Smart Helmet System

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Abstract
Bikers in our country are increasing, the road accidents are also increasing everyday most of them are occured due to most common negligence of not wearing the helmets. This project ensures the safety of biker, by making it necessary to wear helmet as per government guidelines. The main objective of this paper is to build a safety system which is integrated with the smart helmet and IR sensor to reduce the probability of two-wheeler accidents. The IR sensor checks if the rider is wearing the helmet or not. If the rider is not wearing the helmet it will give a buzzer sound untill he wears a helmet.

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INTRODUCTION

A traffic accident is defined as any vehicle accident occurring on public highway roads .The thought of developing this project comes to do some good things towards the society. The main aim of our project is to build a safety system which is integrated with the smart helmet to reduce the two wheeler accidents. The bike accidents are increasing daily and lead to the loss of many lives and death rate is increasing every year . By using helmet number of accidents can be reduced. This project to designed to check whether the person is wearing helmet or not. If a person is not wearing helmet it is sensed by IR sensor and gives a buzzer sound indicating to wear a helmet

I-EXISTING SYSTEM

The system ensures the safety of the biker, by making it necessary to wear the Helmet, as per the government guidelines, also to get proper and prompt medical attention, after meeting with an accident. A module is affixed in the helmet, such that the module will sync with the module affixed on the bike. The system will ensure that the rider has worn the helmet. If he fails to do so, the bike won't start. Vehicle Detection with GPS and GSM modem avoids lots of accidents happen on highways due to increase in traffic and also due to the rash driving of the drivers. And in many

situations, the family members of the ambulance and police authority are not informed in time. This result in delaying the help reached to the person who suffered due to an accident.
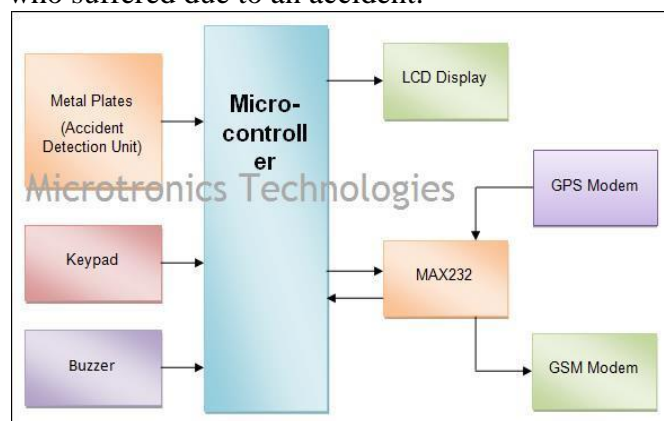
II-PROPOSED SYSTEM

2.1 BLOCK DIAGRAM

All these sensor outputs are sent as input to the microcontroller. The microcontroller processes the data and sends it to the module on the bike via RF module consisting of RF transmitter and RF receiver. The receiver sends the data to the microcontroller on the bike module. If the IR sensor is LOW, it implies that the helmet is worn and hence the bike will run smoothly else it will ot allow the bike to start. it will not allow the bike to start else the bike will run smoothly.
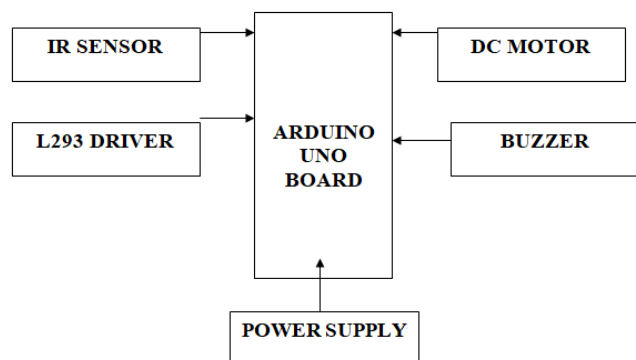
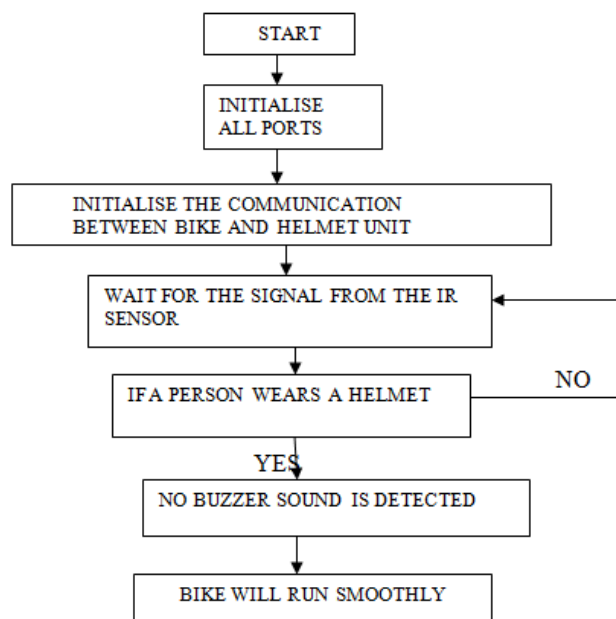**Fig:1** Block diagram of Intelligent Helmet System

2.2 FLOW CHART

Fig:2 Flow Chart of Intelligent Helmet System

III-HARDWARE EQUIPMENTS

3.1 ARDUNIO UNO BOARD

Arduino Uno is a microcontroller board which uses 8-bit ATmega 328P microcontroller and other components such as voltage regulator,crystal oscillator, serial communication etc. for supporting the microcontroller. Arduino Uno has 14 digital input/output pins out of which 6 can be used as PWM outputs and 6 analog input pins, a USB connection, a Power barrel jack, an ICSP header and a reset button.

3.1.1 How to use Arduino Board

The 14 digital input or output pins can be used as input or output pins by using pinMode, digitalRead and digital Write functions in arduino programming. Every pin operates at 5V and receives a maximum of 40mA current, and has an internal pull-up resistor of 20-50 KOhms which are disconnected by default. Out of these 14 pins some pins have specific functions as follows
•Serial Pins 0 (Rx) and 1 (Tx) pins are used to receive and transmit TTL serial data simultaneously. They are connected with the ATmega328P USB to TTL serial chip.
•External Interrupt Pins 2 and 3 can be configured to trigger an interrupt on a low value a change in value or a rising or falling edge .
•PWM Pins 3, 5, 6, 9 and 11 pins provide an 8-bit PWM output by using analog Write function.
SPI Pins 10 (SS), 11 (MOSI), 12 (MISO) and 13 (SCK)e pins are used for SPI communication.
•In-built LED Pin 13 pin is connected with an built-in LED, when pin 13 is HIGH LED is on and when pin 13 is LOW it offs.
In addition with 14 Digital pins there are 6 analog input pins each of which provide 10 bits of resolution, i.e. 1024 different values. They measure from 0 to 5 volts but this limit can be increased by using AREF pin with analog Reference function.
•Analog pin 4 (SDA) and pin 5 (SCA) are also used for TWI communication using Wire library.
Arduino Uno has a couple of other pins such as
•AREF which is used to provide reference voltage for analog inputs with analog reference function.
•Reset Pin resets the microcontroller when it is LOW.

3.1.2 Arduino for Communication:

Arduino communicates with a computer or another Arduino board or other microcontrollers. The ATmega328P microcontroller provides UART TTL 5V serial communication which can be done using digital pin 0 and pin 1 . An ATmega16U2 channels serial communication over USB and appears as a virtual com port to software on the computer. The ATmega16U2 firmware uses the standard USB COM drivers and no need of external driver but any ways requires a .inf file in windows . The Arduino software contains a serial monitor that allows simple textual data to be sent to and from the Arduino

board. There are two LEDs for receiving and transmitting on the arduino board which will glow when data is being transmitted via the USB-to-serial chip and USB connection to the computer not used for pins 0 and 1 in serial communication. A Software library allows for serial communication on any of the Uno's digital pins. The ATmega 328P also supports I2C TWI , SPI communication and contains a Wire library to simplify use of the I2C bus.
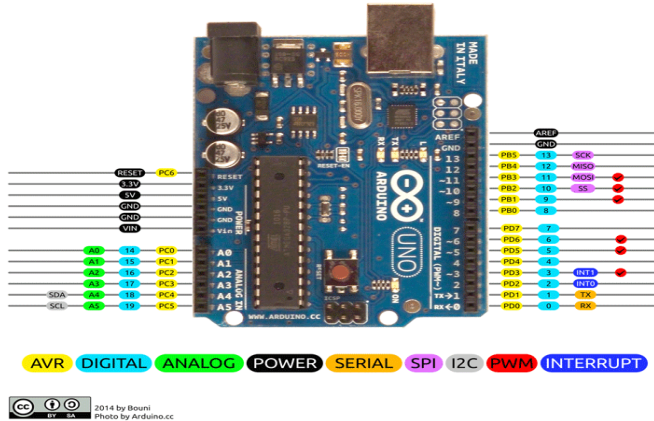

Fig:3 Ardunio uno board

3.2 IR SENSOR

Infrared radiation (IR) is an electromagnetic radiation with a wavelength ranging from 0.7 and 300 micro meters, which has a frequency range between a 1 and 430 THz approximately. Its wavelength is longer athan that of visible light,but the wavelength is shorter athan that of terahertz radiation microwaves. Bright sunlight provides an brightness level of about 1 kilowatt per square meter at sea level. In 527 watts is infrared light, 445 watts is for visible light, and 32 watts is for ultra violet light. Infrared imaging is used widely for military and civilian purposes. Military applications are target acquisition,surveillance, night vision, homing and tracking. Nonmilitary applications include thermal efficiency analysis,short-ranged wireless communication remote temperature sensing, spectroscopy, and weather forecasting.

Fig:4 IR sensor

3.3 L239 DRIVER

A L293D chip has two h Bridge circuit inside the IC which can rotate two dc motor independently.Because of its size it is very much used in robotic application for controlling DC motors. Figure shows the pin diagram of a L293D.There are two Enable pins on l293D. Pin 1 and pin 9 are used for driving the motor, and the pin 1 and 9 need should be high. For driving the motor with left H-bridge pin 1 is enabled to high and for right H-Bridge 9 to enabled to high. If either pin1 or pin9 goes low then the motor in the corresponding section will stop working.
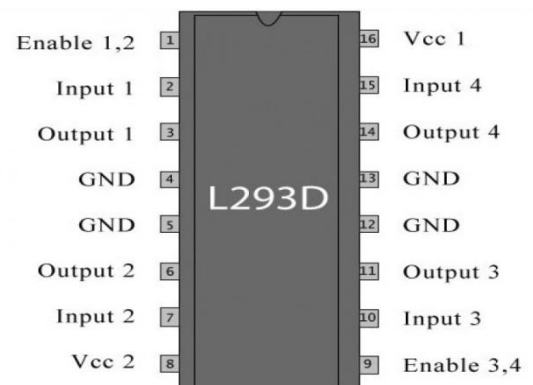

Fig:5 L293 DRIVER

Fig:6 L293 PIN DIAGRAM

3.4 BUZZER

A buzzer is device mainly audio signalling device which may be piezoelectric (piezo for short)mechanical,electromechanical. Generally used buzzers and beepers including alarm devices, timers,and confirmation of user input such as a mouse click or keystroke.The buzzer consists of an outside case with two pins to attach it to power and ground. When current is givento the buzzer it causes the ceramic disk to contract or expand which causes the surrounding disc to vibrate. That's the sound that you hear.
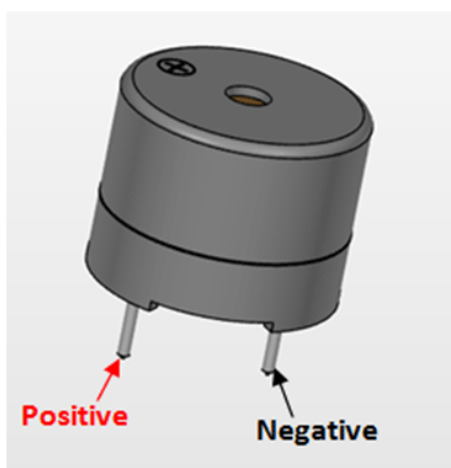
Fig:7 BUZZER

Buzzer Features and Specifications

- Buzzer Features and Specifications
- Rated Voltage - 6V DC
- Operating Voltage-4-8V DC
- Rated current- <30mA
- Sound Type - Continuous sound
- Resonant Frequency- approximately 2300 Hz
- Small and neat sealed package

3.5 DC MOTOR

A DC motor converts electrical energy into mechanical energy.all types of motors have internal mechanism either electronic or electro mechanical to change the direction of current in the part of motor periodically. DC motors most widely used because of direct current lighting power distribution systems and its speed can be controlled using a variable supply voltage or by changing the current strength in the field windings

Fig:8 DC MOTOR

3. 6 Power supply

The Project needs power for its operation. The board need a supply of 7-12 volts either from DC power jack or 5V from USB connector or 7-12 volts from Vin pin in of the board.
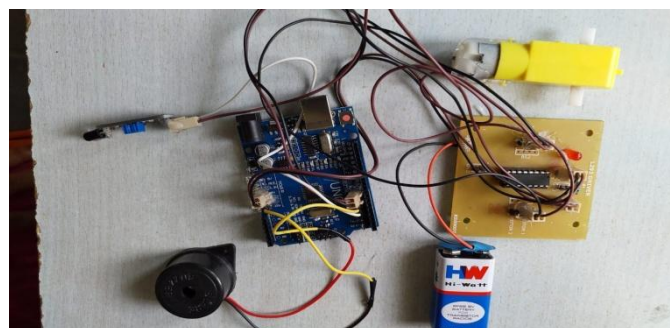
IV.HARDWARE RESULTS
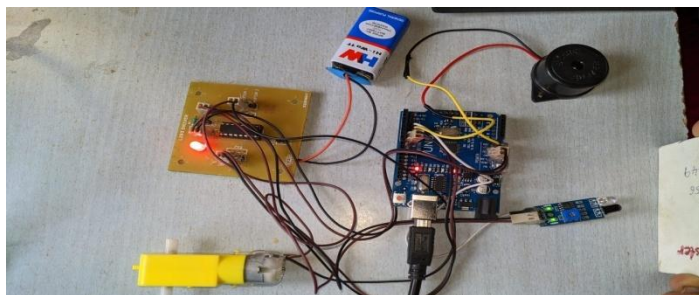
Fig:9 CONNECTION OF HARDWARE OUTPUT

Fig:10 HARDWARE OUTPUT(TWO GREEN LIGHTS IN IR SENSOR INDICATES PERSON IS WEARING A HELMET)
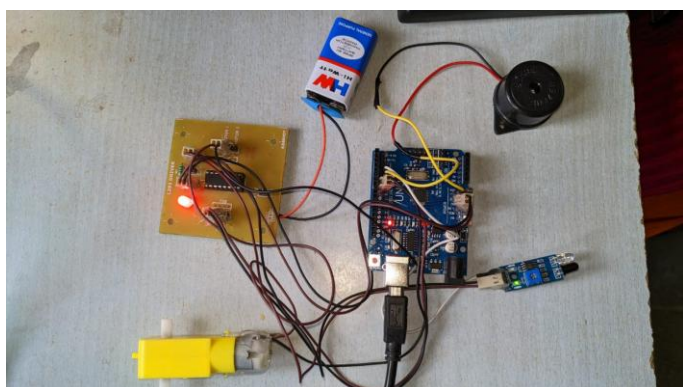

Fig:11 HARDWARE OUTPUT(ONE GREEN LIGHT IN IR SENSOR INDICATES PERSON IS NOT WEARING HELMET AND GIVES A BUZZER SOUND)

V.CONCLUSION

The two-wheeler safety system developed with smart helmet is reliable and help in the prevention of accidents hence reducing the probability of accidents. It has many advantages compared to the previous systems. This proposed system gives the primary importance of preventing the accidents and give safety for a greater extent to two wheeler's . Nowadays, most accident cases occur due to motor bike. These types of those accidents are increased because of the absence of helmet . By implementing this type of system a safe two wheeler journey is possible which would decrease the head injuries throughout accidents caused due to the absence of helmet.

VI. FUTURE SCOPE

The helmet can be further developed by adding additional features like wireless transmitter and receiver, providing the route for the rider, password for unlock the bike.

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