Driver Controlled Traffic Light System to Provide Way for Ambulance

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Abstract— In past 5years, there are numerous mishaps happened, if the mischances is occurred at any spots, at that point everybody utilize the emergency vehicle to spare the life of the individual. So the rescue vehicle require a free way, it can't ceased at any spots, however it have to regard the standards of the movement, since all should regard the activity rules. In this manner the emergency vehicle ought to need to look out for the flag. Point is to control the basic circumstance on the movement motion, by the programmed petty criminal offense and cautioning framework. Here given more significance for rescue vehicle, it require not to hold up in the flag that the red flag is naturally moved to the green flag. In substantial rush hour gridlock, to give approach to rescue vehicle, the red flag transformed into green flag by abusing the standards. Alternate infringement might be educated to the movement police, on the off chance that anybody break the flag administers, the siren is settled for alarm the activity police. In our venture, that emergency vehicle can't need to look out for any flag, here giving free route to the rescue vehicle. Therefore the flag is controlled by the rescue vehicle driver for some minute, by utilizing of (ZigBee CC250, Arduino UNO ATmega328, ULN2003-Hand-off Driver IC, Rectifier, 7812 Voltage Controller, Advance down Transformer) in the wake of moving of emergency vehicle then the movement flag assumes a typical part.

Key words: Arduino UNO ATmega328, Zigbee CC250, 7812 Voltage Regulator, ULN2003 Relay Driver IC

I. INTRODUCTION

Many popular countries faced the problem of the traffic. It creates more congestion on the road. Compare to other growth that the vehicle growth is high due to the space and cost constraints [1].

By using of the wireless networks, they planned to control the traffic in an effective way, it should be different compared to the other developed countries. Try to reduce the traffic congestion by the intelligent management of traffic flows. For road transport, that the wireless networks is used and also it is used to control the traffic [2].

Advances like Zigbee, RFID and GSM can be utilized as a part of traffic control to give savvy arrangements. RFID is a remote innovation that utilize the radio frequency electromagnetic energy to convey data between the RFID tag and RFID reader. Some RFID frameworks will just work inside the range inches or centimeters, while the others network system can be work upto 100 meters, it means 300 feet. A GSM modem is a specific sort of modem, which acknowledges a SIM card and works over a membership to a portable administrator, much the same as a cell phone. AT charges are utilized to control modems.

The Zigbee works at low-control and can be utilized at all the levels of work configurations to perform predefined assignments. It works in ISM groups (868).

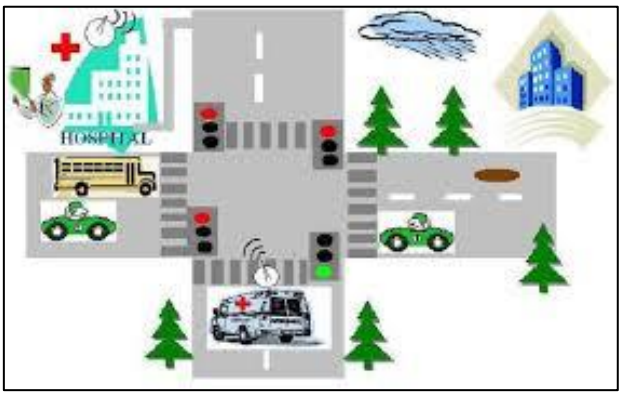

Fig. 1: Traffic Signal Diagram

MHz in Europe, 915 MHz in USA and Australia, 2.4 GHz in rest of the world). Information transmission rates shift from 20 Kilobits/second in the 868 MHz recurrence band to 250 Kilobits/second in the 2.4 GHz frequency band [3] [4]. The Zigbee utilizes 11 directs if there should be an occurrence of 868/915 MHz radio recurrence and 16 diverts in the event of 2.4 GHz radio recurrence. It additionally utilizes 2 channel configurations, CSMA/CA and opened CSMA/CA [5].

II. LITERATURE SURVEY

Traffic clog is a noteworthy issue in urban communities of creating Nations like India. Development in urban populace and the white collar class section contribute significantly to the rising number of vehicles in the urban communities [6].

Clog on streets in the long run outcomes in moderate moving traffic, which expands the season of movement, in this manner emerges as one of the real issues in metropolitan urban areas.

In green wave framework was talked about, which was utilized to give freedom to any crisis vehicle by turning all the red lights to green on the way of the crisis vehicle, thus giving an entire green wave to the coveted vehicle.

A 'green wave' is the synchronization of the green period of traffic signals. With a 'green wave' setup, a vehicle going through a green flag will keep on receiving green flags as it goes not far off. Notwithstanding the green wave way, the framework will track a stolen vehicle when it goes through a traffic light. Favorable position of the framework is that GPS inside the vehicle does not require extra power.

The greatest inconvenience of green waves is that, when the wave is irritated, the aggravation can cause traffic issues that can be exacerbated by the synchronization. In such cases, the line of vehicles in a green wave develops in measure until the point when it turns out to be too expansive and a portion of the vehicles can't achieve the green lights in time and should stop. This is brought over-immersion [7].

In [8], the use of RFID traffic control to avoid problems that usually arise with standard traffic control systems, especially those related to image processing and beam interruption techniques are discussed. This RFID

technique deals with multivehicle, multilane, multi road junction areas. It provides an efficient time management scheme, in which, a dynamic time schedule is worked out in real time for the passage of each traffic column. The real-time operation of the system emulates the judgment of a traffic policeman on duty. The number of vehicles in each column and the routing are proprieties, upon which the calculations and the judgments are done. The disadvantage of this work is that it does not discuss what methods are used for communication between the emergency vehicle and the traffic signal controller. In [9], it proposed a RFID and GPS based automatic lane clearance system for ambulance. The focus of this work is to reduce the delay in arrival of the ambulance to the hospital by automatically clearing the lane, in which, ambulance is travelling, before it reaches the traffic signal. This can be achieved by turning the traffic signal, in the path of the ambulance, to green when the ambulance is at a certain distance from the traffic junction. The use of RFID distinguishes between the emergency and non-emergency cases, thus preventing unnecessary traffic congestion. The communication between the ambulance and traffic signal post is done through the transceivers and GPS.

The system is fully automated and requires no human intervention at the traffic junctions. The disadvantage of this system is it needs all the information about the starting point, end point of the travel. It may not work, if the ambulance needs to take another route for some reasons or if the starting point is not known in advance. Traffic is a critical issue of transportation system in most of all the cities of Countries. This is especially true for Countries like India and China, where the population is increasing at higher rate as show in figure 1. For example, Bangalore city, has witnessed a phenomenal growth in vehicle population in recent years. As a result, many of the arterial roads and intersections are operating over the capacity (i.e., v/c is more than 1) and average journey speeds on some of the key roads in the central areas are lower than 10 Km/h at the peak hour. In [10], some of the main challenges are management of more than 36,00,000 vehicles, annual growth of 7–10% in traffic, roads operating at higher capacity ranging from 1 to 4, travel speed less than 10 Km/h at some central areas in peak hours, insufficient or no parking space for vehicles, limited number of policemen. In [11], currently a video traffic surveillance and monitoring system commissioned in Bangalore city. It involves a manual analysis of data by the traffic management team to determine the traffic light duration in each of the junction. It will communicate the same to the local police officers for the necessary actions.

In [12], the traffic light is controlled to provide way for prioritized vehicles by using the RFID (radio frequency identification).

III. PROPOSED MODEL

From the traffic problem, thus the congestion is created, to avoid these situation and most effective solution is prepared, it is the one Zigbee circuit is placed on the ambulance, it is pressed or controlled by the ambulance driver at before 30m, then the signal is automatically changed to the green signal, then the ambulance moved to their destination as earlier. By using of the (Arduino ATmega328 microcontroller, Zigbee cc250, 7812 voltage regulator, ULN2003 relay driver IC) all these components, that the signal is controlled. It is the easy method to control the signal and the emergency vehicles can be moved easily by this method. It is the cost effective method. The components are all explained below.

A.ARDUINO, it is the open source project model and it is based on the microcontroller board, it based on the ATmega328. It has the 14 digital input and output pins, in these 6 pins used as PWM outputs and 6 pins used as analog inputs. The various parameters are 16MHZ ceramic resonator, USB connection, power jack, an ICSP header and reset button.

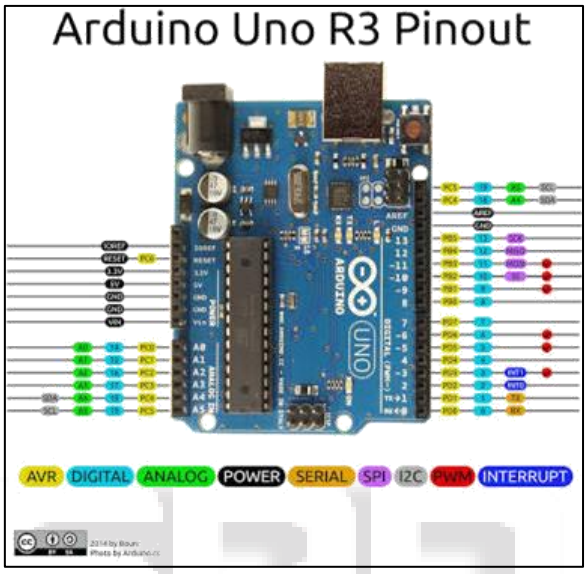

Fig. 2: Arduino UNO Diagram 1

Arduino schematic diagram is shown above, it gives the clear explanation about the Arduino UNO. Arduino AT mega 328 pin diagram is shown below.

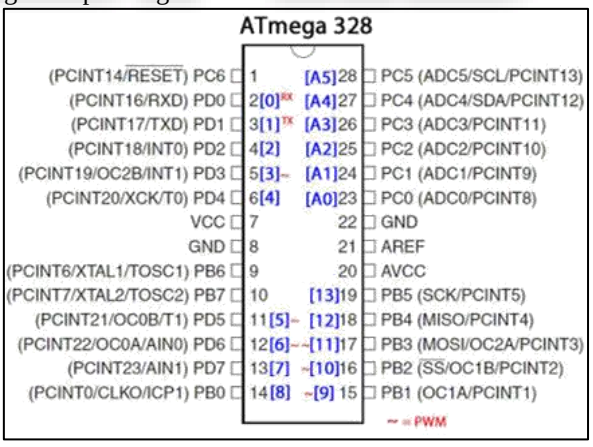

Fig. 3: ATMega 328 Pin Diagram

A. B. Zigbee

The CC2500 is a RF module and has transceiver, which gives a simple method to utilize RF correspondence at 2.4 GHz. Each CC2500 is outfitted with the microcontroller (PIC 16F877A), which contains Special ID Number (UIN). This UIN depends on the enlistment number of the vehicle. A standout amongst the most critical highlights is serial correspondence with no additional equipment and no additional coding. Henceforth, it is a transceiver as it gives correspondence in the two bearings, yet just a single heading.

The microcontroller and CC2500 dependably speak with the microcontroller by means of serial correspondence. Rx stick of CC2500 is associated with TX (RC6) of microcontroller and TX stick of CXC2500 is associated with Rx stick of microcontroller (RC7). Other two pins are utilized to empower transceiver. It is utilized to transmit and get the information at 9600 baud rate. Fig(c) demonstrates the picture of transceiver.

Here, we utilizes CC2500 Zigbee module and it hastransmission scope of 20 meters.

Fig. 4: Zigbee Diagram

B. 4-Channel Relay

4 Channel Relay Board is a straightforward and advantageous approach to interface 4 transfers for exchanging application in your task. Extremely minimal outline that can fit in little territory, for the most part this board is made for low voltage applications. The board is intended for low voltage exchanging application, most extreme supply at hand-off contacts 48V DC/7Amps

IV. CONCLUSION & ENHANCEMENTS

The activity clog issue can be comprehended by these technique and the crisis vehicles can be moved as before conceivable. With modified action signal control in perspective of the development thickness in the course, the manual effort as for the development policeman is saved. Emergency vehicles like protect vehicle, fire trucks, need to achieve their objectives and no more timely. If they put a huge amount of vitality in streets turned parking areas, important presences of various people may be in risk. With emergency vehicle opportunity, the development signal swings to green as long as the emergency vehicle is holding up in the surge hour gridlock convergence. The banner swings to red, basically after the emergency vehicle experiences. So the rescue vehicle can move quickly to their goal.

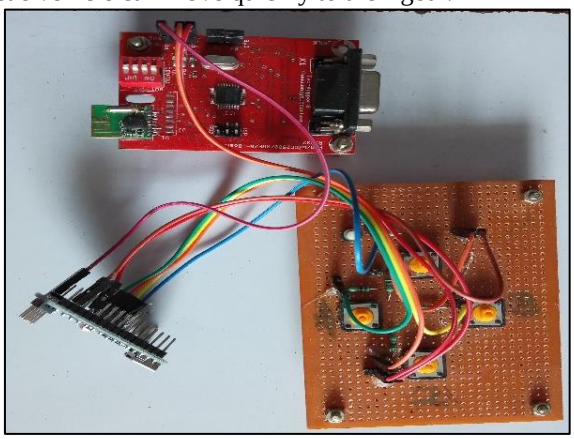

Fig. 5: Driver Control Module Diagram

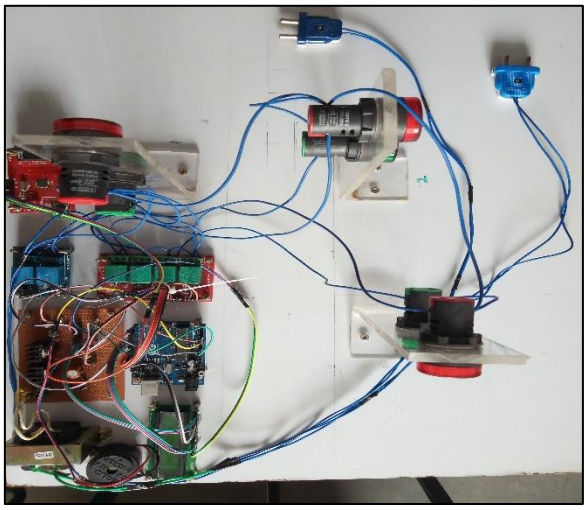

Fig. 6: Traffic Light Control Module Diagram

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