Design And Implementation Of Smart Helmet Using IoT

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Abstract: Now a days road accidents are occurring very frequentlyin our daily life because motor cyclists are not wearing of helmet. Toavoid those road accidents motor cyclists can have to wear helmet. Bywearing it riders can have to save their life up to some instant. Thisproject is to improve the safety of riders. The design of this smart helmetis to detect the user can wear helmet or not. Not only but also the helmet can detect the user is alcoholic or not. If user is alcoholic the ignition gets OFF. Only the ignition gets ON when user can wear helmet and user is not alcoholic .Even user met with an accident by using GPS and GSM the location can share to contact members .By using IOT the data of user can send to cloud for monitoring of activities like wearing of helmet, alcoholic and accident condition.

Keywords: ArduinoATmega328P, GPS, GSM, WIFI, IOT.

1. Introduction

The major aim of this project is to prevent road accidents,detection and notification. Many road accidents are occurring because violating the traffic rules and regulations, rash driving, drunk and drive and using mobile phones while driving. Many people lose their lives because of triple riding and the report of accident place is not easily track by the people. So by using the GPS and GSM the identification of exact accident location is can be possible with exact latitude and longitude locations. The use of IOT is for the police men to detect very easily because the information of the bike rider is saved in the cloud about accident condition, alcoholic state and helmet state. In India according to the Motor Vehicles act 1988,the sections 129 the wearing of helmet is compulsory. So this smart helmet is to decrease the road accidents and if government can place this helmet is must and should the use of smart helmet is increases and the accidents can reduce day by day. World Health Organization(WHO) has declared that many deaths and injuries are reduced because of wearing of helmet. The main goal of this project the two wheeler riders can wear helmet compulsory for their safety.

2. Literature Survey

By similarity with other vehicles, two wheelers are having less importance in increasing of their safety levels. Comparing with other vehicles the danger is very high for the motor cycle riders. The smart helmet is even used in the mining industries for their risk and work. GPS and GSM are used for identification of the preciselocation and something about rider. If the user is fell down then the helmet hits and damages then there is a cause occur to the user .When there is a high harm to the person immediately there is delivery of messages for the contact members. For transferring of information wireless communications like Zig -Bee and radio frequency etc; are used. In the middle of helmet and bike various types of wireless communication systems are used. There are various features such as temperature sensor, accelerometer, ultrasonic sensor, force sensing resistor, vibration sensor, push buttons are used for their protection. Based on applications and cost types of microcontrollers like arduino and raspberry pi are used. Regards to the Research paper in 2016 titled 'Smart Helmet' in this paper the aim of the author is to wear helmet for bike rider is compulsory for safety of life.

_ In this aggressive world one of the survey says that many of death and accidents are occurring because not presence of helmet. Traffic police cannot cover remote areas like cities and other places where there are people are heavy. It is very difficult to them to check each and every motor cycle rider. So 'Smart Helmet' is very useful for many conditions for traffic police to see the activities of motor cycle riders.

3. Existing System

The objective of the existing model of smart helmet is to prevent accidents. The wireless communications such as Bluetooth, Zig-bee are already existed for purpose of communication between helmet and two wheeler. For detection of various activities of bike rider many types of sensors are attached to the helmet. If the bike rider is in emergency condition then by using GSM and GPS sharing of exact location is automatically existed. The other set of sensors are fixed to the helmet whether the user is drunken or not for their security purpose. Along with other type of photoelectric cells speed limit sensors are fixed to the helmet module for decreasing of speed of motor vehicle. For measuring distance ultrasonic sensors and for converting text-to-speech, speech synthesizers are used.

There are many Research papers on 'Smart Helmet' for preventing of road accidents and to protect head from injuries. Many authors are working to build smart helmet with different applications for the convenient of the users. One of the example is that if the bike is stolen then by using smart helmet the identification is simple to know who had stolen it. For different types of applications and uses this smart helmet is very benefited.

4. Proposed System

The idea of smart helmet is to check primarily whether the rider is worn helmet or not. Secondly is to know the user is alcoholic or not. If above two conditions are detected then ignition gets OFF. If two circumstances are satisfied then ignition gets ON. To know about ignition OFF to rider there is an LCD for displaying the conditions of smart helmet.

Other main condition is also present in this smart helmet is accident prevention. The mercury switch is used to detect while driving accident is happen or not. When there is happen of accident then there is sending of messages to the contact person using GPS and GSM. By using GPS exact latitude and longitude number can be sent to contact person.

IOT is also present in our proposed system because every activity of bike rider is saved in the cloud services. For viewing of person activity the Things speak

account is created. The activities that are monitored in cloud are helmet condition, alcohol state and accident status. Not only has these but also viewed other parameters based on applications.

5. Block diagram

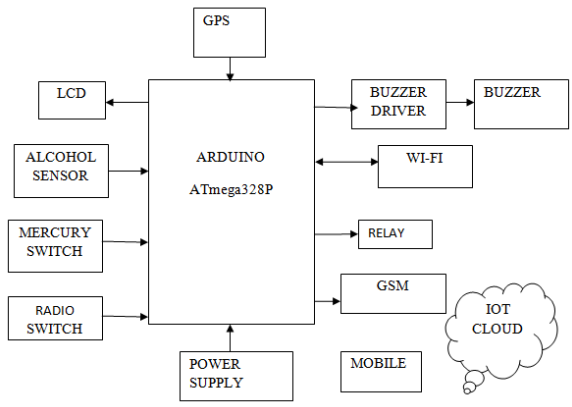

Fig.1: Block Diagram

It is an 8-bit microcontroller based on AVR RISC architecture. It is the most popular of all AVR controllers as it is used in ARDUINO boards. It has 28 pins and operating voltage is +1.8v-+5.5v. It has 23 number of programmable I/O pins.

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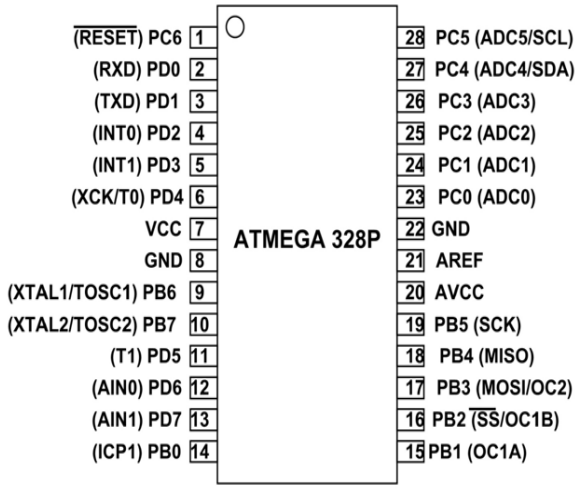

Fig.2: Arduino ATmega328P Pin Diagram

LCD (Liquid Crystal Display) is a type of flat panel display which uses liquid crystals in its primary form of operation.. LCD's were a big leap in terms of the technology they replaced, with light-emitting diodes.

Fig.3: LCD

GPS (Global Positioning System) is a satellite navigation system used to determine the ground position of an object. A GPS receiver combines the broadcasts from multiple satellites to calculate its exact position using a process called triangulation.

Fig.4: GPS

GSM(Global System for Mobile Communication) is a digital mobile network that is widely used by mobile phone users. GSM digitizes and compresses data, then sends it down a channel with two other streams of user data, each in its time slot.

Fig.5: GSM

An alcohol sensor detects the attentiveness of alcohol gas in the air and an analog voltage is an output reading. The sensor activates at temperature ranging from -10 to 50 degrees with a power supply of 5v.

Fig.6: Alcohol Sensor

A mercury switchis an electrical sensor that opens and closes a circuit when a small amount of the liquid metal mercury connects metal electrodes to close the circuit. It is used to know the occurrence of an accident.

Fig.7: Mercury Switch

A buzzer is an audio signaling device, which may be a mechanical or piezoelectric. Typical uses of buzzers and beepers include alarm devices, timers etc.

Fig.8: Buzzer

A Wi-Fi(Wireless-Fidelity) is a single device that combines the functionality of a modem and a router, making it one-stop for internet connectivity.

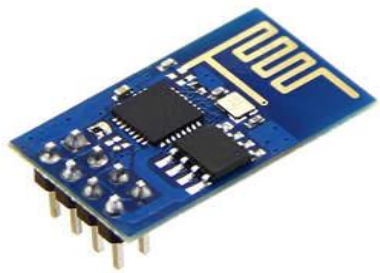

Fig.9: Wi-Fi

A relay is an electric switch operated by a signal in one circuit to control another circuit. The relay module has three pins and it should be connected to Uno as Vcc to 5V, Gnd to Gnd, IN to digital pin8.IOT cloud refers to any number of cloud services that power the IOT. These include the underlying infrastructure needed for processing and storing IOT data. It also includes the services and standards necessary for connecting, managing and securing data.

One of the basic building blocks of electronics project is building your own DC power from an AC source of 110 VAC or 220 VAC. The common DC voltages that are required to power up the devices

are generally in the range of 3 VDC to 30 VDC. Typically the fixed types of DC voltages are 5V, 9V, 12V, 15V and 18V DC.

6. Results Comparisions

This paper gives a different way of the approaching problemwhen compared with other papers. The results are as shown below:

1. If helmet is worn then only ignition gets ON else the ignition gets OFF.
2. If user is worn helmet but user is drunk then ignition gets OFF.
3. If user met with an accident then message sent to the respected mobile number with latitude and longitude directions by using GPS and GSM.
4. By using IOT the data can be stored in the cloud to view the information about the motor cycle rider.

There is a LCD displayto view the conditions about the bike rider. From the display only user knows why the ignition gets ON and OFF.

By comparing with other papers our smart helmet is very efficient for the security of preventing the road accidents to the motor cycle riders.

7. Conclusions

With the advancement of science and technology the life of every individual is important. So, Smart Helmet is used to provide security and accommodate all the needed facilities in compact manner. The proposed design of smart helmet will give in terms cost effective and updated technology front for all kinds of helmets for the prevention of road accidents.

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