A Review Paper on Smart Helmet : HelNet Smart Safety

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Abstract-T*he statistics of survey on road accidents from 2015 to 2019 in India says that on record, there are on average 472,606 road accidents. According to the BussinessStabdard.com report published on December 27, 2020 "6 two-wheeler riders die every hour in accidents" due to faulty helmet and poor enforcement of rules and regulation. In recent years, the number of two-wheeler riders are increasing rapidly. Also, the annual sales of two-wheeler projects to reach 26.6 million by 2025 at 2.6% growth rate, according to UnivDatos. These accidents are due mainly due to drunk & drive, high density roads, poor or no communication of accidents which leads delay in medical aid. In this paper we are developing an IOT product called Smart helmet, which comprises of two units, motor unit and helmet unit. Helmet unit consists of the alcohol detector, accelerometer, GPS module, IR sensor and load cell module.*

Keywords: *Accidents, GPS, IOT, Smart Helmet, Sensor.*

1. INTRODUCTION

The monitoring of physiological signals using wearable devices is increasingly becoming a necessary for the assessment of the state of body and mind in natural environments. Following the same trends, many smart improvements are made in transportation system. Since the transportation is necessary so the safety of riders. With this in mind, helmets of two-wheeler riders are gone through lot of improvements throughout the years. In spite of these improvements, the road accidents are still increasing. The reasons for the accidents are human mistakes, violating traffic rules, usage of mobile phone or drunk. To overcome this issue, researchers worked by using the methods like auto ignition that motor did not start until the rider wear helmet on his head. The other sensors are also used to monitor the riders' safety and activities during riding the wheel.

This project is built to aid people to monitor the various action such as accident detecting, navigating and many more. Although our project is not full replacement of manually checking hazards but our product will help in the occurrences, where a simple mistake could lead to a fatal outcome or things which are outside the natural field view of rider.

2. LITERATURE SURVEY

[1] Sreenithy Chandran, Sneha Chandrasekhar, Edna Elizabeth N had proposed a smart helmet device for detecting and reporting bike accidents. Smart helmet system comprises of multiple sensors, and it identify the accident by evaluating uneven or irregular variations obtained from sensor system, and a trigger are going to be sent to Pager Duty from the microcontroller. Pager Duty will then trigger a call to the number registered by the rider. If the rider does not response to it for a period of 5 minutes after the initial call, then the emergency contacts will be informed with the data about the accident. The emergency contacts get alerted through text message, e-mail, and call until they acknowledge the incident. In real time, this method assures a reliable and quick delivery of data regarding to the accident.

[2] Karthik P, Muthu Kumar had proposed a system in which different way of accident detection and notification is employed. It consists of two parts within which one is helmet part and other is vehicle part and both are interacting with one another using radio frequencies. Piezoelectric sensor is employed for accident detection. Output the signal is sent to the vehicle side from helmet side so appropriate actions could be taken. For emergency message, GSM module is employed.

[3] Rashmi Vashisth, Sanchit Gupta had presented the work on smart helmets consisting of two modules, one on the helmet and other on bike, each of which is synchronized to make sure that the rider wears a helmet. The helmet provides features like automatically deducting the desired amount

from the user's virtual wallet, wirelessly preventing the rider from stopping and paying, using alcohol sensors to forestall drunk and driving condition, detecting and alerting an accident, over speeding detection.

[4] Archana D, Bhoomija G, Manisha J, Kalaiselvi V. K. G. proposed a system which doesn't let the driver to begin engine if the rider isn't wearing the helmet. When rider wore the helmet, helmet gets locked and engine can be started. The system also checks the approaching vehicle's speed on either side of the bike while riding by using ultrasonic sensor and alert the rider by generating vibrations in the handlebar of the bike.
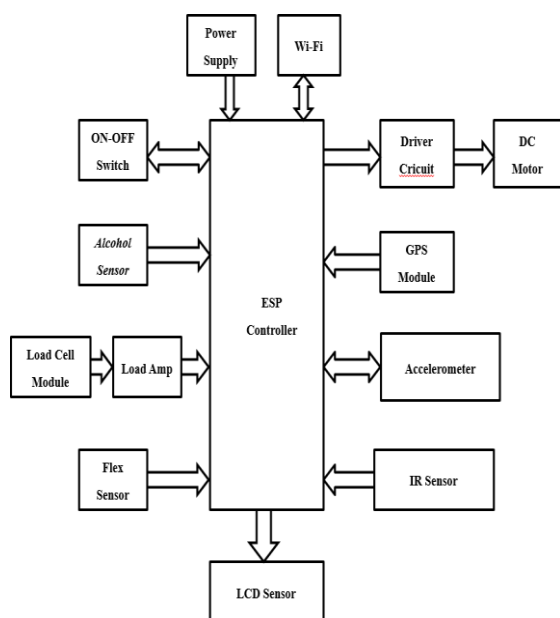
3. PROPOSED SYSTEM

Fig.1: Block Diagram

In this system ESP-32 controller is being used. The vibration sensor is placed in the back of the helmet such that when the rider crashes, the impact causes the vibration sensor to detect that an accident has occurred and it will send an emergency message with the information about the accident and the location of the place where accident has taken place using the GPS modules. The load cell is used in the helmet such that the rider will not be able to start the vehicle unless he has worn the helmet . Alcohol detector is placed at the mouth piece of the helmet which does the task of checking alcohol content in the breath of the rider , if it detects any alcohol then it prevents the rider from starting the vehicle. This whole system ensures that the rider is safer enough in much higher quantity thus reducing the percentage of rider losing their life in accidents.

4. RESULTS

The parametric values gathered by sensors are transmitted to the ESP32 microcontroller which computes the data and reacts accordingly. If any condition is not satisfied the ignition won't start and the rider would not be able to ride which will be notified by the messages. Also, when the accident will occur, the emergency number will be notified with co-ordinates precisely upto 5 meter and the respected people can reach there and provide help or it can be shared with police station or medical assistant teams.
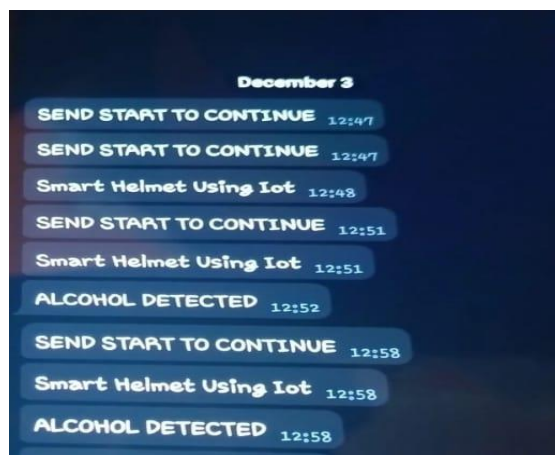

Fig.2: Smart helmet
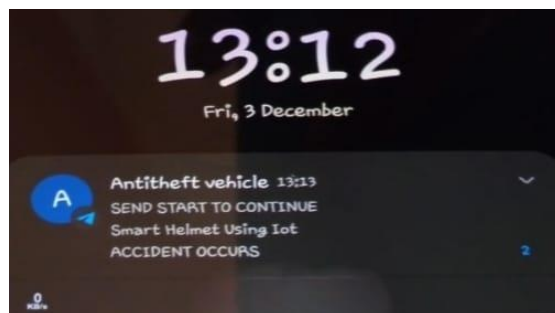

Fig.3: Alcohol detection Alert message

Fig.4: Accident Alert Message

5. CONCLUSION

The two-wheeler safety system developed with smart helmet is reliable and aims to help in the prevention, detection and reporting of accidents hence increasing the safety and survivability of the rider. It also has several advantages compared to the previous systems. The majority of two-wheeler accidents have increased because of the absence of helmet or by the usage of alcoholic drinks. Our proposed system ensures that the rider is protected and is sober enough to ride the bike. If an accident occurs, the GPS module notifies the necessary people about the accident and the location. with faster medical attention, the chances of the rider surviving will be increased massively. It gives primary importance of preventing the accidents and ensures safety for a greater extent in bikes. By implementing this system, a safe two-wheeler journey is possible which would decrease the head injuries throughout accidents caused due to the absence of helmet and additionally reduce the accident rate due to drunken driving. If the Government makes it mandatory to wear this particular helmet, the two-wheeler accident rate can be reduced massively and could potentially save lives in future.

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