

Touch sensor based Smart Helmet for Bikers

D.Yasaswini¹, B.Narasimhulu², A.Akshaya³, K.Siddartha⁴, S.Habeeb⁵, Y. B. Shabber Hussain⁶,
V. M. Vinod Kumar⁷

^{1,2,3,4,5} UG Scholar, Anantha Lakshmi Institute of Technology and Sciences, Anantapuramu.

^{6,7} Assistant Professor, Anantha Lakshmi Institute of Technology and Sciences, Anantapuramu.

Abstract: All over the world, there are many instances of bike accidents visible round us. Many people get injured in road accident more frequently because of the main reason not wearing a helmet or not wearing an ISI certified helmets. Considering the increasing number of motor cycle riders in our country and the number of accidents happening each year, it is evident that in most cases the rider suffers injuries to the head and it leads to fatal casualties. Road accidents occur in our day to day life because the riders or drivers won't stick to the rules made by the Indian Government and also because reckless drives are in the habit of drinking. Under the influence of the alcohol they indulge in rash driving. Some major reasons for the road accidents are over speeding, consumption of alcohol and riding the bike without helmet. Many people lose their loving family in accidents. Numerous lives could have been saved if emergency medical service could get accident information and each in time to the scene. To overcome these issues, we have proposed a system "Smart Helmet for Bikers". It focuses on three major applications. First, the bike won't start unless and until the rider wears the helmet. Secondly, alcoholic riding is not possible by using this helmet. Third application is accident detection. When the rider meets with an accident, sensor detects the motion and tilts of the helmet and reports the occurrence of an accident by sending the message to the predefined numbers along with GPS location. The main feature of designing this smart helmet is that it will provide safety to rider

INTRODUCTION

India is the one of the densely most populated country. This exponential raise in the population and due to the recent pandemic many people did not prefer to use public transport to go to their work and to travel this increased sales of the motor cycles rapidly compared to 2019, the sales

has been doubled in 2022 this increase the traffic among the Indian roads and increase in the number of road accidents according to the 2019 report 42% of accidents occur in India are because of motorcycles. There are several causes for road accidents in India the major cause for road accidents are given below.

Over speeding: Most of the accidents are occur due to the over speeding it is the natural psychology of humans to excel and to win, if there is a chance human will go to infinity in speed. But as the speed thrills it also kills, faster vehicles riders are more prone to accident. Drunken Driving: Consumption of alcohol to celebrate any instance is very common. But when it is mixed with driving it turns enjoyment to misery. Alcohol can reduces concentration of riding. It decreases reaction time of a rider body. Hands and legs take more time to react. It suppress vision due to dizziness. Alcohol dampens fear and incite humans to take risks. All these factors while driving cause accident.

Avoiding safety gears and helmet: Most of the motor cycle riders doesn't wear helmet while driving the motor cycle many studies have shown that helmets and other safety gears reduce the impact of the accident to a great extend but many did not wear even though it is made into law.

RELATED WORK

This lecture survey presents previous work related to our proposed system. Many great contributors had placed a significant sign in the field of IoT and Knowledge-based expert systems. We have highlighted some of them

to identify the significant attributes of these systems.

Mohammad Ehsanul Alim et.al [1] has given an approach Arduino NANO and Arduino Mega-2560 are microcontrollers which control the entire components of the system. Two 2.4 GHZ nRF24L01 for communication between sender and receiver. MQ-3 alcohol sensor is used which can detect whether the bike rider is consumed alcohol or not. If the bike rider is alcoholic, then the MQ3 sensor detects it and turn off engine. A Sharp IR sensor detects the head of the rider within the specified range. The Bike rider's engine will start only when the rider will buckle the helmet. GPS & GSM Technology is used for tracking the location of the bike rider and sending text message to the family members of the Bike rider when an accident occurs.

Dhruvesh H. Patelhas et.al [2] proposed an approach which the System is plan and implemented such a way that the bike will not ignite until the rider wear helmet and pass an alcohol test, this will help to solve the problem of 'drink and drive'. It consists of GSM GPS technology which sends the message to the family member as well as hospital with the current location at the time of an accident.

Saima Siddique Tashfia et.al [3] has proposed scheme reflects on the embodiment of a smart helmet, having an alcohol detection sensor to diagnose if the rider wears a helmet or is drunk. The expert system processes the information about bike speed, engine temperature, distance with the nearby vehicle, and location tracking. In the case of an accident, the system immediately sends an SMS, including GPS location to the emergency contacts. The proposed Expert System which analyzes IoT cloud data and gives a possible solution to identified problems.

Sandhya.A.Kulkarni et.al [4] has proposed the smart helmet system is equipped with advanced alcohol sensing, potholes, speed breakers and fall detection modules. The bikes ignition will be avoided, if the rider has consumed alcohol the system not letting the rider to ride bike. The proposed system is detecting alcohol concentration from 0.05 mg/l to 10 mg/l by using MQ-3 alcohol sensor, able to identify potholes and humps within range of 2cm-400cm. Global System for Mobile Communication and Global Positioning System are used to send the information to the registered number, if the biker meets with accident.

Pranav Pathak et.al [5] has proposed a smart helmet system has two units, the helmet unit

(HU) and a motorbike unit (MU). Both the parts linked radio frequency (RF). The helmet has the sensors to detect the pulse of the human, the alcohol content in breath of the rider, and the intensity of vibration. The pulse sensor is used to detect helmet worn or not. The GPS and GSM module are used to share location and to send message. Accelerometer used for detecting accident. The sensor on bike helps to ensure that the rider is in perfect riding position, if accident detected send message to emergency contact. A LIDAR sensor used to detect vehicles approaching behind. Force-sensitive resistors are used to detect perfect riding position.

Keesari Shravya [6] has proposed a system to identify whether the rider worn the helmet or not. If the rider worn the helmet then ignition will start the engine otherwise it remains off. For this, Force Sensing Sensor sensor is used. The second step is alcohol detection [2]. Alcohol sensor is used to detect the presence of alcohol in rider's breath and if it detects ignition cannot start.

Navya Sri K [7] proposed a system with GPS and GSM for accident detection. It uses push button to detect an accident and if the accident occurs location will be sent to the contact list saved in EEPROM.

H.C. Impana [8] has given a method method proposed using microcontroller RF transmitter and other sensors is cost effective but we find the system proposed using Raspberry pi module, Pi camera, Pressure Sensor, GPS system which uses image processing algorithms is most useful since the image processing is included so that we can easily detect the helmet from the rider.

PROPOSED SYSTEM

The figure 1 shows the helmet and bike module. The helmet consists of Arduino UNO ATmega328P and various sensors used are MQ2 gas sensor, Touch sensors, ADXL sensor, RF transmitter, LCD and buzzer. The bike module consists of RF receiver, Arduino UNO.

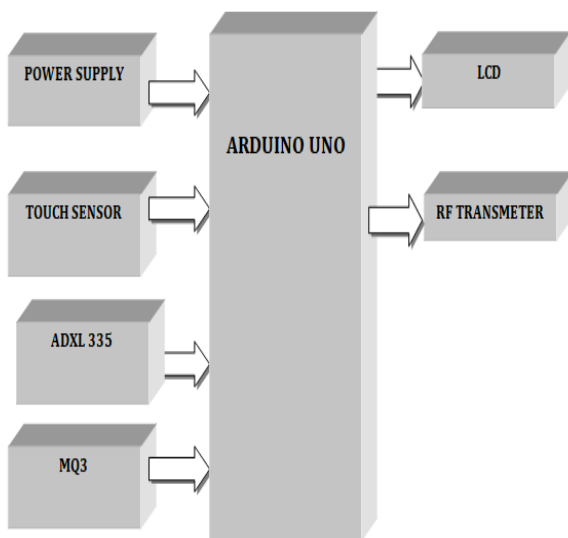


Fig 1 Block Diagram of helmet

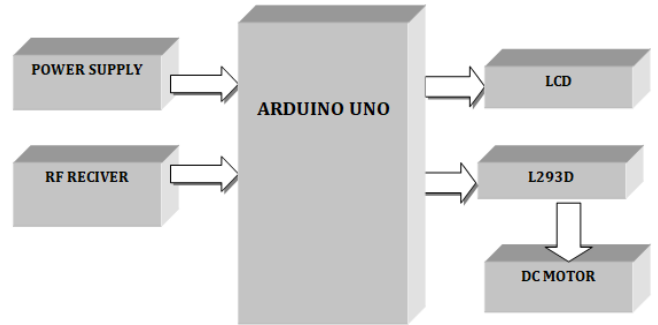


Fig 2 Block Diagram of Bike

Figure 1 shows LCD which displays helmet status. The rider wearing the helmet is sensed using touch sensor depicts the whether rider has worn the helmet or not.. Touch sensors as the name is used to detect touch and it operates as a switch when it is touched. They are used to detect whether the rider is wearing helmet or not. MQ3 gas sensors is mainly used to detect the presence of alcohol. A threshold value of 360 is set to the sensor to get digital output notify the presence of alcohol. The RF module is been used to connect bike and helmet they have the voltage range of 3V - 12V. The ADXL 335 which is a 3 axis accelerometer has 3.3V regulator used in detecting motion of helmet when the accident takes place. Based on the signal vehicle will on or off .

V. Conclusion

The proposed system ensures that the bike rider cares about their safety while riding. It also checks if that the rider is under the influence of alcohol or not. The creation of

smart helmet increases safety and rate of road accidents can be reduced. The smart helmet ensures the general safety of the rider.

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