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Design and Implementation of IoT Based Smart Helmet for Road Accident Detection

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Abstract: *A smart helmet is a special idea, which makes motorcycle driving safer than before. This is implemented using GSM & GPS technology. The working of this smart helmet is very simple; vibration sensors are placed in different places of helmet where the probability of hitting is more, which are connected to microcontroller board. and Reporting System authors describes Therefore, when the rider crashes and the helmet hit the ground, these sensors sense and gives to the microcontroller board, then controller extract GPS data using the GPS module that is interfaced to it. When the data exceeds minimum stress limit then GSM module automatically sends message to ambulance or family members.*

Keywords: Smart Helmet, Internet of Things (IoT), GSM Technology, Accident Detection, Alcohol Detection, Bike Rider's Safety.

I. INTRODUCTION

Internet of things are currently being used in many fields such as wearable's, home automations, smart appliances, smart agriculture etc. where there is a mutual communication between devices and people over a network. The work of the IOT devices is to sense the data and send the data to server by this huge amount of data can be generated. By the generated data we can draw the conclusion by processing and analyzing the data obtained. This gives the advantage in real time data reporting from environment. Now a day's motorbike accidents are increasing day by day and we can notice numerous losses in lives. We can avoid this by using smart helmet. From the survey we can know that in India 4 people die every hour because they do not wear helmet. In 2017, more than 48,746 two-wheeler user died in road accidents, Incidental 78.3% of them did not wear a helmet. To go through or to solve this, there are two important conditions that should be checked before the bike starts by the smart helmet. First most condition is that we should check whether the rider is using the helmet and not just keeping it. Second to check whether the user has consumed alcoholic substance or not by his breath, this can be verified by using sensors. Third if a person meets with an accident, the sensor checks the condition of person and bike and send information of location to nearby hospital. If the person has no major injurious then the button is pressed which is present in the bike this indicate that the person condition is good

II. LITERATURE REVIEW

The Smart Helmet may be a trending concept in these recent days. By reviewing different paperwork and techniques of used several Smart Helmet, we've started acting on our design of "Design & Implementation of IoT Based Smart Helmet for Road Accident Detection" The papers surveyed for literature are as follows

Approach No	Research/Technical Papers	Process	Advantages
Approach :-1	A Review on Smart Helmet for Accident Detection using IOT published on 14 May 2020	Basic introduction Of components efficiency.	We can use smart helmets in real life it acts as realtime application
Approach :-2	Konnect: An Internet of Things(IoT) based smart helmet for accident detection and notification Conference Paper December 2016	How notification System Works.	Received message or call on device.

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Approach :-3	Design & implementation of IoT Based Smart Helmet for Road Accident Detection Conference Paper November 2020	Connection between Arduino and SIM800L	Easy to make connection between Arduino and SIM800L
Approach :-4	International Research Journal of Engineering and Technology (IRJET) Volume: 08 Issue: 06 | June 2021	Design Of Hardware Prototype Circuit	System with low cost is less complex
Approach:-5	Smart Helmet with Emergency Notification System–A Prototype rd International Conference on Wireless Communication and Sensor Network (WCSN 2016)	How to activate or Deactivate helmet When it is wearing or not .	Reduce continous power supply and active when only It Is weared.

III. NEED OF PROJECT

The 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 wheelers 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. The normal helmet or should I say the older version or what we get in the market now a days, are good but it can be better. Since the technology is getting better day by day in lot of fields then why not in transportation field specially in the "two- wheeler transportation system" which gets more accident than any other vehicles on road compulsory to wear the helmet while driving. In spite 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.

IV. OBJECTIVE

The main objective of the project is to design a low-cost intelligent helmet that is capable of identifying alcohol consumption and preventing road accidents. This system is capable of providing security and safety of the bikers against road accidents. The circuit is so designed that the bike won't start without wearing helmet and if the rider is drunk. And in case of accident, GPS system will globally locate the biker and immediate message will be sent to the family members about the location of accident

V. SCOPE OF PROJECT

The smart helmet developed is a smart and reliable piece of technology that is cheap to develop and operate and yet not compromise on safety. Additionally, it offers several advantages over the existing methods of accident detection and notification systems that rely heavily on the data collected from cellular devices of the drivers. Also, most of the systems that are available in the automobile market are designed for only four-wheeled vehicles. Thus, the Internet of Things based application- Konnect, proposed in this paper will prove to ensure greater safety for the motorists. As a future extension of the work the smart helmet could be equipped to detect alcohol content in the breath of the motorist
in order to keep a check on drunk and driving cases.

VI. OBJECTIVE

1) Make wearing the helmet compulsory.
2) Avoid drunk and drive.

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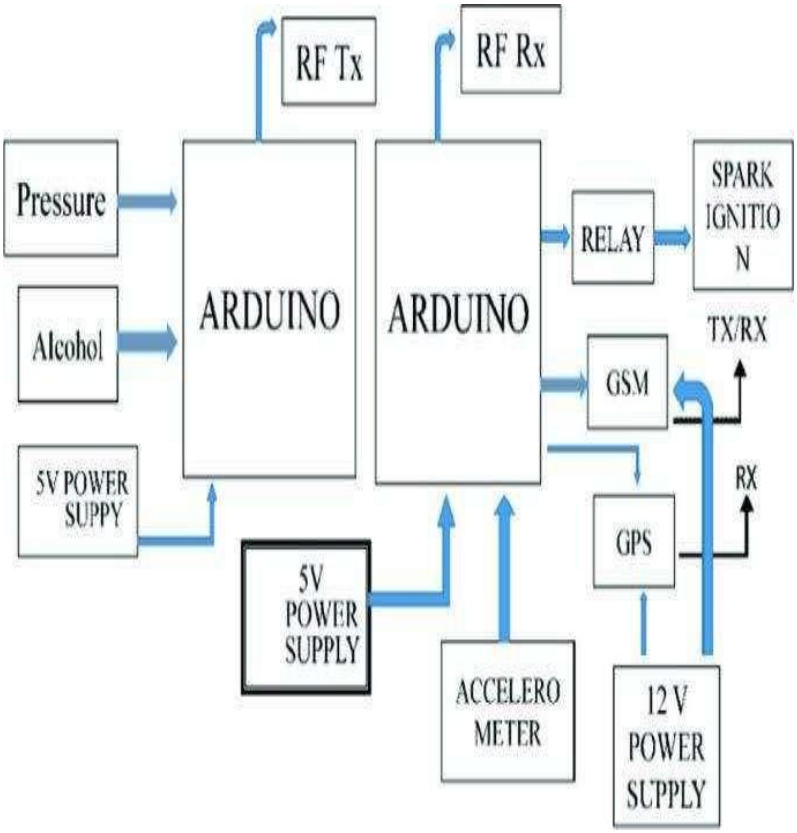
3) If person met with an accident, no one is there to help him. Simply leaving or ignoring the person he may die. In such situation, informing to ambulance or family members
through mobile to rescue him for an extent.
4) The circuit is designed that the bike won't start without wearing the helmet.
5) In that helmet one sensor is used that is MQ3 alcohol sensor which is detect the rider has consume drink or not.
6) If MQ3 alcohol sensor sense the alcohol then bike ignition will not on that is accident is not happen.

VII. PROPOSED METHODOLOGY

In this survey we are discussing various smart helmets with various approaches and methodologies. Jesudoos A et.al[1] proposed a mechanism, where sensors such as IR sensor, vibration sensor and gas sensor, mems are used. The gas sensor is used to detect the amount of liquor he had consumed by checking the breath of a person wearing the helmet. The bar control of the vehicle is handled by MEMS. Accident is detected by vibration sensor. Load of the vehicle is recognized by load checker. The Sensors are interfaced with the PIC microcontroller. The gas sensor will detect if a user consumed alcohol and display on the LED display. If an accident occurs the vibration sensor, sense the accident and send information through GPS to the hospital.If there is any rash driving is done by the rider the MEME sensor detect the amount of the person from his bank account. To check whether the rider is wearing the helmet or not IR sensor is used. In this system exactness and accuracy are high and ambulance is booked automatically based on ten locations. K.M. Mehata et.al[2] proposed a techniques which provide safety to the workers or to identify any fall of the workers in working area. The proposed system has two components. One is the wearable device built using sensors and electronic elements. Another component is the cell phone. The communication between the two components is provided by GSM module. These devices also monitor the health and safety of the worker is continuously. This system ensures good fall detection and alert the register person to give medical attention



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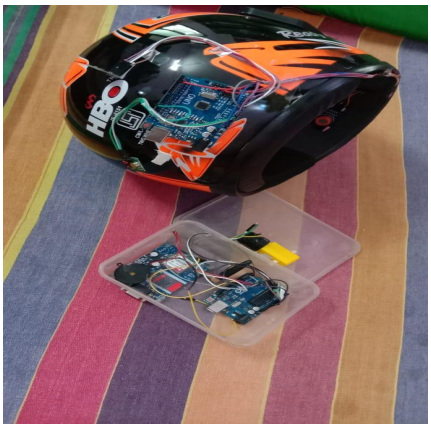
VIII. RESULT



IX. CONCLUSION

Our Smart Helmet is an intelligent system which will aid more secured bike riding. Regarding the poor condition of our roads, large number of accidents, a lot of violations of traffic rules andpoor regulation system, there is no alternative to smart helmets for motorcycle rider's safety. Wearing a helmet is imperative while riding a motorcycle because it can save the rider from severe injury to the head in the case of an accident. So, this is where the sharp IR sensor will come into action. It will ensure that the rider must wear the helmet to start the bike. Drunk driving is also an important issue to consider nowadays. Because drunk driving can cause more accidents in the case of bikes than cars. So, the alcohol sensor will check if the driver is drunk or not. Smart helmets are very popular in Western and European countries, but the concept is not familiar in Bangladesh yet. If we can make our design more full-proof and get a sponsorship, then we will be to mass produce it. A smart helmet maybe a little bit more expensive than a regular helmetbut its benefits certainly outweigh the costs.

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