

SMART HELMET USING ARDUINO UNO

Suresh B. Kadam¹, Snehal R. Patole², Vaibhav B. Gaikwad³, Prasad B. Pawar⁴

Prof. S. P. Kharde⁵

*Department of Electronics and Telecommunication Engineering
Shreeyash College of Engineering & Technology, Aurangabad, Maharashtra*

Abstract - A smart helmet is a type of protective headgear designed to enhance the safety of bike riders. Its main purpose is to ensure the rider's safety by incorporating advanced features such as alcohol detection, accident identification, location tracking, hands-free device functionality, and fall detection. This transforms the helmet into a smart accessory for the bike itself. Wearing the helmet is mandatory, as the ignition switch will not turn on without it. Communication between the helmet and bike can be achieved using an RF Module as a wireless link between the transmitter and receiver. If the rider is intoxicated, the ignition will be automatically locked, and a message with the current location will be sent to the registered number. In the event of an accident, a message along with the GPS location will be sent through GSM technology. The project's distinctive feature is fall detection, where if the rider falls off the bike, a message will be sent to notify others.

Key Words: Node MCU, Motor and motor driver.

1. INTRODUCTION

It is a well-known fact that young generation prefers bikes and motorcycle over four wheelers. A survey indicates that more than 70% of the riders avoid wearing helmet without any specific reason. A traffic accident is defined as any vehicle accident occurring on roads. Two wheeler accidents are increasing day by day and lead to loss of many lives. In many accidents that occur around us, there is a huge loss of life. According to a survey, about "7500" people die on roads per year that occur due to bike accidents. Due to lack of experience or focus and violation of traffic rules, result in severe accidents. It's common knowledge that young people prefer bikes and motorcycles over cars. A survey shows that over 70% of riders choose not to wear helmets without any specific reason. Two-wheeler accidents are increasing, leading to numerous fatalities. About 7,500 people die each year in bike accidents. These accidents occur due to factors like lack of experience, distractions, and traffic rule violations. Our project aims to reduce accidents and fulfill our social responsibility to society. One major focus is making helmet-wearing mandatory while addressing other causes of accidents. Our "Smart Helmet" project has three main objectives: ensuring the bike won't start without a helmet, preventing drunk driving through the helmet, and enabling accident detection and communication with family and hospitals. We utilize various technologies, including wireless communication, to enhance bike rider safety. This includes communication between the bike, helmet, traffic signals, and

speed breakers. By using RF technology, we can detect speed breakers and ensure rider safety.

2. OBJECTIVE

The aim of this project is to develop a smart helmet to protect human from accident in case of drowsiness or while attesting phone call in vehicles. It is a cost-effective system and the output rate is more desirable and accurate which is implemented as prototype.

3. BLOCK DIAGRAM

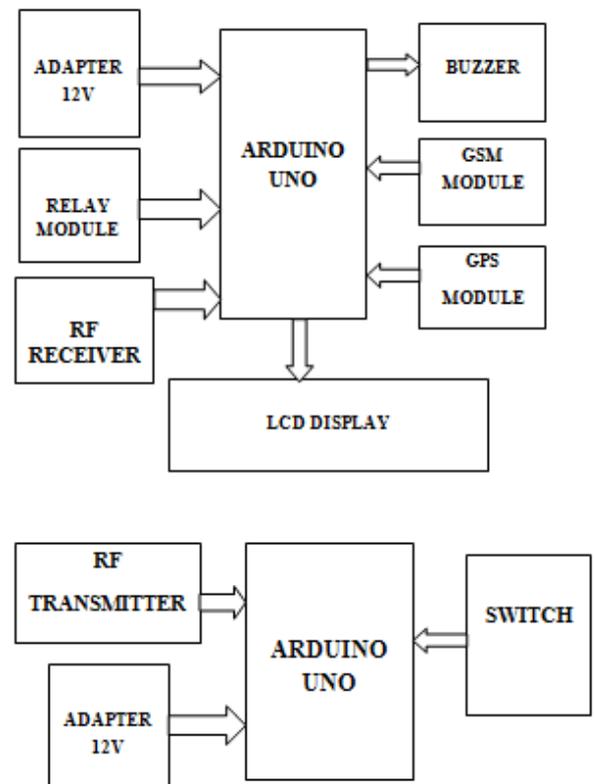
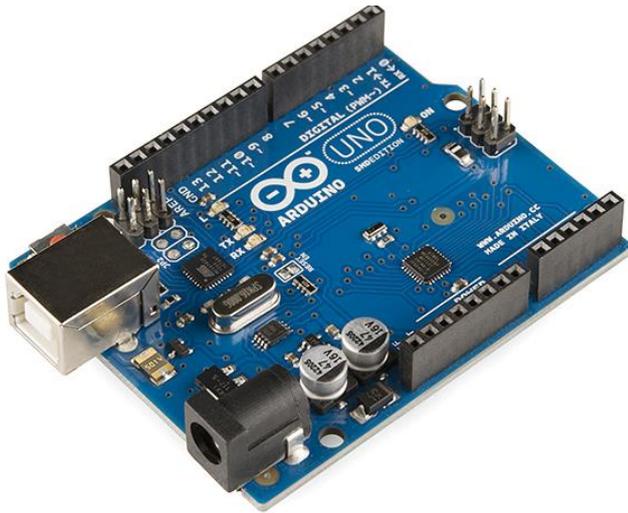


Fig.1: Block diagram of Rx and Tx

4. HARDWARE USED

A. Arduino uno

The Arduino Uno is a popular microcontroller board based on the ATmega328P microcontroller. It is widely used in hobbyist projects, prototyping, and educational settings due to its ease of use and versatility.



B. 16X2 LCD Display

A 16x2 LCD is a text and number display device that can be easily programmed and used with different microcontrollers. It has command and data registers. The command register stores instructions for tasks like initialization and screen clearing, while the data register holds the ASCII values of characters to be displayed. In projects, the LCD plays a crucial role in showing the system's current status.



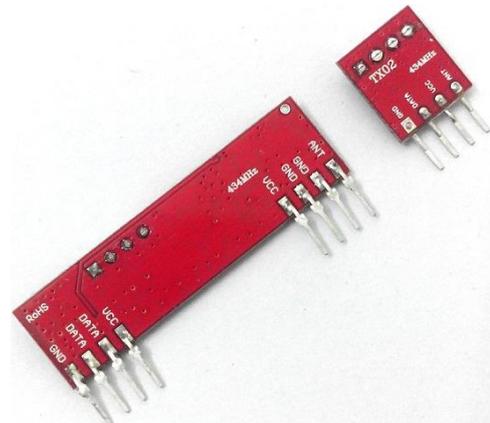
C. GPS & GSM Module

The SIM800L and SIM900L modems are GSM-based communication devices that can be used with any GSM network operator's SIM card. Similar to mobile phones, they have their own unique phone numbers. The SIM900L modem is a plug-and-play device that doesn't require RS232 serial communication support. It can be utilized for various applications such as SMS control, data transfer, remote control, and logging. Additionally, the SIM900L modem supports features like voice calls, SMS messaging, data/fax transmission, and GPRS connectivity.



D. RF Module

An RF module (short for radio-frequency module) is a (usually) small electronic device used to transmit and/or receive radio signals between two devices.



5. CONCLUSIONS

The developed smart helmet is an affordable and reliable piece of technology that prioritizes safety. It offers several advantages over existing accident detection and notification systems, which heavily rely on data from drivers' cellular devices. Unlike many systems available in the automobile market, this smart helmet is designed specifically for all types of vehicles, including bikes and motorcycles. This paper introduces a vehicle accident detection and alert system that utilizes GPS tracking and GSM technology. The system is implemented using Arduino MCU in the field of embedded systems. It automatically tracks geographical information and sends alert SMS messages to user-defined mobile numbers in the event of an accident.

a. ADVANTAGES

- It will help to reduce the number of road accidents which are very frequent in a country like India where the traffic is very high.
- It will help to create awareness about the need to wear helmet during bike riding.
- The system will ensure that the motorbike will not start unless the rider is wearing a helmet and has not consumed alcohol. Also GSM & GPS technologies are used to inform the family members in case of an accident.

b. APPLICATIONS

- The system will ensure that the motorbike will not start unless the rider is wearing a helmet and has not consumed alcohol. Hence safety of person is ensured.
- Also, GSM technology is used to inform the family members in case of an accident. This project could be highly developed with upcoming technologies to provide further more safety and security to the vehicle systems.
- In future if all the bike manufacturing companies include this system on each bike before the sell, accident rates will drastically all down.

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