

# SMART HELMET FOR ACCIDENT SAFETY

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## **Abstract**

*Nowadays most of the countries are enforcing their citizens to wear helmets while riding bikes and not to ride bikes when the person is under the influence of alcohol, but still rules are being violated. "Accident Detection, Theft and Drive Protection using Intelligent Wireless Safety Helmet" is designed to solve this issue. It is made up of an adaptive device that is built into the helmet and the vehicle. The helmet device guarantees that the rider wears a helmet during the ride and is not under the influence of alcohol. If the above condition is not met, it interacts with the vehicle unit to turn off the bike's ignition system. Vehicle unit checks and intimates accidents through geometric coordinates via SMS. By using geometric coordinates, the location of the injured rider can be traced using a simple GPS tracking application. Also, this system provides theft protection as a helmet is also essential along with a key to start a bike.*

**Keywords:** *Accident, Bike, Helmet, Sensor, IoT, GPS system, Satellite transmission, Protection, Security.*

## **I. INTRODUCTION**

A motorcycle's helmet is a type of protective headgear used by the motorcyclist. The main purpose is for safety, which is to protect the rider's head from the impact during an accident. It protects the rider's head as the helmet provides ventilation system. Speeding and not wearing a helmet are the main reasons of fatalities and injuries. It is proven that, as the speed of motorcycles increased, so did the number of accident and fatalities. This is again due to the shock of an impact during the accident. Increasing in the number of two wheelers. In the event of an accident, lack of timely medical attention to the injured person may lead to death. Thus there is a need for a system which ensures safety of riders by enforcing riders to wear helmets and also assists in providing the rider for medical assistance in the event of an accident. Today era all talk about the internet of things and how it is changing lives. The internet of things is creating a new world, a quantifiable and measurable world where people and businesses can

manage their assets in better informed ways, and can make more timely and better informed decisions about what they want or need to do. This new world brings in many practical improvements such as convenience, health and safety in our lives [1].

Presently in India every four minutes one death occurs due to road accidents. 25-30% road accidents took place by two wheeler Out of total road accidents. According to a recent survey approx 95.6% of bike drivers died who didn't wear a helmet. Hence the government has made it compulsory to wear a helmet while bike riding. Riders face many problems on the go such as unable to take calls, unable to see maps for navigation purposes etc. While having these helmets as a safety measure is a boon, we add more features to it to make it smart. Smart Helmet is an idea of manufacturing a smart helmet with the latest technologies. This paper deals with the smart helmet consisting of a plurality of sensor for different data collection like over speed, drink and drive and send a message in case of Emergency. To make the riders feel more comfortable, a smart helmet is designed [2].

It is a well-known fact that young people favor four-wheeler bikes and motorcycles. For any particular reason, riders stop wearing helmets. In addition, speeding, drinking and driving have become common problems. Because of the lack of expertise or attention and violations of traffic laws, which leads to accidents? Thus, with the aid of technology, we have ensured that traffic laws are observed, the above issues are avoided and their impacts are reduced. Our social obligation towards society stems from the principle of developing this work. There is a huge loss of life in many accidents which occur [3].

Every year, many people die on the roads due to bike accidents. There are different causes for accidents, such as not having sufficient driving capacity, two wheeler defects, rash driving, drinking and driving, etc. But the biggest explanation was the lack of the person's helmet, leading to imminent death due to brain injury. It is also vital that a facility should be in place to mitigate the after-effects of these incidents. The main objective of our work, however, is to make it compulsory for the rider to wear a helmet during the trip, to deter motorcyclists from drinking and driving and over-speeding or reckless riding, and also to provide sufficient medical care when faced with an accident by alerting the individual concerned to provide solutions to other major accidents.

The prototype of smart helmet using IOT, which ensures the safety and security of the bike rider. Here the system is responsible for the following functionalities.

1. The system will not allow the rider to start the vehicle, if the rider is not wearing the helmet.
2. It detects the consumption of alcohol, if the rider has consumed alcohol, the bike engine will not start.
3. The system alerts the rider when the speed exceeds the limited value.

4. The fingerprint authorization provides security and prevents vehicle theft.
5. When met with an accident it detects it and gives the notification to the registered contact with a location and picture information.

Product Perspective: Smart Helmet is integrated with Bluetooth sensor, which connects to user's smartphone. The helmet consists of push buttons which when pressed does a specific functionality. By pressing the buttons user can play music, pause music, shuffle between music files, get directions to destination, receive incoming phone calls and in case of accident send SOS message to emergency contacts. This product is targeted at two wheeler users on a daily basis. In addition to safety, this item is intended for two wheelers who feel the need to have additional characteristics when driving. Some do not know the directions to the destinations and know the path in their mobiles that they have to stop at some intervals to search for the route. We have incorporated navigation into the helmet to assist these riders. This navigation system uses the location of cell phones to navigate the road.

Product Functions: The helmet comes with a built-in Bluetooth sensor to attach via Bluetooth to the smartphone, Bluetooth speakers for listening to music and answering calls, Arduino Uno microcontroller, basic functionality push buttons, microphone for talking on the phone. Based on circuit diagrams, these modules are related. The user attaches his smartphone to the Bluetooth sensor and the speakers at the start of the drive. Basically, the smart helmet has a wireless telecommunications device and is connected to a smart phone. This prototype uses sensors to identify a crash or injury, and a predefined emergency contact is dialed automatically using the communication hardware. Helping the survivor to contact doctors as soon as possible. The other current method is to regulate the speed at which the biker is travelling. With all the components and sensors that read the speed of the motor, the helmet is fixed and instructs the rider appropriately to reduce or raise the speed depending on the obstacles ahead of the bike [4].

SMART HELMET" is to first check if the rider has actually worn the helmet, in other words the availability of the rider's head inside the helmet. For this purpose, we are using an ultrasonic sensor for detection. Detection alone is not adequate. We have now used a voice encrypted password system to establish the true owner or his or her mate. Upon identification, the user is asked for a password. A microphone that attaches to a voice input module. The "user-independent" system is this system. That is, the machine does not take into account the rider's voice, but, in other words, takes into account and measures the content of the speech or password. An alphanumeric password is then checked and the next steps are carried out. This is dependent on the alphanumeric password that the bike engine ignites or does not ignite whether the password is right or not. The ultrasonic sensor is placed in the helmet in such a way that it does not face any difficulty while detecting the person. Its distance of operation is already set by us in a range that only provides accurate result and does not produce results for any garbage value/error value [5].

The IOT based smart helmet system consists of position sensor, microcontroller, infrared camera, Alcohol sensor, RF Transmitter, piezoelectric sensor, Power supply, IOT Modem, Optical camera, GPS receiver, & Solar panel. The IOT based smart helmet system always checks two conditions at initial stage before the rider starts the ignition switch of the bike. The first condition checked is whether the rider is wearing a helmet or not which is detected with the help of a position sensor. The second state is detection of alcoholic content in the rider's breath which is detected by alcohol sensor. Micro controller unit present in the IOT based smart helmet to collect and work on the data with the help of a transmitter called radio frequency transmitter to the section of the bike.

The Radio frequency receiver component in the section of bike receives the data and to operate the engine ON – OFF a relay is attached in the section of bike [6]. If these conditions mentioned in the paper are not full fill then the engine of the bike will not start and which will be notified by a beep sound. If the bike rider is wearing a helmet and the content of alcohol is not found then the engine ON. Once Biker starts the bike, when the rider starts the ride the GPS attached to the smart helmet fetches the current location coordinates and notifies current location coordinates to the mobile number to which they are with a fixed time interval. If any road accident occurs which is detected by a piezoelectric sensor after the collision an alert message will be sent to the number to which they are assigned and also to nearby police stations with help of IoT modem. A Solar panel will be mounted on the top of the smart helmet to charge the battery to provide powered features[1].

## II. CONCLUSION

By implementing this system a safe two wheeler journey is possible which would decrease the head injuries during accidents and also reduce the accident rate due to driving bike after Consuming alcohol. a helmet may not be a 100% proof but is definitely the first line of defense for the rider in case of an accident to prevent fatal brain injuries .the proposed approach makes it mandatory for the rider to use the protective guard in order to drive a two-wheeler vehicle and Ensures the safety to the human brain and there for reduces the risks of brain injuries and death in case of an accident. Besides the developed system prevents theft of two –wheeler in future this intelligent system can be fabricated in a compact size so that it is globally acceptable to notify no Parking areas .government must inforce laws to install such system in every two wheeler.

## III. REFERENCES

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