



Design and Implementation of Iot Based Smart Helmet for Road Accident Detection Using Arduino

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ABSTRACT

Most countries now require citizens to wear helmets while riding bikes and not to ride while under the influence of alcohol, although restrictions are still broken. To address this issue, "accident detection, alcohol detection, and protection utilizing a GSM-based smart helmet" has been proposed.

INTRODUCTION

The project's goal is to ensure the safety and security of bikers on the road. A Smart Helmet is a unique concept that uses GSM and GPS technologies to make motorcycle riding safer than ever before. Another benefit of this study is that it can detect the presence of alcohol in drunk persons riding bicycles. We're working on an embedded kit or system that will be installed in Helmet. consist of sensors and electronic circuitry that continuously monitor and measure the alcohol level and accelerometer state. We take a reading of the alcohol level and display it on the LCD display. When the alcohol level exceeds a predetermined threshold, an alarm sounds and we are alerted to the inebriated person.

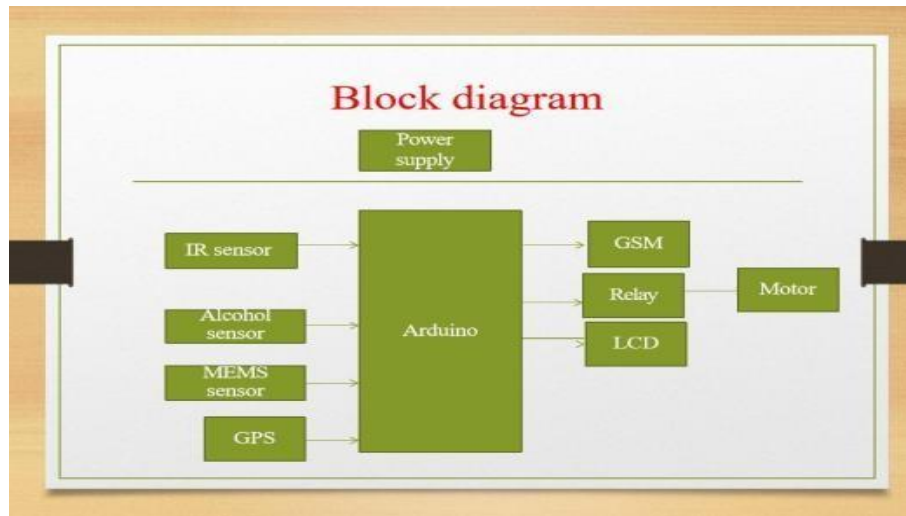
Existing system

Wearing a helmet puts a pressure on the helmet, and a data signal is sent to the transmitter, which causes the bike ignition control to switch on. However, there are certain disadvantages to the technology: By putting any artificial substance inside the helmet, pressure can be created. Instead of wearing a helmet, the rider can provide the appropriate pressure by inserting any dummy material into the helmet. As a result, the primary goal of starting the bike while wearing a helmet might be easily overlooked..

Proposed work

Our smart helmet's goal is to keep bike riders safe while also providing information about the accident location to the ambulance and family members. The GSM module is used to accomplish this. However, simply relaying the accident's message is insufficient. We need to send the accident's location. As a result, we're utilizing the GPS module. When an accident occurs, the MEMS sensor detects the event and sends a signal to the Arduino. The Arduino will then utilize the GPS to determine the location of the accident and give it to the user in the form of latitude and longitude. However, the average user will not comprehend how to get location from latitude and longitude. We're employing an alcohol sensor and an infrared sensor to detect alcohol and helmets, respectively.

Block diagram



Arduino Uno

The ATmega328-based Uno with Cable is a microcontroller board. It contains 14 digital input/output pins (with 6 of them being programmable). 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header, and a reset button are all used as PWM outputs. It comes with everything you'll need to get started with the microcontroller; simply plug it into a computer via USB or power it with an AC-to-DC adapter or battery.

Infrared Sensor-

An infrared sensor is an electronic device that emits infrared light in order to detect certain features of the environment. An infrared sensor can detect motion as well as measure the heat of an item. The term "passive IR sensor" refers to a sensor that just measures infrared radiation rather than emitting it. Normally, all objects emit some type of thermal radiation in the infrared range.

Sensors made of MEMS

MEMS inertial sensors are low-cost, high-accuracy inertial sensors that are employed in a wide range of industrial applications. This sensor is based on the micro-electro-mechanical-system, which is a chip-based technology. These sensors are utilized to detect as well as measure external stimuli such as pressure, after which it responds to the pressure that is measured via mechanical operations.

MQ2 Alcohol Sensor

The MQ2 gas sensor can detect the presence of LPG, Propane, and Hydrogen, as well as Methane and other combustible steam. It is inexpensive and ideal for a variety of applications. The sensor detects combustible gas and smoke.

GPS

The Global Positioning System (GPS) is a satellite-based system that measures and computes its position on Earth using satellites and ground stations. Navigation System with Time and Ranging (NAVSTAR)GPS is another name for GPS. For accuracy, a GPS receiver must receive data from at least four satellites. The GPS receiver does not send any data to the satellites.

GSM

An AGSM modem is a device that can be either a mobile phone or a modem that allows a computer or other processor to interact via a network. The AGSM modem requires a SIM card to operate and runs over a network range that the network operator has subscribed to. It can be used to connect to a computer through serial, USB, or Bluetooth.

LCD

LCD (Liquid Crystal Display) technology is used in scratch pad displays and other small PCs. LCDs, like LED and gas-plasma technology, allow for far slimmer presentations than cathode beam tube technology (CRT). LCD displays use far less energy than LED and gas displays since they emit light instead of obstructing it.

APPLICATIONS

- We can later turn the entire circuit into a tiny module.
- Safety system that uses less energy

ADVANTAGES

- Accidents in remote areas can be quickly identified, and medical assistance can be delivered in a timely manner.
- Using an alcohol detector to avoid driving when inebriated.
- It lowers the chances of an accident.
- It can run on both solar and battery power.
- If the helmet is taken, the password can be used to start the bike.

CONCLUSION

The project's findings revealed that if a helmet is worn, the bike's ignition will start. As a result, the impact of an accident will be reduced automatically, and the bike will be less likely to be stolen. Arduino is capable of controlling the entire system as well as the sensors. Implementing a wireless system that uses a Zigbee module to relay signals from the helmet to the bike. As a result, wireless connections are preferable over traditional connections.

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