



PREVENTING ACCIDENTS BY ENHANCING SMART HELMET USING IOT BASED SMART SYSTEM

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Abstract— It is very unfortunate to hear news of any accident and if it happens with our dear ones it causes great pain to us. Road accidents are very common in India, whatever the reason may be. Two wheeler accidents happen mostly because of not wearing the helmet or wearing it improperly such as not putting on the buckle belt. Helmets save the riders life by reducing the shock of the impact from the accident. This paper presents a design of a tested system which ensures the rider wearing the helmet properly while the complete journey details are recorded on the server.. In today's world, huge numbers of people are dying on road accidents. By using smart helmet, the accidents can be detected. The main target of the project is designing a smart helmet for accident avoidance and alcohol detection. The IR sensor checks if the person is wearing the helmet or not. The Gas sensor recognizes the alcoholic substance in the rider's breath. If the person is not wearing the helmet and if he consumes alcohol, the bike will not start. If there is no sign of alcoholic substance present and helmet is used, then only the bike will start. At the point when the rider met with an accident, the sensor recognizes the condition of the motorbike and reports the accident. Then the GPS in the bike will send the location of the accident.

Index Terms— Motor, Belt sensor, Heartbeat sensor, Arduino Microcontroller

I. INTRODUCTION

The next wave in the era of computing will be outside the realm of the traditional desktop. In the Internet of Things (IoT) paradigm, many of the objects that surround us will be on the

network in one form or another. Radio Frequency Identification (RFID) and sensor network technologies will rise to meet this new challenge, in which information and communication systems are invisibly embedded in the environment around us.

This result in the generation of enormous amounts of data which have to be stored processed and presented in a seamless, efficient, and easily interpretable form. This model will consist of services that are commodities and delivered in a manner similar to traditional commodities.

Cloud computing can provide the virtual infrastructure for such utility computing which integrates monitoring devices, storage devices, analytics tools, visualization platforms and client delivery. The cost-based model that Cloud computing offers will enable end-to-end service provisioning for businesses and users to access applications on-demand from anywhere. Smart connectivity with existing networks and context-aware computation using network resources is an indispensable part of IoT.

The term Internet of Things was first coined by Kevin Ashton in 1999 in the context of supply chain management. However, in the past decade, the definition has been more inclusive covering a wide range of applications like healthcare, utilities, transport, etc. Although the definition of „Things“ has changed as technology evolved, the main goal of making a computer sense information without the aid of human and pace.

II. RELATED WORK

According to the recent Research paper in 2018 titled Smart Helmet Thus this system is very effective for the safety purpose of the user. User

has to wear a helmet to ride a bike and hence traffic rules will be followed by the rider. This system is under pocket control i.e. riding the two-wheeler vehicle having safety in hand and budget. This system has easy functionality. It provides better security to the biker [1].

According to the recent Research paper in 2019 titled Smart Helmet for accident avoidance. There are many accident identification cases. In our work, the exactness and accuracy are high, which demonstrates that our proposed system is precise in recognizing accidents by using the vibration, load monitoring, MEMES and high alcohol consumption. The comparison of the parameters for accident detection shows the importance of the use of a helmet [2].

According to the recent Research paper in 2019 titled Smart Helmet with Data log system As a result, people would be able to access the speed of the vehicle at any instant. This system will help to implement the government rule to wear a helmet and to decreases the accident cases. As well as parents or guardians who worried about their son's/ daughter that are they over speeding of the vehicle or not, so they can see the speed of the vehicle and as well as they can see that is their child have worn the helmet or not. In future, this project can be installed at traffic control office or any organization who can manage all the details of the driver as well as if any mishap occurs with anyone then the ambulance service or medical aid can be provided at the right time. By which a life can be saved and proper treatment can be given to that person [3].

III. HARDWARE DESCRIPTIONS

A. Alcohol Sensor:

This alcohol sensor is shown in Figure 1 has been placed in the helmet, if the rider is consumed with alcohol it detects and sends the input to ignition system, the vehicle won't start.



Figure 1: Alcohol Sensor

B. Belt Sensor:

The Belt sensor is represented in Figure 2 which was fixed in the buckle of the helmet, if it is plugged after wearing the helmet along with the temperature sensor input the ignition system is turned on.



Figure 2: Belt Sensor

C. Arduino UNO:

The Arduino UNO is an open-source microcontroller board based on the Microchip ATmega328P microcontroller represented in Figure 3.



Figure 3: Arduino uno

D. GPS Receiver:

A GPS Receiver is a L-band radio processor capable of solving the navigation equations in order to determine the user position, velocity and precise time (PVT), by processing the signal broadcasted by GPS satellites is in Figure 4.



Figure 4: GPS Receiver

E. Motor:

The main principle of the DC motor is whenever a current-carrying conductor is placed in a magnetic field, it experiences a mechanical force and the direction is given by Fleming's left-hand rule and its magnitude. Figure 5 shows the Motor.



Figure 5: Motor

F. Heart Beat Rate Data:

Heart Rate data can be used in many Electronic design and microcontroller projects. But the heart rate data is difficult to read, however, the Pulse Sensor Amped helps us to read heart rate. The Heart Beat Pulse Sensor Amped is a plug-and-play heart-rate sensor for Arduino is shown in Figure 6.



Figure 6: Heart Beat data Rate

IV. PROPOSED SYSTEM

The proposed system, the sensors are used such as IR sensor, load sensor, vibration sensor and gas sensor, mems is represented in Figure 7. The gas sensor detects the measure of liquor consists of the breath of a person wearing the helmet. The Alcohol recognition sensors connected with the helmet in distinguish the Alcohol detection. MEMS-based handlebar is used to control the vehicle. The Vibration sensor is used to detect any accident. Load checking to recognize the load of the vehicle and alongside the sensor to locate the number of individuals travelling in the bike. The heartbeat sensor detects the measure of pulse rate consists of the breath of a person wearing the helmet. These parameters are used to keep away from accidents in the bike.

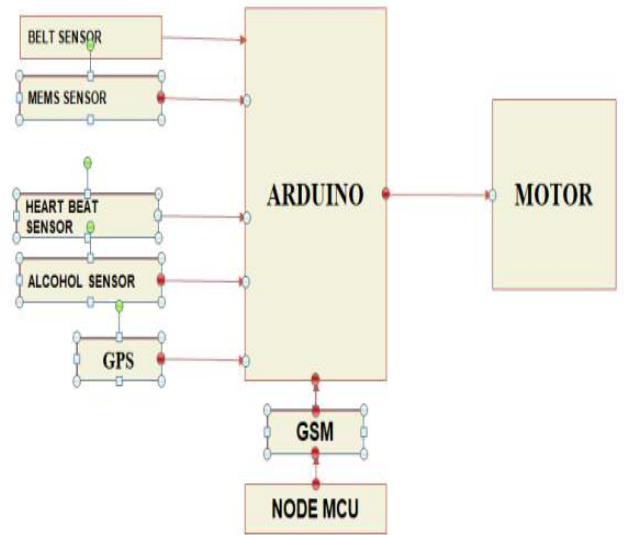


Figure 7: Block Diagram of Proposed System

The flow chart representation of the proposed system is represented in Figure 8.

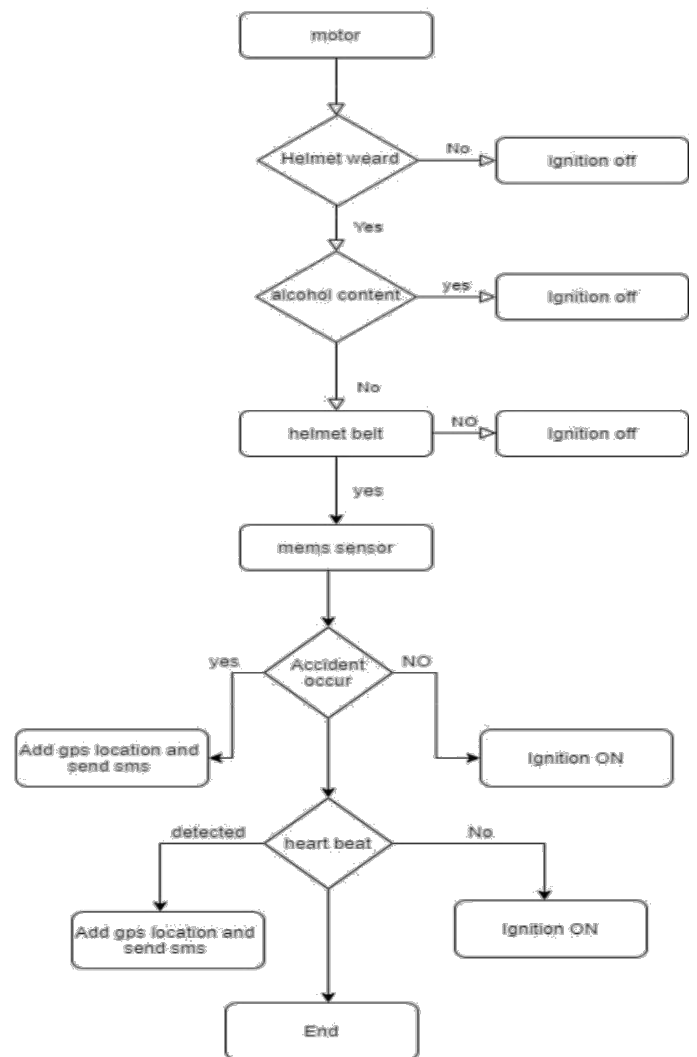


Figure 8: Flow chart Representation

V. EXPERIMENTAL RESULTS

The experimental results of the proposed system are shown in the following Figure 9 and Figure 10. In the emergency situation, it is communicated to relatives and nearby police personnel. This can be achieved by encoding GSM, GPS modules to transmit the exact GPS coordinates of the accident to responsible authorities making them aware of the dire situation for quick action which may help in saving lives.

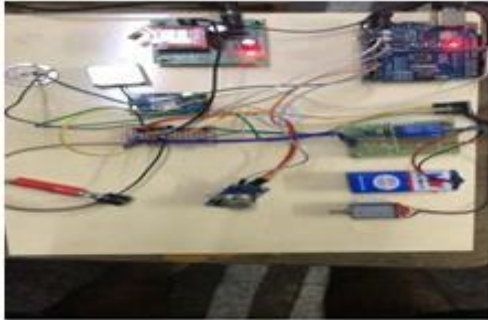


Figure 9: Hardware Kit

VI. CONCLUSION

All the components are assembled and tested successfully. The circuit is designed in such a manner that bike does not start until and unless the rider wears the helmet. Also, the bike won't start if the rider is drunk. If an accident occurs the engine automatically shuts off to avoid further injuries. Thus, the experimental phase was completed. This study was conducted in a controlled manner. Thus, there is no pressing need for further experimentation in real-life conditions but before full-time deployment, more simulations need to be performed. In the future, a GSM module and a GPS module can be applied to a system in which the sensor reports to a relative and nearby police station.

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