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Smart Helmet for Electric Bike & Scooter

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ABSTRACT: A smart helmet equipped with IR sensor for helmet position and MQ3 sensor for rider is a device that integrates advanced sensor technology to enhance the safety and comfort of motorcycle riders. The helmet is designed to monitor the position of the rider's helmet using an IR sensor and to detect alcohol consumption through the MQ3 sensor. This information is then relayed to a microcontroller that controls a display screen on the bike.

The IR sensor ensures that the rider's helmet is in the correct position, thereby reducing the risk of injury in the event of an accident. The MQ3 sensor detects alcohol consumption in the rider's breath, alerting the rider to the danger of riding while intoxicated. This helps prevent accidents caused by impaired driving.

Overall, the smart helmet is an innovative and useful device that can significantly improve rider safety and prevent accidents.

KEYWORDS: Safty of humans,

I. INTRODUCTION TO ROAD SAFETY

According to the Ministry of Road Transport and Highways in India, there were a total of 4, 37,396 road accidents in India in 2020, out of which 2,69,423 people were injured and 1,54,732 people lost their lives. Going by the figures, more than 39,000 people lost their lives in road accidents in 2020 as they did not wear a helmet. 12 percent of these fatalities were recorded in Maharashtra alone. The report showed that 83 percent of all the bikers that were killed in road crashes in Maharashtra in 2020 were not using a helmet.

In India, the National Crime Records Bureau (NCRB) reported that in 2020, a total of 5,543 people were killed in road accidents caused by drunken driving. This accounted for 3.7% of all road accidents in the country that year. Maharashtra, one of India's most populous states, accounted for a significant portion of these deaths, with 455 fatalities caused by drunken driving.

In Maharashtra, the fine for riding a bike without a helmet is Rs. 500 for the first offense. If the rider is caught for the same offense again, the fine increases to Rs. 1,000. In addition to the fine, the rider may also face other penalties, such as having their driving license suspended or being required to attend a road safety course.

It's important to note that wearing a helmet while riding a bike is not only required by law, but it also helps to protect the rider from serious head injuries in the event of an accident. It is always recommended to wear a helmet while riding a bike, even if the law does not require it in your area.

In India, it is illegal to drink and drive under the influence of alcohol or any other intoxicating substance. The penalties for drunk driving in India vary from state to state. In Maharashtra; the penalty for drunk driving is a fine of Rs. 2,000 for the first offence and imprisonment of up to six months for subsequent offences. In addition, the offender's driving license may be suspended or cancelled, and their vehicle may be impounded.

It is important to note that drunk driving is a serious offence that can result in accidents causing injury or death to oneself and others on the road. It is always advisable to avoid drinking and driving and opt for alternate modes of transportation like public transport or hiring a cab.

Our Project Basically Focus On Alcohol Detection And Compulsory Use Of Helmet To Avoid Accident It's important to note that wearing a helmet while riding a bike is not only required by law, but it also helps to protect the rider from serious head injuries in the event of an accident. It is always recommended to wear a helmet while riding a bike, even if the law does not require it in your area. Our Project Basically Focus on Alcohol Detection and Compulsory Use of Helmet to Avoid Accident. Recent time's helmets have been made compulsory in Maharashtra State for avoiding accident.

Traffic accidents in India have been increased every year due to drink and drive. As per Section 129 of Motor Vehicles Act, 1988, every person riding a two-wheeler is required to wear protective headgear. Drink driving is a criminal offence according to the Motor Vehicle act 1939, which states that the bike rider will get punishment. To make the system compulsory with E Bikes so we have developed smart helmet

II. LITERATURE REVIEW

P. Eswari et al. [1] proposed Intelligent Helmet Based on Web Communication and Iot Technology for Safe Driving. The main goal of the paper is to ensure that the public wears helmets for protection while riding. The wireless smart helmet enables the rider to drive safely by monitoring the ignition of the vehicle when there are positive parameters. It's capable of testing "estimated alcohol content in blood (each)", if the driver wears the helmet and is not drunk and also alerts the health care systems in case of accidents. This serves the purpose of reducing the road accident numbers.

VI Jayakumar D et al [2] proposed Micro Controller Based Smart Helmet by IR Motion Sensors. The main objective is to eradicate drunken driving and helmetless driving. In this regard, an attempt has been made by using microcontroller assisted RF transmitter and receiver unit. The IR sensor detects the presence of helmet on the head. Mq3 alcohol sensor detects the alcohol level. The comparator analyses the values and gives command to relay circuit. Thus the starting of two wheelers is controlled by the application of sensors. In addition to this, a motion sensor has also been incorporated to inform the driver about the presence of nearby vehicles.

Garish Ratnaparkhi et al. [3] Smart Helmet and Accident Identification System Using Gsm and Gps. This paper proposes a system of smart helmet to avoid the accident and casualty. The system divides into two parts helmet circuit and automobile circuit. Basically the helmet circuit consists of two sensors ir sensor and alcohol detection sensor. The automobile circuit also called as on board circuit consists of 3- axis accelerometer, LCD module, gsm module, GPS module and arduinouno. The helmet circuit gives a signal to the automobile/on board circuit to start the bike if the helmet is wore by rider and no alcohol consumed. Then the automobile/on board circuit confirms the position of the load to start the bike and 3-axis accelerometer (adxl335) senses crash or hit of the bike. After detecting an accident GPS module track location and gsm module sends the accident location and message immediately to emergency contact number.

Mangesh Jadhawar et al. [4] proposed Mart Helmet Safety System Using Atmega 32. Smart helmet safety system is the idea that has been developed for the social responsibility towards the society. Recently the number of bike riders has increased so there is over-all increase in the number of motor bike accidents. The system assists in reducing major number of accidents. It consists of microcontroller along with IR sensors for helmet authentication followed by alcohol detection with the help of mq3 sensor. As soon as the bike rider try to start the bike it shall rest authenticate if the person is wearing the helmet through IR sensors. Secondly, mq3 sensor detects the presence of alcohol, if detected the bike won't start. It also detects fall detection through accelerometer. The project focuses on bike rider safety and reduction of accidents which are fatal.

Dr. S.Sekar et al. [5] IOT Based Smart Helmet. This paper proposed the bike engine will start only when the rider will worn the helmet. It detects the head of the bike rider within the range. A radio frequency (RF) module is used for wireless communication between helmet unit as transmitter and bike unit as receiver. Ultrasonic sensor used to detect nearby approaching vehicle's and send voice alerts to rider by speakers, most important utility of this method is that fall detection using vibrator sensor and gsm & gps module system is included so that emergency medical service can easily track the location of the incident occurs and also sending SMS message alert to the emergency number of the rider stored. Smart helmet system helps to provide accident detection, safety and security to the two wheeler riders.

Kimaya Bholaram Mhatre et al. [6] proposed Smart Helmet with Intercom feature. The ir sensor placed in helmet checks whether the rider is wearing a helmet or not. The gas sensor detects the alcoholic substance in the rider's breath. If the rider is not wearing his helmet and if he/she has consumed any alcohol then the vehicle won't start. If the rider clears all the security checks then only, he/she is allowed to ride his/her vehicle. If the rider met an accident, the sensor which is attached on the bike detects the force absorbed by the bike, if it exceeds threshold value an "accident occurred" message will be sent to the registered number. Also, location will be sent to catch current location of the accident.

H.C.Impana, et al. [7] proposed Smart Helmet for Accident Detection using IOT This survey is on smart helmets for accident avoidance and also examines various related techniques. This research also helps us to understand IOT technology which is being emerged nowadays. The method proposed using a microcontroller RF transmitter and other sensors is cost-effective in comparison to the system proposed using Raspberry pi module, Pi camera, Pressure Sensor, GPS system which uses image processing algorithms. This system is the most efficient since the image processing is included so that we can easily detect the use of helmet from the rider. Smart helmet system helps to provide safety and security to the two-wheeler.

Dr. T. Haritha et al. [8] proposed an alcohol sensor and helmet wearing sensitive switches are installed inside a helmet, which is connected wirelessly and communicates with the vehicle unit to switch off the ignition system of the bike if any violations occurred. The helmet is powered by a lithium-ion battery, integrated outside the helmet. Vehicle and helmet units check and intimate information about helmet status, alcohol consumption and accident through geometric coordinates via SMS. By using geometric coordinates, the location of the rider can be traced using a simple GPS tracking application.

Karthick Eyanthra et al. [9] this paper presents a novel idea to detect drunken driving by infrared wave analysis of the driver's seat to detect ethanol. The basis for this scheme is Blood Alcohol Concentration (BAC). Ethanol present in sweat is detected using IR sensors. In order to prevent the driver from drinking while driving, analysis is carried out periodically in the cabin by using sensors mounted on the steering wheel. In case, driver drinks while driving, an automated complaint is sent to the nearest police control tower along with the location and violator's vehicle registration number. Warning systems such as alarms and sirens are triggered to warn fellow road users. The algorithm for the analysis is depicted in the form of pseudo code.

Jerlin Jose s. T et al. [10] in this paper, the authors propose a Smart-Helmet which can be used as an intelligent system, to check whether the person is wearing the helmet and has a non-alcoholic breath before driving. A transmitter on Smart-Helmet generates a signal on the basis of two mentioned conditions with the help of a FSR sensor and an alcohol sensor and then sends it to the receiver on the bike through the RF transmitter. Now, the receiver decodes the signal and the microcontroller, according to decoded signal, and then takes the required decision.

Phesto Peter Namayala et al. [11] This research aim at solving the problem by preventing riders accessing the motorcycle when they are either drunk or have not worn the helmet, the research develops a prototype which automatically prevents the motorcycle from starting when any of the two requirements are not met.

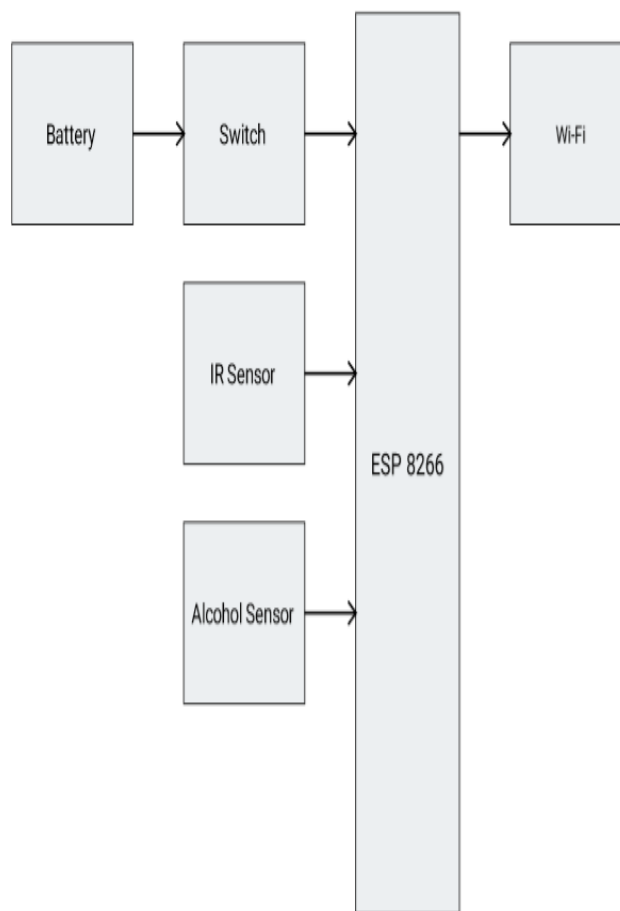
B Tharunika et al. [12] this paper gives description of a smart helmet to avoid Accidents on road. If he/she alcohol consumption level is more and did not wear a helmet the ignition will not on. If the rider met with an accident than immediate alert message will sent to the family member using GSM and the entire data is monitored using things board.

III. METHODOLOGIES

- Understand the requirements: Determine the specific requirements for the smart helmet system. For example, the system may need to detect the helmet position, detect alcohol consumption by the rider, and provide alerts hazardous conditions.
- Plan the helmet module: Plan the components and sensors to be used in the helmet module, such as an alcohol sensor, IR sensor, microcontroller (such as ESP2866), and voltage booster. You may also need to consider the power source for the module.
- Plan the bike module: Plan the components and sensors to be used in the bike module, such as a voltage regulator, DC motor engine relay, microcontroller (such as ESP2866), LCD 16x2, buzzer, and jumping wires. Consider the power source for the module and any necessary protections against voltage spikes or other electrical hazards.
- Design the circuit: Design the circuit diagrams for both modules, including the connections between components and sensors. You can use circuit design software such as Eagle, Ki CAD, or Altium Designer to create the circuit diagrams.
- The smart helmet system mainly consists of two modules: the helmet module and the bike module. The helmet module is worn by the rider and contains sensors and a microcontroller to monitor the rider's behaviour and detect any hazardous conditions. The bike module is mounted on the motorcycle and contains additional sensors and a microcontroller to communicate with the helmet module and control the motorcycle's behaviour.



- The sensors used in the helmet module may include an alcohol sensor to detect the rider's level of intoxication, an IR sensor to detect the position of the helmet (whether it is being worn or not), and a voltage booster to regulate the power supply for the module.
- The bike module may contain a voltage regulator to regulate the voltage supplied to the DC motor engine, a DC motor engine relay to control the motor's behaviour, an ESP2866 microcontroller to communicate with the helmet module and other devices, an LCD 16x2 to display information, and a buzzer to provide audible alerts. Jumping wires are used to connect the various components and sensors.
- When the rider wears the helmet, the IR sensor in the helmet module detects the position of the helmet and sends a signal to the microcontroller and vehicle starts.
- The microcontroller in the helmet module monitors the alcohol sensor to detect the rider's level of intoxication. If the rider is intoxicated, the microcontroller sends an alert to the bike module.
- The bike module receives the alert from the helmet module and deactivates engine and the buzzer to provide an audible alert to the rider

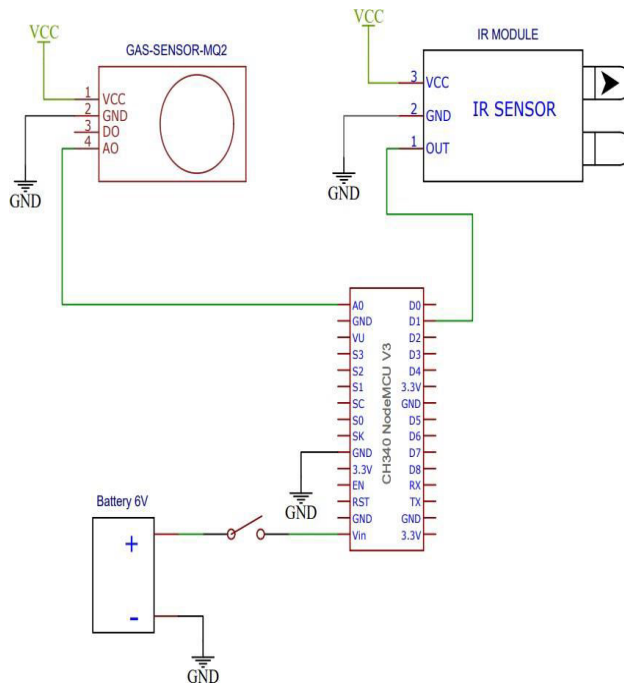


Block diagram smart helmet transmitter

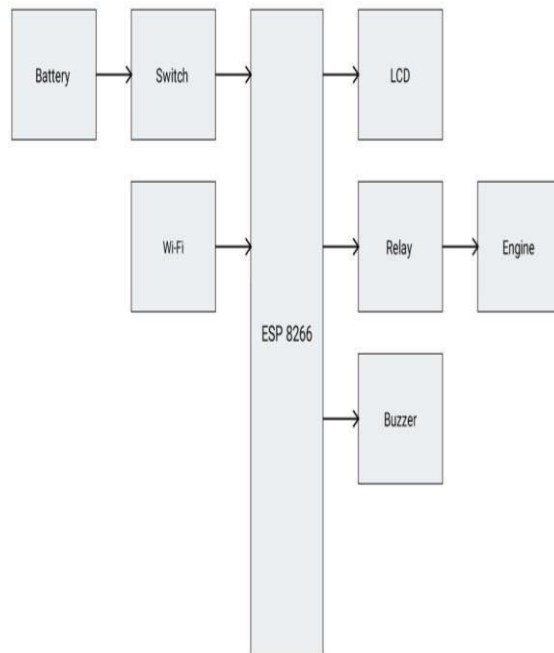


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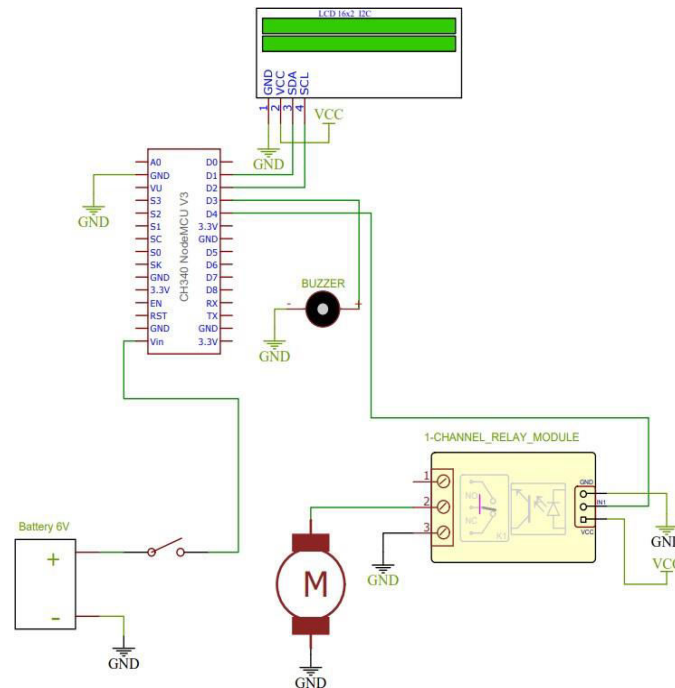
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Circuit Diagram for smart helmet transmitter



Block diagram for bike receiver



Circuit Diagram for Bike Receiver

IV. CONCLUSION

Smart helmets with IR sensors for detecting the position of the helmet and MQ3 sensors for alcohol detection of the rider can have a significant impact on road safety and ultimately on the quality of life.

By using IR sensors, the smart helmet can detect whether the rider is wearing the helmet correctly or not. This can help prevent accidents caused by improper helmet usage, which is a major cause of head injuries in motorcycle accidents. Additionally, the use of MQ3 sensors for alcohol detection can help prevent accidents caused by impaired driving, which is another major cause of motorcycle accidents.

Overall, the use of smart helmets with IR sensors and MQ3 sensors for alcohol detection can help reduce the number of accidents and injuries caused by motorcycle accidents, leading to a safer and healthier environment for riders and other road users. It can also help raise awareness about the importance of safety measures, such as proper helmet use and avoiding driving under the influence, which can ultimately improve the overall quality of life for everyone.

Detailed go thorough learning on a mixture of different components of helmet circuits is obtainable in an effective manner. The technologies projected under every group has been finished and presented here in a successful manner. In order to figure out, an immense lesson was complete the growth of helmet circuits in all dimensions as well as right through the time, smart helmet system circuits has been evolved. Experiments and new technology components has been proposed and tested. Smart helmet circuit significant information was noted and a smart device that creates talented outcome of the results in prevents accidents by monitoring various conditions. We observed that same information applied on a quantity of cases, various algorithms creates entirely different results. The foremost complexity faced by helmet system is choosing a suitable conceptual algorithm that would superior suit the accident free and lighter version. A uncomplicated readily

Obtainable well known arduino uno nothing but microcontroller always choose by scientist, educators and researches for use of smart design. The final outcome of the literature is safe and secure travel between sources to destination. Developed smart helmet system is a valuable answer to numerous troubles. Compulsory condition to start a two wheeler bike was wearing the component helmet and also human being clear head which in turn reducing the probability of road accidents. The proposed smart helmet device maintenance the two-wheeler driver and create safer roads because it acts as a virtual policeman.

REFERENCES

- 1) Karthick Eyanthra S A, “Perspiration based drunken driving prevention system – Chennai”, India al Symposium on Robotics, PP 329-336, 2011.
- 2) Mohammad Ehsanul Alim, Sarosh Ahmad, Marzieh Naghdi Dorabati, Ihab Hassoun”Design & Implementation of IoT Based Smart Helmet for Road AccidentDetection”ISBN:978-1-7281-8416-6 DOI. 10.1109/IEMMCON51383.2020.
- 3) Dhruvesh H. Patel, Parth Sadatiya, Dhruvbhai K. Patel, Prasann Barot “ IoT based Obligatory usage of Safety Equipment for Alcohol and Accident Detection”. ISBN:978-1-7281-0166-8 DOI. 10.1109/ICECA.2019.8822104.
- 4) Saima Siddique Tashfia, Rahabul Islam, Sadee Ibn Sultan, Md. Wahidur Rahman, Md. Ahsan Habib, Lubna Yasmin Pinky “ Intelligent Motorcyle Monitoring Scheme using IoT with Expert System in ”. DOI. 10.1109/ICCIT51783.2020.9392675.
- 5) Sandhya.A.Kulkarni, Sowmya C S, Subhalaskmi P, Tejashwini S A, V R Sanusha, Amitha S and Vandana Jha” Design and Development of Smart Helmet Using IoT”ISBN:978-1-6654-4668-6DOI. 10.1109/iSSSC50941.2020.9358838.
- 6) Pranav Pathak ”IoT based Smart Helmet with Motorbike Unit for Enhanced SafetyISBN:978-1-7281-83381. DOI.10.1109/ICACCCN51052.2020.9362986
- 7) Keesari Shravya, Yamini Mandapati , Donuru Keerthi , Kothapu Harika , and Ranjan K. Senapati”Smart helmet for safe driving Smart helmet for safe driving”. DOI.10.1051/e3sconf/20198701023.
- 8) Navya Sri K, M Pavan Reddy , G Lavan Kumar”Smart Helmet with Accident Detection“. ISBN:978-1-5386-2045-8 DOI. 10.1109/CSITSS.2017.8447702.
- 9) H.C. Impana , M. Hamsaveni and H.T. Chethana “A Review on Smart Helmet for Accident Detection using IOT”.DOI.10.4108/eai.13-7-2018.164559.
- 10) Souhardya Das,Sahadeb Santra,Sanket Sinha” Smart Helmet with Quick Ambulance Response System”. Paper ID: IJERTV10IS080210.
- 11) P. Eswari and dr. S. Mary praveena “intelligent helmet based on web communication and iot technology for safe driving”, 2020 international research journal of moderni- zation in engineering technology and science 2020.
- 12) Vijayakumar d and ramesh g “micro controller based smart helmet by ir motion sensors”, 2019 international journal of engineering and advanced technology (IJEAT), 201



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