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Smart Helmet an Aid to Save Rider by Using Microcontroller

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Abstract: ***A smart helmet is a type of protective headgear used by the rider which makes bike driving safer than before. To Provide safety for the rider, the rider has to wear the helmet. By using advanced features like alcohol detection, accident identification, location tracking, fall detection. It is a hands free device. This is not only a smart helmet but also a feature of a smart bike. It is compulsory to wear the helmet, without which the ignition switch cannot turn ON. An RF Module is used as an wireless link for communication between receiver and transmitter. The ignition gets locked automatically when the rider is drunk , and sends a message to the registered number with his current location. If accident occurs it will send a message through GSM along with location with the help of GPS module. The distinctive utility of project is fall detection; if the rider falls down from the bike it sends a message to the registered mobile number.***
Keywords: Helmet, GSM, GPS, RF Module, Transmitter

I. INTRODUCTION

Nowadays around the world, a huge number of people dies from accident. The main aim is m to solve the problem by using smart helmet. A smart helmet is a best idea which makes motorcycle driving safer than before. The Arduino is implemented. The main aim of this project is to create a safety system which is integrated with the smart helmet and intelligent bike to reduce the probability of two-wheeler accidents and drunk driver cases. It consists of vibrator sensor for detection of accidents. And alcohol sensor which detects the alcoholic content in riders' breath. For the detection of helmet, we are put one switch if that switch was pressed then it will detect as helmet detected. If there is any alcohol content found in rider's breath, or not wearing the helmet the ignition switch remains off. So when the rider falls to the ground and the helmet hits the ground, it will sense by the vibrator sensor. And the message and GPS location was send to the rider's registered family member number. The SMS alert was send through the GSM module and the GPS datawas extracted through Arduino, using the GPS module that is interfaced with Arduino. We can get the exact location of the rider was detected by GPS Module. Smart helmet helps if accident occurs by using GSM and GPS technology.

A. Objectives

1) Used in motor vehicles to ensure safety of the rider.
2) Alcohol detector can also be implemented in cars.
3) It can be used in real time safety system.
4) This safety system technology can further be enhanced in car and also by replacing the helmet with seat belt.
5) Can be applied to the persons who are working in the underground Mining helmets.
6) It can be used in real time safety system.

II. LITERATURE REVIEW

Authors invented a new helmet model, when an accident occurs; a cloud-based service is used to send the alert SMS and current location to the emergency contacts. The location of the vehicle is detected from the GPS module. BMA222 accelerometer, Wi-Fi enabled processor (TI CC3200), sensors and cloud computing platforms are used for constructing the system. The authors have designed a helmet to the riders to provide speacial features like listening to music while riding, sending SOS messages along with the location in case of emergency via microcontroller (ATmega328P) . This helmet is modified with latest Bluetooth (HC-05 Module) technology through which it connected to the rider's Smartphone and can receive phone calls while driving through the Arduino Software (IDE).[1]

Helmet is upgraded with peltier module for rider comfort , by Peltier module (TEC-12706T125), thermoelectric effect is maintains the heat inside the helmet. To detect the temperature the temperature sensor (LM35D). When the accident occurs the GPS module sends current location to the registered contacts and in case of bleeding, it can be clotted by thermoelectric module so the risk of danger can be low. Smart helmet is runs by GPS and GSM technology .[2]

Phone via Wi-Fi and finally Smart Helmet connects to Smart phone through Bluetooth to give audio guidelines for navigating the rider, inform about notifications.

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The Smart Helmet concept is proposed by the authors having a control system inside the helmet which consists of a RF transmitter through pin17 of HT12E and a RF receiver system. The bike will not allow the rider to start before wearing the helmet, after rider wore the helmet a RF signal indicates from transmitter and after this signal gets sensed by the receiver placed in the ignition switch of the bike is turn ON, bike will get start for riding.[3]

III.METHODOLOGY

This consists of different sensors and a transmitter Circuitry. Microcontroller consists of three sensors which are vibrate sensor, alcohol sensor and IR sensor. Alcohol sensor is to recognize the alcohol focus. The alcohol sensor is placed near the mouth of the rider, in the helmet. Vibrate sensor is used for crash location. Another microcontroller contains two sensors which are pulse sensor and UV sensor. Pulse sensoris used for measuring of pulse rate. LED1 blinks white light when the pulse rate increases. UV sensor will sense the opposite vehicle to avoid collision also avoid the accident. LED2 is activated and blinks red light when any vehicle detected near our vehicle. A RF transmitter is transmit information from any controller or standard Encode IC has been used. The RF transmitter transmits information from the microcontroller on the helmet side to the recipient on the vehicle side through transmit antenna.

This module includes of a LCD, GSM module, RF recipient, Receive antenna, DC motor, drive L293D and GPS module. It is an wireless communication. The information from the transmit antenna receives through the receive antenna then transmits to the RF receiver which gets the information and sends it to the microcontroller for further Handling. If any accident situation occurs, the GPS module will receives the coordinates of the accident site. These co-ordinates are sent by means of GSM module to a emergency number. Receives the detection of accident along location with the help of GPS to the person who belongs to the number. The start status is controlled by the microcontroller relying upon different conditions. DC motor decreases speed when any sensor senses their activity by using drive called driver L293D. conditions of sensors activities displays using LCD.

IV.HARDWARE IMPLEMENTATION

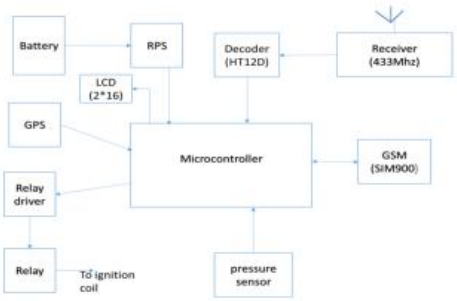


FIG 1: Hardware Implimentation

A. Hardware Details

1) ATmega328p: The Arduino Uno is a microcontroller boarsbased on the atmega328p. It consists of 14 digital input/output pins (of which can be used as PWM output), 6 analog inputs, a 16 mhz ceramic resonator, a USB connection, a power pack, an ICSP header, and a reset button.

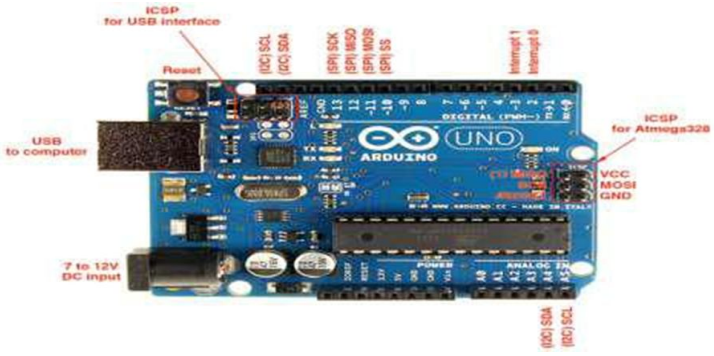


Fig 2: ATmega328p

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2) *Liquid Crystal Display (LCD):* Liquid crystal display is a flat panel display which emits the information of incoming and outgoing signal with the preset value. The commonly used LCD is 16×2 LCD which display 16 character per line and has ability to display in two lines i.e. 16 columns and 2rows, and also includes three control signals, one data bus, read and write pin, enable pin, register select pin.



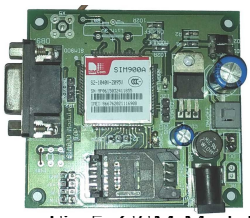
Fig 3: LCD Display

3) *Power Supply:* A Power supply is an electrical device that supplies electric power to an electrical load. The function of a power supply is to convert electric current from a source to the correct voltage , current and frequency to power the load.



Fig 4: Power supply

4) *GSM Module:* GSM module is used in many mobiles, and also for developing IOT and embedded system applications. GSM has a unique slot for SIM where it relays the information to the concerned person.



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Fig 5: GSM Module

5) *Alcohol Sensor:* The main application of alcohol sensor is identifying alcohol content from the breathe of the rider. It can be placed near the mouth of the rider.



Fig 6: Alcohol Sensor

6) *Vibration Sensor:* Piezoelectric sensor is the another name of vibration sensor. These are flexible devices used for measuring various processes.

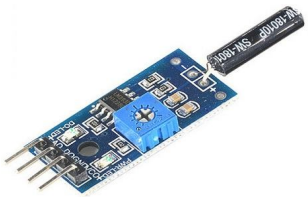


Fig 5: Vibration sensor

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7) *Finger Print Scanner:* Finger print is the main unique biometric signatures which are used to find the human very accurately. This is done by only placing the finger on the surface of the scanner.

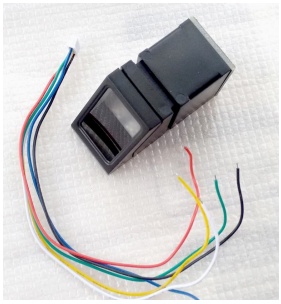


Fig 6: Finger Print Scanner

V. SOFTWARE DESCRIPTION

A. *Arduino IDE*

The Arduino Integrated Development Environment - or Arduino Software (IDE) – For writing code it contains a text editor, a message area, , a toolbar, a text console with buttons for common functions and a series of menus. To upload programs and communicate with them it connects to the Arduino and Genuino hardware.

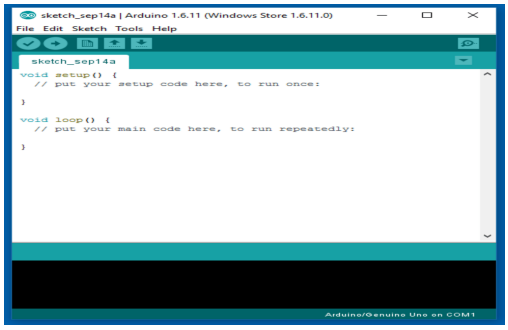


Fig. 7: Arduino IDE Programming Page

VI. ADVANTAGES AND DISADVANTAGES

A. *Advantages*

1) Easy to use in rural areas.
2) Power consumption is less.
3) It is very flexible and Reliable.
4) More reliable than manual operation.
5) This is easy to install and operate
6) This can implement for security of supply.
7) Controlled automatically and Easy to use.
8) If accident occurs in remote area, it can be easily detected and provides medical services in short time.
9) It will control the accidents by avoiding drunk and drive by the help of alcohol detector.

B. *Disadvantages*

1) Requirement of GSM network.
2) If the rider is not wear helmet, then the bike cannot be started.

VII. CONCLUSION

This smart helmet main aim is the safety of the rider by making wearing compulsory of hemet. And finds the rider is drunk or not, if the rider is drunk then the bike will not start.This also helps in efficient handling of the aftermath of accidents by sending SMS with the proper location to the near police station. Then the rider get proper and prompt medical service.

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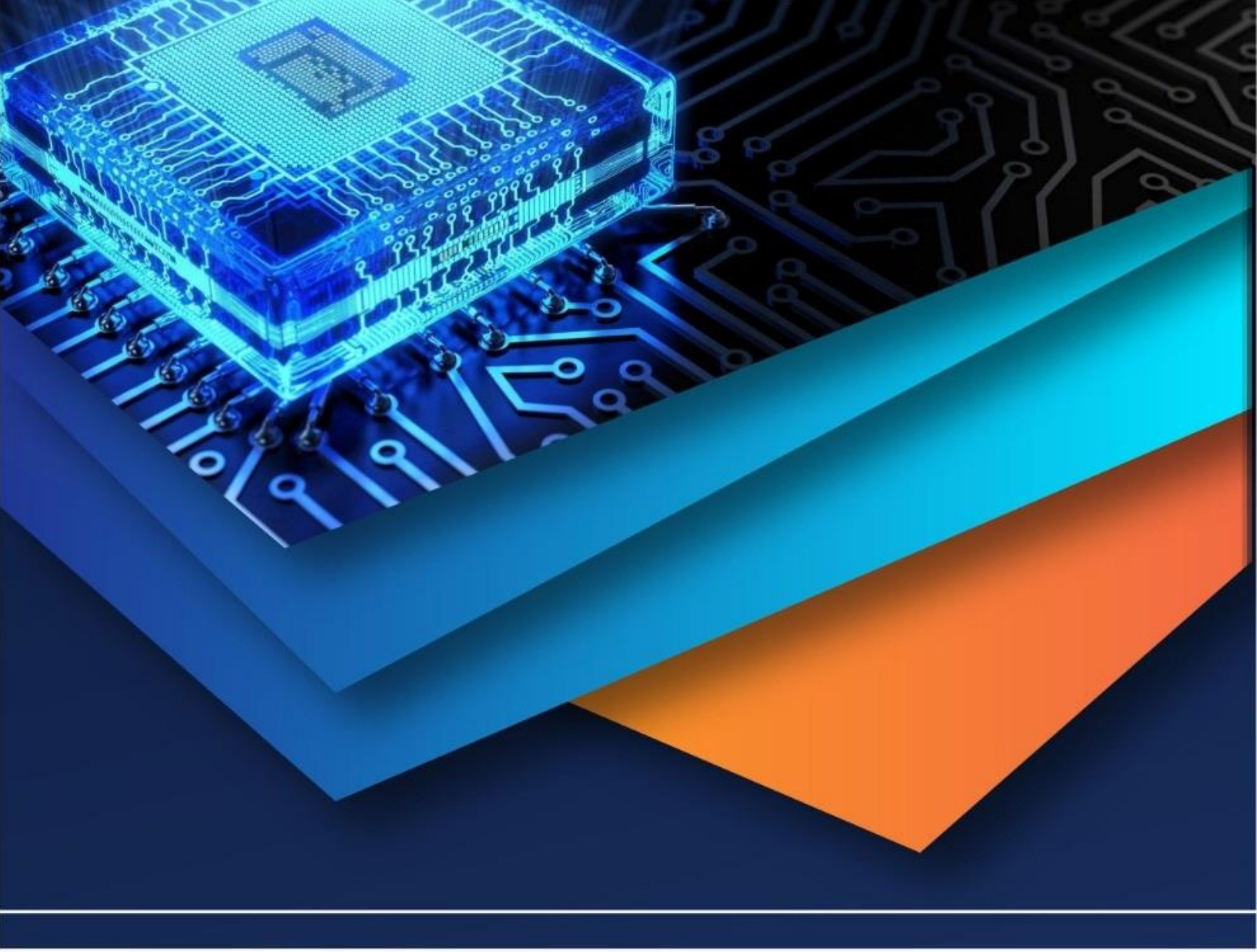
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