

Bike Rider Safety Monitoring System Using IoT

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Abstract: Now a days, accident is very serious problem to everyone. Accident are increasing day by day, so we have minimized accident by taking some good precaution method, in this survey paper, our aim to create a system utilizing IoT concept to detect the accident in a bike. We are using microcontroller, accelerometer, position sensor, and Android application using in IOT, and also accident happen send message by hospital, family, friends, using GPS, GSM location

Keywords: Microcontroller, Android application, Gyroscope accelerometer sensor.

1. Introduction

We already know that young generation people prefers 2 wheeler's compared to 4 wheelers, A survey paper shows more than 70% of the 2 wheeler's ,bike rider didn't wearing helmet, drink and drive , 3ble riding have become common issues. The report on the road safety reflecting information from million countries shows that it's close to 1.35 million people dead every year because of road accident. And also violation of any rules become major issues of accidents. In this project our main aim is to provide safety to 2 wheeler's rider and prevent injuries. Here we use gyroscope and Accelerometer sensor etc. This sensor is used to detect the accident to family and nearest hospital. GSM and GPS technology are used to track the accident occurred in a current location. Blue-tooth receiver checks the wearing of helmet. If the person intentionally removes all the operation is monitor and controlled by Android application. Here we another concept is theft detection. Where there is a unknown person access the vehicle, it inform the owners of bike by round alert, and also the owner can cut off fuel engine anywhere from android application. The owner can also create geo location boundary to vehicle suppose if the vehicle goes out of the boundary then it alert the owner.

2. Literature Survey

In this survey we are discussing various smart helmets, with various approaches and methodologies.

Rashmi Vashisth etc [1], proposed system works at a time, in this Paper a magnetic chip is connected with the helmet. Which detects that if the rider is working the helmet or not .Here Magnetic chip will send the output of an analog signal to the system then that helmet is detected by showing message that rider is wearing helmet here we get 2 types of output [high, low].high indicate that output is received from the chip low indicates that chip is not connected to the system then turn off

bike engine. And also used in the project is gas sensor, which detects if the rider is drunk and drive, speed limit sensor is used, which contains a turbine, Turbine is used to tell about the speed limit of the bike .if a rider cross the speed limit then buzzer is warn the rider of speed limit.

Kishore V et al [2] in their work accidental identification and navigation system tried to develop a system which was made developed looking at many days to day use cases. This was a special idea to encourage riders to wear helmets so that they are safe on the roads and don't met with an accident. So, this protype was made to promote usage of helmet whenever we go for a ride and deaths can also be reused on the road.

Edna Elizabeth N [3] in their work build a smart helmet which was loaded with many sensors. Wi-Fi and cloud computing features were also added in development in of the system. The system was fitted with accelerometer and it regularly monitors the all the erratic vibration. whenever accident happens all the details are shared by emergency contacts like family, friends, etc., with the help of cloud-based services & GPS motorcycle location is recorded .With the help of cloud service location is shared which was a really quick and reliable form of communication and it provide real time with the help of Connect. But if sometime there was low internet connection there was no communication with the people.

Sun-Hwa Lim, Kang [4] Bok Lee in their work smart helmet for disaster and safety they made a prototype of smart helmet which have a lot of sensors like infrared camera, electro optical camera, drone camera ,oxygen residual sensor, 6-axis inertial sensor and a smart iWatch device which was monitored through head mounted display and was controlled centrally with the help of all these sensors. They developed a new software framework to manage all these bunch of sensors so that all can be managed efficiently. The main aim of the helmet was to that it should be used in disaster management which would help the disaster team to find out all the people and rescue they as soon as possible so that quick medical help can be provided and no if deaths can be reduced. They also used IoT to get the data to the server. Infrared sensor was used to detect all the people buried in the building rock. Drone camera was used to get a wider picture of the area. Oxygen residual sensor was used to check the oxygen value of the patient. But it had few setbacks as drone was not able to detect people which were buried deep inside the build rocks. As well as in few cases they were asked to remove the helmet and it was not useful at all. As there were a lot of sensors it used to take time to analysis as well as to get

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to the final result which would help the disaster management team to make a road map for the further process.

C. Vidyasagar [5] in their work Helmet operated in smart bike. There are two types operating nodes which are SLS [Security lock system] and SES [Safety engine system]. The first node solves have RFID reader as well as two RFID tags. When a unique id tags matches any of the RFID reader then only handle lock will open and the user will be able to operate the bike and the second operating part was using a force sensing sensor. But there were some drawbacks during no internet connection they sensors were not able to connect with the database and this would lead to slow response and more time wastage of the users.

Jesudoss A [6] in their work design of smart helmet for accident avoidance it was loaded with less sensors. Gas sensor was used for alcohol detection which is quite impartial as alcohol detected should be used for alcohol sensor. They also had a clip that was fixed in the helmet as soon as the clip is attached and when the connection gets completed it will share the information with the sensor and which start the bike. They also did not have any IOT or Wi-Fi enabled device which can be used to transfer the data from the sensors. It should be always be connected to a mobile device so that all the data can be received and analyzed which would take a long time. Since it was not connected to any data transmitting sensors so it was not

use full for any authority.

Julian Johari *et al.*, [7] in their work smart helmet with sensors for accident prevention. they used for IOT sensors such a force and position sensor, brushites direct current BLDC, Timer 555, etc., so all these sensor sensors were a complex sensors and required a lot of time to execute each and every formula to get an accurate results. They also put a RF data transmission module which was quite bulky and required a lot of space and proper arranges to be kept so that accurate results could be found or else the results shown were not accurate. This was a great example of human development and required a lot of good development skills to develop this but this was quite bulky to handle and all the sensors are display was quite costly and also it was not packet friendly product to handle them.

Surrender Dhana Sekaran *et al.*, [8] in their work safeguarding of motorcyclist through helmet recognition was an interesting example of electronic sensor work as it all the required sensors and they also added and decoder and encoder to decode all the sensors data so that all the signals are kept secret and cannot be caught by anyone and be used so this was an interesting feature of the project. But because of these encryptions all the processing time was lost in this and it was taking a lot of time to show results.

Table 1
Comparison table

Author	Approach	Description	References
Rashmi vashisth, Sanchit gupta, Aditya join	Implementation and Analysis of smart helmet	Proposed system works at a time, in this Paper a magnetic chip is connected with the helmet. Which detects that if the rider is working the helmet or not.	[1]
A. Ajay, G. Vishnu, V. Kishore	accidental identification and navigation system	This was a special idea to encourage riders to wear helmets so that they are safe on the roads and don't met with an accident. So, this prototype was made to promote usage of helmet.	[2]
Sreenithy Chandra, Shena Chandrasekhar, Edna Elizabeth N	build a smart helmet using IOT	Which was loaded with many sensors. Wi-Fi enabled processor and cloud computing infrastructures were also used in development in of the system.	[3]
Sun-Hwa Lim, Kang Bok Lee, Mingi Jeong, Hyesum Lee, Myungam Bae, Dong Beom Shin,	Development and of the smart Helmet for Disaster and Safety	smart helmet for disaster and safety they made a prototype of smart helmet which have a lot of sensors like infrared camera , electro optical camera , drone camera ,oxygen residual sensor , 6-axis inertial sensor and a smart iWatch device which was monitored through head mounted display and was controlled centrally with the help of all these sensors.	[4]
Durga K Prasad, Gudavalli, Bh. SudhaRani, C. Vidyasagar	Helmet operated smart E-bike	It was having two operating nodes which are SLS security lock system and SES safety engine system.	[5]
Jesudoss A, Vyabhavi R, Anusha B	smart helmet with sensor for accident avoidance	It was loaded with very less sensors and gas sensor was used for alcohol detection which is quite impractical as alcohol sensor should be used to for alcohol detection.	[6]
Mohd khairul afiq mohd rasli, Nina korlina madzhi, Julian Johari	Smart helmet for accident prevention.	They used a lot of sensors such a force sensor, brushites direct current BLDC, IC Timer 555 and so on .So all these seniors were a complex sensor and required a lot of time to execute each and every formula to get an accurate result.	[7]
G. sasikala, Kiran padol, Aniket A Katekar and Surrender dhanasekaran	safeguarding of motorecyclist through helmet recognition	Electronic sensor works as it all the required sensors and they also added and decoder and encoder to decode all the sensors data so that all the signals are kept secret and cannot be caught by anyone and be used so this was an interesting feature of the project.	[8]

3. Methodology

The proposed system consisting of two block a helmet monitoring section and vehicle onboard processing system.

Helmet monitoring system Fig. 1 consists of Bluetooth transmitter, Microcontroller, sensors. Helmet on head is sensed by position sensor and a force sensor. When the helmet placed on the head and the sensors sends the signal to the microcontroller and then it will processes the data and transmits the data to the receiver section using Bluetooth.

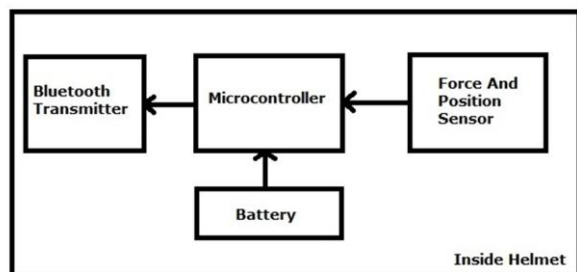


Fig. 1. Helmet monitoring system

Vehicle onboard processing system Fig. 2 consists of crash detection, ignition controller, 4G LTE module, GPS, Bluetooth receiver. The vehicle will move only when the Bluetooth receiver signals to the rider is wearing the helmet. When the rider removes the helmet intentionally the system alerts the rider by sound alert.

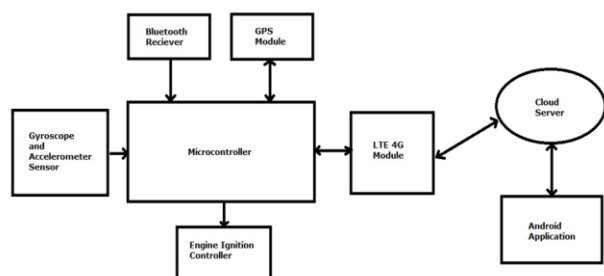


Fig. 2. Vehicle onboard processing system

The rider will get minute of time to wear the helmet. If the bike rider won't wear safety helmet the bike engine ignition will be off after that. When bike met with accident the geo location details are sent to the guardian and friends through android app, the app uses Google Map API to locate and gives the directions on the map to reach the spot and to track the rider condition. The proposed system also consists of theft monitoring and controlling. When there is unauthorized access to the vehicle is

detected the system alerts the owner. The owner can cut off the fuel supply to the engine anywhere from the world using the app. The owner also can create the geo location boundary to the vehicle when the vehicle goes out the boundary geo locations alerts the rider and turns off the vehicle ignition immediately.

4. Application

- We can use helmets in real life it acts as real time application.
- The helmets can be used as the key as without the helmet we cannot start the vehicle.
- Helmet can be used to warn triple riding using mobile phone and also rash riding.
- We can also use helmet in mining areas and also in construction area to provide safety to the workers. In this survey we are discussing various smart helmets, with various approaches and methodologies.

5. Conclusion

By reviewing all papers, we come to know and conclude that wearing helmet and ride the bike concept should be very effective and its very essential feature for providing safety to 2-wheeler's rider

It is easy to design and monitor 2-wheeler bike accident, also low cost to detect the accident and gives the information about accident within minute, facilitates that to inform nearby hospital

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