



An Efficient Traffic Clearance System For Life Saving Vehicle

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Abstract: In today's life traffic jams during peak hours is one of the major concern. During peak hours emergency vehicles like ambulances and police cars get stuck in traffic. Due to this the emergency vehicles are not able to reach the destination on time, resulting in loss of life. Hence in modern life it becomes mandatory to save the human life by reaching the hospital very sooner. Hence we have developed a system in order to overcome this problem. Our system provides the path clearance of an emergency vehicle in a heavy traffic by turning the red light to green. In this system we use ZIGBEE module to detect the presence of ambulance. The ZIGBEE module is placed in both the ambulance and the traffic signal. The signal which is transmitted from the ambulance is received by the ZIGBEE module present in the traffic signal part.

Keyword: PIC (16F877A), ZIGBEE module, Traffic signal

I. INTRODUCTION

In this busy world we spend major part of our utility time in transportation, due to the great increase in the traffic density our travel time has increased although our vehicle speeds have increased. Huge amount of fuel is being wasted every day due to inefficient distribution of traffic on roads. To avoid all this we can distribute the huge amount of traffic in alternate roads. For this we should know the traffic information ahead us. This system works with a main module "the ZIGBEE module". This system works in low power hence it can work with the power of the vehicle's battery. This system finds a lot of applications like ambulance path clearance, Traffic police department surveillance, public transports accident location etc. The display is used to specify the ambulance path information. This unit also helps in giving information about the traffic signals and their timings. So in this paper we are to discuss the overall system design, working and the process and construction of this system. Our system consists of three sections. They are (i) Ambulance section (ii) Traffic signal section (iii) Intermediate section.

These sections are used in our system to clear the path of the ambulance in heavy traffic.

II. LITERATURE SURVEY

There are many systems in clearing the path of the emergency vehicles. Methods of emergency corridors have been proposed using GPS and Bluetooth. In general, the emergency vehicle path clearance method involves in using a predetermined announcement module installed in the

ambulance, which informs the people on the roads about the arrival of an ambulance in an emergency. But what actually matters is the ease of use and the economic cost in implementing the design. In [1], while using a GPS module, the economic cost is too high that it can't be installed in all vehicles.

In [2], the use of Bluetooth means that the arrival of the ambulance will be informed only when it is too close to a particular station that there will be very less time in the order of seconds which is not useful in clearing of traffic signals. So there is a need to develop a new system which is not too costly as the GPS and also much more efficient than the Bluetooth. Thus using ZIGBEE module is the best for such a system.

III. PROPOSED METHOD

Our proposed work is based on ZIGBEE (IEEE standard 802.15.4). In this paper we have proposed an automated emergency path clearance system.

3.1. Transmitter Section

The ZIGBEE module is placed inside the ambulance. It frequently sends the signal when power is ON. Once the ambulance comes within the range of receiver section it starts to communicate with the ZIGBEE module present in it, and sends the code "A" to the display placed in the receiver section.

3.2. Intermediate section

The intermediate section is placed on the way through which the ambulance travels. Whenever it receives the signal from the ambulance section, it displays the message on the LCD. Here we use four codes for the four



directions.”N” for north,”S” for south,”E” for east and “W” for west. If the ambulance travels in the north direction, then the ZIGBEE module sends the code N to the ZIGBEE module present in the traffic signal section. Similarly it sends the relevant codes for each direction based on the direction of the ambulance.

3.3. Receiver section

The Receiver section also contains the ZIGBEE. The code for the particular direction of ambulance is communicated between the road section and the traffic signal section. Then it is processed by the microcontroller present in it and clears the path by changing the red signal to green.

3.4. Components Used

Some of the major components used in this system are:

3.4.1 PIC Controller (16F877A)

This is the assembly used to establish the communication between ZIGBEE modules. Peripheral Interface Control (PIC) 16F series has a lot of advantages as compared to other series. It executes each instruction in less than 200 nano second. It has 4 pins and has 8K program memory and 36 byte data memory. It is easy to store and send UINs. At the junction; it is easy to store large number of emergency vehicles. Before switching to green, it should satisfy all the conditions. It is easy to switch any time. It consumes less power and operates by vehicle battery itself without any extra hardware.

3.4.2 ZIGBEE module

The ZIGBEE defined in IEEE standard 802.15.4 has a range of 10-1000 meters. The frequency range of ZIGBEE used here is 2.4GHz to 2.48GHz. In this paper ZIGBEE is used as a transceiver. The CC2500 is a RF module and has transceiver, which provides an easy way to use RF communication at 2.4 GHz. Every CC2500 is equipped with the micro-controller (PIC 16F877A), which contains Unique Identification Number (UIN). This UIN is based on the registration number of the vehicle. One of the most important features is serial communication without any extra hardware and no extra coding. Two pins are used to energize transceiver. It is used to transmit and receive the data at 9600 baud rate. Here, we use CC2500 ZIGBEE module and it has transmission range of 20 meters.

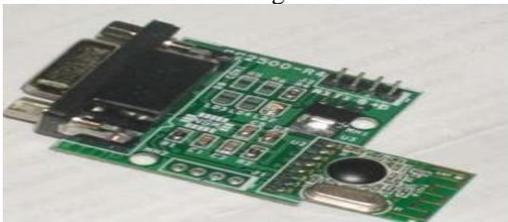


Figure 1: ZIGBEE module

3.5. Block Diagram

The proposed method is shown in the block diagram. The block diagram consists of three sections namely Transmitter section, Intermediate section and Receiver section.

3.5.1 Transmitter Section

The Transmitter section is shown below. It consists of power supply, PIC controller and ZIGBEE module.

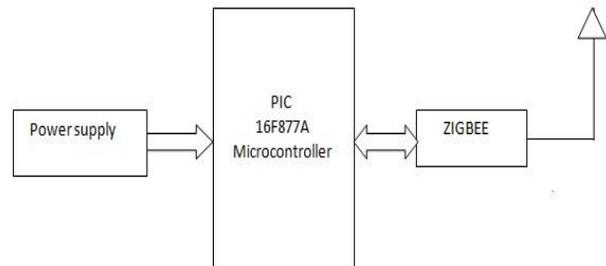


Figure 2: Transmitter Section

3.5.2 Receiver Section

The receiver section is shown below. It consists of power supply, PIC controller, driver circuit and signals.

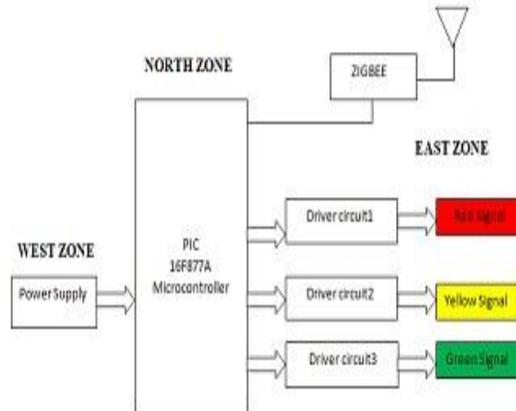


Figure 3: Receiver section

3.5.3 Intermediate section

The intermediate section is shown below. It consists of PIC controller and ZIGBEE module.

The Intermediate section is placed between the transmitter and the receiver section.

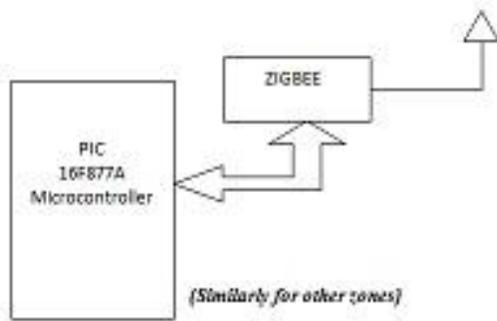


Figure 4: North zone

3.6 Flow chart

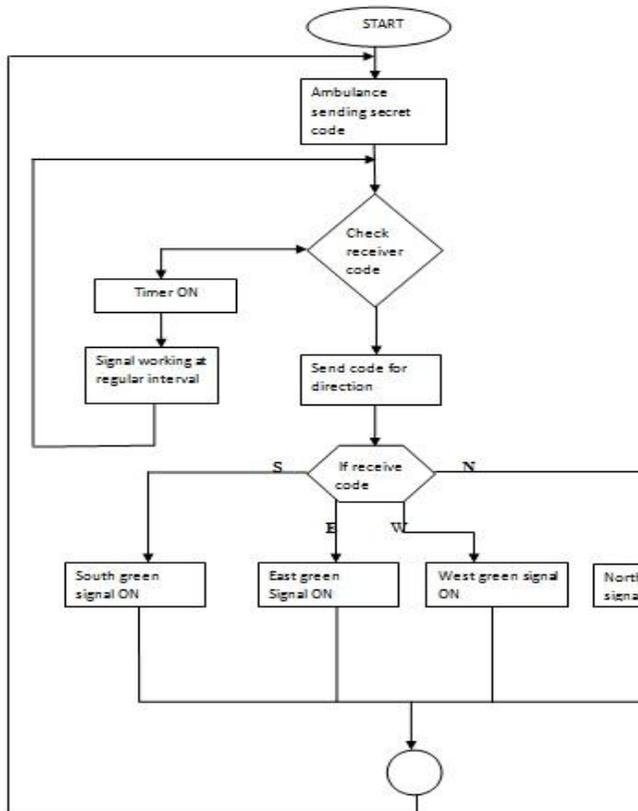


Figure 5: Flow Chart

3.7. Working

Initially the ZIGBEE placed in the ambulance is switched ON. It transmits the unique code for ambulance say "A". Once the ambulance reaches near the road section the ZIGBEE present in it will be activated and the code A will be displayed.

When the road section ZIGBEE receives the code "A" it confirms the presence of ambulance in that path. It generates the code (say N for north direction if the

ambulance is in north) for the particular direction in which the ambulance travels.

Once the code for the location of ambulance is received by the ZIGBEE present in the traffic signal section it gets processed. The process involves the checking of original signal present in the traffic signal when the code (say N for north) is received by the ZIGBEE module. If the signal is green it does not make any changes and leaves the signal as it is. If the signal is red it changes to green while the other signals are turned red. Thus it clears the path of ambulance in that direction.

IV. RESULT

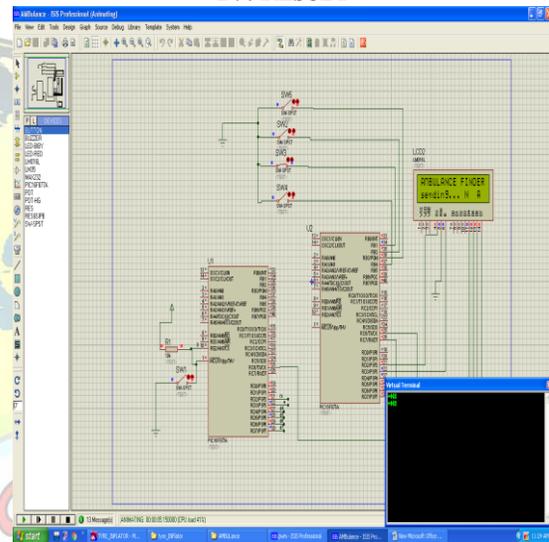


Figure 6: Result of intermediate section

6.2 Receiver Section:

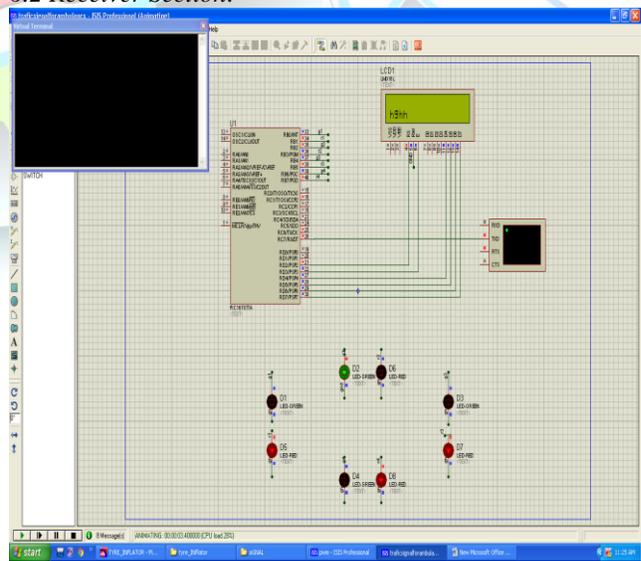


Figure 7: Result of receiver section



IV. CONCLUSION

In this project, a novel idea is proposed for controlling the traffic signals in favour of ambulances. This system will definitely help the traffic police to give the way to the ambulance during heavy traffic on the road.

The design and implementation of this technique is directly targeted for traffic management so that the emergency vehicle on the road gets clear way to reach their destination in less time without human interruption.

This paper gives importance to the public and shows the importance of the human life. So the ZIGBEE based path clearance system may implement the mean to save a person and also save the person and their family. This system has greater scope in future.

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