious problem in recent years. As the number of accidents continues to rise, efforts are made to prevent them and mitigate their effects. The rules of the road do not matter in our society, and they are routinely disregarded. India ranks first in terms of the number of two-wheeler accidents and deaths resulting from them. Using a smart helmet, we provide safety with magnificent and brilliant features by adopting a different perspective. The smart helmet is a GSM-based initiative. It is a helmet with advanced features that enhance the driving experience and make driving safer. The Internet of Things (IoT) is a concept that aims to connect all of our everyday objects to the Internet. It is a fairly broad notion, with applications ranging from agriculture to health care to even common household goods such as a television and refrigerator. The IoT industry has been on the increase over the past few years, and numerous innovations are occurring in this industry. Today, it is extremely improbable that we will interact with a device that is not connected to the internet for even a single day. This technology can be used in automobiles to detect obstacles and help drivers avoid collisions. An ultrasonic sensor can be installed in the front or rear bumper of a car to detect nearby objects such as pedestrians, other vehicles, or obstacles. The sensor then sends this information to the car's onboard computer, which can alert the driver through a visual or audio warning. The use of ultrasonic sensors in automobiles can greatly enhance safe driving by providing real-time information about the environment and allowing drivers to react quickly to potential hazards on the road.

## I. INTRODUCTION

Road accidents involving two-wheeler motorcycles are a major cause of injury and death worldwide. Despite the various safety measures taken, the number of accidents continues to rise. One of the main reasons for this is the delay in receiving medical attention due to the inability to detect accidents immediately. There is a need for a system that can quickly detect accidents involving two-wheeler motorcycles and notify emergency services to reduce the response time and improve the chances of survival for the riders. A potential solution to this problem is a smart helmet-based accident detection and notification system that can automatically detect accidents and alert emergency services. India has a huge number of road accidents every year. The accidents may be due to many reasons like by drink and drive, driving rashly, exceeding the speed limit, etc. Sometimes, the person who gets injured might not be responsible for the accident. It might be the fault of some other vehicle rider. But overall both riders will get affected. Due to a lack of first aid and emergency medical services on time, the riders may die. Some deaths are due to the ambulance not reaching the desired location on time. In case of an accident, to save time and inform the concerned person, a system is proposed which can make sure that the rider gets the required attention in a short time. In India, many people use two-wheeler vehicles as compared to four-wheeler vehicles because of its low cost and simplicity. In many accidents, the rider gets injured mainly on the head. A helmet plays a very important role in saving the life of the ridden. So to encourage people to wear helmets and to avoid accidents, a design is proposed that synchronizes the module present in bike.

## II. LITERATURE SURVEY

### 'Helmet must for pillion riders in Karnataka from Jan 12'

Traffic cops will have to enforce the rule and a first-time offender will be fined Rs100. But a third-time offender may lose his/her driving license if the pillion rider does not wear a helmet. The rule is being implemented after the Supreme Court Committee of Road Safety directed the state to implement it at the earliest. This, was after TOI reported on the government deferring the rule on December 26. The committee notified the same to six states including Karnataka first on August 18, 2015, to implement the rule.[7]



**"Safeguarding of motorcyclists through helmet recognition"** The motorcycle is the most widely used vehicle in India. Fatalities due to road accidents in India are significantly high. Motorcycles being an obvious choice as a convenient transportation mode, it has a major contribution to road accident casualties and injuries. Despite the Government traffic regulation, people still avoid using helmets. The impetuous or deliberate nature of people could be the reason for avoiding helmets. The proposed system is an effort to create awareness in society by endorsing the use of helmets and leading people to safety.[2]

**"Automatic Detector for Bikers with no Helmet using Deep Learning"** The success of digital image pattern recognition and feature extraction using a Convolution Neural Network (CNN) or Deep Learning was recently acknowledged over the years. Researchers have applied these techniques to many problems including traffic offense detection in video surveillance, especially for motorcycle riders who are not wearing a helmet. Several models of CNN were used to solve these kinds of problems but mostly required the image pre-processing step for extracting the Region of Interest (ROI) area in the image before applying CNN to classify helmets. In this paper, we proposed to apply another interesting method of deep learning called Single Shot Multi-Box Detector (SSD) to the helmet detection problem. This method is state-of-the-art that can use only one single CNN network to detect the bounding box area of the motorcycle and rider and then classify whether the biker is wearing or not wearing a helmet at the same time. The results of the experiment were surprisingly good. The classification accuracy of bikers not wearing a helmet was extremely high and the detection of the ROI of the biker and motorcycle in the image can be done at the same time as the classification process.[4]

**"I-Helmet: An intelligent motorcycle helmet for rear big truck/bus intimation and collision avoidance"** We propose an intelligent motorcycle helmet, called I-Helmet, which integrates IR sensors with an image sensor and adopts the image recognition methodology to recognize rear big vehicles. Two detection modes (day/night) are designed for the purpose of image recognition accuracy. Experimental results showed that the proposed I-Helmet can successfully be achieved image recognition of the license plate for the rear big truck/bus. The recognition accuracy rate achieves about 70% (night) to 75% (day). Therefore, the proposed IHelmet can real-time provide related intimations for avoiding rear big truck/bus collisions.[5]

### III. PROPOSED SYSTEM

- **Sensor Monitoring:**
  - The accelerometer and gyroscope detect sudden changes in velocity, tilt, or freefall.
- **Accident Detection:**
  - Based on predefined threshold values, the microcontroller identifies a possible accident.
- **Bluetooth Communication:**
  - The helmet sends the accident data to a smartphone using Bluetooth.
- **Emergency Alert:**
  - The smartphone sends a notification to emergency contacts with the accident location (if a GPS module is integrated).
- **Safety Confirmation:**
  - The user can cancel the alert in case of a false detection using the app.

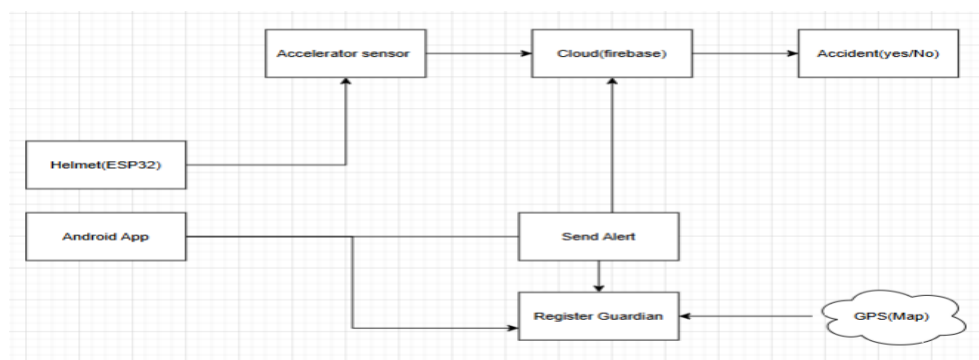
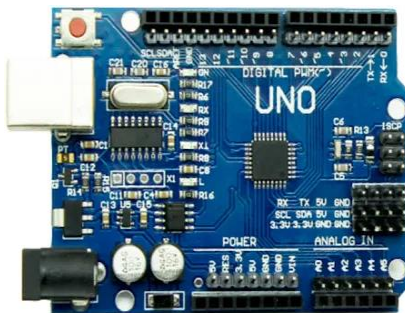


Figure 1. System Architecture diagram of the setup

Segregation is the initiative to complete waste management. Studies show that majority of the population in urban and rural areas don't segregate wastes being a reason that they notice it inconvenient. Management or assortment of waste is secondary. There are effective systems of waste management for smart alert system for garbage clearance by giving an alert signal to the municipality for fast assortment of garbage in trash bin with correct verification based on level of garbage filling. Here we propose a project that makes use of different sensors and actuators to manage the waste in a locality and also segregate it in the initial stages itself. The main components that will be used for implementation is as listed below and as shown in the block diagram (figure 1) below.

#### A. Arduino Uno microcontroller

The Arduino Uno microcontroller is the system's main component. On top of the ATmega328, the Arduino Uno microcontroller board is constructed (datasheet). It features an ICSP header, a reset button infrared sensor, a USB connector, a power jack, six analog inputs, 14 digital input/output pins (six of which can be used as PWM outputs), a reset button infrared sensor, and a 16 MHz crystal oscillator. This procedure is employed to ascertain whether the dustbin contains any trash. By employing a specific light sensor, an infrared (IR) sensor can identify a single wavelength of light. It records the intensity of the light received by the sensor using an LED that emits light of the same wavelength.



#### B. sensor:

Vibration sensor is a device that measures the amount and frequency of vibration in a given system, machine, or piece of equipment. Vibration sensors can be used to give maintenance teams insight into conditions within key assets that might lead to equipment failure, allowing them to predict the maintenance of the machinery, to reduce overall costs and increase the performance of the machinery.

#### C. Accelerometer:

It is an electromechanical device which is used to measure acceleration forces and the forces will be static or dynamic forces. An accelerometer will measure the vibration of the material and it is employed to continuously monitor the head inclination of the rider and position of the helmet and helpful for calculating the likelihood of accidents

#### D. HC-05 Bluetooth Module

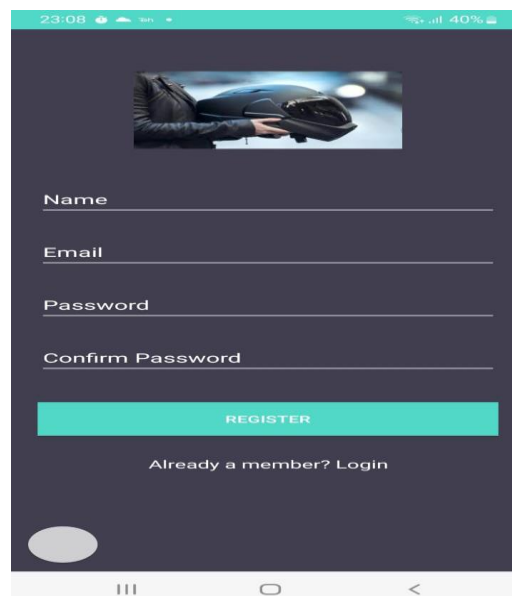
- HC-05 is a Bluetooth module which is designed for wireless communication. This module can be used in a master or slave configuration.
- HC-05 has red LED which indicates connection status, whether the Bluetooth is connected or not. Before connecting to HC-05 module this red LED blinks continuously in a periodic manner. When it gets connected to any other Bluetooth device, its blinking slows down to two seconds.
- This module works on 3.3V. We can connect 5V supply voltage as well since the module has on board 5 to 3.3 V regulator.
- As HC-05 Bluetooth module has 3.3V level for RX/TX and microcontroller can detect 3.3 V level, so, no need to shift transmit level of HC-05 module. But we need to shift the transmit voltage level from microcontroller to RX of HC-05 module.
- The data transfer rate of HC-05 module can vary up to 1Mbps is in the range of 10 meters.

#### IV. SCOPE


When the bike rider meets with an accident it detects it and gives the notification to the registered contact with a location.

For the safety of the bike rider, we are using the latest technology IoT, this technology provides the advance techniques for alerting the rider and ensures that rider follows the rules and regulations. For two-wheeler rider, Helmet is the most basic protection device and it is necessary for every bicycle or motorbike riders. But it does not ensure the safety of the rider and the rider wont follow the traffic rules. Most of the people use ordinary helmet just to avoid giving challan to the traffic police, these helmets do not ensure the safety of the driver. So, to overcome these problems we need to use the smart helmet.

#### V. RESULT



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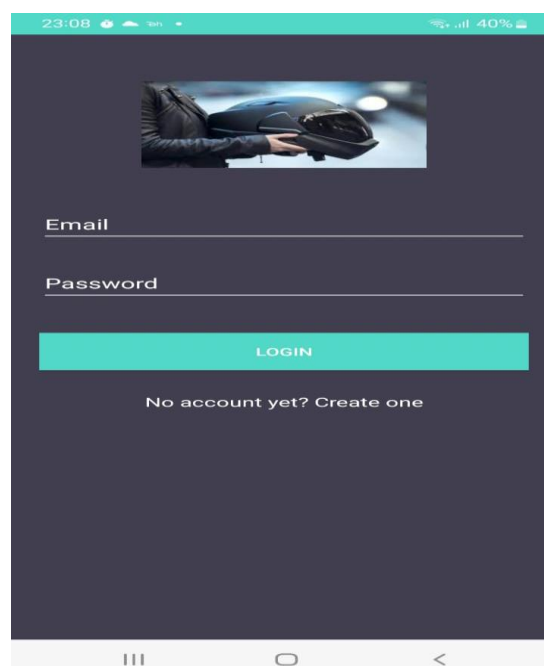
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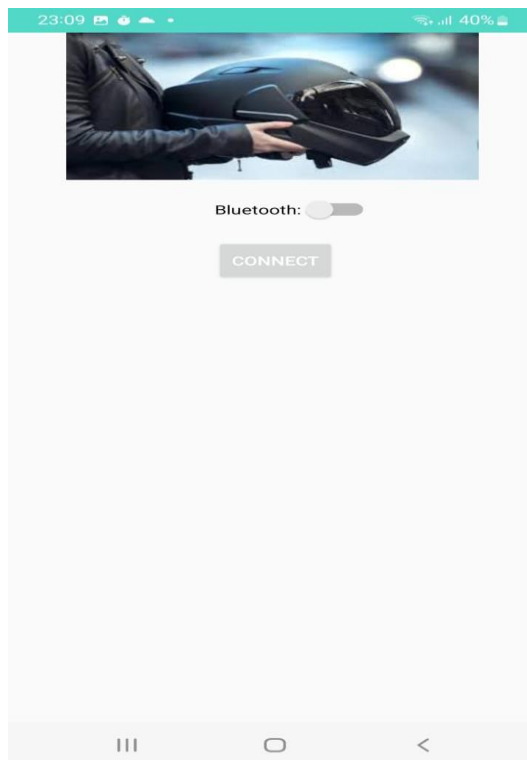


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## VI. CONCLUSION

Accidents have become a serious problem in recent years. As the number of accidents continues to rise, efforts are made to prevent them and mitigate their effects. The rules of the road do not matter in our society, and they are routinely disregarded. India ranks first in terms of the number of two-wheeler accidents and deaths resulting from them. Using a smart helmet, we provide safety with magnificent and brilliant features by adopting a different perspective. The smart helmet is a GSM-based initiative. It is a helmet with advanced features that enhance the driving experience and make driving safer

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