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Smart Helmet System For Advanced Safety Using Iot

Munagala Navadeep Reddy[1], Poli Sainath Reddy[1], Shaik Suraj Kumar[1], Tanga Siva Shankar[1], Dr.S. Ananth[1], Mrs. M. Nithiya[1]

[1]Department of Artificial Intelligence & Data Science Mahendra Engineering College,Namakkal.

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ABSTRACT

By consolidating many real-time monitoring capabilities into a single, affordable unit, the suggested smart helmet system is an Internet of Things (IoT) based safety solution that aims to improve the protection of riders of two-wheelers. Based on an Arduino Uno microcontroller, the system makes use of an infrared sensor to identify when a helmet has been worn, a multi-gas meter to measure blood alcohol content, and an accelerometer to identify when an accident has occurred. The device utilizes a relay module to disable vehicle ignition in the event that the helmet is not worn or if alcohol is detected. The system has a GPS module that automatically tracks the rider's position in case of an accident and a GSM module that notifies pre-set contacts of the rider's whereabouts. This smart helmet is a small, practical, and energy-efficient way to reduce road fatalities and improve emergency response times. It uses both proactive and reactive techniques to keep riders safe

Keywords: Smart Helmet, Arduino Uno, IoT, Accident Detection, Alcohol Monitoring, GPS Tracking.. ..

1. INTRODUCTION

The area of personal safety has been profoundly affected by the fast development of technology in the last several years, especially in the transportation and industrial sectors. One of the most innovative ideas to improve safety for those in dangerous jobs is the Smart Helmet System that uses the Internet of Things (IoT). This might be a game-changer for people working in construction, mining, or on motorcycles. While traditional helmets do a good job of physically protecting the wearer, they can't detect or react to potential threats because they lack intelligence. To overcome this drawback, helmets that include IoT technology into their design are no longer just passive safety devices; they are dynamic, responsive systems that can communicate and interpret data in real-time. The Internet of Things (IoT) allows smart helmets to enhance safety in various ways. Some examples of this include the ability to identify accidents in real time, monitor health using biosensors, and receive alerts about potential environmental hazards based on gas, smoke, or temperature readings. Accidents can happen at any moment, but with this helmet, you can reduce reaction time and maybe save lives by automatically alerting neighboring hospitals, family, or rescue services. Also included are functions such as alcohol detection.

Sensors, microcontrollers, communication modules (such as GSM or Wi-Fi), and analytics hosted in the cloud form the backbone of the system. Data is collected, sent, and analyzed in real-time by these parts. For instance, in the event of a motorcycle accident, the accelerometer within the helmet would register the force of the fall, the GPS would pinpoint the exact spot, and the GSM module would communicate a signal of distress. Automated processes and rapid decision-making are made possible by the tight integration of software and hardware. Logging and analyzing the obtained data can also be used for compliance reporting, insurance claim verifications, and preventive safety tactics. For safety-conscious engineers, the Internet of Things-based Smart Helmet System is the next bigthing. With its all-encompassing approach to risk mitigation in different high-risk contexts, it fits nicely with the increasing worldwide focus on smart infrastructure and intelligent transportation systems. Smart helmets have the potential to significantly reduce mortality in an era of rising urban mobility and persistent work dangers.There is an increasing demand for a Smart Helmet System because to the high risk of serious injuries and fatalities in certain work settings, including construction sites, mining operations, and roadways. The primary function of traditional safety nets is to prevent physical damage; In the event of an accident, these helmets only depend on the user's functions and other external reaction mechanisms. There is an immediate requirement for more active, automated safety mechanisms due to increasing frequency of traffic accidents, especially motorcycle drivers and dangerous working conditions in industrial environments. The Internet of Things (IoT) allows this difference to bridge the user of the smart helmet user, identify risky tasks and inform the officials in the emergency immediately. This improves the existence of the security protocol and the possibility of general compliance. In today's speedy, interacted world, data in real time and remote monitoring are absolutely important

The Smart Helmet System project includes several subjects including safety technology, built -in system and Internet of Things (IoT). Computer science, electronics, sensor networks, and by combining ideas from telecommunications, creating an intelligent automation system that makes people safe. The helmet sensor includes gyroscope, accelerometer, temperature, alcohol, heartbeat and GPS module. To make quick decisions or send notifications using communication modules such as GSM or Wi-Fi, these sensors collect real-time data from both the user and the environment. The data is then analyzed by a microcontroller, such as Arduino or NodeMCU. This research has significant implications for health monitoring, smart urban infrastructure, industrial safety (including construction, mining, oil and gas) and transport safety (especially for motorcycle riders). In settings where the ability to identify and respond to emergency conditions is inevitable. The Smart Helmet system uses automation, cloud connection and wireless communication to back up other smart technologies. These include tracing of real time, preventive health monitoring, warning system based on the Internet of Things and data analytics for accident analysis. It establishes initiative as a state -art -species, scalable alternative for industrial risk management and public security.

2. RELATED WORK

[1] An alcohol sensor is made in the unit to monitor the rider's breathing. The unit ensures that intoxicated drivers cannot be found behind the wheel by blocking the ignition if the blood alcohol concentration (BAC) exceeds a specific point. This study suggests that built -in systems with sensors can effectively reduce the incidence of drunken and how important it is to intervene in real time. When it comes to poor countries, where traffic safety is still a major problem, the proposed measures are both practical and affordable.

[2] To prevent the driver from going behind the wheel while it is impaired, the system is programmed to cut the vehicle if it detects alcohol. Research advocates an active built -in strategy, which highlights the growing concern for accidents caused by alcohol. The article tells the basis for smart security solutions about how easy it is to integrate liquor sensor into another car system and how reliable they are.

[3] Chitte et al.'s smart bike system, which includes an intelligent helmet, provides riders with a comprehensive solution for safety. Among the many sensors it incorporates are those for detecting alcohol, infrared (IR) sensors for helmet detection, and crash detection. In the event that the driver is under the influence of alcohol or does not wear a helmet, a relay will disconnect the ignition system of the vehicle. Furthermore, the device notifies emergency contacts by GSM of a crash and provides GPS data. The goal of this all-encompassing system is to decrease fatalities by banning drunk driving and mandating the use of helmets, and by assuring rapid medical treatment through the use of automatic warnings.

In their discussion of powered two-wheelers' improved comfort and safety features, Bekiaris et al. [4] introduce technologies that increase rider protection via intelligent monitoring and automation. Smart helmets are highlighted as a solution to road safety issues, and the paper details how embedded sensors can be used to monitor riding conditions in real-time. The study goes on to discuss ergonomics of helmet systems and human-machine interactions, arguing that smart systems ought to be both functionally robust and easy to use. This lays a solid groundwork for cutting-edge smart helmet systems.

[5] In order to ensure the safety of motorcyclists, Faezah Binti Hashim has developed a prototype of an intelligent helmet system. Among the many sensors built into the helmet are accelerometers, which can detect accidents, infrared sensors, which can verify the helmet, and communication modules, which can notify emergency contacts. The system is designed to be useful and cheap so that it can attract a lot of users. It shows how real-time data processing and wireless connections can be used to make sure riders wear helmets and speed up response times after accidents.

Jennifer William et al. [6] made a smart helmet with a lot of safety features, like being able to determine if someone is wearing it, check for drinking, and let the rider know if they are in an accident. The helmet features a GPS module that can tell you exactly where you are and a GSM module that can send you alerts right away. If you were to get into an accident, the system would immediately let the people who need to know where you are and what happened. This study shows how this kind of technology could greatly improve emergency response and traffic safety. Perfect for real-world use because it uses simple parts and is cheap to make.

[7] Kaizad Avari and his team devised a smart helmet system that can tell when a cyclist has worn a helmet and when they have been drinking. If the helmet is not worn or if alcohol is found, it has a relay system that stops it from starting. There are also ways to send emergency messages and find out about crashes. In order to improve the safety of people riding two-wheelers, the research focuses on automation and making decisions based on data collected from sensors. In an effort to reduce accident rates, the suggested paradigm discourages dangerous behaviors while being easy to use and efficient.

[8] Adaptive MP3 playback depending on traffic density, wireless bike authentication, and road hazard warnings are some of the innovative features introduced by K. Sudarsan and P. Kumaraguru's helmet system. Alerts and user interaction are provided in real-time by means of the system's many embedded sensors and communication modules. Despite its primary emphasis on usage and comfort, it incorporates fundamental safety features such as accident detection and helmet verification. Smart helmets, which combine multimedia with traffic-aware features, offer a fresh take on the idea and hint at the possibility of multipurpose protective gear.

[9] Research by Lih-Jen Kau and Chih-Sheng Chen on a vehicle tracking system using GPS and GSM is very pertinent to smart helmet purposes. External events, such crashes, can activate their system's real-time location tracking capabilities. Because of how exact and dependable the tracking system is, it can be easily integrated with smart safety equipment. In the case of smart helmets, this technology has the potential to alert emergency contacts to the precise location of an accident, increasing the likelihood of prompt medical assistance.

[10] M. K. A. M. Rasli et al.'s smart helmet design has a full suite of sensors to monitor the rider and prevent accidents. Gas sensors identify alcohol, accelerometers detect crashes, and communication modules allow for GSM and GPS-based alerts; all of these are part of the system. In response to readings from these sensors, the microcontroller disables the ignition or notifies the proper parties of an emergency. In order to reduce accident fatalities and promote safe riding behavior, the project showcases an efficient, practical, and small solution that uses real-time monitoring and automated response.

[11] P. Girme, M. Penta, and M. Jadhav suggested a technology to detect helmets in order to make bikers safer. To check if the rider is wearing a helmet before starting the vehicle, their approach integrates multiple sensors and microcontrollers. To make sure everyone follows safety procedures, the device turns off the engine when it doesn't identify a helmet. Addressing road safety concerns and reducing accident deaths can be achieved through the practical usage of embedded technologies, as demonstrated in this work.

A smart helmet system that detects and reports accidents using GSM and GPS technology was created by N. Manjesh and Sudarshan Raj [12]. When a rider is involved in an accident, the system will detect it and notify the proper authorities or emergency contacts of the rider's location automatically. While GPS allows for real-time location monitoring, GSM modules guarantee connectivity even in remote places, providing a dependable solution for speedy emergency response.

[13] Archita Keni, Pratiksha Bhuta, and Karan Desai developed a system for controlling vehicles and detecting alcohol levels through embedded technologies. By incorporating an alcohol sensor into a smart helmet, their method aims to combat drunk driving. The technology will not allow the vehicle to start if it detects any alcohol on the rider's breath. By using this strategy, we can increase safety and encourage responsible driving.

[14] Using GSM (SIM 900D) and GPS (NMEA 0183) technologies, R. Nazir, A. Tariq, S. Murawwat, and S. Rabbani established a system to prevent accidents and report them. Their research details crash detection and the automatic transmission of location data to medical services or emergency contacts using platforms based on microcontrollers. With the goal of enhancing accident management and decreasing reaction times, the system incorporates alarm mechanisms and the ability to monitor speed.

[15] A highway-specific accident detection and prevention system was developed by S. P. Bhumkar, V. V. Deotare, and R. V. Babar. In order to detect impending collisions, their model incorporates microcontrollers, GSM modules, and ultrasonic sensors. Not only that, the system may send info to people you've already designated as contacts and identify accidents. In order to decrease traffic accidents and improve traveler safety, this research highlights the significance of real-time monitoring and automated notifications.

[16] An intelligent helmet system that can detect alcohol was proposed by Sudharsana Vijayan, Vineed T. Govind, Merin Mathews, Simna Surendran, and Muhammed Sabah. A helmet-mounted alcohol sensor and a vehicle-connected ignition control module make up the system. The technology prevents the vehicle from moving if it detects that the rider is drunk. Helmets with built-in safety features encourage sober driving and lessen the likelihood of accidents caused by drunk drivers.

3. MATERIALS AND METHODS

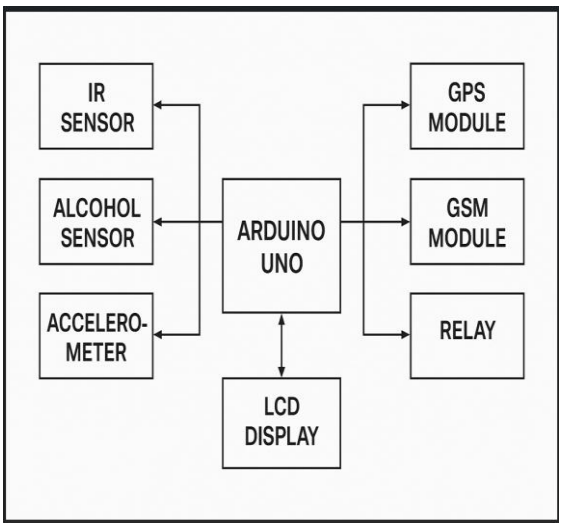
By integrating many safety elements into one efficient configuration, the suggested smart helmet system enhances the protection of two-wheeler users while being cost-effective. It tracks where the rider is at all times, how often they wear helmets, how much alcohol they've consumed, and whether accidents have occurred. The system's brain is an Arduino Uno microcontroller. The shortcomings of previous models are remedied by this system, which provides a realistic, cost-effective, and real-time safety mechanism based on the Internet of Things.

In the event of an accident, the suggested system would immediately notify designated contacts and prohibit the starting of the car if certain safety parameters are not satisfied. The helmet's wear status can be monitored using an infrared sensor. The technology uses a relay module to turn off the ignition if the rider isn't wearing a helmet. The rider's breath is tested for indicators of alcohol use by a MQ-3 sensor. When the blood alcohol concentration (BAC) rises over a certain point, the GSM module will sound an alarm and the system will once again disable the ignition. By utilizing an accelerometer or vibration sensor to identify a collision or fall, the reaction time following an accident can be enhanced. The system will immediately activate a GPS module to retrieve the rider's current location if it detects an accident. The GSM module subsequently notifies a loved one or rescuer of this position and any pre-set alarm messages. In this way, the victim can be helped without delay. With its inbuilt C/C++ code and built-in decision logic, the Arduino Uno processes all the sensor data and responds in real-time. It is optional to use a Serial Monitor or LCD display to provide the rider feedback. This system is perfect for everyday usage because it is small, has low power consumption, and can be simply mounted inside regular helmets.

OBJECTIVES OF PROPOSED SYSTEM

By employing an infrared (IR) sensor to identify if the rider is donning the helmet, the suggested smart helmet system aims to automate the process of ensuring helmet compliance. Encouraging better riding practices and decreasing the chances of head injuries, the device detects when the helmet is not worn and disables the vehicle's ignition through a relay module. The use of a MQ-3 alcohol sensor for the detection of drunkenness is another important objective.

Helmets equipped with accelerometers or vibration sensors can detect collisions or other abrupt impacts and activate safety features in an instant. In the event of an accident, the helmet's GPS module will pinpoint precisely where the rider is. The system includes a GSM module that immediately notifies pre-configured emergency contacts by SMS with the accident information and GPS positions, ensuring that help is sent out in a timely manner. The ability to expedite rescue operations has the power to save lives. The proposed system prioritizes safety measures while still being cost-effective and user-friendly. Its design prioritizes the rider's comfort while being small, inexpensive, and compatible with most helmets on the market.



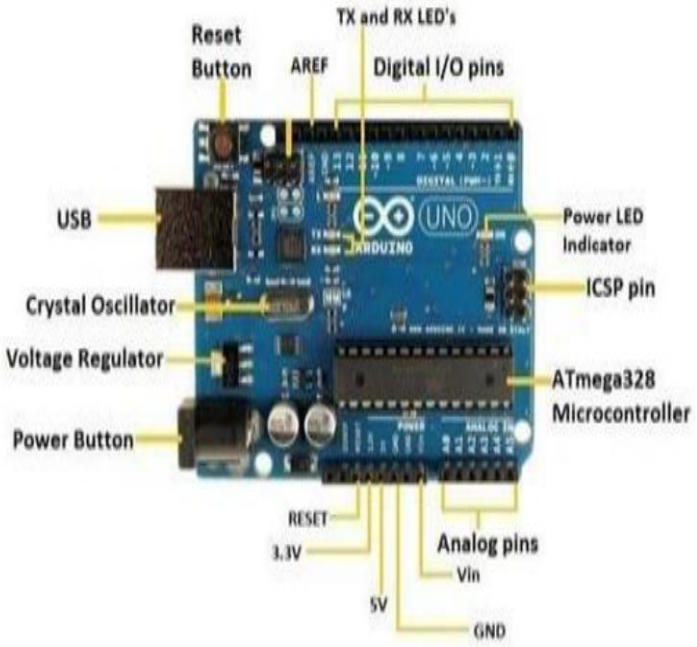
"Fig.1 Proposed Architecture"

One of the leading causes of injury and death globally is road accidents involving riders of two-wheeled vehicles. Many of these accidents happen because riders aren't wearing helmets, are drunk, or take too long for emergency services to respond to incidents. Many riders disregard fundamental safety measures, putting themselves at risk of serious injury or death, and enforcement of existing safety legislation is inadequate. There are a number of problems with the current state of smart helmet systems and helmet safety solutions. First, they are either very expensive or mostly people are very large to use, and secondly, they do not always include all the necessary safety features. Finally, they are very dependent on network access, which can be problematic in more remote areas. On top of it, many systems are not able to detect rapid accidents and guarantee vigilance, or drunk rides effectively discourage behavior such as drunk or helmets. Then the challenge is to find a reliable and affordable solution.

It is an all -encompassing smart auxiliary system that can identify intoxication, check the use of helmets, monitor accidents and send site -based information in emergencies in emergencies. In order to drastically improve rider safety and decrease road accident fatalities, such a system must to be easy to use, perform efficiently even in low-network locations, and incorporate all safety features into one small gadget. Many of these accidents happen because riders aren't wearing helmets, are drunk, or take too long for emergency services to respond to incidents. Many riders put themselves at danger of serious injury or death by not following even the most basic safety protocols, and the enforcement of these rules is lacking.

2. ARDUINO UNO:

The Arduino Uno, created and launched in 2010 by Arduino.cc, is a free and open-source microcontroller board that uses the Microchip ATmega328P MCU. The microcontroller board has digital and analog input/output pins that can be used to connect to other circuits and expansion boards. With a Type B USB cable, you can program 14 digital I/O sticks on the board -including 6 that can produce heart rate width modulation -and 6 analog I/O stick using Arduino idea.

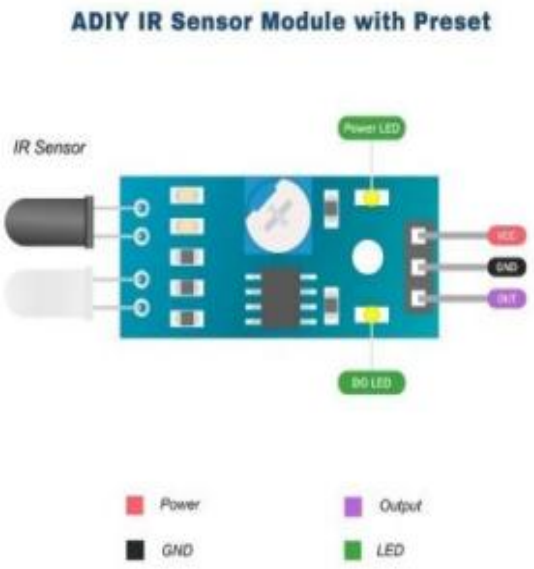


"Fig 2: Arduino Uno"

A popular microcontroller for built -in systems and automation projects is Arduino Uno, based on ATMEGA328P. It is extremely compatible with different types of sensors and modules because for its digital and analog input/output stick. No, from full code beginners to experienced professionals, can use Arduino idea for program boards. Arduino is responsible for collecting data from UNO sensor and performing necessary operations in safety applications such as smart helmets and vehicle control systems. This is perfect for making prototypes due to cheap price, adaptability and great social support.

3. IR SENSOR:

Smart helmet systems often use an IR (infrared) sensor for the main purpose of detection when using a helmet. The unit can find out if the cyclist is wearing a helmet by sending infrared lights out. An infrared light-emitting diode (LED) and a photodiode (receiver) form infrared sensors. Photodiode detects reflected signal when the helmet is worn correctly; This signal is caused by infrared light that reflects the rider head (or a specified surface). By reading this signal, Arduino Uno can tell if the helmet is properly confident in the rider's head.

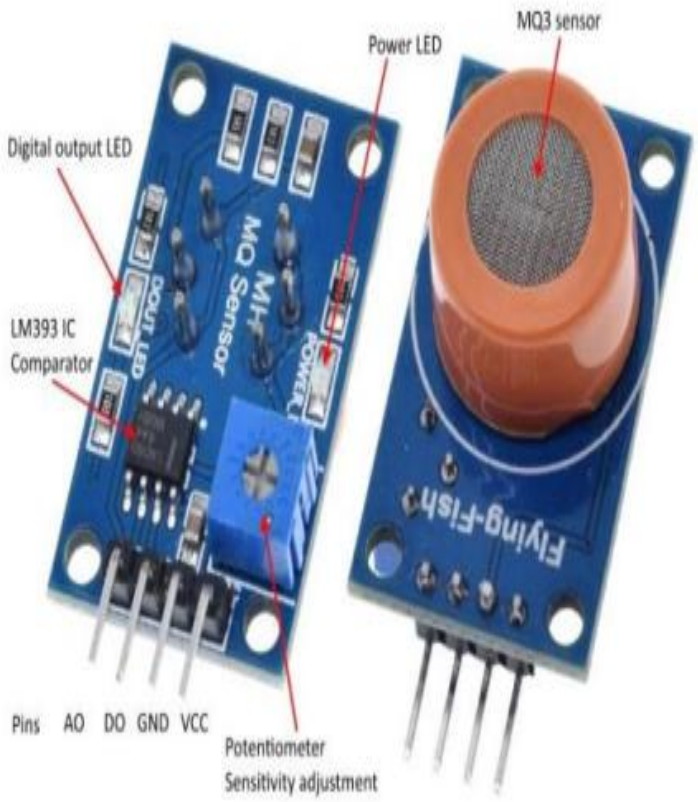


"Fig 3: IR sensor"

One way to detect or detect distance is with an infrared (IR) sensor. These sensors emit and receive infrared lights. The case of use for infrared sensors is to decide if a rider actually wears a security helmet. The system can be set up to prevent the car from starting if it does not detect the helmet. These sensors are ideal for use in human-machine interfaces since they are small, inexpensive, and give feedback in real-time. Several embedded applications also make use of infrared sensors for things like proximity detection, obstacle avoidance, and automation.

4. ALCOHOL SENSOR:

The MQ-3 is one example of an alcohol sensor that may be integrated into a smart helmet system to identify whether a rider is under the influence of alcohol. The Arduino Uno can read the concentration of ethanol fumes because it uses a sensor to convert the vapors into an analog voltage signal. If the rider wants precise readings from their breath samples, they should position the sensor within the helmet close to their mouth or nose. The rider's breath is used to determine their blood alcohol content. The Arduino will initiate safety measures if the measured value exceeds a threshold that has been previously set. Some examples of this include turning on a warning system or buzzer, or even stopping the car from starting.

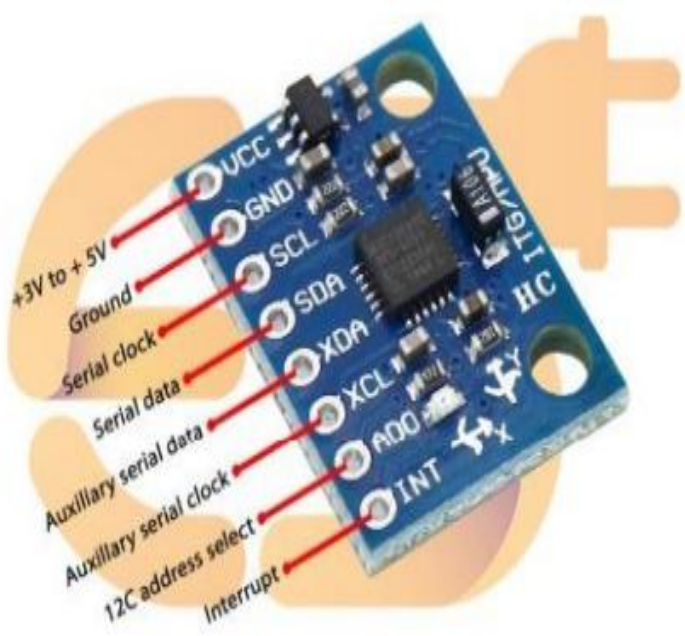


"Fig 4: Alcohol sensor"

One device that can identify if someone is drunk is the alcohol sensor, which is also called the MQ-3 sensor. Smart helmet systems rely on it to detect levels of intoxication by monitoring the rider's breath. To avoid drunk driving, the system can cut power to the car if the blood alcohol concentration (BAC) is found to be higher than a certain point. In addition to being easy to interface with microcontrollers like Arduino, the sensor is sensitive and responds quickly. When used to improve road safety, it makes drivers more responsible and less likely to cause accidents caused by drunk driving.

5. ACCELEROMETER SENSOR:

The acceleration felt in comparison to free fall can be measured with the use of an accelerometer. You can perceive acceleration as a vector quantity using either a single- or multi-axis model, and they both detect the magnitude and direction of the acceleration. falling, direction, acceleration, and vibration shock. Detecting the device's location or providing input for games is made possible by micromachined accelerometers, which are becoming more common. The acceleration that people and objects feel, as well as the acceleration that an accelerometer experiences relative to freefall, is known as appropriate acceleration.



"Fig 5: Accelerometer Sensor"

To detect abrupt motions, changes in orientation, or collisions, an accelerometer sensor monitors acceleration forces. The accelerometer is used in accident detection systems to detect sudden acceleration or impacts, which are signs of an impending crash. The system can initiate emergency procedures, such as sending a GPS-enabled SMS alert, as soon as such an incident is identified. Automatic response systems and real-time monitoring rely heavily on these sensors. Their low power consumption and small size make them ideal for use in cellphones and other wearable safety equipment.

6. GPS MODULE:

A smart helmet system uses a GPS module, like the NEO-6M, to monitor the rider's position in real time, which is particularly useful in case of emergencies, such accidents. The module gets its geographical coordinates (longitude and latitude) from GPS satellites and sends them to the Arduino Uno using serial connection, often utilizing the TX and RX pins. Arduino coordinates GPS with module when an accident is found by an accelerometer or vibration sensor of a sensor.

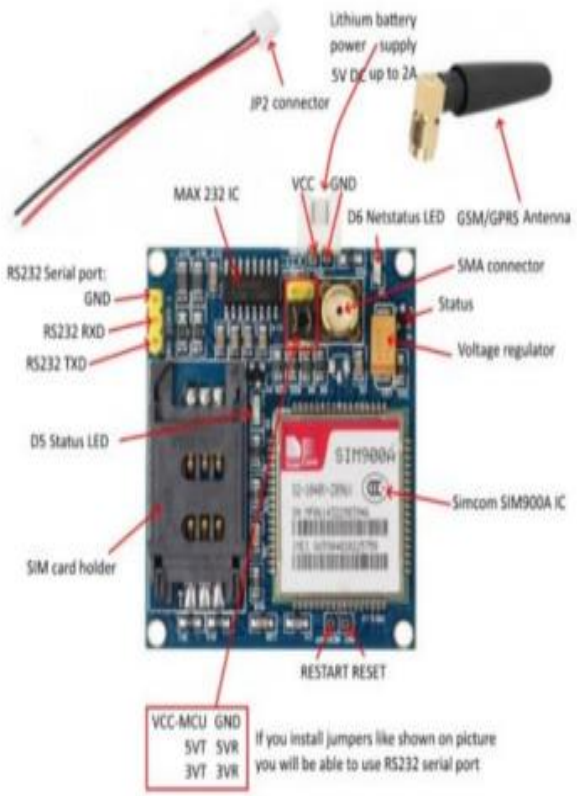
It sends the condition to the rider to those who they have nominated as an emergency contact through the text message using the GSM module. Because of this, help can be sent out quickly, which can save life. By using the global position system (GPS) satellites, we can achieve an accurate location of a goal, which we can then transfer in an Arduino UNO on serial communication, often through TX and RX PIN.

"Fig.6: GPS module"

When using signals obtained from satellites, the Global Positioning System (GPS) provides real -time location data. The ability to indicate the specific location of an incident and communicate this information first makes it important in accident reporting systems. Demonstration of latitude and longitude, which can help with navigation and trekking, can be achieved through the GPS interface with a microcontroller. In an emergency, the module guarantees the consignment of the exact status data in smart helmet applications. For site -based services and quick assistance, this real -time tracking is required.

7. GSM MODULE:

A smart helmet system cannot work without a GSM module such as the SIM800L or SIM900, which allows wireless connections through cellular network. Arduino Uno can now call, send SMS messages and few, and even connect to the Internet on GPRS. Sending emergency alerts for designated contacts is the primary goal of the GSM module in a smart helmet. In case some of the other sensors in the accelerometer, vibration sensor or helmet detect an effect, the GSM module will get GPS coordinates from the rider from Arduino. After that, the module informs those who need to know such family or emergency services, through SMS with an accident alarm message with GPS coordinates.

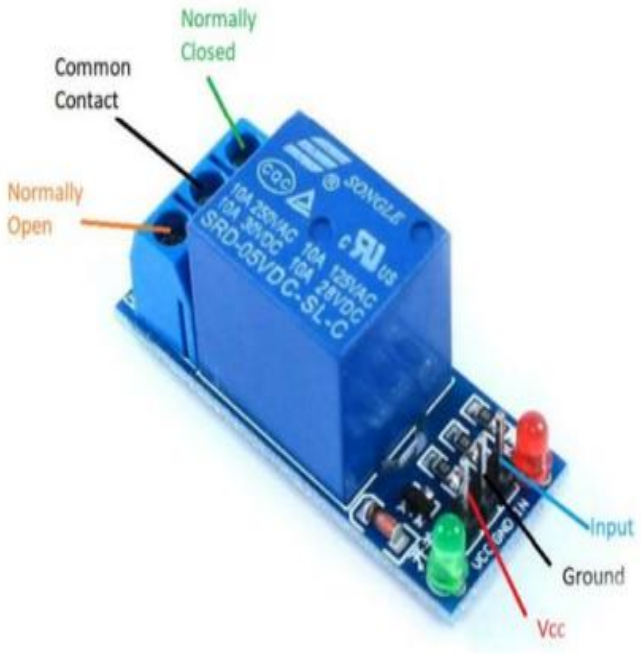


"Fig.7 GSM module"

For mobile network communication, such as texting or making phone calls, a GSM (Global System for Mobile Communications) module is required, such as the SIM900. In safety systems, it's the link that gets the message to loved ones or the authorities when something goes wrong. The GSM module may transmit location-specific notifications when combined with sensors and GPS. Instantaneous response is possible without any user involvement because of this. This module is ideal for remote applications due to its 2G cellular network connectivity and ease of interaction with Arduino.

8. RELAY:

After the Arduino Uno has completed its safety tests, the smart helmet's relay module will activate the bike's ignition system. A low-power digital signal can control high-voltage or high-current circuits (like the bike's ignition) using an electrically controlled switch called a relay. The usual placement of the relay in such a setup is between the power source and the ignition circuit of the motorcycle. In response to signals from sensors like the infrared (IR) detector (for helmet detection) and the alcohol sensor, the Arduino manages the relay.



"Fig.8: Relay"

To manage high-voltage circuits with low-voltage signals from microcontrollers like Arduino, a relay is utilized. In response to signals from sensors like those that detect alcohol or helmets, a relay can be utilized in car safety systems to disable the engine's ignition. This improves security by enabling direct physical manipulation of the vehicle's functions. Relays isolate the control circuit from the high-power load electrically, guaranteeing dependable operation. They play a crucial role in systems for automation and control of safety.

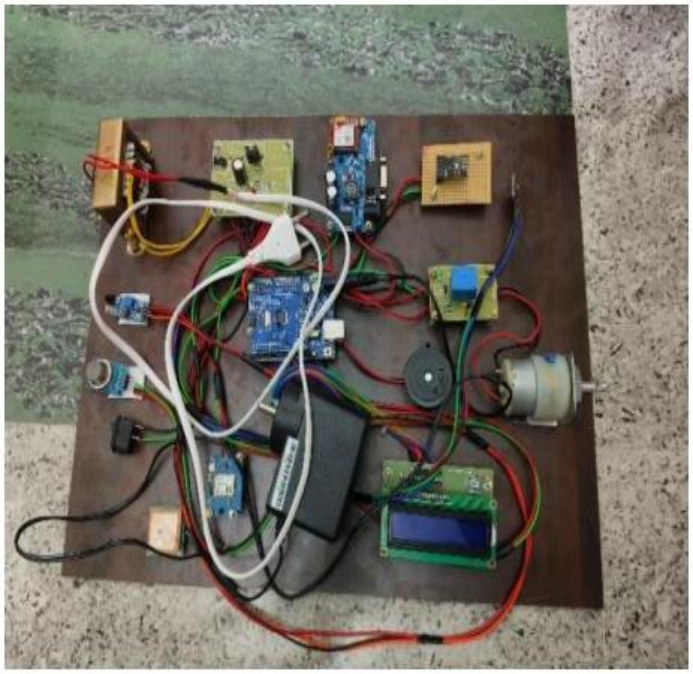
9. LCD DISPLAY:

Liquid crystal display is the abbreviation for this technology. It is a specific type of electronic display module that finds widespread usage in a wide variety of circuits and devices, including but not limited to mobile phones, calculators, computers, televisions, and many more. The majority of multi-segment light-emitting diodes and seven-segment displays are made with these displays in mind. The primary advantages of this module are its low cost, ease of programming, animations, and the lack of restrictions on the display of custom characters, special effects, and animations. Calculators, digital clocks, TVs, cellphones, and embedded system projects are just a few examples of the many gadgets that use LCD screens. Displaying text in microcontroller-based systems is commonly done with character LCDs, such as the 16x2 or 20x4.

"Fig 9: LCD display"

The system's real-time data is shown on an LCD (Liquid Crystal Display), which is usually a 16x2 module. As an example, it can display messages like "Helmet Detected," "Alcohol Detected," or "Location Sent," providing users with straightforward feedback. The microcontroller powers the screen, which serves as an easy-to-understand interface for tracking system health. Debugging, user communication, and visual alarms are all made easier with the LCD in smart safety systems. By making system activities more transparent and easy to understand, it improves user interaction.

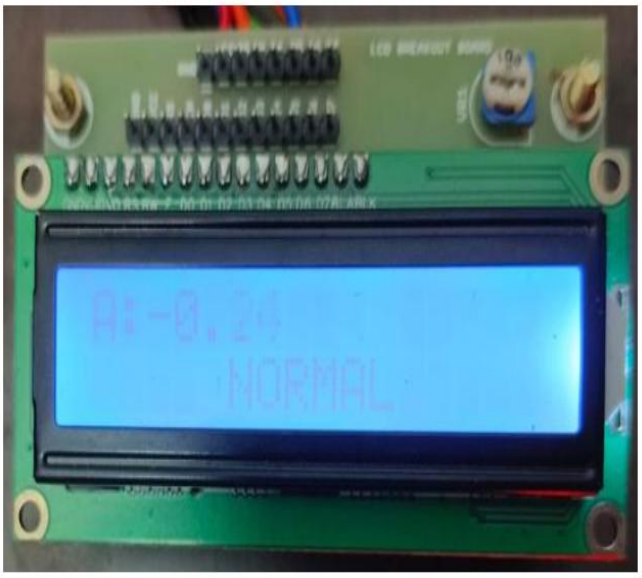
4. RESULTS



"Fig 10: Integrated components"

"Fig 11: Working mode"

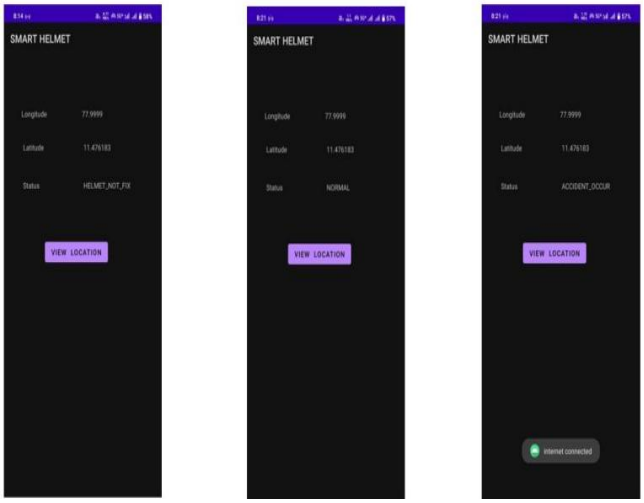
“Fig 12: Sample output-1”



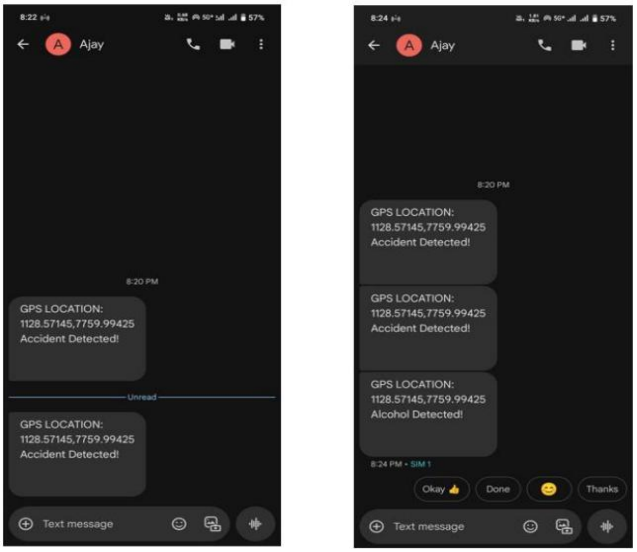
“Fig 13: Sample output-2”

“Fig 14: Sample output-3”

"Fig 15: Sample output-4"



"Fig 16: Real-time monitoring"



"Fig 17: Notification and alert"

5. CONCLUSION

Among the most defenseless road users are those who cycle with two -wheelers; Internet of Things (IoT) Smart Helmet System for Advanced Security is a major jump in integrating technology with traffic safety measures. The system examines to comply with safety standards and try to prevent accidents before using important conditions such as using a helmet and starting a car before starting the car. Equipped with sensors such as accelerometer, influence detector, GPS module and alcoholic nectors, the rider's condition and environment can be monitored in real time. There is a function in the helmet to detect the effect and send an emergency alert with automatically accurate position data that can greatly increase the response from rescue services in the unfortunate case. This function increases the chances of survival and reduces the severity of injuries. This system combines a large image of smart transport and intelligent road infrastructure, which is out of personal security. It paves the way for future integration with smart traffic systems, promotes good riding habits between riders and provides real -time data for law enforcement. The project also shows how to solve real world problems by using cheap and scalable solutions based on the Internet of Things. To make yoga, the smart helmet is more than a head pointer; It is a life savings that combines technology with safety. Such innovation is important to create a future where all road users are safe and smart, especially the number of people using urban mobility increases.

6. FUTURE SCOPE

When combined with smart city traffic infrastructure, technology can automatically consume local hospitals, police stations and traffic control centers in case of an accident and improve coordinated emergency preparedness. An interactive and user -friendly system can be created with a special mobile app and a cloud -based dashboard that allows users to track the riding history, look at their helmet data, manage the emergency contacts and get real -time information. When on the road, sophisticated sensors can tell if your helmet is on or closed or not. By combining gyroscope with machine learning techniques, we can increase the abilities to fall by reducing the number of false alarms together. One way to distract the trip more practically and less is to include voice control features and navigation of turn-for-swing in the helmet using Bluetooth connection. In addition to biometric authentication, such as fingerprints or face identification, the vehicle can be advanced with theft or abuse by ensuring that only authorized individuals are able to operate it. In a permanent and self -recharging power source, the system operated by solar energy can be achieved by attaching small solar panels to the helmet. This reduces the dependence of the battery, resulting in a long battery life for the vehicle.

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