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IOT Based Modern Helmet and Intelligent Bike System

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ABSTRACT: India is prone to road accidents, and most of them involve two-wheelers, according to reports from the World Health Organisation (WHO). Due to this, we developed an IoT-based modern helmet and intelligent bike system as a solution to ensure the safety of bike riders. The Internet of Things (IoT) can offer an architecture that unifies smart services and situational reactions while also enabling cross-network communication between smart things or devices and humans. The main causes of two-wheeler collisions are failing to wear a helmet or disobeying traffic regulations. Designing a contemporary helmet with alcohol detection and accident prevention is the project's primary goal. If a person is wearing a helmet, an IR sensor verifies this, as well as

I.INTRODUCTION

An accident is a distinct, unanticipated, uncommon, and undesired event that can happen anywhere, anytime. This is especially true for the younger age, where biking is becoming increasingly popular. Due to their affordable pricing, middle-class households prefer to purchase two-wheelers over four-wheelers. The number of traffic accidents is rising along with the number of two-wheelers on the road. In the event of an accident, the wounded person's death may result from delayed medical care. Therefore, a system is required to guarantee rider safety by requiring riders to wear helmets in accordance with government regulations and to aid in giving the rider with medical treatment in the case of an accident.

II. LITERATURE SURVEY

TITLE: Smart Helmet for Accident Prevention with Sensors

AUTHOR: Mr.Mohd Khairul Afiq Mohd Rasli, Mr.Nina Korlina Madzhi, Mr.Juliana Johari.

YEAR : 2013

The suggested method for this project was especially created to increase motorcycle riders' safety. When the posted speed limit is exceeded, motorbike riders will get concerned. The rider's head and motorbike speed are each detected using a Force Sensing Resistor (FSR) and a BLDC Fan, respectively. Using a 315 MHz radio frequency module as a wireless link, the transmitter and receiver circuits may interact with one another. The system's whole component may be controlled by the microcontroller PIC16F84a. The motorbike engine won't start unless the rider fastens his or her helmet. In case the motor speed surpasses 100, an LED will blink.

TITLE : Smart Helmets with Automatic Headlamp Control

AUTHOR : Muthiah M, Aswin Natesh V, Sathiendran R K

YEAR : 2015

A project called the Intelligent Safety Helmet for Motorcyclists was started to improve motorcycle riders' level of road safety. The wearing of a helmet while riding is required by law in several nations. India is an illustration. The concept comes from the knowledge that motorbike riders are becoming increasingly concerned due to the rise in fatal traffic incidents over time. For the safety of motorcycle riders, this project aims to implement automated autonomous lighting technology. Here, we concentrate on lights that are clever enough to respond to a rider's face movement. Utilising an accelerometer and other sensors, it controls tiny electric motors that are integrated into the headlamp shell to spin the headlights in the appropriate directions.



TITLE : Smart Helmet & Intelligent Bike System

AUTHOR :Mr.Salunke Akshay S, Mr.Thorat Aniruddha N, Mr. Bhosale Nilesh.

YEAR : 2016

The system can detect alcohol, identify accidents, monitor locations, be used hands-free, be powered by solar, and detect falls. Helmet use is required; the ignition switch cannot turn on without one. A wireless connection that allows communication between a transmitter and a receiver is an RF module. When a rider becomes intoxicated, their ignition switch locks automatically, and a message containing their current position is sent to their registration number. In the event of an accident, a message will be sent through GSM to all phones that have provided a GPS module with their current location. You may use it to take calls while you're driving. Fall detection is the project's standout feature; if a bike rider falls off, a notice is instantly sent.

TITLE : A Smart Helmet for Air Quality and Hazardous Event Detection for the Mining Industry

AUTHOR :Mr. Behr C. J, Mr. Kumar A, Mr. Hancke G.P

YEAR : 2017

They had a dilemma with their safety equipment since any new safety equipment that is not portable and unobtrusive would simply be removed, like all the existing safety equipment. The additional safety equipment was added to the helmet, which is often the sole piece of protective gear worn by miners. An accelerometer, an IR sensor, and an air quality sensor were all employed. These were used to check the air quality and determine whether a miner had received a head injury or taken off his helmet. A ZigBee module was linked to the three sensors. Through the Contiki operating system (OS), this module handles all the processing and manages wireless connectivity between several helmets. The entire system was scrutinised.

TITLE : IOT based Smart Helmet System with Data Log System

AUTHOR : Mr.Manish Uniyal, Mr.Himanshu Rawat, Mr.Manu Srivastava, Mr.Vivek Kumar Srivastava.

YEAR : 2018

This article outlines the creation of a tried-and-true system that makes sure riders are wearing helmets correctly while their whole route is being recorded on the server. The system keeps track of the driver's wearing of a helmet, the vehicle's speed, any accidents, and the vehicle's position from the moment the ignition is turned on. Such information may be given to the traffic enforcement authorities for traffic monitoring or to any medical facility that can treat an injured rider with first assistance. The project now shows how registered users, such as the rider's guardians, may view the data.

III. PROPOSED SYSTEM

There are two parts to the adaptive system. Gas sensor and IR sensor placement is in the helmet part. The RF transmitter part is what it is. LCD, RF receiver, Accelerometer, Vibration Sensor, Ignition System, GPS Module, Buzzer, Gear Motor, and Node MCU (IoT) are utilised in the two-wheeler portion. It is a part of the RF receiver. The goal of the project is to create a contemporary helmet with an alcohol sensor to prevent accidents. The presence of a helmet is detected by an IR sensor. The alcoholic substance in the rider's breath is recognised by the gas sensor. The ignition switch automatically locks and the bike won't start if the person is not wearing a helmet and is drinking. When an accident is detected using an accelerometer and a vibration sensor.



BLOCK DIAGRAM

RF TRANSMITTER SECTION :

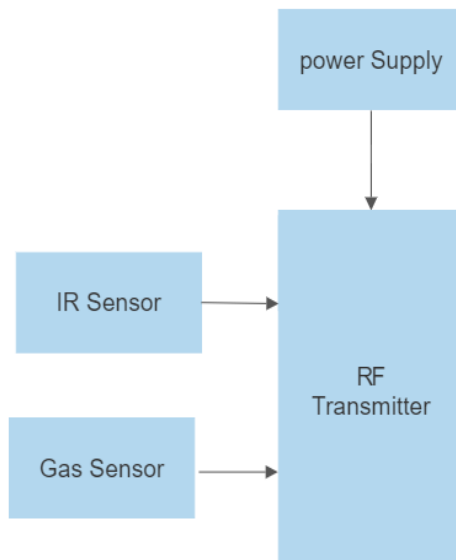


Fig 1. Block Diagram of RF Transmitter section

RF RECEIVING SECTION:

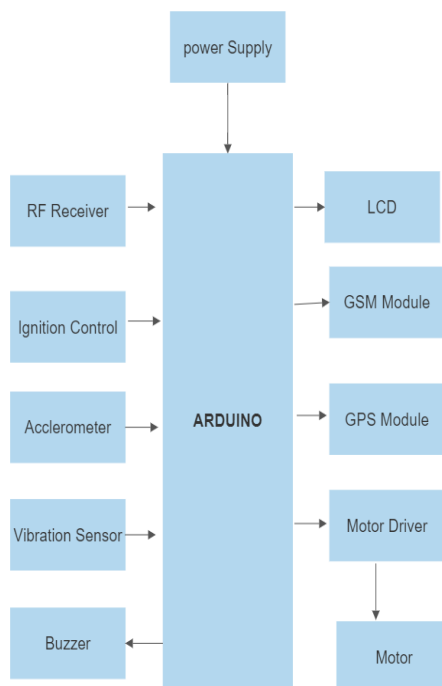


Fig 2. Block Diagram of RF Receiving section



SOFTWARE REQUIREMENTS

ARDUINO UNO

The Arduino UNO is a kind of microcontroller that has an ATmega328 controller. Beginners like the Arduino UNO board when using it for an electronics project. I solely use the Arduino UNO board as an Arduino board. The Arduino board is the one that is used the most frequently.

COMPONENTS DESCRIPTION

ARDUINO MICROCONTROLLER

The ATMEGA 328p chip of the Arduino microcontroller is utilised in this project. It is sometimes referred to as the circuit's brain. the ATMEL company's At mega range of integrated circuits. This is significant because before loading a new programme from the Arduino software, you might need to know the IC type. Commands and values that are generated during a circuit's operation can be stored. All signals are handled at the microcontroller before being sent to different devices.

GPS TECHNOLOGY

The location of the accident is determined using the Global Positioning System (GPS), a satellite-based navigation system. It locates the Longitude and Latitude values of a certain location and transmits them to the GSM module.

GSM MODEM SIM800

Global System for Mobile Communications is referred to as GSM. The link between a computer and a GSM system is made using it. Standard interfaces like RS232 and USB are included. Through the SIM, messages are sent using it.

ACCELEROMETER

Both the measurement of static and dynamic acceleration uses the ADXL 345. The static acceleration of gravity is measured by an accelerometer in this research. Free-fall detection detects when the bike is about to tumble. The bike unit then decides whether or not an accident will occur. In this project, we used the 12C digital interface approach to interface the ADXL345 chip. The ADXL345 requires a two-wire connection due to the CS's high connectivity to VDD I/O. This device's minimum operating voltage is limited to VDD I/O, which is 0.3 V. We employ two external pull-up resistors to ensure appropriate operation. The pull-up resistor has a value of 3.3 kilo ohm.

GAS SENSOR (MQ3)

This sensor is used to measure the amount of alcohol in a rider's breath. It requires a 23.3V power supply to operate. The driver is not permitted to operate the motorbike if the sensitivity of MQ-3 in the air is greater than 0.04 mg/L.

VIBRATION SENSOR

Vibration sensors are sensors for linear velocity, displacement, proximity, and acceleration. They also display and analyse these data.

LIQUID CRYSTAL DISPLAY

In order for the LCD display to show that the raider is not wearing a helmet or drinking alcohol, the raider did not do any of those things.

IR SENSOR

It's connected to the transmitter part. This project uses an IR sensor to detect if the rider of the bike is wearing a helmet or not. The bike will stop if the raider is wearing a helmet. When the helmet is not worn, the bike does not start, and the LCD Display in the receiver portion displays "not wearing helmet,"



RF COMMUNICATION CIRCUIT

A wireless RF link connects the two-wheeler and helmet sections. The RF communication circuit consists of a transmitter and a receiver circuit. On the side of the helmet is an encoder that transforms parallel data into serial data. A message of 12N data bits and N address bits can be encoded by the transmitter. Each address and piece of data has two logical states it can remain in. We decide on a 3 kHz oscillator with IM ohms. Data must be sent in a minimum of 4 words. The receiver, which is on the side of the bike, decodes serial data. This serial data is transformed into parallel data. The decoders are able to receive and comprehend data that is transmitted by an encoder. The initial bits of a period are used as addresses, while the latter 12N bits—where N is the address number—are used to represent the requested contents. The oscillator frequency of this decoder circuit is 50 times higher than the encoder oscillator frequency, fOSCE.

IV. CONCLUSION

This essay attempts to assist society by decreasing the number of fatalities brought on by drunk biking and not wearing a helmet, as well as by informing the family of an accident's location. The development of a contemporary helmet system includes incorporated technology that can detect if a rider is wearing a helmet and whether they have ingested alcohol. The bike would not start in either scenario, making it impossible for the rider to operate it. This is a preventative measure to lower traffic fatalities and accidents. In the unfortunate case of an accident, this system also includes a GPS and GSM device that will send a message and the position of the bike to the bike rider's family and save data in IOT. This will assist in giving the rider prompt assistance and lower the number of deaths.

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