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Smart Helmet

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Abstract: ***Helmet safety is a type of protective headgear used by workers and riders, which makes the work safer than before. The main goal of our project is risk detection, awareness, and prevention. This protective helmet makes the user feel comfortable and provides maximum protection and security. Many lives could have been saved if paramedics could have obtained the accident information and arrived on time at the scene. To solve these current problems we create a protective helmet that provides the best solution. The aim of our project is to design a smart and low-cost helmet that can prevent road accidents.***
This can be done using advanced features such as alcohol detection, smoke detection, vibration detection, temperature detection. For that purpose, we will use a smoke sensor, alcohol sensor, vibration sensor, temperature sensor, etc. This makes it a smart hat. It is compulsory to wear a protective helmet; otherwise, a no-brainer will start. The Bluetooth Module is used as a wireless communication link between the sender and the receiver and after receiving the data on the hardware we compare it with the software data. The software application is designed in such a way that it locates the exact location according to Google Maps. Many people lost their lives due to late reporting of the accident as they could not track the exact GPS location of the accident. Sometimes we cannot report an accident in a timely manner.
The main reason many people get head injuries is because they do not wear helmets.
Keywords: Biker's safety, Vibration detection, and alert system, Smart helmet, Smoke detection, Alcohol detection.

I. INTRODUCTION

In the current situation, we are experiencing many deaths due to lack of user safety. There are three key factors that motivate us to improve this work. The problem is the onset of alcoholism. The alcohol sensor is used as a respirator that detects the presence of alcohol in the rider or construction/mining worker as it exceeds the maximum limit it will send the message to the authorities or registered mobile number.
The second major problem is smoke detection. A smoke sensor is used to detect smoke when smoke is detected and a message is sent. A temperature sensor is used when the temperature is exceeding the normal temperature then it sends a notification on the application. The third major problem is late medical care.
If a user encounters an accident that does not involve immediate medical attention, this is a major cause of death. Every second people die as a result of late medical treatment or the scene of an accident is empty.
In vibration detection, we place a vibration sensor in the unit.
Due to these mechanisms, we detect whether an accident occurs or not. The aim of this project is to make a protection system in a helmet for the good safety of users. The smart helmet that we made is fixed with sensors and after getting data from the hardware it is compared with the software data if data is matched just like, if alcohol is detected then message sent as alcohol detected, and location of helmet that is worn by the user.
The same works with the vibration sensor if the vibration is detected then the message will be sent as vibration detected and the location is sent to the higher authority and as well as the user family.
A software application is designed in such a way that it locates the exact position in terms of Google Maps. If the user is drunk the ignition automatically gives the message.
Many people lose their lives because of the late reporting of the accident as they are unable to track the accurate GPS location of the accident area. Sometimes we are unable to inform them about the accident at the right time. The main reason many people get head injuries is because they do not wear helmets.
Alcohol sensor, Smoke sensor, Temperature sensor, the Vibration sensor are used for various purposes and all the sensors are connected to the Arduino UNO.

II. PROBLEM STATEMENT

To build a system called "Smart Helmet", which improves the safety and security of riders and construction/mining workers, and helps to reduce the number of accidents that occur on a daily basis.

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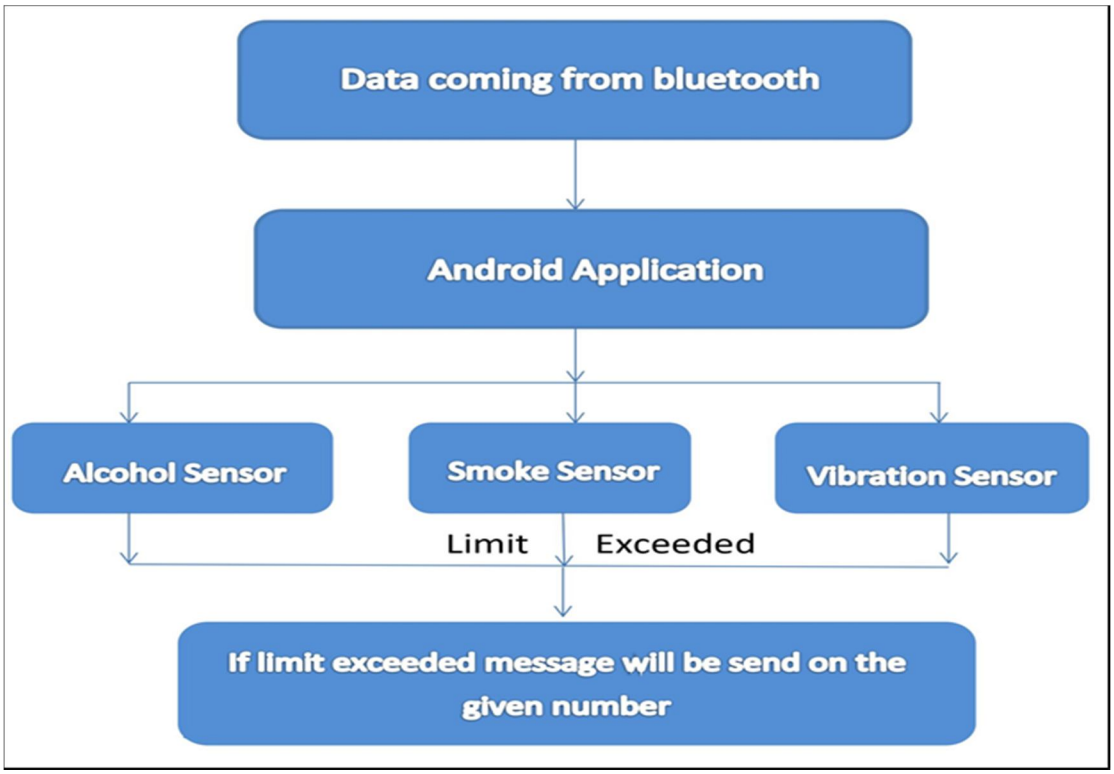
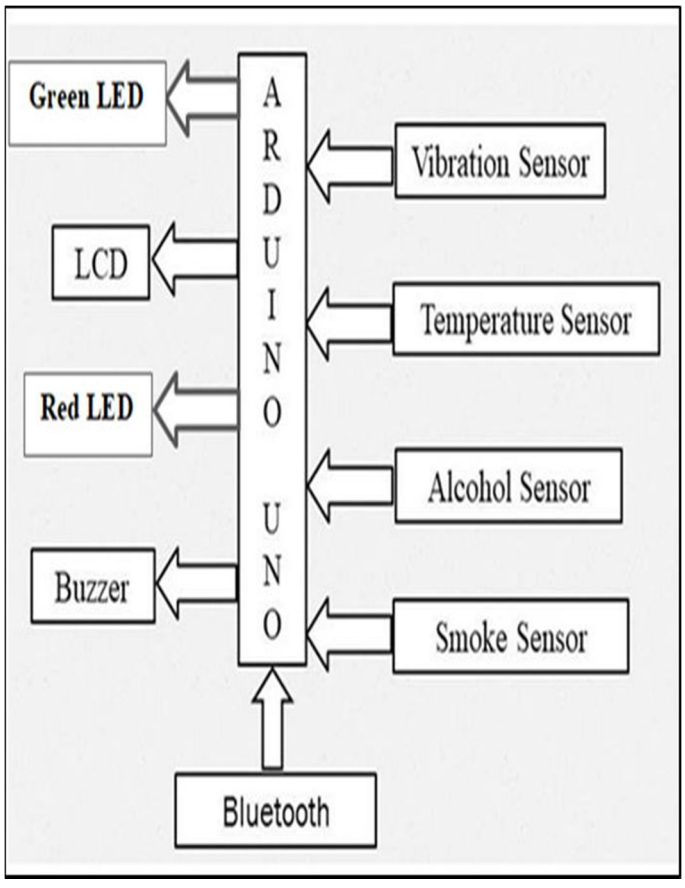


Figure 1 . Software Diagram



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III. LITERATURE SURVEY

Table 1

Sr no.	Title	Author	Publication/ Year	Topic Discussed
1	Analysis of Smart helmets and Designing an IoT based smart helmet: A cost effective solution for Riders	Divyasudha N, Arulmozhivarman P, Rajkumar E.R	IEEE(2019)	• Developed this project to improve the safety of the bikers. • IoT-based helmets are designed that prevent road accidents and detect alcohol consumption. • Able to track the biker and sends GPS coordinates to pre-defined number.
2	Smart Helmet with Cloud GPS GSM Technology for Accident and Alcohol Detection	Prateeksha Nashipudi, Praveen M. Dhulavvagol, Ranjitha Shet, Anand S. Meti, Renuka Ganiger .	Springer(2018)	• Alcohol detection using MQ3 sensor. • To capture the data from the sensor and store it in a cloud. • To trace the accident location using GPS. • Sending the accident location to the concerned people using GSM Modem.
3	IoT Based Smart Helmet and Accident Identification System	Md. Atiqur Rahman, Ishman Rahman, Toufiq Ahmed, S.M Ahsanuzzaman, Abid Ahsan	IEEE(2020)	• In this paper the author discussed working of Arduino Uno, alcohol sensor, Bluetooth module, GPS tracking system, and also working of the mobile application i.e, used to send the location and all the details.
4	Smart Sensors: Analysis of Different Types of IoT Sensors	Sehrawat D. ,& Gill, N. S.	IEEE(2019)	• Various types of sensors in IoT enabled a smart environment. • This paper presents various types of sensors in IoT like temperature sensors, humidity sensors, chemical sensors, motion sensors, pressure sensors, etc.
5	Temperature Sensor Using Thin-Film Transistor	Nakashima A., Sagawa Y. and Kimura M.	IEEE(2010)	• Measure temperature dependence of a transistor characteristic and determine that it is suitable to employ off current.
6	A High Performance Piezoelectric Vibration Sensor	Bahareh Yaghootkar, Soheil Azimi, and Behraad Bahreyni	IEEE(2017)	• The high sensitivity, operating bandwidth, and low inherent noise of these sensors enables their use in many existing and emerging applications of vibration sensors

Table 2

Sr no.	Title	Author	Publication/ Year	Topic Discussed
7	A Single-Chip CMOS Smoke and Temperature Sensor for an Intelligent	Cheon J., Lee J., Lee I., Chae Y., Yoo Y., Han G.	IEEE(2009)	• A single-chip CMOS smoke and temperature sensor for use as an intelligent re detector is proposed. The proposed smoke sensor measures smoke density. The temperature sensor is integrated with the smoke sensor not only to sense heat from a rebut but also to compensate for the temperature dependency of the smoke sensor.
8	Konnect: An Internet of Things(IoT) based Smart Hel-met for Accident Detection and Notification	Chandran, Chandrasekar and Elizabeth.	IEEE(2016)	• The helmet is designed to detect an accident and immediately alert emergency contacts. • As soon as the erratic variations are obtained, a trigger is sent to PagerDuty from the microcontroller. PagerDuty then initiates a call to the motorist's phone number. If the driver does not respond for a period of 5 minutes after the first call is initiated, then the emergency contacts will be informed.
9	Smart Helmet: Wearable Multi-channel ECG EEG	Wilhelm von Rosenberg, Chanwimalueang, Valentin Goverdovsky, David Looney, David Sharp, Danilo P .	IEEE(2016)	• The motorcycle helmet can reliably record cardiac and neural activity, together with respiration via a phenomenon called respiratory sinus arrhythmia (RSA). The advantage of the proposed approach is that the developed signal processing algorithms do not require a priori knowledge of any parameters.
10	Microcontroller-based smart wear for driver safety	Abhinav Anand, Kumar Harsh, Kushal Kumar, Sourav Gouthi	IEEE(2015)	• In this paper, the author discusses the speed of the vehicle. • In this application, the project will be monitoring the areas in which the vehicle will be passing. On entering any cautionary areas like schools, hospitals ,etc the speed of the vehicle will be con-trolled to a predefined limit .LCD is used for showing the various types of messages after wearing the helmet.

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IV. RESULTS

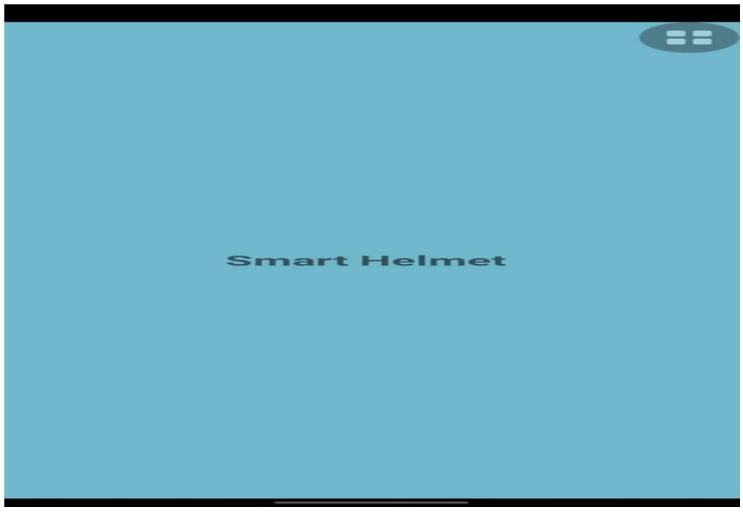


Figure 3 :Home Page

The user has to install the app .Fig no. 3 is the first page of app.



Figure 4: Login Page

In this fig , we can see login and registration button, first we have to do resgiteration. While loging we have to enter the contact no. and password which we have saved during the resgiteration process.



Figure 5: Registration Page (1)

In this registration page ,we have to enter correct data as per given . Here , we can see two emergency contact no. In that you have to enter two contacts no. of your family members or friends .
If any incident occurs , or sensor limits exceed, with the current location the message is send to the contact number which we have saved in the emergency contact no. Thus,through this medical help get instantly .

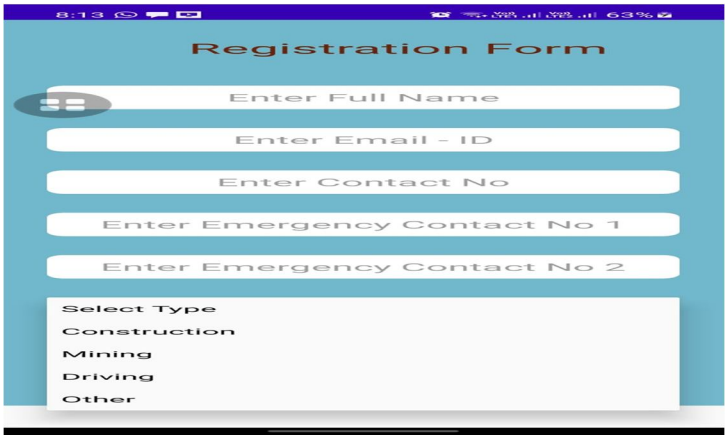


Figure 6: Registration Page(2)

In this Fig. we can see Select Type i.e., Construction , Mining ,Driving and other. As per the need, the user can select any of them.

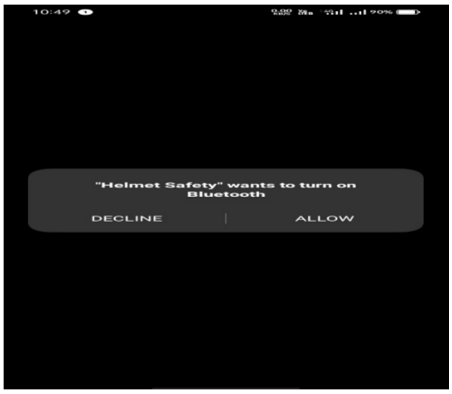


Figure 7: Access to Bluetooth

Connection of the app to the helmet is given through bluetooth by giving the access to the bluetooth .



Figure 8: Pair Of Devices

When we give access to the bluetooth, we can see the list of devices name as above (fig 8).Then connect to bluetooth by pairing the device. By connecting bluetooth to the application through this way only we can get message on phone.

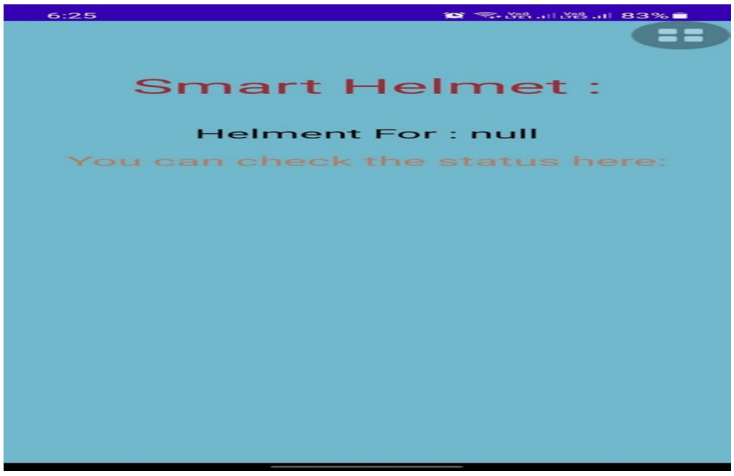


Figure 9: Status Of Helemt

After all the process ,we can see the status of helemt .If the bluetooth is connected to the application we can't see the status of helemt .



Figure 10: Message

In the fig 10 ,the message is send from the user's application to the emergency number ,that we have saved during the registration process .When the sensor's limit exceed then the message with the location of the user is send to the contact number which we have saved.Through this , the current location of the user we comes to know.

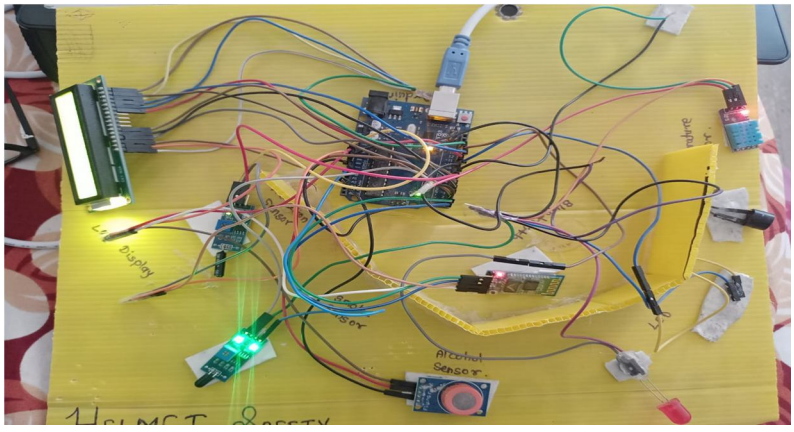


Figure 11 : Hardware

A Smart Helemt is designed using different sensor's ,such alcohol sensor ,flame sensor ,temperature sensor and vibration sensor . The sensors are connected to the arduino uno ,arduino is connected to software application through bluetooth ,with the help of bluetooth the message with current location will be send to the saved contact number.

The location is accessed through the GPS of the mobile. When sensor's are detected the Led light glows ,and also detection information show's on the LCD screen ,and the message is also send .

V. CONCLUSIONS

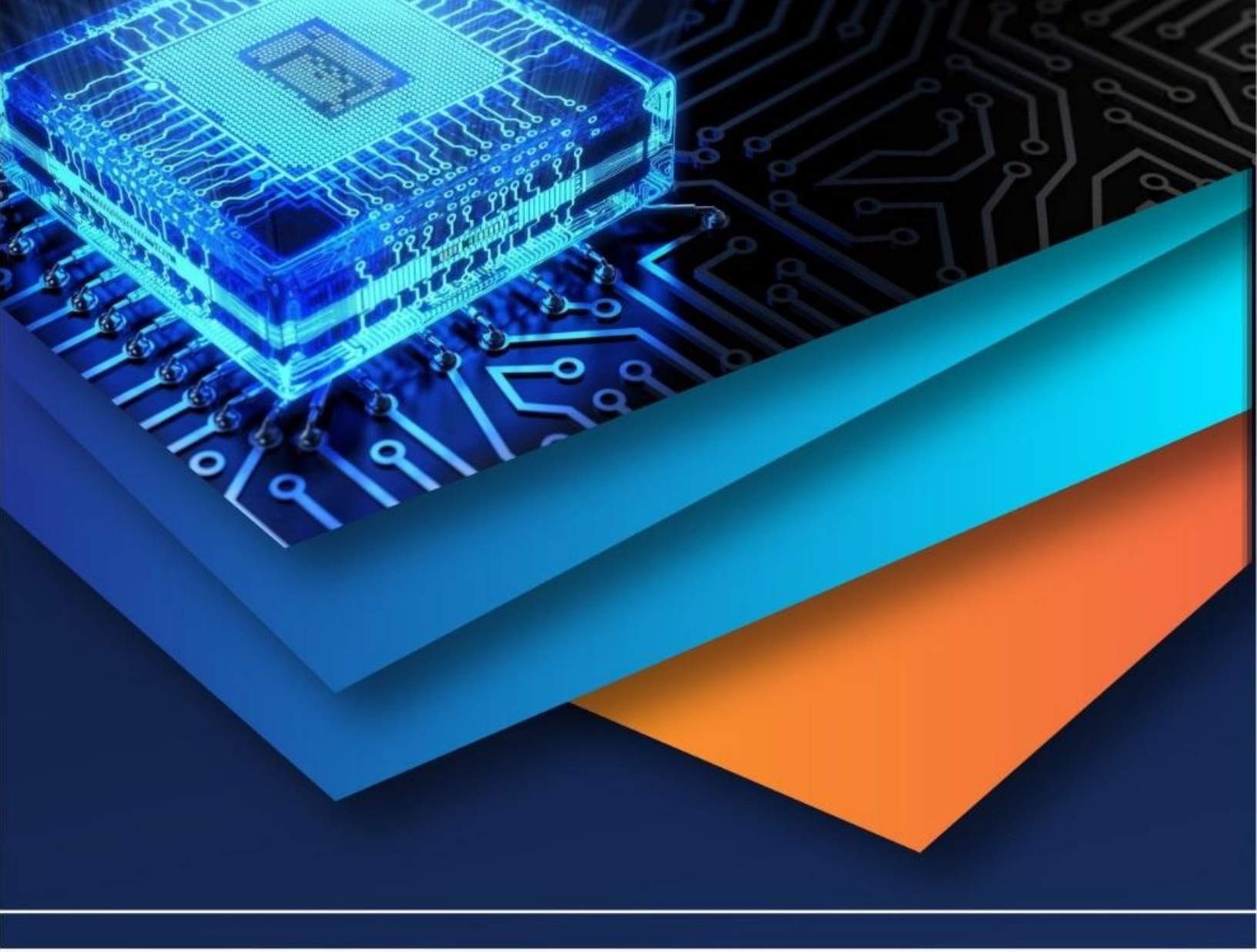
The designed safety helmet ensures the safety of the rider and the construction/mining worker as well as the ability to wear a helmet, and it ensures that the user does not consume excessive amounts of alcohol. The project detects smoke, vibration, and temperature. This program also helps to effectively manage the consequences of accidents. This ensures that victims receive appropriate and prompt health care, in the event of an accident

VI. FUTURE SCOPE

We can add a buzzer in the helmet like the LED will be flashing when the speed exceeds. The LED is placed at the speed meter of a motorcycle, not too alarming. By inserting a buzzer in the helmet, the motorcyclist will be more alert and will slow down the motorcycle once they receive the signal. The motorcycle's engine will only start if the helmet is worn and the belt has been buckled

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