Intelligent HeadGear Using AIML

Abstract: Despite wearing helmets, bikers may still find themselves in dangerous situations due to severe rain. We are creating a helmet that provides the best way to address the current problem. This major problem is what spurred us to create this initiative. The goal of our research is to create a low-cost intelligent helmet that can recognise rain and activate the wipers as necessary to avoid accidents. This intelligent helmet's primary goal is to keep riders safe. Advanced features like automated or manual speed controllers and rain-droplet recognition are used to put this into practice. Although they only make up a small portion of your helmet, helmet wipers have a significant impact on your driving and general safety. As soon as the sensor detects rain, it will rapidly and efficiently get rid of it. Riders are vulnerable to collisions under these circumstances. Thus, the motorcycle visor's windscreen wiper is useful. The wiper is easy to attach and remove.When an accident happens, it will send a GSM message and provide the location via a GPS module.The project's most notable feature is fall detection; if the rider falls off the bike, an alert is delivered.The MSP430 Launchpad receives a signal from the vehicle's vibration sensor module.Finally, using a GSM module, the MSP430 retrieves data from the GPS module and sends it through SMS to the user's mobile device. The latitude and longitude from the GPS module are used to create a Google Map link that shows the location of the accident.

keywords : intelligent Headgear,AI,ML,Rain drop sensor, GPS Module,GSM module , micro-controllers

INTRODUCTION

Our use of motorcycle helmets has a lengthy history that dates back approximately 80 years.Today, no two-wheeler would ever consider going for a ride without a helmet.Since it is the most vital piece of equipment that keeps us alive, it appears to be inseparable. However, helmets have a rich history, and frequently, people were unaware of their functions.

Let's follow the evolution from its classic leather skullcap era to the most stunning works of carbon fiber and Kevlar today.So fasten your seatbelt and let's ride into our history.

When the first motorcycles appeared in the early 1900s, they were essentially "powered bicycles," made for easy transportation, and the necessity for any sort of head protection was unheard of. But motorcycles eventually grew quicker and were utilized in racing. Many bikers suffered injuries as a result. A shellacked canvas was initially ordered in 1914 by British physician Dr. Eric Gardner to protect a rider's head.

Fig 1:Ancient greek bronze helmet

The Finite Element Method is finally portrayed as a potent instrument. Helmets are studied and optimized using finite element analysis, and the experimental process allows for the study and variation of a large number of parameters. A functional and validated numerical helmet model can thus be used to gather a wide range of data.

The first helmet was created in this manner.Knowing the significance of his creation, Dr. Gardner advocated for its inclusion in the Isle of Man TT, the top motorcycle competition of the time.Fortunately, he was successful, and the race directors mandated head protection. Concussions among racers also dramatically decreased after this introduction.

However, despite this achievement, the general public was not enthused. They considered it "strange" to ride while sporting a shell on their head. People wanted to appear well when riding back then, as they do today, therefore cushioned leather caps were the most common choice. The riders thought they provided adequate protection and they looked fantastic doing it. The most protection a rider might go for was a skullcap and goggles. But all changed when T.H.E. Lawrence, or "Lawrence of Arabia," a famous national hero of Britain, tragically passed away in a car accident a few miles from his house rather than in a war or military campaign. The public became aware of the risks associated with motorcycle riding and how to avoid more collisions as a result of this unfortunate turn of events.

Even when bikes got faster over the following decades, the general public did not warmly embrace helmets. Simple half shells with leather straps served as the basic helmets of the era, offering just minimum protection. But in 1953, a ground-breaking development gave helmets the significance they have today. However, a significant advancement was made in 1953 when USC professor C.F. Lombard created a helmet that actually absorbed impact. This unique helmet comprised three layers: an impact-absorbing foam middle layer, a strong fiberglass outer shell, and a padded inner liner for comfort.

The Bell 500 model was developed by Roy Richter, a former racing car driver and the founder of Bell Helmets. He took sure to follow the recommended safety guidelines and based his designs on the current aviation helmets. Bell 500 became an immediate hit as a result, ushering in a new age of contemporary motorcycle helmets. It quickly became required gear for racing, and by the 1960s, a growing number of citizens started wearing helmets. The Bell Star, Bell's first full-face motorcycle helmet, transformed the industry in 1963. Utilizing the same technology and materials used in NASA astronaut flight helmets and the U.S. military, it was pricey but provided the highest level of protection.

The debut of The Star was timely. The USDOT established the first-ever safety requirements for motorcycle helmets the following year, in 1964. Congress also established the US Highway Safety Act in 1966, which made it clear that states would need to have helmet legislation in place in order to receive funding from the federal government for the construction of highways. In the next year, the individual states gradually complied with 47 helmet laws. However, by 1968, many states had revoked the law since helmet use was so widespread among bikers. By the 1970s and 1980s, full face helmets had undergone even more modifications, including the addition of flip-up, tinted visors and modular helmets that combined the functionality of an open face with a full face helmet.

The styles and designs of helmets evolved along with them. A good helmet is one that never forgoes safety while maintaining the highest level of design excellence. Select one of the several STUDDS helmets for the utmost in comfort and fashion. Each of them is made to meet the greatest design requirements and the most stringent safety regulations. Select your STUDDS helmets intelligently for a comfortable long ride.

Fig 2: Modern Helmet

Today everyone has his/her own two wheeler and there are numerous things, such as carelessness, alcohol, and bad road conditions, can result in traffic accidents. One of the biggest causes is riding in raging rain. Riding in heavy rain while unable to see anything could lead to an unanticipated accident. The Prototype's major objective is to provide solutions that let drivers commute safely and responsibly. Electronic stability control has made cars safer than ever and given them a larger choice of features. The intelligent Headgear is designed to offer the same protection for bikes. Thanks to features like the built-in wiper, the user is shielded from spills, dust, and pollution while driving.

These references all helped the project's development and were used in this study.

Objectives

Following are the objectives of proposed paper:

- Accidents in rural areas can be quickly and easily recognised, and medical assistance can be given.
- Your risk of a serious head or brain damage can be reduced by 88% by wearing a correctly fitted bike helmet.
- Helping people who are facing emergency situations.

Literature Survey

As mentioned in paper[1], after two years of excavation at Ayios Ioannis and the new hospital site in Knossos, the helmet was initially published in 1952. The helmet was found in Grave V at the latter site, together with a rapier and a spearhead, as well as stone vases (three of alabaster and two of other materials). Boar's-tusk helmet from Dendra with bronze cheek plates that closely resemble those on the helmet from Knossos conical bronze helmet from the unknown find-spot and, finally, the bronze helmet from Knossos with its bronze cheek plates, conical cap profile, and spool-shaped socket. These three helmets thus far define the transition from boar's-tusk helmets to the oldest European metal helmets.

A model of motorcycle rider’s intentions to use helmets with quality standard labels in Indonesia has been put forth as mentioned in this study paper[2]. The suggested model incorporates both the information signaling theory and the hierarchy of impact theory. The findings of the investigation demonstrated the validity, reliability, and goodness of fit of the suggested model. The study also showed that attitudes about helmets with quality standard labels and perceptions of risk have a big impact on whether or not people intend to wear them. Label marketing has a big impact on how danger is perceived.Awareness has a huge impact on attitude.
Investment in label marketing and clarity have a big impact on awareness. The findings of this study can be used by the government to choose the best tactics for increasing motorcycle riders' intentions to wear helmets that have a quality standard label. This research has several restrictions.
Data was initially exclusively gathered in Jakarta.
Second, a cross-sectional survey was undertaken, and convenience sampling was the method of data collection.
It is advised to undertake a longitudinal research in additional scenarios to assess the model's stability.

For both bikers and pillion riders, wearing a helmet was considered an independent variable.

The percentage of people wearing helmets on high-traffic roads and in the inner city varied by gender, day of the week, timing, and weekend.We can infer from the discussion of the paper [3] that 30% of pilions and approximately 20% of riders did not wear helmets.Both users had poor compliance with ISI (Indian Standard) helmets and poor helmet buckling.

Prevalence and effect of interventions Thailand and Vietnam both reported implementing helmet use laws for drivers and passengers, and in both reviews, helmet use significantly increased compared to before the laws were implemented in both countries which we found in study paper[4]. Reviewing the available data revealed that ASEAN nations use motorcycle helmets less frequently than is ideal, and half of ASEAN nations assessed their motorcycle helmet enforcement as lacking. Expanding national and local initiatives to promote the usage of motorcycle helmets seems effective and promising.

Study paper [5] describes that, a helmet is one of the items that motorcycle users are advised to use in order to lower their risk of being involved in accidents.According to empirical studies, wearing a helmet can lower the probability of being involved in a motorcycle accident. According to Rice et al(2016) .'s investigation, using a helmet may lower the probability of brain injuries by 60%, fatal injuries by 56%, and neck injuries by 37%. A study of 61 studies examining cyclists' use of helmets was done by Liu et al. in 2008. Helmets can lower the risk of fatality from motorcycle accidents by 42% and of head injuries by 69%, according to the review's findings.

A baseline study was carried out in paper[6] which describes that the entire state of Rajasthan was covered by the study, which was carried out in each of the state's seven administrative divisional headquarters.As the most effective form of protection available to motorcyclists, a motorcycle helmet is the best piece of safety equipment one may wear when operating a motorcycle.

Numerous studies have been performed in paper[7], where authors have found that motorcycle helmets have benefits and are advised for use even though there are some drawbacks, such as the fact that their use impairs rider vision and increases neck injuries. Motorcycle helmets have been found to lower the risk of death and head injuries in motorcyclists who crash. The development of kinematic head injury assessment functions and knowledge of the biophysical features of the head served as the foundation for the evolution of helmets (Newman, 2005).In order to distribute the applied force, it was determined that a hard outer shell was necessary.

The CMS SUV Apribile modular motorcycle helmet made by CMS Helmets was the one utilized in this study [8].The dual-density energy-absorbing liner and the shell of the designed FE helmet are made up of three separate parts: the primary padding, which covers the entire cranium but does not include the temporal region, the forehead padding insert, and the lateral padding.The features of the various meshes are depicted in Fig 2 and described in Table III. Expanded Polystyrene (EPS) foam is used to make the lateral liners, which have a density of 90 kg/m3, and the remaining interior surfaces, which have a density of 65 kg/m3.Values for thickness range from 10 to 50 mm and are inversely related to density. The 3 mm-thick Acrylonitrile Butadiene Styrene (ABS) exterior shell is composed of this material.

You should be aware that the motorcycle and the helmet were not created to go together. But it didn't take long for a link to be made between safety and wearing a helmet was studied in literature[9]. A British physicist named Eric Gardner began treating patients in 1914 who had suffered injuries in motorcycling accidents. He had the concept of creating a helmet to protect the heads of these reckless motorcyclists as a result of the numerous cases he saw. Therefore, it is clear that the first helmets and laws were introduced in 1914. In the direction of making motorcycle helmets more commonplace .T.E. Lawrence, a well-known army general, passed away in 1935, which marked the beginning of everything changing.He passed away as a result of injuries sustained in a motorcycle accident. This brought to light the dangers of riding a motorcycle while not properly equipped. The first fiber motorcycle helmet was created by an Italian company in 1954. Today's top motorcycle manufacturers provide helmets that were created in laboratories using cutting-edge technology. Not only is safety crucial, but comfort essential as well.

The idea of an intelligent Headgear is used extensively throughout the world, and many of these firms have entered the market for helmet designs. However, certain nations, such as Sri Lanka, still do not permit motorbike riders to use intelligent Headgears while regular riding. On the other hand, the Sri Lankan government has also outlawed the wearing of full-face helmets by bike riders in general. Despite this, it is evident from the aforementioned study that individuals are pleased about including intelligent Headgears in their riding. The goal of this study was to apply Kansei Engineering concepts to the intelligent Headgear design that was put out in this paper, which takes into account human emotions during the design process, and the study was taken place in paper[10].

Researchers developed a helmet that prevents traffic accidents in their work. In paper [11] they stated that although most motorcyclists prefer not to wear helmets, they are an essential part of everyone's life. They introduced a helmet that offers bike authentication, road hazard warnings, and the ability to record audio files in memory by just pressing the button that is assigned to the helmet. They needed a headphone, an internal microphone, a push button switch, a GPS satellite, and a memory card to incorporate this type of logic inside the helmet. The bike engine only begins in the results when the helmet is close to the bike.When a user wants to erase an audio record, they can do so by clicking a single button because they are kept in memory.

They created a helmet that only operates when the biker is sober and wearing a headgear . Additionally, the device will notify the local police station and family members in the event of an accident as mentioned in paper[12]. The system needs parts such as the MQ-3 Alcohol Gas Sensor, GPS, GSM, PIR, BAC (Breath Alcohol Content), GaN (Gallium Nitride), CsNO3 (Caesium Nitrate), UNO (Italian word One), LNA (Low Noise Amplitude), and LNA (Low Noise Amplitude). Riders must abide by traffic laws as a result of the system, which also offers systems that are safe and affordable.

Bikes cannot be started if the rider is not wearing a helmet or is intoxicated, and the traffic police are notified through message if a biker violates a rule or drives at an unauthorized pace. The following components are needed to make this system: RF Transmitter and Receiver, LCD, SIM908 GSM/GPS Module, ATMEGA8 Microcontroller, MQ5 Breath Analyzer, and IR Sensor. This helmet passed its testing with flying colors and sends the message that if riders disobey traffic laws, their bikes won't start until they put on a helmet which was described in paper[13].

For bike riders, this technology serves as a monitoring and security system as mentioned in paper[14]. Microcontroller PIC16F844a, 315 MHz Radio Frequency Module, Force Sensing Resistance, BLDC Fan, 5VRelay, LM311 and IC 555, Headlamps, Accelerometer, RF transmitter, RF receiver, and Servo motor components are needed to build this project system. This suggested system monitors riders' physiological conditions because it is up to the system to determine whether or not a rider is capable of operating a bike.

This system's goal is to identify and prevent accidents. Motorcycle riders are frequently required to wear helmets even though they are not breaching the law. In this system, a speed limiter is set for bikes, and the rider must be sober and wear a helmet. GSM, Vanet, WiFi, Bluetooth, and rfid were used to construct this system. This Required communication channels and necessary sensors include alcohol sensors, hall effect sensors, Mobile sensor, force sensing resistor, light-dependent resistor, accelerometer, and vibration sensor , IR sensor, temperature sensor, pressure sensor, gravity sensor, and bioelectric sensor. As a result, intelligent Headgears are particularly successful in preventing traffic collisions and protecting bikers.This concept was mentioned in literature[15] and it will help India develop in a safer and more secure manner.

In paper[16], author mentioned that the bike module and the helmet module are two distinct modules that the authors have included in their suggested system. A 433 MHz RF transmitter is the only component of the bicycle module. The bike module should be kept as simple as possible for ease of installation and hassle-free maintenance. There are four ways to control RF transmission. The indicator and the brake light each provide two control signals. The fourth signal is used to activate or deactivate the functions on the helmet. The following modes of operation are available for the helmet module, which is powered by a rechargeable power source installed on the helmet. On/Off: Using a transistor as a switch and the toggle input from the bike module, the RF signal receiver turns off the power to the control unit, the accelerometer, and the LED array when in the off mode. The system's hardware consists of an Arduino Uno, an LED array, an accelerometer, an RF receiver, and a power supply.

A system that delivers a multipurpose helmet is being proposed (intelligent Headgear) in paper[17]. Thermoelectric cooler, Bluetooth-enabled headphones, an emergency button for use in urgent situations, and an ignition control system are just a few of the intelligent Headgear's features that make it possible for the rider to feel safe, at ease, and able to answer calls whenever they want while riding. Additionally, it transmits signals for theft and accident alerts through the vehicle module using GPS and GSM. The ignition system, which controls whether the car's engine is on or off, is the crucial element in this situation. Since motorcycle engines won't start unless riders are wearing helmets, wearing one is a requirement. Here the use of a microcontroller, RF transceiver, vibration sensor, GPS, GSM modem, helmet with Bluetooth, and ignition control.

The rider's electronic wallet, or E-Wallet, has its balance immediately deducted whenever it comes within range of an RF transmitter. Additionally, the maximum speed limit is set whenever the rider enters the designated speed limiter range, and when that limit is exceeded, an LCD indicates overspeeding and an alarm sounds.This device is intended to be installed on speed boards in order to limit excessive speed. It operates in such a way that, whenever a bike approaches a speed board, its speed limit is automatically adjusted to match that speed, and if the bike exceeds that fixed speed, an alarm sounds to warn the rider.Velocity Limiter and E-Wallet Unit. In study [18] the device is intended to be installed on speed boards in order to limit excessive speed. It operates in such a way that whenever a bike approaches a speed board, its speed limit is automatically adjusted to match the speed of the board, and if the bike exceeds that fixed speed, an alarm beeps to warn the rider. Bike Unit: The receiving component and the control signal make up this segment.

In paper [19] it is mentioned that the MQ-3 gas detector (alcohol sensor) employed by the author in the proposed is appropriate for detecting alcohol content in breath. It can therefore be positioned directly above the additional face protection and below the face shield. The sensor's surface is responsive to different alcoholic concentrations. When the resistance value decreases due to the presence of alcohol on the rider's breath, the voltage changes (Temperature variation occurs). According to government regulations, 0.08mg/L of alcohol is the general limit that cannot be consumed while driving. Threshold will be modified to account for abuse and exploitation. Alcohol sensor installed in the helmet's mouthpiece therefore confirms helmet use by detecting alcohol in the breath and sending the quantity to the RIO. Signals are transferred from the helmet unit to the vehicle control unit using an RF module if the necessary conditions are met.The RIO in vehicle unit two receives the decoded RF signal and uses it to start and stop the vehicle. The vehicle can start if the signal from the alcohol sensor is not present, but it won't start otherwise.

In contrast to GSM technology, the authors of paper [20] employed an IOT panel to deliver alert messages to the implanted emergency number. The system includes Accelerometer, Alcohol Sensor, Global Positioning System, Relay, Bluetooth.

Motivation

These are the motivations of our project:

- The difficulties we encounter on the roadways every day in the actual world serve as the inspiration for this project.
- The goal of this system is to guarantee that all motorcycle riders wear helmets and follow traffic laws.

Proposed System

The intelligent Headgear is a piece of equipment that was developed to make cycling in driving rain safer. This tool helps the biker wipe raindrops off his helmet during periods of heavy rain. As a result, the user does not need to physically wipe the helmet. Thanks to sensors, users may quickly wipe automatically. Principles of Artificial intelligence and machine learning were used in the creation of this system.

The rain droplet sensor, servo motor, Arduino Uno R3, wiper, breadboard, connecting wires for rain sensing, and droplet wiping module make up the helmet system.Analog output is provided via the helmet's sensors.

This system's Rain Droplet Sensor detects the water droplet and, in response, rotates the wiper 180 degrees to wipe the helmet shield.

Also accidents and late medical assistance are the main problems. When an accident occurs, the rider is unable to receive medical attention right away, which results in death. Every second, someone dies as a result of inadequate medical attention or an unattended accident site. The method promptly notifies pre-registered mobile numbers with the correct location using GPS and the ambulance service database of the accident. The closest available ambulance is assigned by the ambulance database to rescue the victims.

Components and their Configuration:

[1] Arduino Uno R3 - A detachable dual-inline-package (DIP) ATmega328 AVR microcontroller is used. as the foundation of the Arduino Uno R3 microcontroller board. 20 digital input/output pins are present (of which 6 can be used as PWM outputs and 6 can be used as analogue inputs) .

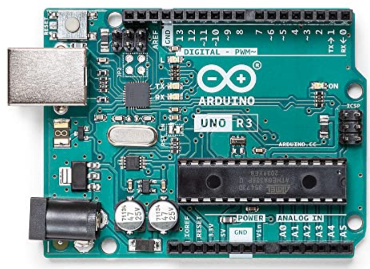

Fig. 3: Arduino Uno R3

[2] Rain drop detection sensor -

The detection unit and the control unit are two separate components of the rain drop sensor. The resistance of the detection device, which comprises conductor strips, varies in response to the presence of rainwater. The entire circuit needed for sensing resistance and voltage change is present in the control unit.

Fig. 4: Raindrop Detection Sensor

[3]Connecting wires - A straight line is used to symbolize a connecting wire.To link electrically between two sites, it is often formed of copper and has insulation.

Fig. 5: Connecting Wires

[4]Servo motors - Servo motors, or "servos," are electronic gadgets and rotary or linear actuators that precisely rotate and push machine parts. Servos are mostly utilized for linear or angular position, as well as for a set speed and acceleration.

Fig. 6: Servo Motor (TowerPro MG 995)

[5]Wiper - An object used to clear rain, snow, ice, washer fluid, water, or debris from a car's front glass is known as a windscreen wiper, windscreen wiper, wiper blade (American English), or simply wiper.

Fig. 7: Wiper

[6] Breadboard -Temporary circuits are constructed using a breadboard, often known as a plugblock. Designers may quickly remove and change components thanks to its usefulness. It is helpful for someone who wants to construct a circuit to show how it works before reusing the parts in another circuit.

Fig. 8: BreadBoard

[7] GPS module-To find and gather data about agriculture, such as yield monitoring, soil sample collecting, etc., a GPS module is employed. The computer system analyses and processes the data to generate the management strategies for farming plots, and then loads the yield and soil condition data into the GPS equipment.

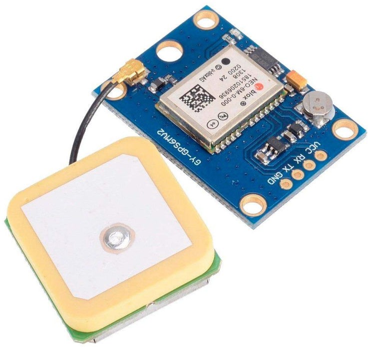

Fig. 9: GPS module

[8]Vibration sensor - Machine vibration levels are measured using a vibration sensor, also known as a vibration detector, for screening and analysis. Industrial vibration sensors are used by maintenance teams for condition monitoring, providing them with information on the strength and frequency of vibration signals.

Fig. 10: Vibration sensor

[9]GSM module-A GSM modem or GSM module is a device that uses GSM mobile telephone technology to provide wireless data access to a network. GSM modems are used in mobile phones and other devices that communicate with mobile telephone networks.

Fig. 11: GSM module

System Work-Flow:

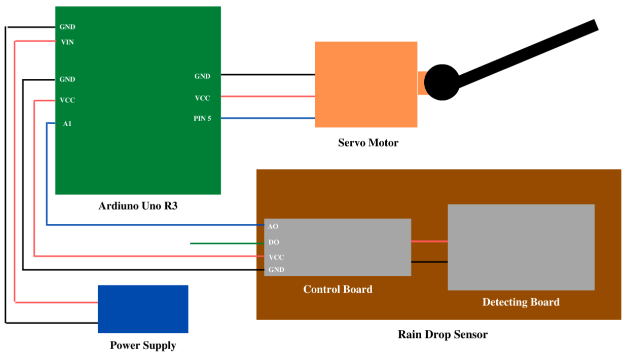

Fig. 12: Block Diagram

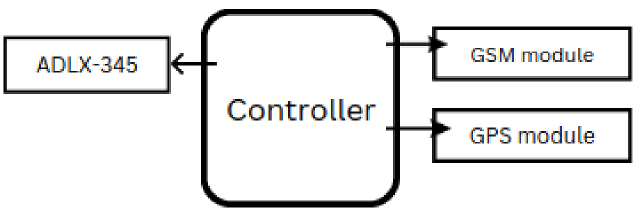

Fig. 13: Block Diagram

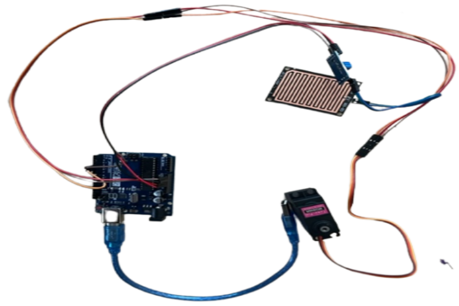

Fig. 13: Wiring Diagram

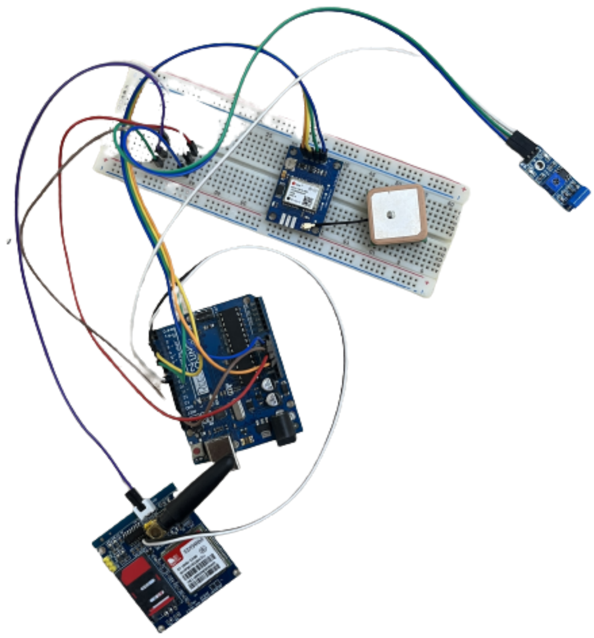

Fig 14: Wiring Diagram

Working:

A) Rain Drop Detection Sensor:

When there is no rain on the detecting board, the resistance is too high, which causes the voltage to increase. Conversely, when there is rain on the board, the resistance decreases, which causes the voltage to increase. When the voltage changes, the control board notices it and communicates the sensor data via the analogue pin.

The control board has four pins: VCC, GND, DO, and VO, as well as two pins for attaching the detecting board.

VCC supplies +5 volts to the sensor, and GND is common ground

Pin DO produces digital data.

AO produces output. The sensor's analogue signal has a range of 0 to 1023.

The value is 1023 when there is no water present, and it is less than 1023 when there is water present.

As the water droplets are detected by the detecting board the resistance is sent to the control unit and control unit gives the Analog signal (sensor value) to the arduino uno where we manipulate that value in our code.

B) Servo Motor (TowerPro MG 995):

The Servo Motor has 3 Inputs VCC (for the Voltage), GND (common ground), and signal which determines how to rotate the motor.

Depending on the manipulated value in the code the servo motor gets command of how to rotate at and what speed to rotate the motor.

As the motor gets signal from arduino uno the motor rotates 180 degree to cover visor of the helmet and speed is automatically determined depending on the Analog Value provided by the sensor.

C) Vibration sensor:

It is able to detect the faint vibration impulses.

In the event of an accident, it detects the pressure and transmits it to the Arduino, which then sends the message to the registered cell number.

D) GPS Module:

The GPS navigation system, which uses a network of satellites orbiting the planet, is used to get the location.

When an accident occurs, sensors like vibration pick up a signal and convey it to the attached microcontroller.

E) GSM Module:

When the bicycle crashes and the helmet strikes the ground, the microcontroller board receives information from these sensors, and the controller utilizes the interface GPS module to collect GPS data.

When the data exceeds the minimum stress limit, the GSM module immediately sends a message to the ambulance or to family members.

The protection of the rider is the main purpose of this helmet. His smart features, such raindrop sensors powered by artificial intelligence and machine learning, can make this happen. This makes both the features of his bike and his helmet intelligent. We came up with the idea for this project as a result of his social responsibility.

This will enable the driver to focus more and lessen the likelihood of a traffic collision. With the aid of Arduino programming, the wiper's speed may be modified in accordance with the severity of the downpour.

Result and Conclusion

All of the parts have been put together and successfully tested. The significance of intelligent Headgears in averting accidents is demonstrated by this study. Helmets should be used in order to reduce the frequency of motorcycle collisions. Designing IOT-based devices is one approach to achieve this.

Bikers' system of security created with intelligent headgear is intended to assist in accident prevention, detection, and reporting, hence lowering the likelihood of an accident.

The creation of this technology makes safe two-wheeler travel possible.If accidents happen, it can lessen head damage.This method uses a GPS to determine the rider's location. In the event of an accident, our system sends a message with GPS coordinates to the predetermined numbers that are programmed using a microcontroller.

To make a straightforward, inexpensive intelligent Headgear, sensors like IR sensors, vibration sensors, GPS modules, and others can be used. For four-wheeled vehicles, the results must be trustworthy, adaptable to government systems, and long-lasting. An innovative helmet design improves rider safety by requiring helmet use. Our Arduino Uno-based invention will be very beneficial in the creation of intelligent helmets that protect people from accidents.

Fig 15: Output

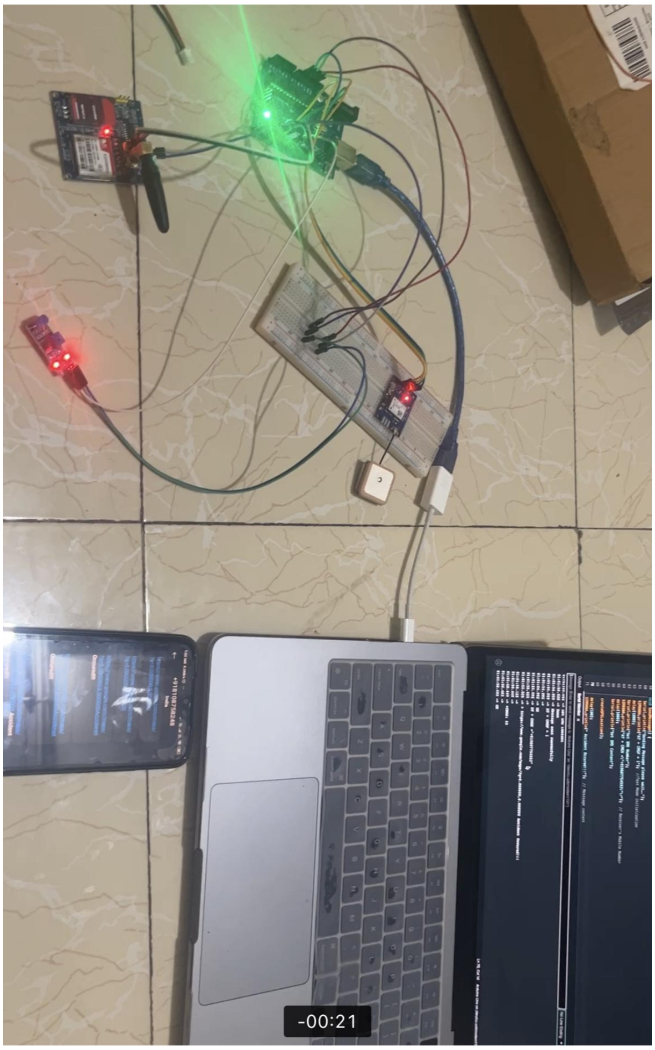

Fig 16: Output

The various applications for this system include:

1. In the future, the helmet can be improved by incorporating augmented reality (AR) technology to offer onscreen navigation.
2. By using nanotechnology in the construction of this circuit, the circuit can be made smaller and easier to mount on a helmet.
3. Cheaper but more potent batteries can be employed to lower the system's overall cost.
4. New features like a GPS or a shock absorber can be installed.

V.References

[1] Modlinger, Marianne. (2013). From Greek Boar's-Tusk Helmets to the First European Metal Helmets: New Approaches on Development and Chronology. Oxford Journal of Archaeology. 32. 10.1111/ojoa.12021.

[2] Rakhmawati, Tri & Sumaedi, Sik & Bakti, Gede & Widianti, Tri & Damayanti, Sih. (2020). Intention to use helmet with quality standard label: an integration model of the hierarchy of effect theory and the information signaling theory. Transportation Research Procedia. 48. 3324-3341. 10.1016/j.trpro.2020.08.120.

[3] Devagappanavar G (2019) An Observational Survey for Assessment of Helmet Usage among Two Wheeler Users in the Metropolitan City of South India. Int J Pub Health Safe 4: 175.

[4] Karl Peltzer & Supa Pengpid. (2014) Helmet use and associated factors among motorcyclists in the Association of Southeast Asian Nations: Prevalence and effect of interventions . African Safety Promotion Journal, Vol. 12, | No. 1.

[5] Rakhmawati, Tri & Sumaedi, Sik & Bakti, Gede & Widianti, Tri & Damayanti, Sih. (2020). Intention to use helmet with quality standard label: an integration model of the hierarchy of effect theory and the information signaling theory. Transportation Research Procedia. 48. 3324-3341. 10.1016/j.trpro.2020.08.120.

[6] Mathur, Alok & Gupta, Shiv & Bandhu, Ashish. (2017). A Baseline Study on Pattern of Helmet Use in the State of Rajasthan, India. Journal of Health Management. 19. 417-434. 10.1177/0972063417717894.

[7] Praveen K. Pinnoji, Zafar Haider and Puneet Mahajan.(2008) Design of ventilated helmets: computational fluid and impact dynamics studies. International Journal of Crashworthiness Vol. 13 |No. 3| June 2008 | 265–278

[8] Fábio A.O. Fernandes, Ricardo J. Alves de Sousa, Rémy Willinger, Caroline Deck. (2013). Finite Element Analysis of Helmeted Impacts and Head Injury Evaluation with a Commercial Road Helmet. International Research Council On Biomechanics Of Injury. IRC | 13- 48.

[9] Pinnoji, Praveen & Haider, Zafar & Mahajan, Puneet. (2008). Design of ventilated helmets: Computational fluid and impact dynamics studies. International Journal of Crashworthiness. 13. 265-278. 10.1080/13588260801933626.

[10] Gamage, Thamodi & Dabarera, Nisansala & Ekanayake, Emnm & Jayasinghe, Pjmsg & Shehan, Dinidu & Jayawardhana, Bjs & Kalansooriya, Pradeep. (2021). An Approach to Design a Smart Helmet Using Kansei Engineering.

[11] K. Sudarsan , P. Kumaraguru Diderot .(2014). Helmet for Road Hazard Warning with Wireless Bike Authentication and Traffic Adaptive Mp3 Playback. International Journal of Science and Research (IJSR).Vol. 3 | ISSN (Online): 2319 - 7064

[12] Nesaian, Mahiban. (2016). Smart Helmet for two wheeler drivers. The International Journal of Advanced Manufacturing Technology. 2. 11-19.

[13] Sobhana, S & Sowmiya, S & Srinathji, M & Tamilselvan, S.. (2021). Smart Helmet. IOP Conference Series: Materials Science and Engineering. 1084. 012116. 10.1088/1757-899X/1084/1/012116.

[14] Deekshitha K. I. & Mrs. Pushpalatha S. (2018) Implementation of Smart Helmet.International Journal Of Engineering Research & Technology (IJERT). Vol. 6 | ISSN (online) 2278-0181.

[15] Anjali Baburaj & Thasni V.T. & Reshma N.S. & Yadhu Krishnan P. & Deepak K.N. 2020 Intelligent Smart Helmet System: A Review. International Journal of Advanced Research in Computer and Communication Engineering. Vol. 9 | Issue 1, January 2020 | ISSN (Online) 2278-1021

[16] Sattar, M.K.; Fayyaz, S.; Waseem, M.; Saddique, M.S.; Usama, M.; Ilyas, H.B. Smart Modular Helmet with an Innovative Information Relaying System. Eng. Proc. 2021, 12, 94. https://doi.org/10.3390/engproc2021012094

[17] Kodanda RGN, Prabhakar HV, Santhosh PB (2015) Smart Helmet: The Next Generation Solar Gadget. Int J Adv Innovat Thoughts Ideas 3: 159. doi:10.4172/2277-1891.1000159

[18] Vashisth Rashmi & Gupta Sanchit & Jain Aditya & Gupta Sarthak & Sahil & Rana Prashant. (2017). Implementation and analysis of smart helmet. 111-117. 10.1109/ISPCC.2017.8269660.

[19] K.Hari Babu & M.Akhila & C.Poojitha & B.Meghana .(May - 2017). Smart Helmet. Journal of Emerging Technologies and Innovative Research. Volume 4, eISSIN 2349-5162.

[20] Pranjal Srivastava & Vatsal Srivastava & Rishabh Chaudhary & Tejasvi Pratap Singh. Design and Fabrication of “Smart Helmet”. IJSRD - International Journal for Scientific Research & Development| Vol. 7, Issue 10, 2019 | ISSN (online): 2321-0613.