IOT BASED SMART HELMET

[1] B.Syamala, [2] N.KiranKumar, [3] T.Taruni [4] V.Sree Siva Naga Surya Prakash

Assistant Professor, CSE Department, Vasavi College of Engineering,Hyderabad.

[2] N. KiranKumar, Assistant Professor ,CSE Department ,JNTUA College of Engineering, Anantapur.

[3] T.Taruni,Assistant Professor ,CSE Department ,JNTUA College of Engineering, Anantapur.

[4] V Sree Siva Naga Surya Prakash, CSE Department, Vasavi College of Engineering, Hyderabad.

ABSTRACT : It's always terrible news when someone we care about gets into an accident. Whatever the cause, motor vehicle accidents are relatively prevalent in India. Most head injuries sustained in major accidents are the result of incorrect helmet use, such as failing to fasten the buckle belt. Helmets prevent fatalities by mitigating the effects of head trauma caused by crashes. In this article, we demonstrate the architecture of a tried-and-true technology for checking whether the rider is wearing a protective helmet while simultaneously saving all the ride's data to a server. From the moment the car's engine is turned on, the system begins recording data on the driver, including whether the helmet is on, how fast they are going, whether an accident has occurred, and where exactly they are. This information might be shared with the local police for use in vehicle tracking or with a nearby healthcare facility so that the harmed rider can receive immediate care. Currently, the project proves that an authorized user, such as a rider's parents or guardians, can view the data.

Keywords— Helmet, Two wheeler vehicle, Micro-controller, Sensors, Internet-of-Things, Server, RF transmitter, Hall effect , GPS

1. INTRODUCTION :

It's possible for anything to go wrong at any moment and at any location, and we call it an accidents. Accidents could be caused by a variety of reasons, including bad driving, automobile malfunction, or mystery. However, the aftermath of a collision may be devastating, with severe or even deadly consequences for the driver and other road users. The motorist's negligence is the primary cause of these incidents. The Ministry of Road Transport & Highways, Government of India, reports that per 60 minutes 55 accidents occur and Seventeen individuals have died on Indian roadways. We saw a sum of 480652 events in 2016. Deaths from traffic accidents in India number 34,8 percent, with 52,500 of them being caused by two-wheeled vehicles. Professionals in charge of traffic are constantly issuing directives to drivers. Though a significant fraction of them break the regulations. More than half (61%) of the fatalities in such crashes may be attributed to excessive speed. In the event of an accident, the rider's head and body will take a far heavier toll if no helmet was worn. From a total of 52,500 two-wheeler motorcyclists involved in traffic accidents, it was determined that 10,135 riders (19.3%) were not wearing a helmet. The most active age group, 18–45, also accounts for the biggest percentage (68%) of accidents. Both at-home family and traffic officials express this concern.

These days, most nations have made it law that motorcyclists must wear protective gear and limit their speed. However, users continue to disregard the guidelines. Many experts have put in many hours toward a solution to this pressing problem.

In the first level only, the engine will not turn on unless the rider is wearing a protective helmet, thanks to mechanical means[2, 3]. It is possible to add multiple sensors that will further reduce the likelihood of major accidents [4]. These techniques guarantee the helmet will be properly fastened to the motorcyclist's face. In the scenario of an accident, immediate medical attention must be given to the wounded; the position of the vehicle must be determined; and it is unknown the extent to which the passenger is secure after the tragic event and can tell his own safety.

Still, the prospect of an incident is a major source of worry for the rider's loved ones, therefore a technology built on the Internet of Things (IOT) is suggested, that monitors the motorcycle's speed and position in real time.

This technology also offers data on where the helmet was positioned while it was worn. Involved parties, such as parent / guardian or family members, may access the whole history through a web or mobile app.

2.LITERATURE REVIEW:

While conducting this review of literature, we came across several sophisticated helmets that used a wide variety of techniques and strategies.

It was suggested by C. J. Behr et al. [2] that miners use sensor helmets to monitor air quality and detect dangerous events. This technology uses an electrochemical sensor to determine the presence of hazardous gases like carbon monoxide, sulphur dioxide, nitrogen monoxide, and particles in the air, and an infrared sensor to monitor for the absence of a protective helmet. By employing the Head Injury Criteria, an incident is also recognised when a worker is hit by an item perpendicular to the head with a force greater than 1000. The HIC was computed in program using data from an accelerometer to determine the velocity of the head after impact.

A sophisticated helmet-mounted accident-reporting system was designed by Edna Elizabeth et al. [3]. The sophisticated helmet system is equipped with a number of sensors, which detect an accident by analysing any unusual or atypical readings from the sensor systems and then sending a signal to Pager Duty through the embedded microprocessor. Once a driver registers a mobile number with Pager Duty, they will get a call to that number. In the event that the passenger does not answer the call within five min of it being placed, the emergency contacts will be notified. Notifications will be sent through text or email and voice call to the contact numbers until they respond. This technology guarantees the prompt and accurate distribution of accident-related data in real-time.

When it comes to detecting bikes that are going too fast, Rashmi Vashisth et al. [4] suggested a solution that makes use of Piezo electric buzzers and is fitted with a technology called a velocity limiter.

it limits how fast you can go on your bike. Also included is an accelerometer for monitoring accidents and a function dubbed ALCHO-LOCK to prohibit riders from driving under the influence of alcohol. There is a mist detector built into this setup to aid the rider's vision in hazy conditions. As an added convenience, the system may debit the necessary funds directly from the rider's wireless virtual wallet without the passenger requiring a stop.

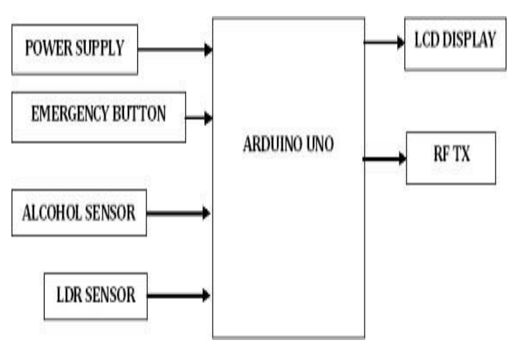
A device built by Selvathi et al. [5] can tell whether a cyclist has drunk alcohol or not and if they are wearing a helmet automatically. If all of these criteria are satisfied, the relay controlling the engine will activate. The device's microcontroller controls the relay and, by extension, the ignition. This device may also detect a bicycle accident anywhere and notify the appropriate party.

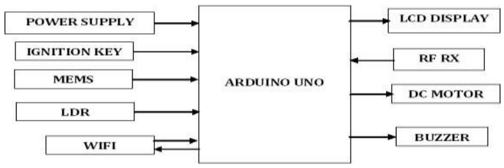
A mechanism that requires the driver to put on the helmet before starting the engine was described by Archana D et al [6]. The helmets will automatically lock and turn on the bike's engine when the rider dons it. To further warn the user, an ultrasonic sensor detects the speed of vehicles coming from either side of the bike and sends sensations to the handlebars.

Sayan Tapadar et al. [7] developed a way for a "smart helmet" that could tell if the rider has been wearing the helmet, if they had taken too much alcohol, and if they had been in an accident. This setup collects data from several sensors, such as an accelerometer and a pressure sensor, and then uploads it to a cloud platform using an API so that a support vector machine may be trained (SVM). So that in the future sufficient data may be gathered and analyzed to offer higher precision regarding event detection, SVM has been developed. A Bluetooth link between the suggested system (smart helmet) and a smart device would allow it to access the web API.

3. PROPOSED SYSTEM

To begin, our "SMART HELMET" project will verify that the rider is wearing a helmet by sensing whether or not the rider's head is present within the helmet. This helmet employs wireless switching technology to replace cables, making it impossible to ride a bike without the key. In addition, the bike will not start if the driver is intoxicated, since an alcohol sensor will analyse the motorist's breath at each ignition turn. GSM and GPS technologies are utilised to improve road safety. There are vibrational sensors attached to a microcontroller board that are strategically positioned in the helmet in areas where the wearer is most likely to take a blow. Therefore, these sensors detect and provide to the microcontroller board, where the controller extracts Location information using the GPS module linked up to it when the rider falls and the helmet hits the ground. If the data collected is over a certain threshold, the GSM module will notify emergency services or family members.





BLOCK DIAGRAM

4 .SYSTEM OVERVIEW

MICROCONTROLLER:

This component serves as the project's central nervous system. To put it simply, a microcontroller and its supporting components such a crystal and capacitors, reset and pull-up resistors (if necessary), and etc make up this part. The microcontroller is the brains of the operation, as it directs the flow of data between the many enabled devices and interacts with them in accordance with the program's instructions.

ARDUINO UNO

SPECEFICATIONS:

Microcontroller ATmega328

Operating Voltage 5V

Input Voltage (recommended) 7-12V

Input Voltage (limits) 6-20V

Digital I/O Pins 14 (of which 6 provide PWM output)

Analog Input Pins 6

DC Current per I/O Pin 40 mA

DC Current for 3.3V Pin 50 mA

Flash Memory: 32 KB of which 0.5 KB used by bootloader

SRAM 2 KB

EEPROM 1 KB

Clock Speed 16 MHz

Liquid-crystal display (**LCD**):

This electronic visual display exhibits the light modification characteristics of liquid crystals in a flat panel display. Light is not directly emitted from a liquid crystal. LCDs may display anything ranging from a static picture to a moving one, like a digital clock's hands, or something more predetermined, like a list of text or numbers.

power source unit

A step down transformer receives an ac signal from the main supply board at 230 volts and 50 hertz. The output of the transformer is chosen to be between 10 and 12 volts. Therefore, the power supply's primary purpose is to provide an output of +5v, the voltage needed by the logic families. The following diagram illustrates a regulated 5v supply.

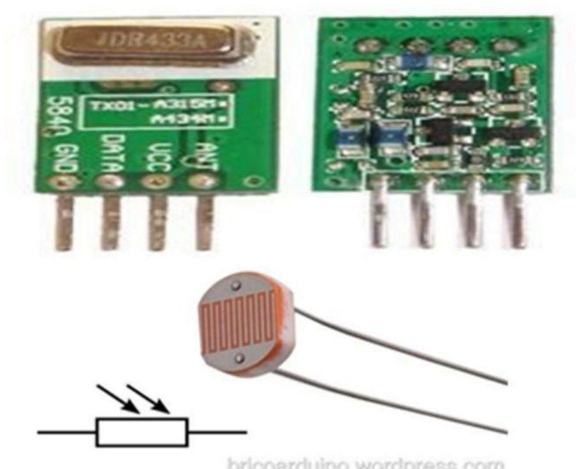
Diagram of the Power Source Unit Connecting the ac voltage (normally 230v) to the transformer reduces the ac voltage to the dc voltage (which often has some ripple or ac voltage volatility) through a simple capacitive filter.

Input dc voltage from a battery may be used by a regulator circuit to produce a ripple-free, controlled output voltage. Several different types of voltage regulation IC modules are often used to achieve this result.

Motor, Direct Current

The principle behind a DC motor is that opposite magnetic poles attract one other and similar poles repel each other. When a current flows through a coil of wire, an electromagnetic field is created that is perpendicular to the axis of the coil. Switching the direction of the current in a coil may cause the magnetic field it generates to change directions by 180 degrees, or the current can be turned on or off to turn off the field entirely.

LDR:



The light dependent resistor (LDR) registers the amount of light hitting it. In light/dark sensor circuits, Light Dependent Resistors (LDRs) shine as a helpful component. The resistance of a light-dependent resistor (LDR) is normally quite high—as high as 1,000,000 ohms—but reduces considerably when exposed to light.

ALCOHOL SENSOR:

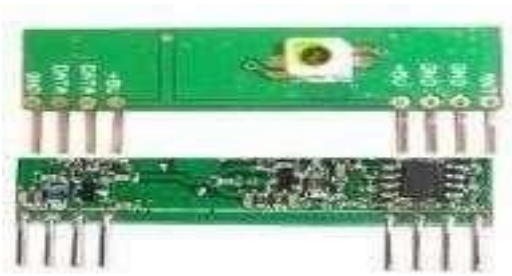
The ALCOHOL Sensor (MQ2) module may be used to detect gas leaks (home and industry). H2, LPG, CH4, CO, alcohol, smoke, and propylene may all be detected with this device. Its great sensitivity and quick reaction time allow for immediate measurement. A potentiometer allows you to fine-tune the sensor's sensitivity.

RF TRANSMITTER

When a greater range and lower price point are mutually desirable in a remote control, turn to the STT-433. The transmitter is powered by a 1.5-12V input, making it suitable for use with batteries. The SAW-stabilized oscillator used in the transmitter provides precise frequency control for superior range performance. Since both the output power and the harmonic emissions may be easily adjusted, meeting FCC and ETSI standards is straightforward. Because of its cheap price and simple SIP-style packaging, the STT-433 is well-suited for high-volume deployments.

International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 06 Issue: 11 | November - 2022 Impact Factor: 7.185 ISSN: 2582-3930

RF RECEIVER:



The STR-433 is excellent for short-range remote control applications where affordability is of the utmost importance. Except for the antenna, the receiver module requires no external RF components. It produces almost minimal emissions, making FCC and ETSI certifications simple. The super-regenerative design has a high sensitivity at a reasonable cost. The STR-433 is excellent for big volume applications due to its manufacturing-friendly SIP style package and inexpensive cost.

MEMS:

Microelectromechanical systems (MEMS) describes very tiny machines. These devices form a set, and we can tell a lot about them from their small size and the way they were designed. These sensors can be designed using parts that are just one to one hundred micrometres in size. These gadgets range in complexity from simple mechanical structures to intricate electromechanical systems with many moving parts that are controlled by built-in micro-electronics. Micro-actuators, micro-structures, micro-electronics, and micro-sensors are typically all integrated into a single device in these types of sensors.

5. RESULTS

Fig: Hardware setup

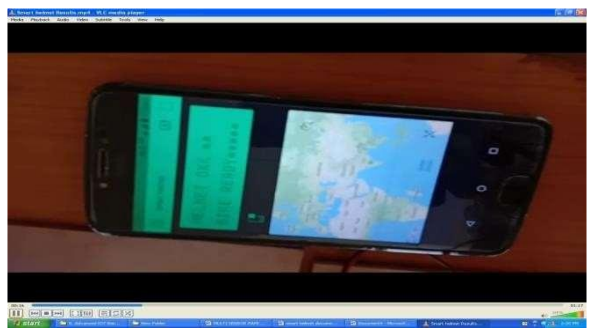


Fig: Showing the result in the google maps

6. CONCLUSION

This would enable passengers to check the vehicle's speed at any time. If everyone uses this method, the number of accidents can be reduced and the government make helmet mandate can be put into effect. To reassure themselves that their children are safe, concerned parents and guardians might check the vehicle's speed and whether or not their children are wearing helmets.

In the long run, this concept can be implemented at controlling traffic offices or any organisation that can monitor all driver information and, in the event of an accident, dispatch an ambulance or other medical assistance immediately. which can help save a life by getting someone the care they need sooner rather than later.

7. REFERENCES

I. [1] P. I. Bureau, "Road Accidents in India- 2016," *Government of India, Ministry of Road Transport & Highways* , 2017. [Online].

II. Available:

III. http://pib.nic.in/newsite/PrintRelease.aspx?relid=170577.

IV. IV.

V. [2] A. Garg, S. Gupta, and H. Kaur, "Smart helmet," *Int. J.Comput.Appl.* , pp. 19–22, 2004.

VI. VI.

VII. [3] K. Singh and R. Nandu, "Smart Helmet for Two-Wheelers," *Adv.Automob. Eng.* , vol. 3, no. 1, pp. 1–2, 2014.

VIII. [4] M. K. A. Mohd Rasli, N. K. Madzhi, and J. Johari, "Smart helmet with sensors for accident prevention," *2013 Int. Conf. Electr. Electron. Syst. Eng. ICEESE 2013* , no. December, pp. 21–26,2013.

IX. [5] Texas Instruments, "Digital-Switch Hall Effect Sensor ," *DRV5023 datasheet* ,May 2014[Revised Sept.2016].

X. [6] Sky lab "Ultra High Sensitivity and Low Power GPS ReceiverModule" *SKG13C datasheet* April 2010 [revised March2012]

XI. [7] InvenSense Inc. "MPU6000and MPU-6050ProductSpecification"Document Number:

XII. PS-MPU-6000A-00Revision: 3.4Release Date:08/19/2013

XIII. [8] Raspbery pi "RAspberry pi 3 B model" Datasheet also available:

XIV. "http://docseurope.electrocomponents.com/webdocs/14ba/090076 6b814ba5fd.pdf"

XV. [9] knit "Makerville Knit"document available

XVI. :https://makerville.io/knit/#misc-get-in-touch"

XVII. [10] Nitin Agarwal, Anshul Kumar Singh, and Pushpendra Pratap Singh, Rajesh Sahani "SMART HELMET"International Research

XVIII. Journal of Engineering and Technology(IRJET)e-ISSN:2395-0056 Vol. 2, 02 May 2015

XIX. [11]Tutorialpoint"HTTPtutorial"tutorialpoint.com Available: " https://www.tutorialspoint.com/http/ "

XX. [12] Python Software Foundation U.S "Python, python 3" Library available :"https://docs.python.org/2/library/urllib.html"