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INTELLIGENT HELMET SAFETY SYSTEM

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Abstract— Smart helmet is a modern innovation for head protection. With more two-wheeled vehicles on the road, accidents are happening more often. The use of alcohol, not wearing a helmet, and failing to report an accident in a timely manner are major contributing factors to accidents. The primary objective of the project is to provide superior safety and protection to the wearer. For that purpose, the helmet is equipped with sensors such as an MQ sensor, Infrared Sensor, accelerometer, GPS module, and Wi-Fi-enabled NodeMCU as a Microcontroller by using. If the person doesn't wear a helmet or consumed alcohol the bike will not start. The location of the accident is sent in an alarm message to the carer if the helmet senses a sudden impact or excessive force. This system can be further used in sports applications, and industrial settings, and provides safety to the wearer all the time.

Keywords: MQ Sensor, IR Sensor, Wi-Fi enabled NodeMCU, GPS.

INTRODUCTION

In today's world, the safety and well-being of individuals have become an important role. The general people will gain very little from the notion of expanding this enterprise. Two-wheeled vehicle use has increased as a result of the growing population. The frequency of accidents is on the rise the reasons might be numerous, for example, the quick riding of the bicycle, no legitimate driving information, smashed and drive. With the increasing number of accidents, there arises a demand for innovative solutions. This system consists of Wi-Fi-enabled NodeMCU as a microcontroller IR Sensor, MQ sensor, GPS module, accelerometer, ignition key, and buzzer. For instance, by taking into account the three key prerequisites for keeping a healthy distance from accident sources, making it mandatory to wear a helmet, Avoiding drinking and driving, and If someone were to have an accident, no one would be there to help them. Almost every year many people are died because of the absence of treatment at the appropriate time. The reasons behind this, are no people at the accident spot, and the late appearance of the rescue vehicle. To avoid this kind of circumstance in our daily life we proposed an idea to resolve this issue by giving information about the accident in time. The sensors will determine if the cyclist is wearing a helmet and smelling for signs of intoxication the information is given in time, we can save a large portion of lives due to accidents. The information is about the area of a mishap through the GPS module to the guardians. we choose to send an SMS, utilizing a GPS module. By using the GPS module's information, the microcontroller sends the SMS that gives information about the longitude of a region to relatives.

OBJECTIVE OF THE SYSTEM

The Helmet is to provide safety to the rider by utilizing IoT technology. Nowadays it is required to wear a helmet for both rider and pillion rider. The sensors will determine if someone is wearing a helmet and will analyze their breath for alcohol concentration. The bike will not turn on the ignition key. If the rider does not wear a helmet. This will help to reduce accidents. If the rider wears the helmet and consumed the alcohol, the alcohol sensor identifies the liquor substance and prevents from beginning the bike. If the person wears the helmet without consuming alcohol, any occurrence of an accident, the SMS will be sent to the chosen guardian by using the cloud information. This information can save a large portion of lives due to accidents.

SYSTEM ARCHITECTURE

The first step is to initialize all sensors connected to the controller board and the next step is to wait for the signal from the IR sensor

for detecting the helmet and wait for the signal from the alcohol sensor for identifying the bike rider's alcohol intake. The bike will start with the ignition key if the rider is wearing a helmet and has not consumed alcohol; otherwise, the ignition locks. Find the longitude and Lamade of the vehicle using the GPS Module. Continuously monitoring vehicle accident status using an accelerometer. Connecting to Wi-Fi Communication and establishment of communication between the controller and IT cloud platform using HTTP. Sends data to the Things Head Cloud platform
using HTTP. If any accident is detected, send an alert to family members using GSM technology including a location link.
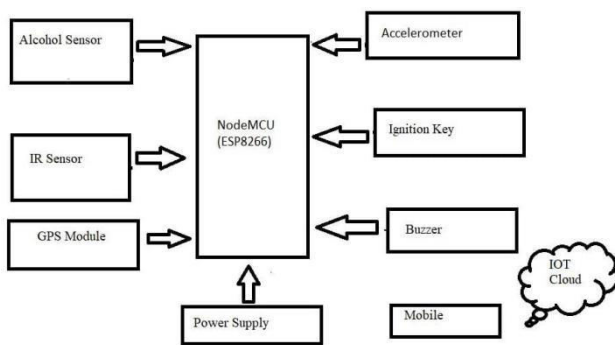

Fig. 1: Block Diagram

HARDWARE MODULES

• Infrared sensor to discriminate between shading and separation, this IR intelligent sensor module used the TCRT5000 IR Sensor. Both an IR transmitter and an IR receiver are included in this sensor module. The IR receiver detects the IR transmitter's signal after it is repeatedly discharged, reflected by a snag, and then received. Since the TCRT5000 Infrared Reflective Sensor Module can determine whether a surface is white or black, it is frequently used in object-arranging robots and line-following robots. The estimated spacing spans from 1mm to 8mm, and the main problem is about 2.5mm. Changes to the affectability can also be made using a potentiometer on the PCB. When the module is powered ON, the infrared diode will continuously transmit infrared if the discharged infrared light has not been reflected or the quality is insufficient. The yield stick, for example, DO, will be LOW and the recipient diode will

be in the off-state.

• NodeMCU: - NodeMCU an ESP8266 Wi-Fi module is required by the NodeMCU IoT module. The Lua programming language is used by the open-source Internet of Things (IoT) platform NodeMCU. This module houses the CH340g USB to TTL IC. The Node-MCU IoT Module has the following features:

o Open-source IoT Platform

o Easy Programmability

o Low cost and simple implementation on WI-FI enabled

• An electromechanical device called an accelerometer (MMA7361) is used to monitor acceleration forces, which can be static or dynamic. The location of the helmet and the rider's head angle are continuously monitored by an accelerometer, which is helpful for calculating the likelihood of accidents.

• There will be either static or dynamic forces. The location of the helmet and the rider's head angle are continuously monitored by an accelerometer, which is helpful for calculating the likelihood of accidents.

• MQ-3 alcohol detector This semiconductor gas sensor module is easy to use and requires little effort to produce. The MQ3 Alcohol gas sensor is used in this module as a component for detecting alcohol gas. There are no additional components needed; all you need to do is connect the ground and Vcc pins. An onboard potentiometer may effectively establish the edge worth for digital yield. You may easily connect an MQ3 alcohol sensor to an Arduino or other microcontroller by using this module. This Gas Sensor module may be used since it is sensitive to alcohol.

• Buzzer: a signaling gadget with sound. It is either mechanical, electromechanical, or piezoelectric. Typically, DC electricity is used to power it. According to the various designs, it may emit a range of sounds, including alarm, melody, bell, and siren. The '+' sign or a longer terminal is used to indicate that this is a positive terminal. The negative terminal, which is connected to the GND terminal, is indicated by the short terminal, or '-' symbol, whereas the positive terminal is powered by 6 volts.

RESULTS

The outcomes are Only when a helmet is worn does the ignition turn on; otherwise, it turns off. If the user is wearing a helmet but is intoxicated, the ignition will turn off. If the user had an accident, a message with GPS-based

latitude and longitude directions would be sent to the appropriate cell phone. To access the information about the motorcycle rider, IOT can save the data in the cloud. A buzzer lets others know what the conditions are for the bike rider. The user can now understand why the ignition turns on and off. Our intelligent helmet is particularly effective at protecting motorcycle riders from traffic accidents.

ACCIDENT OCCURED AT LOCATION: https://www.google.com/maps/place/18.02167,79.54506

APPLICATIONS

•   In the motorcycle industry, where they may shield riders from head injuries and offer extra capabilities like communication, navigation, and real-time monitoring, intelligent helmet safety systems are used the most frequently.

•   Cycling and mountain bikers both employ intelligent helmet safety systems to add extra protection and functions like GPS tracking, real-time monitoring, and communication.

- Construction: While working in dangerous areas, construction workers employ clever helmet safety devices to protect themselves from falling items and keep an eye on their vital signs.

FUTURE SCOPE

On the helmet, several bioelectric sensors may be incorporated to assess different activities. We may capture the actions of the drivers using a little camera. By employing a wireless transmitter, it may be utilized to send messages from one vehicle to another. Additionally, the research focuses on accident avoidance and suggests a mechanism to obey the regulations. We may include the speed and distance calculations made before the collision to further enhance the situation. Next, use the helmet to forecast navigation while regulating the headlights, braking, acceleration, and storage locking mechanism. We may incorporate a bike's speed control system and a helmet that shows the speedometer reading. Next, add a further feature, such as a digital sign and message board. By doing so, we can increase the effectiveness of bike automation and effectively lower the accident rate.

CONCLUSION

There are many instances of ID mistakes. Our experiment shows that our proposed framework is accurate in preventing accidents by employing the dazzling helmet that is outfitted with a range of potent sensors to detect excessive alcohol intake. The precision and exactness of our experiment are quite high. The correlation between the accident detection criteria highlights how crucial it is to wear a helmet. Some problems can be successfully solved with a clever protective cover. It is crucial to put on protective headgear and maintain composure before starting the bicycle to reduce the likelihood of accidents. Accidents certainly happen sometimes, whether or not someone is paying attention. Here, our engine turn-off component significantly reduces the likelihood of deaths. The sharp head protector functions as a Protector who patrols the streets as a fictitious police officer, keeping the drivers in check and enhancing safety.

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