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ijmrset@gmail.com



www.ijmrset.com



# Smart Helmet System for Accident Prevention

P.V.Nandhakumar<sup>1</sup> Dr.M.Karthigairajan<sup>1</sup> Dr.P.Palanikumar<sup>1</sup> S.Dishindhan<sup>2</sup>

Department of Automobile Engineering, Karpaga Vinayaga College of Engineering and Technology, India. <sup>1</sup>

Student, Department of Automobile Engineering, Karpaga Vinayaga College of Engineering and Technology, India. <sup>2</sup>

**ABSTRACT:** The smart helmet's main purpose is to give people a way to identify and report incidents. The system aims to address the growing concerns of accidents and injuries related to motorcycle and bicycle riders. By leveraging a combination of sensors, communication modules, and intelligent algorithms, the smart helmet system provides real-time monitoring and assistance to the user, contributing to accident prevention and rider safety. The system is built using sensors and Rf module, cloud computing infrastructures. The CPU receives the accelerometer measurements from the accident detection system and continually checks for irregular changes. When an accident happens, the relevant information is provided via a cloud-based service to the emergency contacts. The global positioning system is used to determine the location of the vehicle. The system guarantees the timely and accurate distribution of accident-related information to cloud services that are accessed by IOT in real time. Thus, a smart helmet for accident detection is constructed by utilizing the pervasive connection that is a key component of smart cities.

## I. INTRODUCTION

Every year, there are a large number of traffic accidents in India. Accidents can occur for a variety of causes, including drinking and driving, driving recklessly, exceeding the speed limit, and so on. Sometimes the individual who is hurt is not at fault for the mishap. It might have been caused by another car rider. Nonetheless, both riders will be impacted. The cyclists may perish due to a lack of timely first aid and emergency medical care. Several fatalities occur as a result of the ambulance failing to arrive at the targeted location on time. In the event of an accident, a system is developed that would ensure that the rider receives the necessary assistance in a timely manner. Because of their low cost and simplicity, two-wheeler vehicles are more popular in India than four-wheeler vehicles. In many incidents, the rider is mostly hurt on the head. A helmet is extremely crucial in safeguarding the life of the rider. Hence, in order to encourage people to wear helmets and avoid accidents, a design that synchronizes the module contained in the bike is recommended.

### 1.1 Transmitter side:

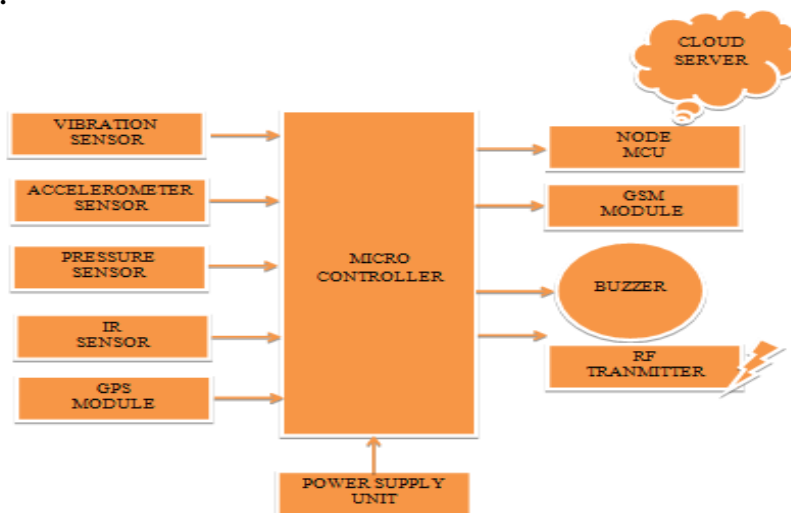


Fig: 1.1 Block Diagram

## 1.2 Receiver Side

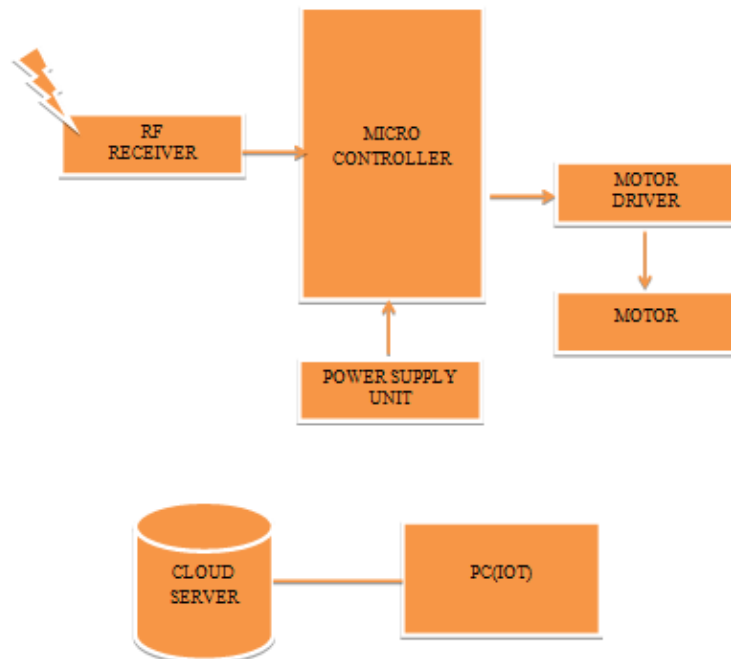


Fig: 1.1 Receiver Side Block Diagram

## 1.3 System Configuration

### Hardware requirements:

- MICROCONTROLLER
- NODE MCU
- VIBRATION SENSOR
- ACCELEROMETER SENSOR
- IR SENSOR
- RF MODULE
- MOTOR DRIVER
- MOTOR
- GPS MODULE
- GSM
- BUZZER
- CONNECTING WIRES
- POWER SUPPLY UNIT

### 1.4 Software requirements:

- EMBEDDED C
- PHP MY SQL
- ARDUINO IDE
- PYTHON

## II. SOFTWARE DETAILS

### 2.1 Arduino ide:

The Arduino Integrated Development Environment - or Arduino Software (IDE) - 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 connects to the Arduino and Genuino hardware to upload programs and communicate with them.



Programs written using Arduino Software (IDE) are called sketches. These sketches are written in the text editor and are saved with the file extension .ino. The editor has features for cutting/pasting and for searching/replacing text. The message area gives feedback while saving and exporting and also displays errors. The console displays text output by the Arduino Software (IDE), including complete error messages and other information. The bottom righthand corner of the window displays the configured board and serial port. The toolbar buttons allow you to verify and upload programs, create, open, and save sketches, and open the serial monitor.

Before uploading your sketch, you need to select the correct items from the Tools > Board and Tools > Port menus. The boards are described below. On the Mac, the serial port is probably something like /dev/tty.usbmodem241 (for an Uno or Mega2560 or Leonardo) or /dev/tty.usbserial-1B1 (for a Duemilanove or earlier USB board), or /dev/tty.USA19QW1b1P1.1 (for a serial board connected with a Keyspan USB-to-Serial adapter). On Windows, it's probably COM1 or COM2 (for a serial board) or COM4, COM5, COM7, or higher (for a USB board) - to find out,.

## **2.2 Embedded c:**

Embedded C is a set of language extensions for the C programming language by the C Standards Committee to address commonality issues that exist between C extensions for different embedded systems.

Embedded C is a set of language extensions for the C programming language by the C Standards Committee to address commonality issues that exist between C extensions for different embedded systems. Historically, embedded C programming requires nonstandard extensions to the C language in order to support exotic features such as fixed-point arithmetic, multiple distinct memory banks, and basic I/O operations

An embedded system is a computer system with a dedicated function within a larger mechanical or electrical system, often with real-time computing constraints. It is embedded as part of a complete device often including hardware and mechanical parts. Embedded systems control many devices in common use today. Ninety-eight percent of all microprocessors are manufactured as components of embedded systems.

Examples of properties of typical embedded computers when compared with general-purpose counterparts are low power consumption, small size, rugged operating ranges, and low per-unit cost. This comes at the price of limited processing resources, which make them significantly more difficult to program and to interact with. However, by building intelligence mechanisms on top of the hardware, taking advantage of possible existing sensors and the existence of a network of embedded units, one can both optimally manage available resources at the unit and network levels as well as provide augmented functions, well beyond

## **2.3 Internet of things (IOT):**

The Internet of things (IoT) describes the network of physical objects “things” that are embedded with sensors, software, and other technologies for the purpose of connecting and exchanging data with other devices and systems over the Internet.

Things have evolved due to the convergence of multiple technologies, real-time analytics, machine learning, commodity sensors, and embedded systems. Traditional fields of embedded systems, wireless sensor networks, control systems, automation (including home and building automation), and others all contribute to enabling the Internet of things. In the consumer market, IoT technology is most synonymous with products pertaining to the concept of the "smart home", including devices and appliances (such as lighting fixtures, thermostats, home security systems and cameras, and other home appliances) that support one or more common ecosystems, and can be controlled via devices associated with that ecosystem, such as smartphones and smart speakers. IoT can also be used in healthcare systems.



### III. CONCLUSION

Several difficulties can be solved with a smart helmet. Wearing a helmet and providing the proper verification are prerequisites for the bike to start, lowering the possibility of an accident. Accidents happen even when people exercise extreme caution. Whenever an accident occurs, a notice is given to the surrounding people, who can then serve hospitality by tracking the accident's position using IOT. Here, our engine turn off technology dramatically minimizes the possibilities of deaths. The smart helmet functions as a virtual police officer, keeping drivers in check and roadways safer.

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