

Smart Helmet for Cellphone Accident Avoidance Frequency Based Vehicle Controlling Approach on IoT

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Abstract: People choose motorbikes because it is much cheaper to run, easier to park and flexible in traffic. In India, more than 37 million people are using bikes. Since usage is high, accident percentage of two-wheeler are also high compared to four wheelers. Motorcycles have high rate of fatal accidents than four wheelers. The impacts of these accidents are more dangerous when the driver involves in a high – speed accident without wearing helmet. It is highly dangerous and can cause high number of deaths. So, wearing a helmet can reduce accidents and may save the life. This paper main objective is for avoidance of accidents and develop helmet detection system. The proposed system is an intelligent/safety helmet. A smart helmet consist of two module, such that, the helmet module will sync with the bike module and will also ensure that biker has worn Helmet.

Keywords: Helmet.

I. INTRODUCTION

In generally Motorcycles have high rate of fatal accidents than four wheelers. The level of these accidents are more dangerous when the driver involved in a high-speed accident without helmet. It is extremely dangerous and can cause high no of deaths. So, a helmet can decrease this number of accidents and may save the person life.

II. EXISTING SYSTEM

The existing system only has a helmet section to detect whether the rider is wearing a helmet or not . Death occurs due to damage occurred in the driver brain. In existing system we couldn't control the vehicle section and also there helmet section only.

2.1 Disadvantages of Existing System

- To increasing number of deaths in road accidents. Mostly death occurs due to collision at brain of biker. The accident happens due to avoid the helmet while driving. In the accidental condition, first aid treatment to the victim is generally delayed. This leads to high number of deaths in road accidents.

III. PROPOSED SYSTEM

The proposed system is to design a helmet that provides safety prevent over a drink and drive cases to the driver. It detects whether the rider met with an accident if he meets, then it alerts the guardian about the accident and sends SMS. For the safety of the bike rider, we are using the latest technology IoT, this technology provides the advance techniques for alerting the rider and ensures that rider follows the rules and regulations. The proposed project work presents the smart helmet that ensures that the rider cannot start the bike without wearing it.

Disadvantages of Proposed System

- To decrease cell phone accidents. This system ensures correct, properly fitted helmet can help protect your brain by absorbing the force from a crash or a fall, dramatically decreasing the risk of serious injury.

Merits

- Improved Safety.

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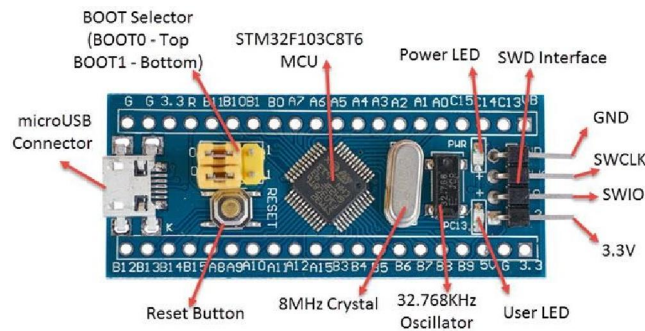


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- Increased visibility.
- Communication will be enhanced.
- Comfortable to rider
- Better GPS- navigation system.

Hardware Component

- STM32 Microcontroller
- The STM32 is a series of microcontroller developed by STMicroelectronics. These microcontrollers are based on the ARM Cortex-M processor cores and widely used in various embedded systems and applications.
- Key Features:
 - ARM Cortex-M Core
 - Peripheral Integration
 - Memory Options
 - Wide Range of Models
 - Low Power Capabilities



Power Supply

The power supply section is the important one. It should deliver constant output regulated power supply for successful working of the project. A 0- 12V/1 mA transformer is used for this purpose. It’s important to consider factor such as the required voltage and current levels, efficiency, stability, noise levels and protection.



LCD 16X2

LCD screen is an electronic display module and is a commonly used alphanumeric display that an display 16 characters per line and has two lines. They provide a simple and cost effective way to display textual information and can be interfaced with microcontroller.



LCD Adapter

Adapter could be a module or circuit that acts as an interface between a microcontroller and LCD display. This chip converts the I2C data from an Arduino into the parallel data required for an LCD display.

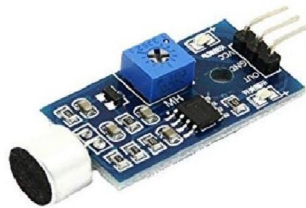
Force Sensor

Force Sensing Resistors (FSR) are a polymer thick film (PTF) device which exhibits a decrease in resistance with an increase in the force applied to the active surface. Its force sensitivity is optimized for use in human touch control of electronic devices. FSRs are not a load cell or strain gauge, though they have similar properties.



Sound Sensor

The sound sensor is one type of module used to detect the sound. The module is used to detect the intensity of sound. The usage of this module mainly include switch, security, as well as monitoring. The accuracy of this sensor can be modified for the ease of usage.



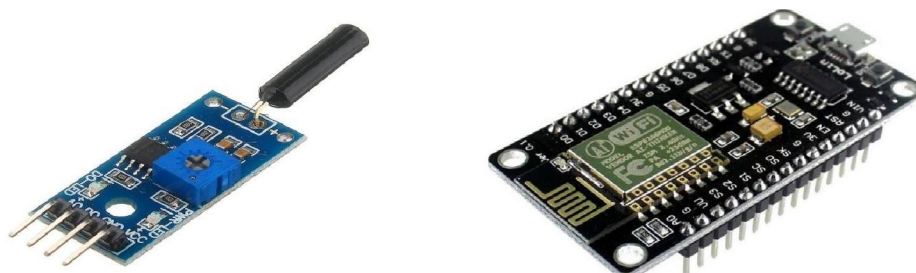
Gas Sensor

The MQ2 has an electrochemical sensor, which changes its resistance for different concentrations of varied gasses. The sensor is joined in series with a variable resistor to create a voltage divider circuit and the variable resistor is modify to change sensitivity.



Vibration Sensor

Vibration Sensor is a high sensitivity non- directional vibration sensor. When the module is stable, the circuit is switch on and the output is produced. When the movement or vibration occurs, the circuit will be disconnected short-time and output low. At the same time, you can also change the sensitivity according to your own needs



Motor Driver IC

L293D IC is a typical Motor Driver IC which provide the DC motor to drive on any direction. This IC consists of 16-pins which control two set DC motors instantaneously in any direction. It means, by using a L293D IC we can use two DC motors. As well, this IC can ride small and quiet large motors.

DC Motor

A DC motor is an electric motor that runs on direct current power. In any electric motor, operation is based upon simple electromagnetism. A current carrying conductor creates a magnetic field

GPS

GPS or Global Positioning System is a satellite navigation system that provides location and time information in all weather conditions to the person. GPS is providing navigation in planes, ships, cars and trucks also. The system provides critical abilities to military and civilian users around the globe.

GSM Modem

A GSM modem is a wireless modem that works with a GSM wireless network. A wireless modem behaves like a dial-up modem. The main difference between them is that a dial-up modem transfer and receives data in a fixed telephone line while a wireless modem transfers and receives data in radio waves.

Buzzer

A buzzer or beeper is an audio signaling device, which may mechanical, electromechanical, piezoelectric (piezo for short). Main uses of buzzers and beepers consists alarm devices, timers, and confirmation of user input such as a mouse click or keystroke.

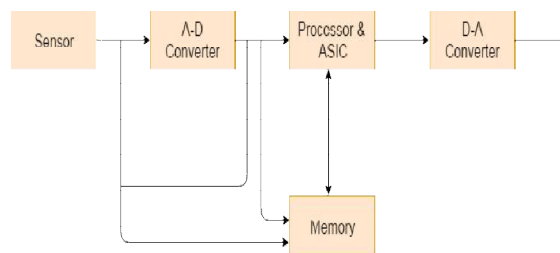
ESP-12 IOT

The **internet of things (IoT)** is the network of physical devices. It is widely used in IOT applications, homes, networks and other projects which uses wireless connectivity. It runs at a clock speed of 80 MHz and low power consumption

IV. SOFTWARE COMPONENT

Embedded C

Embedded C is high popular programming language in software field for developing machines and systems. It has limited resources and direct access is allowed. It uses interrupts and real time responsiveness. Embedded C is used all industrial components and systems.

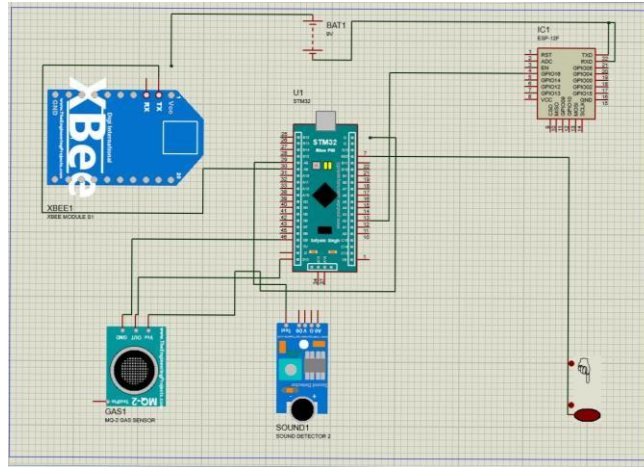


Arduino Software IDE

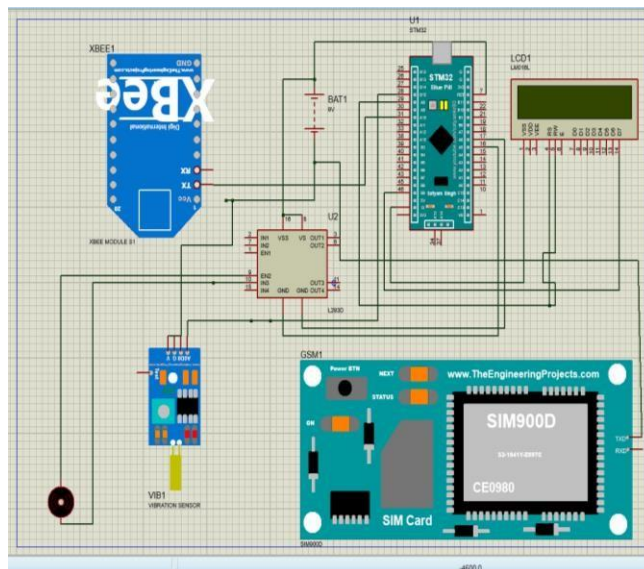
The Arduino Integrated Development Environment contains a text editor for writing code, a message area, a text console, a toolbar with buttons for common functions and a series of menus. It designed to be beginner friendly and accessible. It comes with pre-installed libraries and functions.

V. CIRCUIT DIAGRAM

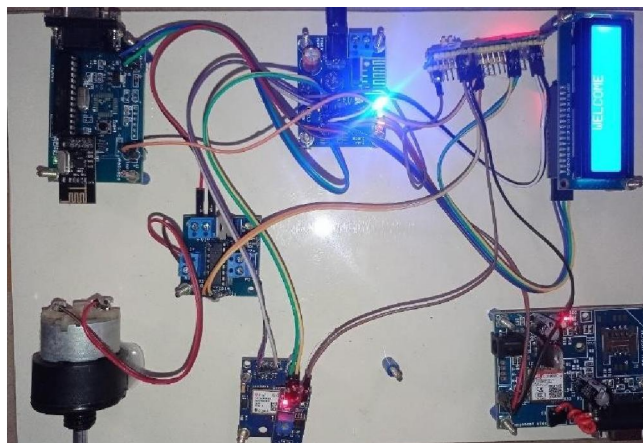
HELMET SECTION:



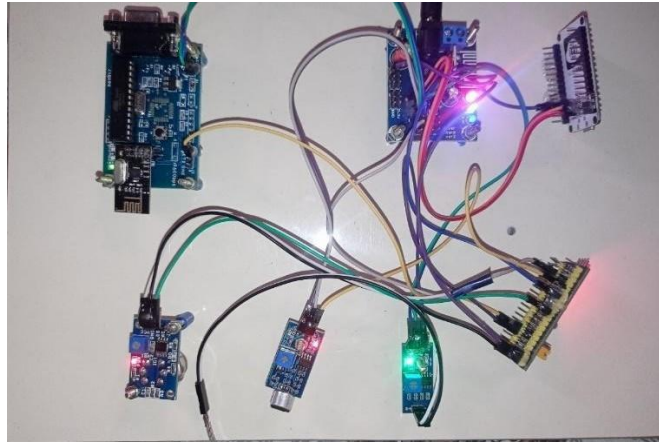
BIKE SECTION:



PROJECT FINAL STAGE BIKE SECTION:



HELMET SECTION:



VI. CONCLUSION

The model proposed in this paper aims for avoidance of accidents and develop helmet detection system. The proposed system is an intelligent/safety helmet. The bike module connected with helmet module which control the vehicles. The module fixed on the helmet consists of force sensor, MQ- 2 sensor, and mic sensor and zigbee transmitter. The force sensor is used to determine whether the driver is wearing the helmet properly. MQ-2 sensor detects alcohol consumption. The mic sensor is used to detect the whether the person speaking while driving. The helmet and vehicle section communicate with each other with zigbee transmitter and receiver. Once an accident is detected through vibration sensor, GSM sends the alert message. GPS sends the location of accident. The fingerprint sensor is used to provide authentication. The DC motor is used to prototype of vehicle engine

VII. FUTURE SCOPE

Future scope of this project includes designing the proposed model using high-end controllers like Arduino and involvement in vehicles communication (V2V). The automatic error detection in the vehicle and displaying those errors in the display to inform the user, integrating with the prompt audio messages are some advanced features which are currently under developing stage. Additionally, road signs are made to be detected at a distance using image-processing AI software and alert can also be showed to the user while riding the bike.

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