SMART HELMET BASED ON IOTTECHNOLOGY

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ABSTRACT:

The globe is currently seeing a new technological advancement called the Internet of Things (IoT). Thanks to IOT, we may now connect our commonplace devices to a network for the sole goal of exchanging data. Due to the increase in the number of 2-wheeled motor vehicles on the road, accidents are occurring more frequently. When the victim was not wearing a helmet, his accident was not reported in a timely manner, or he was riding while inebriated and could not be saved, a major portion of fatalities occur. The suggested techniques can see accidents, recognize helmet wearers, and tell if someone has had too much alcohol. An ultrasonic sensor is incorporated to prevent accidents if other vehicles approach the bike from a predetermined distance. It will also beep when the rider exceeds the given speed limit.

KEYWORDS:

IOT, HELMET, BEEP, ULTRASONIC SENSOR, ALCOHOL.

INTRODUCTION

It's remarkable how obsessed people are with motorcycles today, especially the younger generation. Middle-class families prefer to buy motorcycles over 4-wheelers due to their reasonable prices, huge variety, vigorous competition among 2-wheeler manufacturers, and durability. Road accidents also climb everyday [1] as the number of motorcyclists in our country rises, which results in an increase in fatalities. Most of these fatalities are caused by the most frequent mistake of failing to wear a helmet, and many more are caused by injured people delaying seeking medical help.This makes it more important for us to think about creating a system that ensures bikers' safety by requiring them to wear helmets in compliance with legal requirements and to get the right medical care as soon as possible after an accident. The concept is to safeguard bikers' security and safety in order to prevent accidents. The circuit layout prevents the bike from starting without a helmet. It introduced a security mechanism on the rider with the proper helmet usage prior to riding.Microcontroller 8051-based circuitry is used in this system instead of more complex Java programming languages (JavaScript, j2me) [2]simple to use and based on an RF link. If the motorcycle detects a signal from the helmet, it can be moved with an RF transmitter and receiver. Our main objective in developing this training is to increase motorcycle safety. A traffic accident is any automobile collision that occurs on a public road. (i.e., originating on, terminating on, or involving a vehicle partially on the highway). Therefore, crashes involving vehicles and people, animals, or immovable objects are also included in this category. Here, we created a system that verifies the two circumstances before starting the motorcycle's engine. Our system has a helmet sensing switch and an alcohol sensor [8]. To determine whether the cyclist is wearing a helmet, a switch is employed. A biker's intoxication can be determined using an alcohol sensor, and the MCU receives the output. The helmet is equipped with both the switch and the alcohol sensor. The engine won't start if either of the two requirements is broken. Here, the alcohol sensor MQ3 is utilized to measure the amount of alcohol in the driver's breath.

MATERIALS:

HARDWARE TOOLS:

1. Microcontroller
2. Relay
3. GSM module
4. GPS Module
5. RF Modules
6. Encoder/Decoder
7. Relay unit
8. IR

9. Power supply module

SOFTWARE TOOLS:

1. Arduino IDE compiler
2. Embedded C

METHODS:

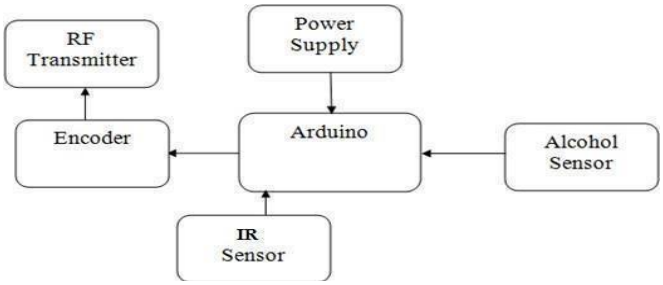


FIG1. HELMET SECTION BLOCKDIAGRAM

Our Finding out whether or not the helmet is worn is the first step. If a helmet is worn, the ignition will turn on; otherwise, it will stay off until a helmet is removed. We employ IR sensors for those. Alcohol detection is the second stage. Alcohol sensors are used as breathalyses to detect the presence of alcohol in the rider's breath; if the amount detected exceeds the allowable range, the ignition will not turn on. To the registered phone, the message will be sent. These employ the MQ-3 sensor. Ignition will begin once these two requirements have been met. Accidents and delayed medical assistance are the third main problem. If the rider is in an accident with him, he cannot get medical care right away, which is a major cause of deaths. Every second, about one person dies as a result of ignored injuries or delayed medical care. For fall detection, we attach an accelerometer to the bike unit. We can identify whether an accident has occurred thanks to these methods.

Two different microcontrollers are used in this project, each gadget has used a separate microcontroller; we use Arduino for the bike unit and the helmet unit. Signal transfer the between the bike unit and the helmet unit uses an RF concept.

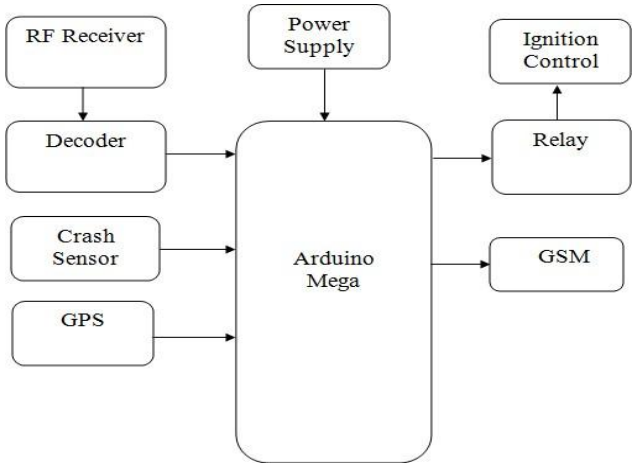


FIG2. VEHICLE SECTION BLOCK DIAGRAM

It could provide a more accurate detection. It can reduce the number of accidents brought on by distracted driving without a helmet, automatically halting, and controlling the vehicle. The controller alerts the GSM module, which subsequently sends the message to the hospital with a GPS location, when an accident is detected by an accelerometer. rapid wireless information transfer and an anti-corruption campaign.

RESULTS:

The following are the conclusions and the results' implications for the future.

- The device won't let the rider start the car if they are not wearing a helmet.
- The bike's engine won't start if the rider has been drinking, which is detected.
- It recognises an accident when it happens and sends a location-based notification to the registered contacts.
- The device alerts the rider when the speed exceeds the limit.
- It alerts the rider if any other vehicles are getting close to the bike.
- The individual needs to have a driver's licence to use the bike.

These are the results in terms of the potential future.

1 For added security, biometrics and fingerprint unlock can be enabled.

2 Include a microphone and Bluetooth speakers within the helmet.

3 The bike can finally stop moving if the rider keeps pushing it past its top speed.

DISCUSSION:

1. HARDWARE SETUP

Fig 3 depicts the smart helmet prototype with both a helmet and a bike component. A power source is provided to both parts. After processing the information from the IR sensor and alcohol sensor, the bike component receives input from Arduino.

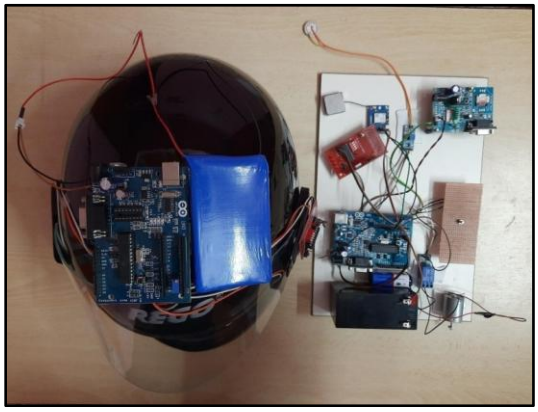


FIG3. HARDWARE SETUP PROTOTYPE

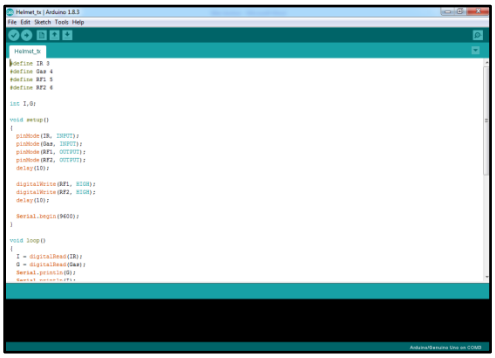
Based on the information provided by the helmet section,

the bike component decides whether or not the ignition needs to start.

Only when the driver's licence is close enough to the reader module will the motorcycle start. The IR sensor warns the driver that you are riding the bike quickly, and it only stops after the rider slows down to a reasonable speed. The front and back of the bike each have ultrasonic sensors. It can tell how far away our car is from the ones in front and behind it. If the distance between the rider's car and the other vehicle is closer than the desired distance, a beep is utilised as an alert.

The reflected sound and the electric signal picked up by the ultrasonic waves can be used to estimate how far the reflected object is from the ultrasonic sensor, which has a range of 2 cm to 2 m. Then, utilising the relationship between the object's distance and the medium's ultrasonic wave speed (v), (L).

2. SOFTWARE SETUP



The code starts to execute as soon as power is applied to both Arduino boards. The program executes in a sequential manner. The code starts with the IR sensor and then moves on to the alcohol sensor in the helmet area. Before moving on to the motor, the coding starts at the receiver in the bike portion. To confirm that the parameters are as requested, the code will run simultaneously. If the parameters are outside the predetermined range, the device starts to beep.

CONCLUSIONS:

This prototype can be used to safeguard roads and prevent accidents. Both installing and using it are easy. Moreover, using auto detecting circuits helps save labour costs. The promotion of helmet use and reduction of traffic accidents are the main objectives of this project. This prototype in certain aspects ensures rider security and aids in reducing traffic accidents. The helmet is a relatively simple and affordable tool used in businesses. In the future, it can be combined with a range of existing technologies to provide on-road track amenities and guiding.

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