

EMERGENCY VEHICLE DETECTION AND ALERTING SYSTEM USING RF MODULE

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Abstract -As a prototype, this paper proposes an intelligent lane clearance and collision avoidance system, which would avoid delays of emergency response vehicles. It is basically a smart RF-based emergency vehicle detection system by fixing an exclusive RF module and Wi-Fi enabled Arduino microcontroller to the emergency vehicle and a signal reader or sensor to each vehicle on the road. If the vehicle gets closer to an emergency vehicle, the micro controller sends data to the nearby vehicle through radio frequency (RF), and the nearby vehicle displays some text regarding the presence of the emergency vehicle. The Global Positioning System (GPS) feature will assist in sending alerts from emergency vehicles to normal vehicles only on the way to the emergency vehicles' destination by fixing the source and destination for both emergency response vehicles and normal vehicles. Emergency vehicles can trigger the traffic light signal to change from red to green in order to make clearance for their path automatically. When the emergency vehicle has completed crossing the road, the traffic light operations will return to normal using radio frequency. The Arduino microcontroller can delay the traffic signal to some extent according to the crossing time of an emergency response vehicle.

Key Words: GPS, RF Module, Emergency Response Vehicle, Sensor, Reader, Detection System.

1.INTRODUCTION

Many of us have seen how emergency vehicles are tolling up to find a way forward amid the traffic. It is very difficult for them to reach on time. This will result in the loss of life or property. This project introducing a smart RF module based emergency vehicle detection and alerting system. There are several advanced technologies and innovations that are available for vehicle safety and for the fastest way for emergency vehicles. Even though the high rate of increasing vehicle numbers causes many deaths due to the delay of emergency vehicles reaching the accident spots and hospitals. The delay of ERVs is because of vehicles not giving way. This is because a car's audio and other kinds of sounds may prevent a driver from hearing an ERV siren. Hence, to avoid these mistakes, we are introducing a smart emergency vehicle detection and alerting system using the RF module. In this system, we installed an RF module and a microcontroller on both the emergency vehicle and the normal vehicle, and at a certain distance, the RF transmitter on the emergency vehicle sends a signal to the RF receiver on the normal vehicle, and the display unit in the vehicle displays some text about the approaching emergency response vehicle. The need for an advanced alerting system for emergency vehicles provides intelligence to the vehicles and it advances the safety system for emergency vehicles. It also provides advanced technology such as triggering traffic lights to change from green to red and the signboard to display a

stop signal when an emergency vehicle approaches. Our project includes a Global Positioning System (GPS) feature that will assist in sending an alerting signal to the only vehicle in the way of an emergency vehicle to its destination by fixing both source and destination in each of the vehicles using specific software. Using a Wi-Fi enabled Arduino microcontroller helps to delay the red signal to some extent according to the crossing time taken by the emergency vehicle.

2. PROPOSED SYSTEM

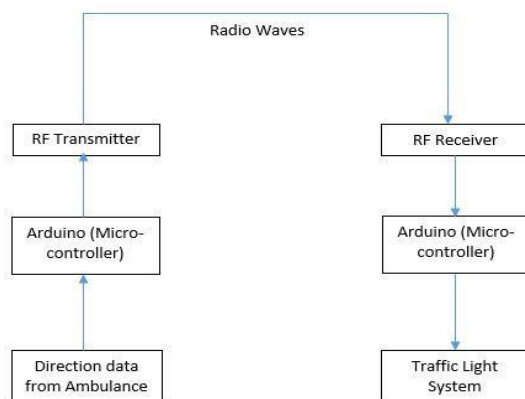


Figure 1: Emergency vehicle detection and alerting system

In the proposed system, an emergency vehicle detection and alerting system is designed in a way that it can both alert normal vehicles on the road of the presence of approaching emergency vehicles and also trigger the traffic signal change from red to green when necessary.

- 1)RF Data Sending and Receiving.
- 2)Traffic Light Control System.
- 3)Vehicle Alerting System
- 4) Sign Board

The microcontroller used for the control and monitoring of vehicles is Arduino UNO Mega. Data transmitting between emergency vehicle done using RF module include RF Transmitter and RF Receiver. Also, the IoT features are also done here.

2.1 SENSORS AND COMPONENTS USED

2.1.1 ARDUINO

Arduino is an open source electronic platform based on easy to use hardware and software. Arduino boards are able to read inputs -light on a sensor. It uses C and C++ languages for programming. It is programmed using Arduino IDE software.

2.1.2 RF MODULE

RF module include RF Transmitter and RF Receiver must interfaced with microcontroller in order to transmit signals .it is used to drive an output from a faraway place. The RF modules uses radio frequency to send signals. These signals are transmitted at a particular frequency and a baud rate based on requirements RF signals can travel even when there is obstacle between receiver and transmitter.

2.1.3 GPS MODULE

A GPS (global positioning system) module is used to find the live location of a device. It makes use of signal transmission through the Arduino. In this system, the GPS module is used to send signals from emergency vehicles to normal vehicles only in the way of the emergency vehicle's destination.

2.1.4 TRAFFIC LIGHT SYSTEM

Emergency vehicles can trigger the traffic signal to change from red to green in order to make clearance for its path automatically. Using radio frequency(RF) the traffic light operation will turn back to normal when the ambulance finishes crossing the road. Traffic light system embedded with Arduino micro controller and an RF receiver, When emergency vehicle reaches the signal from the RF transmitter of emergency vehicle captures by RF receiver and trigger the traffic light to change from red to green.

3. IMPLEMENTATION

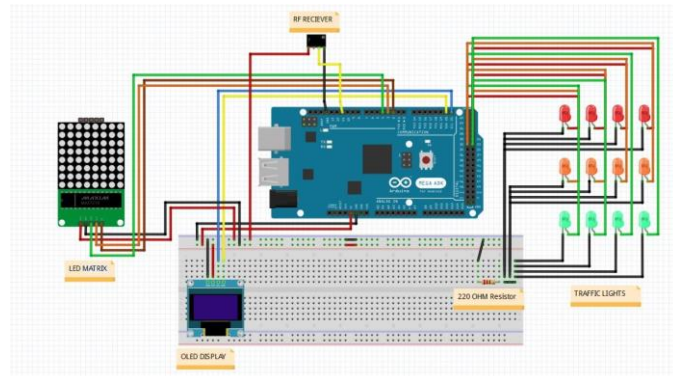


Figure 2: RF Receiver

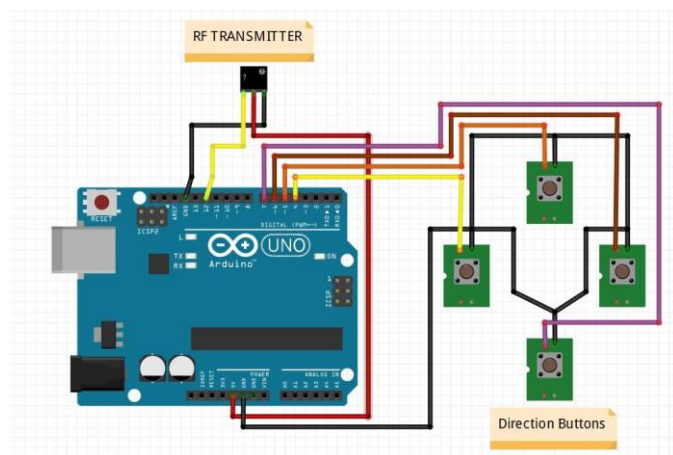
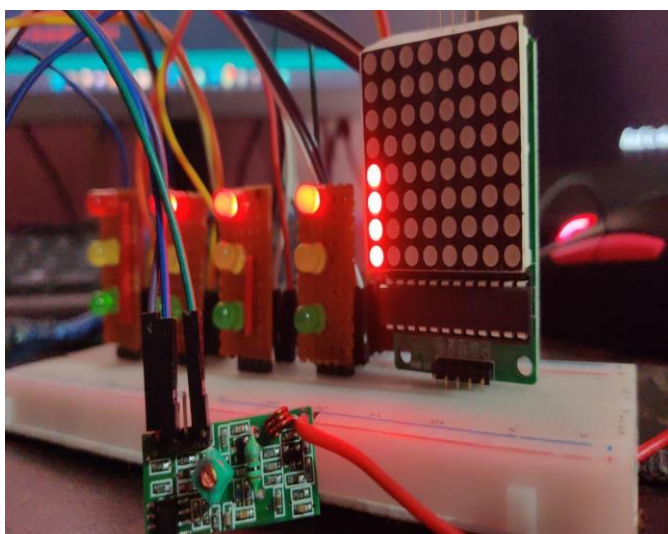
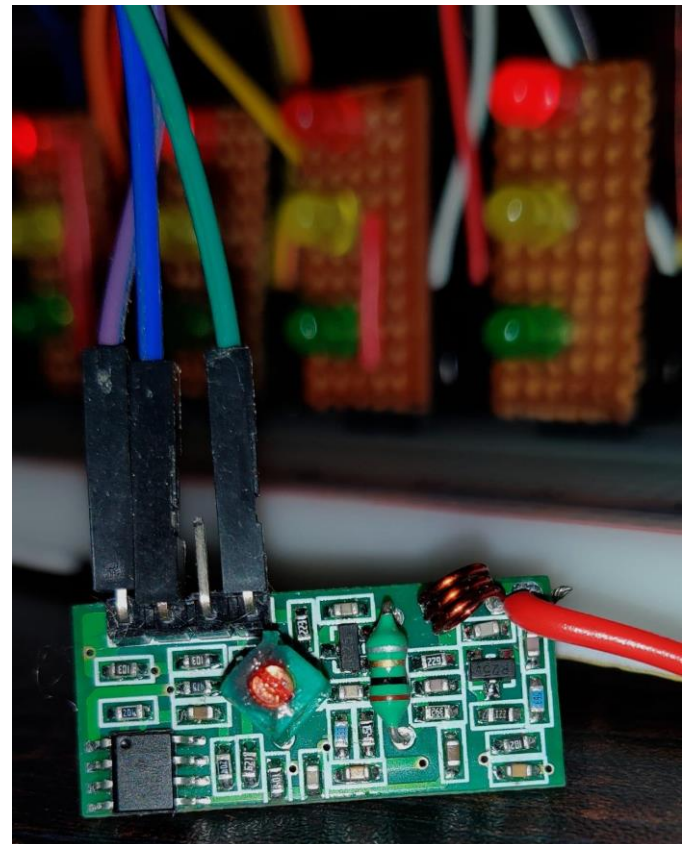


Figure 3: RF Transmitter

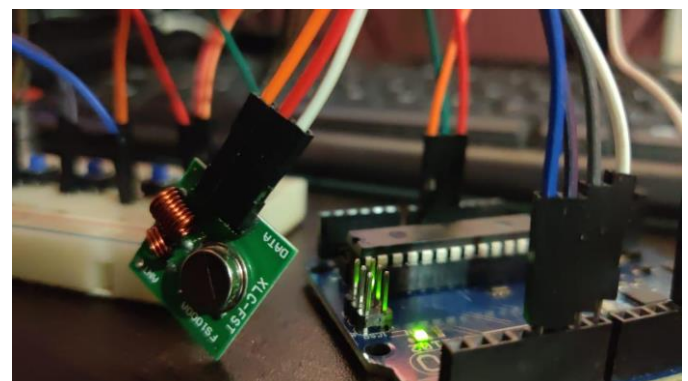
3.1 TRAFFIC LIGHT CONTROL SYSTEM



3.2 RF SIGNAL RECEIVING-RF RECEIVER



3.3 RF DATA TRANSMITTING-TRANSMITTER



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