Emergency Vehicle Assistant System

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Abstract—: **— A circuitry that helps in reducing the time wasted by emergency vehicles at the traffic signals and thus help the people concerned with it. This system will reduce accidents which often happen at the traffic light intersections because of the hurdle caused while moving for emergency vehicles. As a result, this project is successful in analyzing and implementing the traffic assistance system for emergency vehicles.**

I. INTRODUCTION

With current trends in suburban development, infrastructure limitations generally result in increasing congestion along feeder routes due to the increasing number of vehicles requiring access to urban areas. Additionally, high density urban housing developments create further congestion.

Now, the patients who need immediate treatment, those who want to get to nearest hospitals or the fire trucks or any emergency vehicles who want to get to the scene and are not able to get through easily because of which the patients die in the ambulances or various emergency vehicles face problems reaching their destinations on time.

So, to avoid these circumstances, we have worked on a project which mainly focuses on reducing the time by clearing the traffic from the traffic signals where most of the time of the emergency vehicles is wasted.

II. CONCEPTS AND COMPONENTS (PHASE 1)

We are using 2 Arduino Uno and an Ultrasonic sensor for distance measurement.

A. Ultrasonic Sensor

Ultrasonic Sensor is a distance measurement sensor used to measure the distance between the traffic signal and the ambulance as done in our project.

We can also use other sensors such as lasers for real life usage.

B. Arduino Uno

Arduino Uno (ATMEGA 328P) is a microcontroller equipped with multiple pins for input and output. It supplies a maximum voltage of 5V and that is the reason we picked a 5V input instead of a 12V.

We are programming the pins to give highs and lows depending on the LEDs we have to show.

Arduino Uno

III. OVERALL WORKING

To Measure the distance between traffic signal and ambulance and thereby controlling the traffic lights.

A. Working of Arduino, RF Transmitter-Reciever and Ultrasonic Sensor.

This project uses an Arduino UNO as a microcontroller. Arduino gets one input from user from emergency vehicle coming towards the signal. The Arduino sends a message using transmitter which is received by the receiver on the other end. In traffic signal system, the green light allows traffic to proceed in the direction denoted. The amber (yellow) light warns that the signal is about to change to red and also indicates ready before signal is about to change to green. The red signal prohibits any traffic from proceeding. A flashing red indication is treated as a stop sign. When the emergency vehicles come at a particular distance from the traffic signal, the red light is turned into green allowing the traffic to pass through. Here we are implementing a system in the existing traffic signal which is having four lanes. If the emergency vehicle comes through lane1, the ambulance siren indicates the free right vehicles in the traffic have to move on to the left side. So that the passing of emergency vehicle is easier. If in case we are getting a block before the traffic signal we have a free passage with a boom barrier on the dividers of the road which opens for the emergency vehicles.

Here we are also using an Ultrasonic sensor. We will use this sensor to measure the distance between emergency vehicle and the traffic signal, accordingly triggering and changing the red signal to green to disperse the traffic and letting the ambulance through. Or if the signal is green then it will stay.
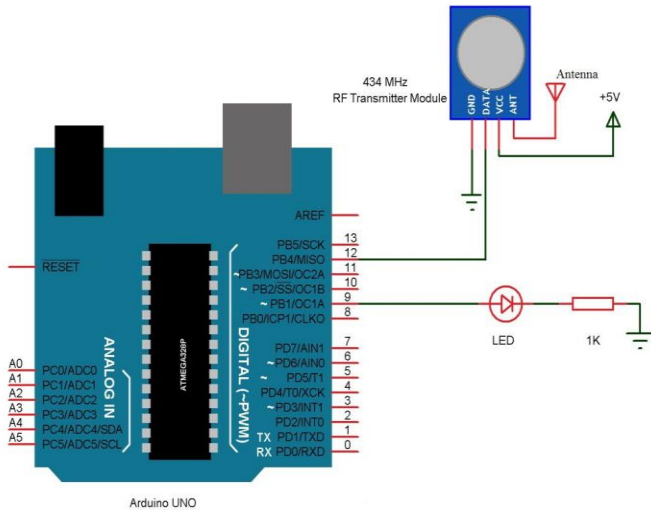
B. Construction and working

For the assembly, we are using a breadboard, Arduino Uno, Ultrasonic Sensor and resistors.

To begin, we wrote the code such that the microcontroller should give highs and lows based on the signal transmitted by the transmitter and the ultrasonic sensor.
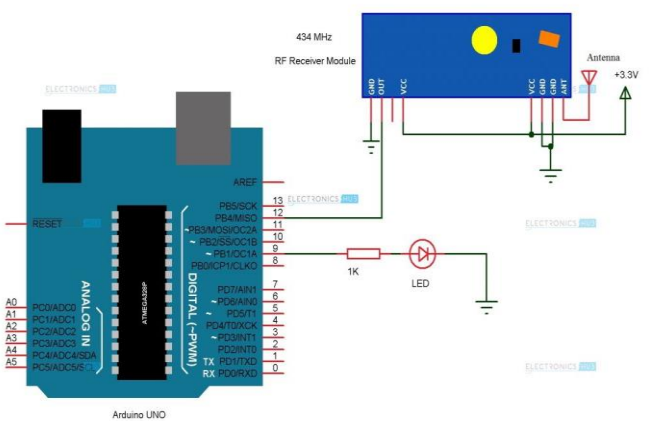
IV. FIGURES

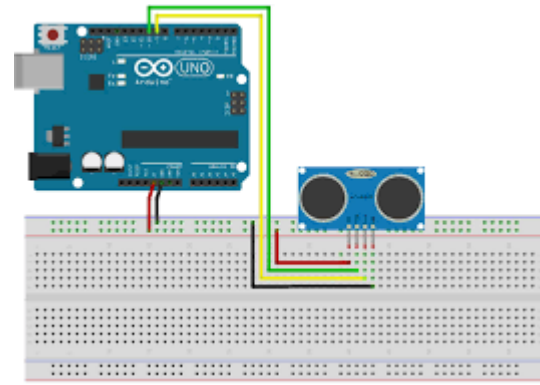Transmitter Part is Connected as shown in Fig, 1:

Fig.1

Receiver Part is connected as shown in Fig.2:

Fig.2

Ultrasonic Sensor is connected as shown in Fig.3:

Fig.3.

V. CONCLUSION

As a conclusion, this project has achieved the main objective stated earlier which is analyzing and implementing the wireless communication; the radio frequency (RF) transmission in the traffic light control system for emergency vehicles. The prototype of this project is using the frequency of 433 MHz compared to the range of about 3 kHz to 300 GHz of frequency which have been reserved for the RF theoretically. Besides, the functionality of this project proved that the other objectives have been successfully attained which are designing an emergency sequence mode of traffic light when emergency vehicles passing by an intersection and changing the sequence back to the normal sequence before the emergency mode was triggered. The sequences for this project have been developed using the programming in the Arduino and Ultrasonic Sensor. In future, this prototype system can be improved by controlling the real traffic situation and the study can be done by investigating the length, reception and transmission issue for the system to be operated with this traffic light.

VI. ACKNOWLEDGMENT

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