

# IOT Based Smart Helmet for Two Wheeler Application

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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, over speed ,over load 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 and IOT 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.

**Keywords**— Internet of things (IOT), smart helmet, motorcycle security, wireless modules, receiver, transmitter, GSM,GPS.

## I. INTRODUCTION

Smart helmet focuses on three major objectives which are helpful in our day to day life. At first and foremost one is the ignition of the bike will not start unless and until we wear a helmet. Secondly alcoholic driving is not possible when wore a smart helmet. If the rider is alcoholic, the bike will not start. Third application is accident detection. If a person meets with an accident and no one is there to help him, or when he is in are mote areas, in such situations we can inform his family members and hospital with help of this smart helmet using technology. Various technologies are now available for bike rider safety. Wireless communication

between bike to helmet and bike to traffic signal and speed breaker where the system will be comprised of a helmet module including stereo speakers and microphone, and a bike mounted base unit. The system will make use of different wireless communication protocols including zigbee and another radio frequency protocols. When the dose not know where the speed breakers are, by using RF technology they will find out where the speed breakers are there. Smart Helmet with Sensors for Accident Prevention, the microcontroller used in the system is Peripheral Interface Controller (PIC)

The rising number of method for transportation in India, particularly motorbikes, affects expanding wrong doing. The burglary and theft of engine vehicles in India is developing from one year to another.

There are multiple ways of shielding yourself from the criminal demonstration of engine seizure, like furnishing oneself with an allowed weapon, for example, pepper shower, setting up a cellphone to settle on a crisis decision to the Police headquarters, keeping away from abandoned roads, and allowing the looter to take a motorbike to forestall more serious violations, for example, harming the casualty. Be that as it may, all the salvage techniques above actually can not be defeat totally. Likewise, car crashes in Indonesia are as yet a alarming phantom.

An overview shows that more than 70 of drivers try not to wear caps for no great explanation. Driving at rapid, inebriated driving, or absence of satisfactory foundation are the primary elements in auto collisions. In expansion, numerous drivers underrate traffic rules, prompting foolish activities. In 2017, the demise rate on the roadway was as yet overwhelmed by the way of behaving of careless motorcyclists, particularly the people who would have rather not worn caps, because of

an absence of legitimate mindfulness or worry for traffic request, which brings about serious street accidents[2].

Web of things (IoT) is an idea where objects or articles, for example, equipment organizations, vehicles, home apparatuses, and different things are inserted with advancements for example, sensors, actuators and programming to impart to empower these items to be associated and trade information. IoT permits objects to be detected or controlled from a distance across the existing organization foundation. A few tasks have been grown, for example, shrewd work area based IoT [3] or Rice Gift Framework in a Web of Things Based Halfway house[4].

Seeing these issues over, this paper expects to make a model to give a security framework to caps for better security for cruiser riders. Subsequently, the advancement of savvy caps for IoT-based cruiser wellbeing is planned utilizing a remote module, with transmitter and collector sensors, GSM and GPS put on the protective cap. The microcontroller was utilized in this venture to control the framework.

The head protector is coordinated with the bike motor,so the cruiser motor must be begun assuming that the rider has utilized the head protector. At the end of the day, bike riders will be compelled to wear caps.

On the off chance that a wrongdoing or burglary happens out and about, and the cap is a long way from the motorcyclist, the cruiser motor will naturally switch off. The cap has a GPS highlight.

GPS shows the scope and longitude positions. This head protector beats this inadequacy by sending a visual picture of where the individual met the mishap with the specific area of the scope and longitude, also, the contact will get this. The GSM module promptly makes an impression on the crisis contact. Bike proprietors can send SMS to the cap by sending a order to switch off the motorbike and sending the protective cap position.

## I. RELATED STUDY

Research connected with the Web of things idea utilizing Savvy Protective caps to Guarantee Security in Industry. Shrewd Caps give observing of risky gases like CO, CH<sub>4</sub>, and LPG continuously, as well as temperature and stickiness. To manage such risky circumstances, this framework gives an crisis caution to the observing station [5]. A brilliant head protector upgrades the

mining protective cap to guarantee more security mindfulness among excavators [6]. A brilliant head protector is created with a remote sensor organization, acknowledging continuous observation with clever early admonition on perilous gas in the mining region furthermore, involving GPRS to screen potential wellbeing issues in coal creation utilizing IoT innovation. Moreover, it gives an caution sound utilizing a bell when perilous gases are identified and individuals who are not wearing caps [7].

The Savvy Cap for bikes was additionally produced for mishap recognition and warning with WiFi, sensors, and empowered processors and coordinated with the distributed computing foundation used to construct the framework. The accident recognition framework imparts the accelerometer worth to the processor, which consistently screens for unpredictable varieties [8] and is likewise furnished with a liquor identifier. A MQ3 liquor sensor is mounted on the protective cap and is utilized to screen the liquor level in the rider's breath if the BAC (Blood Liquor Content) assuming the rider's breath is more than 0.02 to 0.05 in 100 ml of blood [9].

Framework improvement in another examination is a brilliant head protector utilizing a PIC16F844a Microcontroller, 315 MHz Radio Recurrence Module, Power Detecting Opposition, BLDC Fan, 5V Transfer, LM311, and IC 555 for Mishap Counteraction and coordinated with cruiser motors [10]. This strain sensor is utilized to quantify changes in boundaries, for example, temperature, tension, speed increase, and power by changing over them into electric charges [11]. The cap is associated with the vehicle and the cloud, where pictures can be gotten to and shipped off the beneficiary. The sensor will send order on raspberry 3. Accordingly the order will be shipped off the recipient. A product application has been made so that it finds the specific situation as far as Google maps. The cloud- based help will make an impression on the beneficiary's contact, where the data set is recorded [12].

In another exploration improvement, savvy head protectors are implanted in Mishap Warning Frameworks. The warning framework is partitioned into two sections, client and server. The TI CC3200 microcontroller goes about as a client, and the server is a cloud-based web administration. The observing framework uses accelerometer and GPS values to send data to a cloud based warning framework [14]. It is important to coordinate a head protector and a cruiser so the rider will be "expected to utilize a protective cap"; any other way, the bike can not begin. Other than that,

the shrewd protective cap is additionally for security from road wrongdoing and is outfitted with a programmed SMS framework what's more, GPS.

### III . EXISTING METHODOLOGY

Per vehicle mile voyaged, motorcyclists are multiple times more probable than a traveler in a vehicle to kick the bucket in an accident. Also, the greater part of cruiser fatalities in 2013 were unhelmet riders. Most bike mishaps that outcome in death are brought about by a head injury. Saving a daily existence and forestall a cerebrum injury rider ought to wear a protective cap. Serious wounds are enormously decreased both in seriousness and in recurrence by the basic demonstration of wearing a head protector. Presently mishaps on streets have turned into a serious worry for every one of the large number of individuals particularly young people are either winding up dead or harmed consistently. The most recent gauge by the World Well being Association additionally shows that internationally world street traffic wounds are the main source of death among youngsters matured 15 to 29 years. Every year, around 3.4 lakh young people in this age bunch passed on in mishaps as per the report ready by the services transport research wing. The absolute number of street crashes has expanded barely from 3.86 lakh in 2013 to 4.50 lakh in 2014.

The quantity of fatalities has likewise gone up by around 1.5 percent. This shows that there is a need to focus on make youngsters more mindful of street security issues. It is a mammoth misfortune and working out the social expense would uncover how huge it is an ascent in the quantity of mishaps and the quantity of individuals winding up dead or harmed in those mishaps is unquestionably a central issue. Notwithstanding, it is the obligation of each and every individual particularly the young people who go onto the streets that they must be protected and keep the traffic guidelines. The primary commitments of this current work can be brief as follows: a) forestalling mishap, b) lessening mishap causality ,c) recognizing the mishap, and d) fostering the mishap related traffic the executives framework.

The smart helmet circuit consists of two sensors, an alcohol sensor, and an IR sensor. Alcohol sensor measures alcohol present in the rider’s breath and the IR sensor detects the presence of the rider’s head. If there any alcohol presents or doesn’t wear the helmet, an abnormality signal sent to the on board circuit by RF signal at the frequency of 433 MHz Any abnormality found in the helmet circuit which gives a signal to the microcontroller for high pulse output to the encoder IC HT12E.

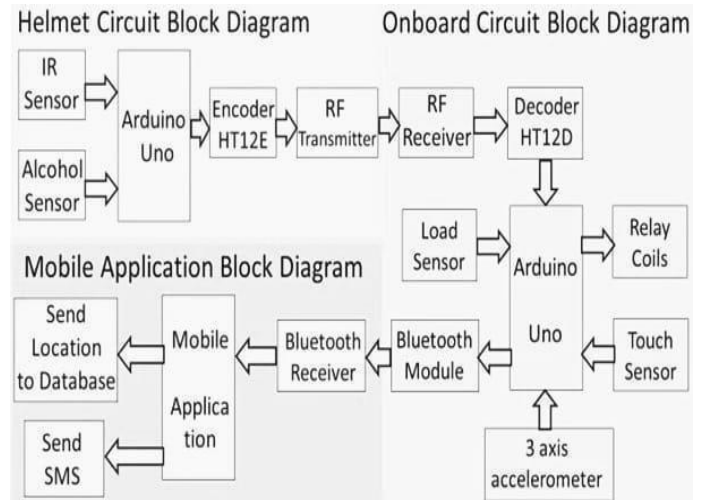


Figure 1 : Block diagram of Existing System.

### IV . PROPOSED METHODOLOGY

The more youthful age inclines toward bicycles and motorbikes north of four- wheelers, which is a verifiable truth. As indicated by an overview, over 70% of riders decide not to wear protective caps for a specific explanation. Moreover, plastered driving and speeding are presently continuous issues. This prompts serious mishaps in light of an absence of involvement or focus, as well as infractions of transit regulations. In this manner, we guaranteed that traffic guidelines were complied, the issues depicted above were kept away from, and their outcomes were diminished with the utilization of innovation. The motivation for making this piece came from our social obligation to the local area. There is a huge death toll in numerous episodes that happen near us. A review viewed that as "7500" street fatalities yearly are inferable from bicycle mishaps. Mishaps can happen for various reasons, including deficient driving inclination, breaking down bikes, crazy driving, "driving under the influence," and so on.

However, the essential driver was that individual's absence of a head protector, which brought about prompt passing from mind injury. Thus, it's important that there should be an office to limit these occurrences' eventual outcomes. Notwithstanding, while likewise offering answers for other huge worries connected with mishaps, the essential target of our work is to make it fundamental for the rider to wear a protective cap while on the excursion. This feeling of ethical constraint to society subsequently filled in as the stimulus for our "Brilliant Cap" drive. Accordingly, "Shrewd Head protector" fills in as the undertaking's basic idea. The Liquor Sensor is a gadget which is utilized for distinguishing in the event that the driver who is driving has drank the liquor or not.

On the off chance that the driver drank the liquor, it will naturally send the alarm message when the individual has taken the liquor and start switch off consequently. Mishap switch which can likewise be called as Knock Switch is utilized in cautioning by the SMS alarms to the contacts which are available on the casualty's portable as a crisis and furthermore to Emergency clinics.

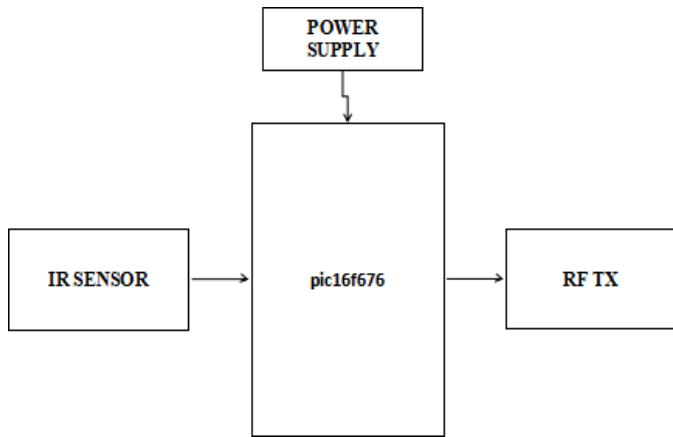


Figure 2 : Block Diagram for Helmet

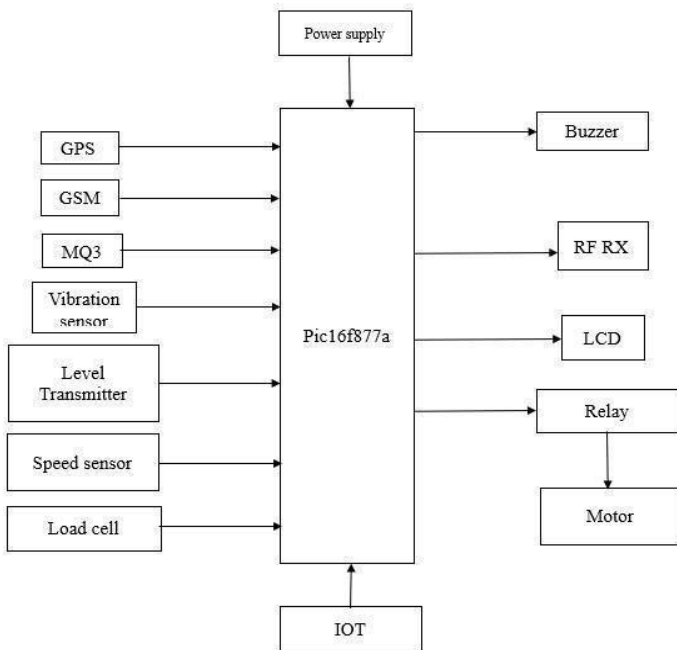


Figure 3 : Block Diagram for vehicle

This proposed this framework distinguish the fuel robbery by utilizing level transmitter. There is an over-burden indicator, which will show assuming the vehicle is over-burden, or not. The speed sensor estimates the rotational speed of the hagle it by the wheel size to decide speed. On the off chance that the speed cross the breaking point it sends the message to the rider. It store the data set like where the spot visit, mileage of vehicle speed of the vehicle and fuel utilization.

V . HARDWARE IMPLEMENTATION

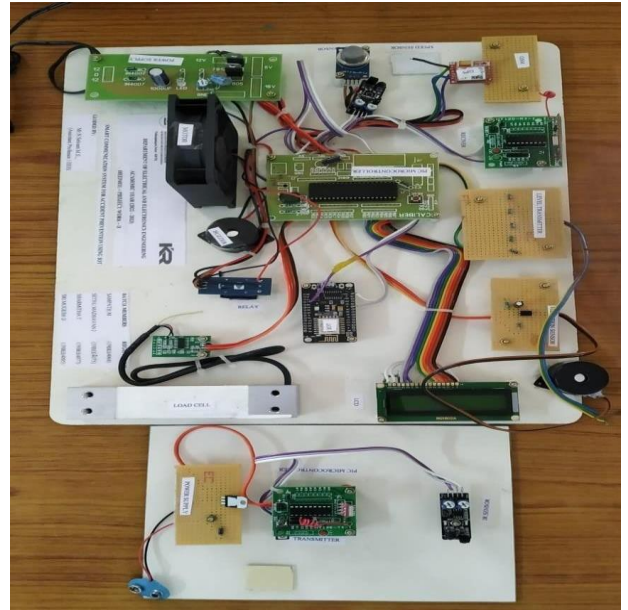


Figure 4 : Hardware Setup

The transmitter Side consists of an IR Sensor, PIC 16F676 Controller, and RF Transmitter. When an object is detected in the vicinity of the Transmitter, the IR Sensor will sense it and alert the PIC 16F676 Controller. The PIC 16F676 Controller will then send an RF signal to the Receiver Side. The Receiver Side consists of an RF Receiver, PIC 16F877A Controller, GPS and GSM, MQ3 Sensor, Vibration Sensor, Level Sensor, Speed Sensor, Load Cell, Buzzer, Relay and Motor, LCD, and IOT. The Receiver Side will receive the RF signal from the transmitter side and will alert the PIC 16F877A Controller. The PIC 16F877A Controller will then activate the sensors and other components such as the GPS and GSM, MQ3 Sensor, Vibration Sensor, Level Sensor, Speed Sensor, Load Cell, Buzzer, Relay and Motor, LCD, and IOT to detect the cause of the accident and alert the users. The users will then be able to take necessary actions to prevent or reduce the damages caused by an accident.

VI . RESULTS AND DISCUSSION



Figure 5 : Output for helmet does not wear out



Figure 6 : Output for alcohol detection

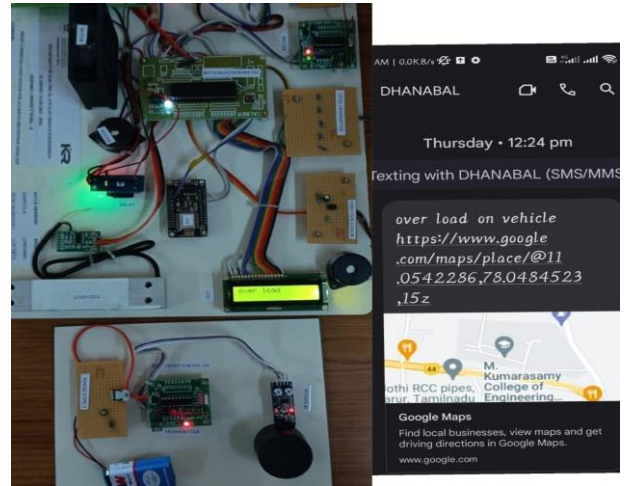


Figure 9 : Output for abnormal load detection

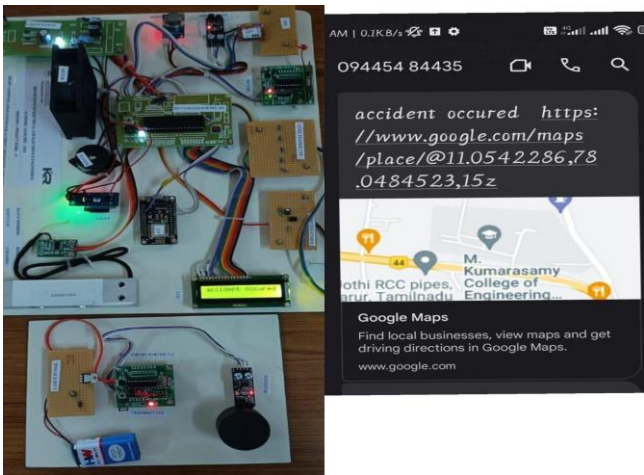


Figure 7 : Output for accident detection



Figure 8 : Output for over speed detection

### VII . CONCLUSION

Our Smart Helmet is an intelligent device that promotes safe ride. There is no substitute for smart helmets for the protection of vehicle riders given the state of our roads, the high accident rate, the volume of infractions of traffic laws, and the inadequate regulatory structure. It is essential to wear a helmet when operating a vehicle because, in the event of an accident, it can prevent serious brain injuries. Therefore, this is where the sharp IR sensor will be used. Nowadays, it's also crucial to take drunk driving into account because drunk driving can result in more accidents involving vehicle than vehicles. So, the alcohol sensor will determine if the motorist is intoxicated or not.

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