

# AUTOMATIC TRAFFIC LIGHT FOR AMBULANCE USING PERIPHERAL INTERFACE CONTROLLER

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**Abstract** - Traffic lights play such important role in traffic management to control traffic on the road. Situation at traffic light area is getting worse especially the event of emergency cases. During traffic congestion, it is difficult emergency vehicle to cross the road which involves many junctions. Situation leads to unsafe conditions which may cause accident. An Automatic Traffic Light Controller for Emergency Vehicle is designed and developed help emergency vehicle crossing the road at traffic light junction d emergency situation. This project used Peripheral Interface Controller to program a priority-based traffic light controller for emergency vet During emergency cases, emergency vehicle like ambulance can traffic light signal to change from red to green in order to make clear its path automatically. Using Radio Frequency (RF) the traffic light opera will turn back to normal when the ambulance finishes crossing the road. Showed the design is capable to response within the range of 55 meter project was successfully designed, implemented and tested.

**Key Words:** Peripheral interface controller, Traffic light, Radio frequency

## 1.INTRODUCTION

If the traffic light already shows green, time duration will be delayed until the emergency vehicle finishes crossing the junction. This project uses Radio Frequency (RF) for wireless signal transmission. The traffic light operation will turn back to normal when ambulance finishes crossing the road. The system designed is analyzed in terms of detectable range and results prove the system is able to work perfectly within the range of 55 meters of distance between the transmitter and the receiver

An automatic traffic light controller for emergency vehicle using PIC is a project to program a priority based traffic light controller for emergency vehicle during emergency cases where it is able to trigger the traffic light to change from red to green to make a path for its way.

## 2. LITERATURE REVIEW

This paper explain to Every year the number of accident numbers are growing; the count of human death is increasing. Most human death occurs because of the Ambulance not reaching on time because of heavy traffic in the Road. For this we created this Project called Automatic ambulance detection to clear a traffic and railway gate is opened in case of Ambulance is detected. The main objective is used to identify

the Ambulance, and the control the traffic for providing free path in Road for the Ambulance quickly reaches the hospital. The red signal, in particular, Road, our Project detect the Ambulance and give a green message for the Road and automatic gate control in case of Railway gate. Our Project is based on RF communication. The Ambulance detected in particular Road they will clear the traffic[1] The proposed system (Effective Traffic Management System for Emergency Vehicles) gives the control to the emergency vehicle; say an ambulance which sends radio signals to the vehicles ahead of it. These signals are received by the vehicle unit in all the vehicles and indicates the approach of the emergency vehicle in an lcd screen and a constant buzzer. Additional to this, the system also provides speed control of the vehicles based on particular zones, say accident prone zone or a school zone, which when the vehicle enters that zone, the module indicates the driver andP gradually reduces the speed.[2] A traffic light control system is designed in order to Solve these problems. This system was designed to be operated when it received signal from emergency vehicles Based on radio frequency (RF) transmission and used the Programmable Integrated Circuit (PIC) 16F877A Microcontroller to change the sequence back to the normal sequence before the emergency mode was triggered. This system will reduce accidents which often happen at the traffic light intersections because of other vehicle Had to huddle for given a special route to emergency vehicle. As the result, this project successful analysis and Implementing the wireless communication; the radio frequency (RF) transmission in the traffic light control System for emergency vehicles.[3] Here whenever a vehicle equipped with its RFID is detected in a range of 5-10 meters, the project automatically identifies the type of the vehicle & depending upon the priority set, activates the automated gate. Here the project also decodes the approaching vehicl code and based on the information vehicle transmits, takes decision like displaying an emergency alarm, paging to the concerned doctor, sending message to the required ward etc.[4] As the traffic road density is being increased, several problems occur due to delay in reaching the hospital with the patients in an ambulance. It can be done by using RSSI (Received Signal strength Indication) which works based on Message Queuing Telemetry Transport algorithm. Node MCU acts as transmitter and server acts as receiver. Node MCU has the inbuilt Wi-Fi module (EP8266). It receives the signal from server and identifies that signals strength which is used to reduce the speed of other vehicles within the particular limit. An APR voice module is used to provide intimation to the surrounding vehicles about the arrival of ambulance. Also the traffic signals are made automated for ambulance so that the signals will go green thus providing a clear path for the

ambulance to reach without time lag. The original signal is again restored once the ambulance moves over a particular distance from the signal that has been fixed earlier [5] Ambulances are provided to help the people who met with accidents or the people who are in emergency conditions without any delay Our project was introduced in order to avoid the above problem. In this an automated congestion control system is used for clearing the traffic junction by signaling according to the availability of ambulance. Now a day's every system is automated in order to face new challenges. Automated systems are more accurate, flexible, reliable etc., The congestion control system is one of the automated system which works depending up on situation of the patient. Based upon these, two sections are present. One section is at traffic signal junction. And another is at ambulance. The ambulance transfers the information to another section by activating switches. According to the information, the traffic signal section carries out the control action that is timing for green light. The technology used in this system is 'RF'. So we can save the life of a person by using this technology.[6] In existing literature there's less focus show on the emergency vehicles to clear the trail, to overcome this issue a RFID based system is proposed by using this technique we will manage and regulate the traffic signals at junction which emergency vehicle approaches. Thus there'll be easy passing out for the emergency vehicles in traffic congestion. The proposed frame work is modeled by the means of an experimental setup using Arduino and LED displays which simulates a true time traffic scenario. This simulation results illustrate the terms of detection still as is providing passing for the emergency vehicle to of holdup in peak hours.[7] To overcome this delay in first aid service this paper describes a solution that is "Intelligent Ambulance with Automatic Traffic Control" which includes the accident detecting, alerting and tracking mechanism with automatic traffic light controlling system such that the ambulance can achieve a free way in order to provide the first aid to patient as fast as possible. These parameters are sent to a PC in ambulance via serial communication and this data will be sent to the hospital server. In traffic control system an RF transmitter on the ambulance will communicate with the RF receiver mounted on the signal post. An algorithm is used to control the traffic signals automatically based on the key pressed by the driver from keyboard in the ambulance. The information reading the current as well as future location of ambulance is sent from the ambulance itself. This information is used to optimally control the traffic.[8] The number of vehicles using the road is increasing exponentially every day. Due to this reason, traffic congestion in urban areas is becoming unavoidable these days. Inefficient management of traffic causes wastage of invaluable time, pollution, wastage of fuel, cost of transportation and stress to drivers, etc.1 but more importantly emergency vehicles like ambulance get stuck in traffic. Our research is on density based traffic control with priority to emergency vehicles like ji ambulance and fire brigade.[9] Traffic lights play such important role in traffic management to control the traffic on the road. During traffic congestion, it is difficult for emergency vehicle to cross the road which involves many junctions. This situation leads to unsafe conditions which may cause accident. An Automatic Traffic Light Controller for Emergency Vehicle is designed and developed to help emergency vehicle crossing the road at traffic light junction during emergency situation. This project used Peripheral Interface Controller (PIC) to program a priority-

based traffic light controller for emergency vehicle. During emergency cases, emergency vehicle like ambulance can trigger the traffic light 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. Result showed the design is capable to response within the range of 55 meters.[10] This paper analyzes the everurban population around the world and discusses the traffic systems in densely populated towns. In addition, it proposes an advanced traffic management system, implemented using the Internet of Things (IoT).The system is supported by a circuit built into the vehicle, which operates with clustered systems using RFID.[11]

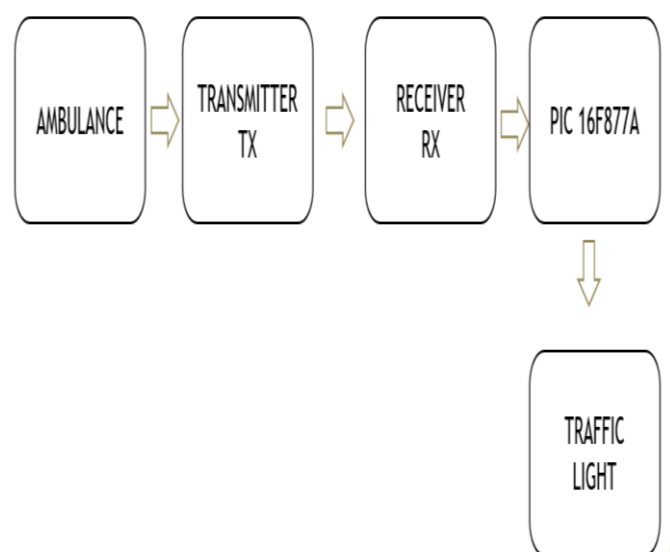
### 3.PIC 16F877A

The PIC microcontroller PIC16f877a is one of the most renowned microcontrollers in the Industry. This microcontroller is very convenient to use, the coding or programming of this Controller is also easier. One of the main advantages is that it can be write-erase as many Times as possible because it uses FLASH memory technology. It has a total number of 40 Pins and there are 33 pins for input and output.

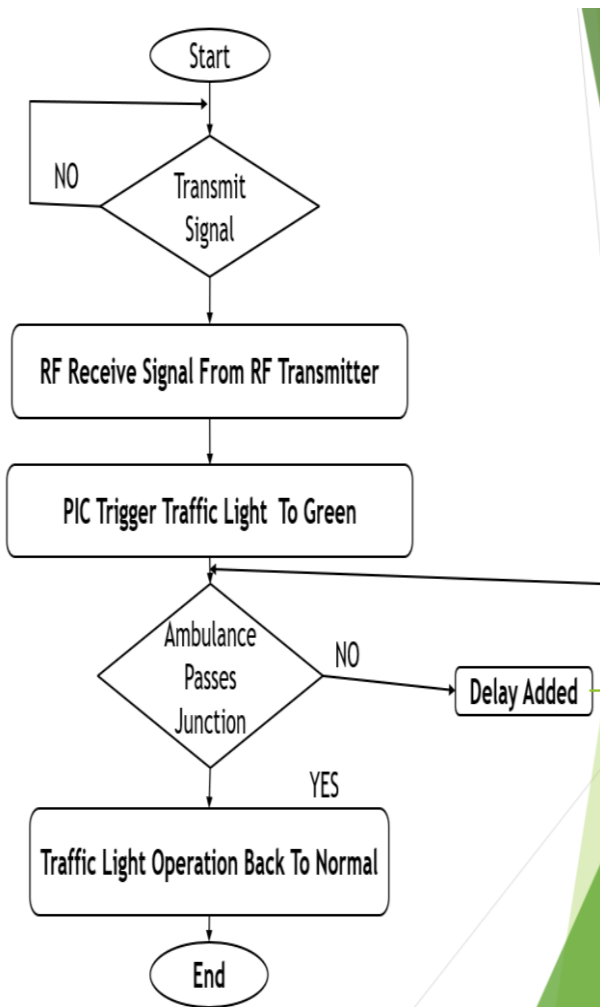
### 3.1 PIC MICROCONTROLLER FEATURES

- It has a smaller 35 instructions set.
- It can operate up to 20MHz frequency.
- The operating voltage is between 4.2 volts to 5.5 volts.
- There are five ports for I/O, PORTA from PORTE

### 4. BLOCK DIAGRAM



## 5. FLOW CHART



## 6. AUTOMATIC TRAFFIC LIGHT CONTROL

Automatic traffic light controller for emergency vehicle consists of both software and hardware implementation. An embedded program was created using MicroCode Studio where this software was specially designed for PIC compiler. Once the push button is pressed, an RF signal will be transmitted to the RF receiver. This will activate the PIC to control and trigger the traffic light to turn from red to green. The traffic light system will be back to normal when the emergency vehicle successfully crosses the traffic light junction.

An experiment was conducted at outdoor area to test the performance of the system. The Figure shows the experiment setup for data analysis. The location of the RF transmitter was varied incrementally until the RF receiver was not able to detect the RF transmitter

The RF receiver is able to detect the signals up to 55 meters. The connection is lost after 55 meters if the distance between the RF transmitter and the RF receiver is more than 55 meters due to RF limitation seconds delay was added into the program to represent the time taken to switch the traffic light from red to green. The time at specific distance is measured once the pushbutton at the RF transmitter is pushed until the red LED

At the traffic light circuit board changes to green.

## 7. CONCLUSIONS

In this paper, we have successfully designed and analyzed an automatic traffic light controller for emergency vehicle. Peripheral interface controller (PIC) is used as the micro controller and the system can be operated wirelessly using radio frequency (RF) during emergency cases. In future, different type of wireless technology such as LoRa and multi hop network could be replaced in the existing system to cater for longer traffic jam. Furthermore, the 9 volts battery used to operate the system could be replaced with solar powered battery to increase the efficiency of the design. Different microcontroller could also be introduced to save programming processing time in the future.

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