Smart Helmet

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SMART HELMET

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Abstract. According to the investigation in India, nearly 25% of the road accidents are caused by two wheelers. The foremost causes for the fatalities are due to drunken driving, rash driving, and drowsiness due to long drive. The aim is to build an interesting smart helmet that protects us from accidents and indicates the accident prone area. Here we are using various sensors to build the smart helmet. To detect alcohol consumption of the rider we use Alcohol sensors. In order to check a rider's helmet, an infrared sensor can be used. Vibration detector is also added to the helmet to indicate the harsh hitting of the helmet during an accident. When the two wheelers slide down due to road rashes, the GPS is used to identify the location of the accident spot and quickly sends messages (location) to police stations and hospitals nearby through GSM.

Keywords : Rider's safety, Alcohol detection, Accident detection, Quick alerting system.

INTRODUCTION

The idea of the Smart helmet is done completely for the betterment of society. Two wheelers should use this Smart helmet and it is developed such that without this helmet the vehicle's ignition will not start. So this will warn the rider at the very beginning of his journey! And in recent days helmets have become compulsory in accordance with the (section 129) Act of Motor vehicles. It has strictly stated that each and every person traveling on a two-wheeler must wear protective headgear. This protects the rider from at most carelessness like riding without proper knowledge-rules, no proper condition of the bike etc. One main reason the fatality rate in mishap is rising is due to the delay and lack of proper treatment in time and No immediate response from society to inform the police and the hospital. Many have lost their life in this case. Saving life in golden hours matters a lot here. So, we must not let time take any life. The Smart helmet also helps the traffic police and follows government regulations. The device is completely safe for use of two wheeler riders.

1.   LITERATURE SURVEY

Nowadays most of the people's day can't get over without internet. In such case the embedded devices get connected to the internet which is a platform called internet of things [1]. The main reason for deaths happening in our country is the road accident, which is not recovered by the police immediately. So the nearby police department should be notified immediately so that the police urge them to take to the

nearby hospital [2]. In this paper it is clearly listed, that one of the main reason for the road accidents is the alcohol consumption of the person. Careless driving of the rider can also be taken as a consideration for the road accident to rectify that IR sensor is used to detect the obstacles to keep the rider in a safe zone [3].

This paper put forth the solution for the safe driving of the rider .the smart helmet consists of breath alcohol sensitizer to know the state of mind and the alcohol consumption of the rider. Suppose if the person is listening to the music using smart mp3 player where the sound can be adjusted automatically for the safety precautions of the rider [4]. Wearing helmet is a must during driving. So to notify the people with the automatic SMS, a relay should be connected along with the receiver module where the signal is transmitted from the transmitter of the helmet [5].MQ3 sensor checks whether the person has drunk and having nonalcoholic breathe. Then the switch placed in the helmet powers the helmet and pressures the sensor to wear the helmet [6].

The author's idea was to pre-check the rider for alcohol consumption and also to insist the rider to put on the helmet. The bike would not be started if these pre-conditions fail. If the person met with the accident with the help of GPS and GSM module the message will be sent to the family members and nearby hospitals [7].

This paper has clearly explained about the detection, the smart helmet has vibration sensor to detect the accident by checking the assumed threshold value and it automatically sends message to the relatives and ambulance [8-10].

2. TECHNICAL WORKS

The techniques of our project are the vehicle will not start if a person has consumed alcohol and prevents the person from accident. All these things work only when the person wore the helmet. So for our project we have used different types of sensors integrated together.

- ❖ IR SENSOR
- ❖ ULTRASONIC SENSOR
- ❖ VIBRATION SENSOR
- ❖ GYROSCOPE SENSOR
- ❖ ALCOHOLIC SENSOR
- ❖ NODEMCU

2.1 IR sensor

Here IR sensor checks whether the person has head covering or not once the vehicle has been started and if the person is not where the helmet it intimate the person to wear the helmet by indicating an LED and a alert message.

Figure 1 IR sensor

2.2   Ultrasonic sensor

This ultrasonic sensor is placed back side of the helmet to indicate whether any vehicle is near our vehicle. It is indicate by small beep sound using buzzer.

Figure 2 Ultrasonic sensor

2.3   Alcoholic sensor

This alcohol sensor is used to detect the driver's alcohol consumption status. If the person is consumed alcohol the vehicle won't start and it will be indicated by led red, green depending upon the consumption level.

Figure 3 Alcohol sensors

2.4   Gyroscope sensor

The Gyroscope sensor is used take care of the person while riding and after the accident mainly during his left and right turns and this is indicated through message.
The message shows the angle of the person standing or lying after the accident.

Figure 4 Gyroscope sensors

2.5   Vibration sensor

Vibration sensor is used to detect whether the accident has happened or not. At the same time the message will be sent to the authorized person and rescue system management through the GSM Module.

Figure 5 Vibration sensor

2.6   GPS

It guides the rescue team to locate the accident spot. Immediate prevention can be taken by sending messages to the neighboring hospitals, sensing the person's position through GPS to spot the place. Here we have used NODUMCU along with GPS and GSM.

Figure 6 NodeMCU

2.7   Cloud

All these information are sent through cloud to rescue systems, family members etc.
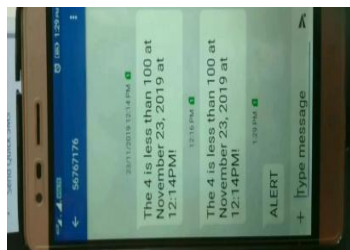
Figure 7 Alert Messages Through Cloud

3.   METHODOLOGY

3.1   Block diagram

It is another object of invention is to design a sensor based device for detecting a person's accident. It will check whether the person had worn a helmet or not and it will intimate the person to wear the helmet .It will detect that the person is lying down or standing after the accident has happened. It will detect

that the rider had consumed alcohol or not. It will alert the rider whether the person is coming ahead or not. It sends the current location of the rider during his/her travel with GPS location.
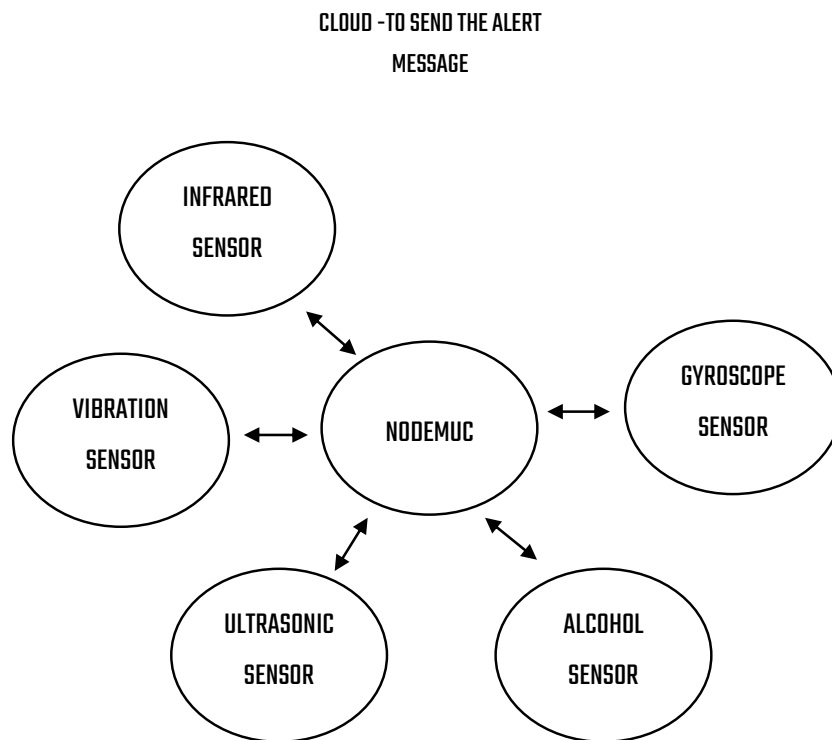
Figure 8 - Flow chart for smart helmet

3.2   Circuit diagram

Here our smart helmet may be a cost effective and detachable device to supply safety for the driving force against the road accidents. Here we have used NODEMCU with GPS, alcohol sensor, vibration sensor, ultrasonic sensor, IR sensor, gyroscope sensor.
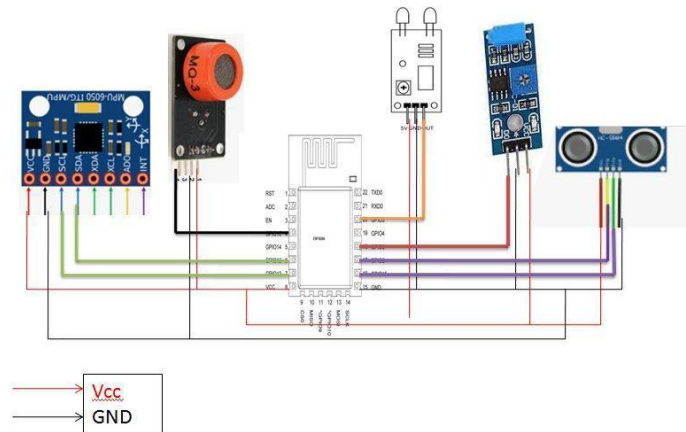
Figure 9 – Systematic diagram

Figure 10 – Prototype

4. ADVANTAGE

- ❖ Cost effective and easily replaceable with various sensors.
- ❖ We can easily detect the accident in remote areas and send the alert message.
- ❖ We can send the information to rescue system like hospital, fire station etc., simultaneously with the alert message.
- ❖ As we mentioned above are only when the person is wearing helmet and we can check whether the person is wearing or not.
- ❖ Here we have used ultrasonic sensor to detect when some vehicle is near to your vehicle .

5. APPLICATION

- ❖ We can easily implement this with VLSI chips in helmet and bike unit.
- ❖ It is often designed in real time safety system to scale back the death rate from the accident.
- ❖ It is often designed for safety system with less power consumption.

❖ We can also implement this system in various types of vehicle like car, lorry, etc., instead of helmet.

❖ We can use this in all types of weather condition as it is detachable device.

6.   FUTURE SCOPE

❖ In future we can use invisible camera to capture all the information regarding accidents which will also helps in future investigation.

❖ The camera in the helmet will go inside when it is not in use because it can get damage when the camera is outside.

❖ We can use solar panel instead of battery in helmet power.

❖ We can use set password or biometric for helmet if it gets stolen.

7.   DESCRIPTION:

| SI. NO	COMPONENTS	SPECIFICATION	WORKING	NORMAL RANGE	RANGE TO DETECT THE ACCIDENT
1.	IR SENSOR	LM393	wearing the helmet or not	2-30cm	obstacle < 5
2.	ULTRASONIC SENSOR	HC-SR04	any vehicle is coming near	2cm-400cm	distance < 100
3.	GYROSCOPE SENSOR	GY-521 MPU6050	person's angle after the accident	3-axis gyroscope and accelerometer	$(x >= 190)$ && $(x <= 200)$
4.	VIBRATION SENSOR	SW-460D	detects the accident	10hz to 10khz	previous_condition > 350
5.	ALCOHOLIC SENSOR	MQ3	alcohol consumption or not	0.5-10mg/l	gaslevel>300 && gaslevel <=600
6.	NODEMCU	ESP8266	GPS and GSM detection	-	message sent

8.   RESULT

Fig 11 : Helmet Set Up
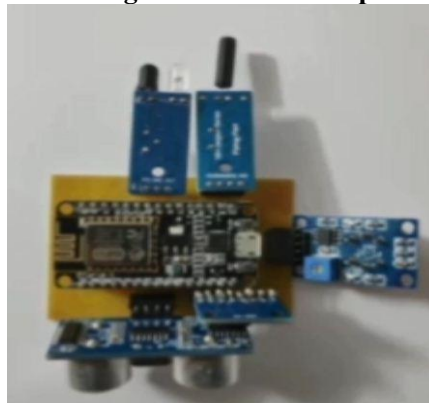
Fig 12 : Our Product
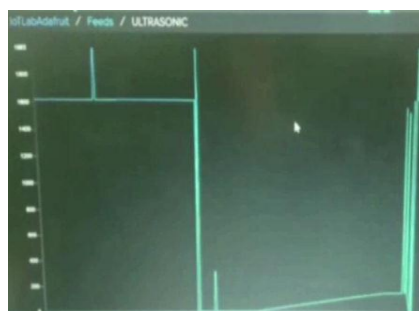
Fig 13: Output of Ultrasonic Sensor

Fig 14 : Output of Gyroscope Sensor
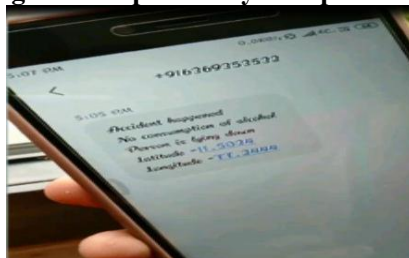
Figure 15 : Alert Message On The Phone After The Accident

9. CONCLUSION

If accident happens at night there will be no one to help, because of that death rate has increased. By implementing these types of smart helmet in the future, further accident will get reduced and immediate prevention will be taken by sending messages to the neighboring hospitals, sensing the person's position through GPS to spot the place. These smart helmets can be used by all standards of people as it is of less cost.

ACKNOWLEDGEMENT

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