

# AUTOMATICALLY PATHWAY FOR EMERGENCY VEHICLES USING ARDUINO & IR SENSORS

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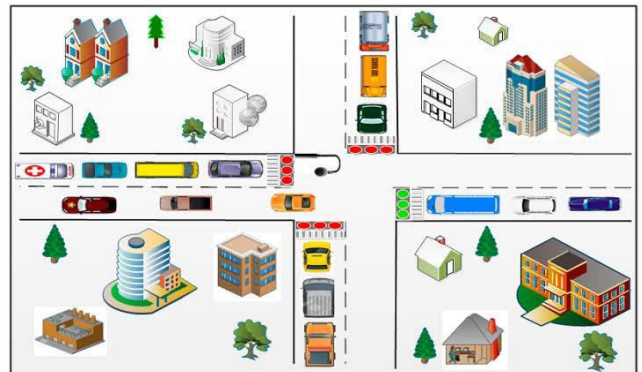
**Abstract:** The project is aimed at designing a density based dynamic traffic signal system where the timing of signal will change automatically on sensing the traffic density at any junction. Traffic congestion is a severe problem in most cities across the world and therefore it is time to shift more manual mode or fixed timer mode to an automated system with decision making capabilities. Present day traffic signaling system is fixed time based which may render in efficient if one lane is operational than the others. To optimize this problem we have made a frame work for an intelligent traffic control system. Some times higher traffic density at one side of the junction demands longer green time as compared to standard allotted time We, therefore propose here a mechanism in which the time period of green light and red light is assigned on the basis of the density of the traffic present at that time. This is achieved by using PIR (proximity Infrared sensors). Once the density is calculated, the glowing time of green light is assigned by the help of the micro-controller (ARDUINO).

Index Terms:- Preliminary, Pioneer, adaptability

## I. INTRODUCTION

We know that INDIA is a biggest country and it occupies 2<sup>nd</sup> place in world in population. The population as estimated in mid-2018 is 130 crores approximately and it keeps increasing. Most Saudis use their private vehicles for transportation because the lack of public transportation. And government also identified that lot of deaths are happening due to traffic only. As a result, the number of vehicles on roads have been increased. Consequently, traffic is becoming a serious problem. In big cities due to

the traffic congestion, emergency vehicles such as ambulance, fire engines are affected by traffic jams and consequently many people could lose their lives because of an ambulance delay. Although the emergency vehicles in Saudi Arabia have the right to pass red lights and exceed the speed limit on roads to reach the patient, but this adds another problem and it might cause farther accidents. The proposed system would save people life and the environment from the consequences of emergency vehicle delay.



**Fig 1:- Ambulance stuck in traffic**

Furthermore, it saves the emergency vehicle passengers from any accident that would result from crossing the red light. Also, it avoids the time wasted by waiting the emergency vehicle for the red light to turn off and avoiding forcing cars in front of it to cross the red light to enable passing the emergency vehicle. We know that INDIA is a biggest country and it occupies 2<sup>nd</sup> place in world in population. The population as estimated in mid-2018 is 130 crores approximately and it keeps increasing. Most Saudis use their private vehicles for transportation because the lack of public transportation. And government also identified that lot of deaths are happening due to traffic

only. As a result, the number of vehicles on roads have been increased. Consequently, traffic is becoming a serious problem.

## II. LITERATURE REVIEW

Road infrastructure has seen consistent improvement in the last few years. Connectivity has improved and road transportation has become a focus of rapid development. Roads are providing better access to services, ease of transportation and freedom of movement to people. But in metropolitan cities traffic congestion is increasing rapidly, it results in chronic situation in dense downtown areas. Traffic signals play a significant role in the urban transportation system. They control the movement of traffic on urban streets by determining the appropriate signal timing settings. Adaptive traffic signal controllers as the principle part of intelligent transportation systems has a primary role to effectively reduce traffic congestion by making a real time adaptation in response to the changing traffic network dynamics. Many methods used for traffic signal timing optimization under different criteria's. In this paper different methods are proposed by reviewing different research papers for traffic signal control, which gives best adaptability & optimization ideas in traffic signal control. Thermal cameras could aid in sensing vehicle inflow during conditions with low visibility. This advantage comes with a hefty cost. P. Jagannadha Rao et. al. [3] have suggested the idea to use them as detectors. Despite the advantages, when we consider the working of thermal cameras during times when visibility is okay, normal cameras will outperform them while also being relatively cheaper than them. From the plethora of data sources available, it will be easier to collect and harness images about non-thermal cameras than thermal cameras in order to build a model from them.

While the devices mentioned above do offer partial solutions for traffic control, it is also important as to where the sensors and devices

would be placed and mounted. Although the weakness, one takeaway is that an embedded system can prove as a useful device going forward because of the functionalities offered at limited cost. "Automatic Path Maker for Emergency Vehicles" The project makes use of ARDUINO uno and IR sensors to control the signals using IoT based technology. "Automatic Path Maker for Emergency Vehicles"-The signals are controlled using ARDUINO, which Node MCU, which will be in the same network where it uses the MQTT protocol for transmitting and receiving information to the cloud server giving exact analysis. "Automatic Path Maker for Emergency Vehicles"- involves IR sensors and RFID Readers to detect the moving vehicles connected with IR sensors.

IoT based Industrial automation paper proposed by Sanyuta Swami and team. Industrial Automation Uses as the Internet of Things (IoT) In these papers, there is developed as system is automatic monitored in the industrial application & generated & made into intelligent decision used to the concepts as iot. ARDUINO and iot based industrial automation. Internet of things as completed through used to local networks standard & remote controlling a& monitoring signals parameter through ARDUINO (IoT based Technology). The UK People have developed a series of small single-board computers. ARDUINO Foundation to encourage the teaching of basic computer science in schools and developing countries. It does not take in peripherals and cases. The originally is model because most popular than projects, as sell outside it is targets as marketing as used to like robotics. It is developed in the new technology as has been allows at moves with the 1st Generation as the Internet to the current change over as the Fourth generations. IOT based the unique models because far more popularly in than expect, In this paper, Referred from IEEE paper of International Research Journal of Engineering and Technology Industrial Automation using IoT paper proposed by Bhosale. Then automatically creating an interface for controlling that appliance.

### III. EXISTING SYSTEM

Under present scenario, traffic control is achieved by the use of a system of hand signs by traffic police personal, traffic signals, and markings. A comparable and matching education program is needed, through driver-licensing authorities, to assure that those who operate motor vehicles understand the rules of the road and the actions that they are required or advised to take when a particular control device is present. Each traffic control device is governed by standards of design and usage; for example, stop signs always have a red background and are octagonal in shape. Design standards allow the motorist to quickly and consistently perceive the sign in the visual field along the road. Standard use of colours and shape aids in this identification and in deciding on the appropriate course of action. Electrocardiogram (ECG) uses electrodes that is placed on the patient's body to measure the contraction and relaxation of the heart. Heart rate record is measured when the patient's finger is placed in an instrument that uses infrared Light Emitting Diode (LED) that transmits signal that is reflected by the patient's blood plasma in the finger. Body temperature is recorded using temperature sensor. On the other hand, traffic control system allows ambulance driver to control the traffic light. This kind of control is handled through a keypad by the ambulance driver by choosing the path that it will pass. Once ambulance driver presses the keypad, RF (Radio Frequency) transmitter, which is in the ambulance, will send a signal (binary signal) to the RF receiver that it is in the traffic light controller.

Under current circumstance, traffic lights are set on in the different directions with fixed time delay, following a particular cycle while switching from one signal to other creating unwanted and wasteful congestion on one lane while the other lanes remain vacant. The system we propose identify the density of traffic on individual lanes and thereby regulate the timing of the signal's timings. IR sensors count the obstructions and provide an idea about the traffic density on a particular lane and feed this

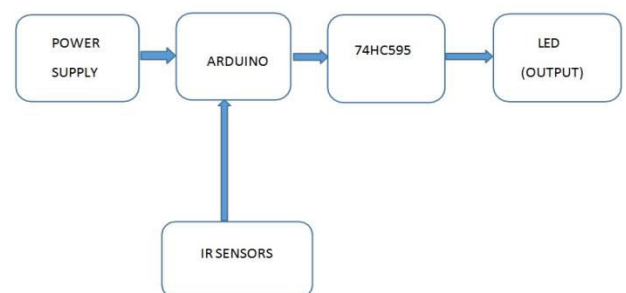
response to a controller unit which will make the necessary decisions as and when required.

### IV. PROPOSED SYSTEM

The proposed system would save people life and the environment from the consequences of emergency vehicle delay. Furthermore, it saves the emergency vehicle passengers from any accident that would result from crossing the red light. Also, it avoids the time wasted by waiting the emergency vehicle for the red light to turn off and avoiding forcing cars in front of it to cross the red light to enable passing the emergency vehicle. In addition to the mentioned above when an emergency vehicle has to pass a distance from A to B, it would save the duration time of the red light for each traffic light in the that way from A to B. This project proposed a solution for this problem by proposing an emergency mode to the current traffic light system, which gives ambulance the priority to pass the traffic light to arrive to patients and hospitals smoothly. The rest of the paper is organized as follows.

Section 2 provides a background sight about the domain that the proposed system is covered. Section 3 discusses related work to our project. Section 4 presents our proposed solution. The system design and implementation are presented in section 5 and 6. Section provides the paper's conclusion and future work.

### V. BLOCK DIAGRAM & WORKINPRINCIPLE



**Fig 2:- Block diagram**

The model works on the principle of changing of Traffic signals based on the density through an assigned section of the road. There are four

sensors placed at four sides of a four way road which checks the density of the area covered by the sensors. Here we are using IR sensors to design an intelligent traffic control system. In order to measure the density of traffic on each side, IR sensors will be kept one on each side of the road at a specific distance. Each of the IR sensors consists of an IR transmitter and an IR receiver. Just as the name suggests, the IR transmitter transmits the IR rays and the receiver is responsible to receive the rays. The whole system is controlled by the microcontroller which is the Arduino. This is called as Akhil Bhargav. ARDUINO is interfaced with Serial to

parallel IC(74HC595) and IR sensors. As the vehicle passes through these IR sensors, the IR sensor will detect the vehicle & will send the information to the ARDUINO. The total no of IR sensors required are 4 and LEDs 12. Three sets of LEDs via Green, Yellow and Red are used to indicate the GO state, Ready to Go state and WAIT state. The traffic signal will be tuned with a default timing of 10 seconds of green light and all other signal will be red. After 10 seconds two signals will be yellow for 4 seconds and another two will be red. This condition will be followed till all the IR sensors receiving the signals or all the IR sensors are not getting signals. The LEDs G (green), Y (yellow) and R (red) glow in following sequence.

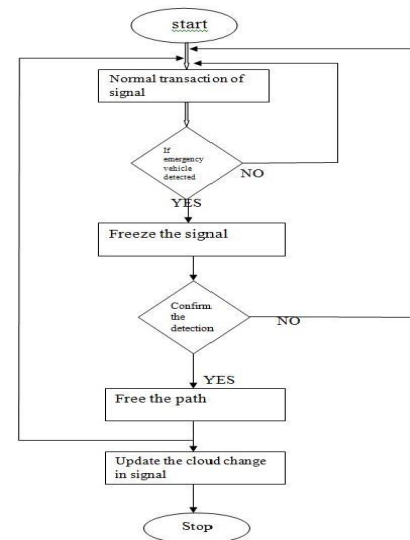
The project is to make micro controller is accessible on everybody, both these are minimal computers backgrounds, regardless as the age. It is different techniques as ARDUINO

boards, together. Working to the NODEMCU, They

needed as a laptops, desktops, and tablets than your may downloading the ARDUINO developmental into environments. It has been write into Java & can be coding at Window, Mac OS X 10.7 Lion as newer, or Linux 32 and 64 bits. The connected as your board for your computers, you can be needed as a USB data cables. Unlike USB charges and synching wire, they can be squares, block shape interfaces as instead into small interface such as the micro USB. Unless at a well establishing into electronics hobby for ton of the cold sensor &

like lying around, we invested as a kits. Form tests & prototypes, your laptop provide in the power form the ARDUINO by means of the USB data cables.

We have designed the interface to be user friendly and consistent. The interface operations are done in the same way and the interface have consistent colors, font size, and terms. The interface shows a feedback to provide information to the user about what action has been taken and what has been accomplished. Fig. 5 shows the system architecture. Fig. 6 shows the overall system workflow.



**Fig:- Flow chart for main code**

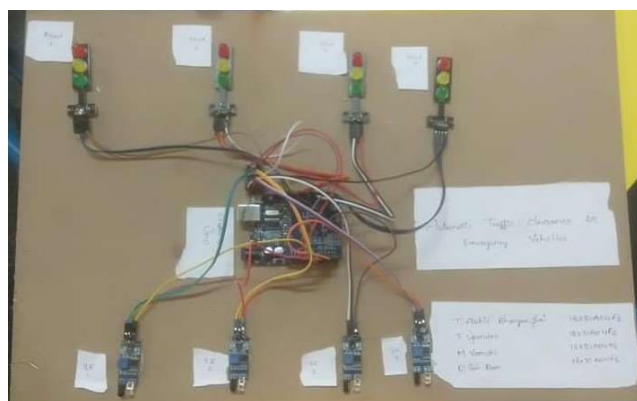
In this section we illustrate the system using circuit diagram and present the proposed system in block diagram. A circuit diagram is a visual

display of an electrical circuit using either basic images of parts or industry standard symbols. These two different types of circuit diagrams are called pictorial (using basic images) or schematic style (using industry standard symbols). We use the pictorial circuit diagram to represent the proposed system. The system can be represented using two circuit diagrams, one for the traffic light unit and the other for the ambulance unit. The block diagram is used to represent the components of the system and shows the flow of the system's work. It represents each component by block and uses arrows to show the



relationship between the components and the system's work. Fig. 4 shows the block diagram of ambulance unit and the block diagram of traffic light unit respectively.

The originally is model because most populars than projects, as sell outside it is targets as marketing as used to like robotics.

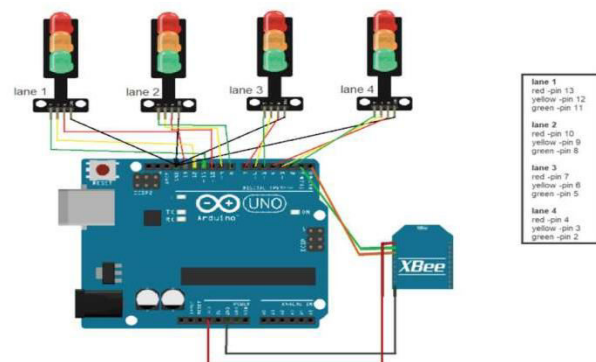


**Fig :- Sample Design**

## VII. RESULTS

The project is an output of 1 year of research and implementation. The circuits when implemented separately works as per the desired output however during integrating all, output fluctuates and shows different response every time. This could be a problem of loose connections of the wires or internal wiring of the breadboard used. This project lists down the results realized from the practical work and examines whether ideas/solution approaches recommended in research are met by the practical implementation. For this project the main communication is by using IR technology. The proposed system can be easily integrated into the ambulance as it only needs 12V,1A power for GSM SIM 900A and 10V for ARDUINO UNO, which can be easily provided from the fuse board present that is inside the ambulance. The proposed system in existing literature needed that driver to have an Internet connection. In the proposed system, the driver just needs to click on the GPS screen once. There is a need to send the

location of the ambulance as a message continuously. This must be done once because the location that is sent from device acts as a live location. The proposed approach can give way to one or more ambulance at the same time.



**Fig :- Connecting to ARDUINO**

## VIII. CONCLUSION

There is exigent need of efficient traffic management system in our country, as India meets with 384 road accidents every day. To reduce this congestion and unwanted time delay in traffic an advanced system is designed here in this project. With field application of this technology, the maddening chaos of traffic can be effectively channelized by distributing the time slots based on the merit of the vehicle load in certain lanes of multi junction crossing. We have successfully implemented the prototype at laboratory scale with remarkable outcome.

**FUTURE SCOPE:** This system can be implemented in any vehicle for establish a communication. We can share the patient information to the hospital in an easy way. The information like break apply, speed of the vehicle or any failure, damage in the vehicle etc can share through a lifi system. The patient information can be shared to the hospital through lifi communication. Traffic signal timer can be controlled dependent on number of vehicle present in front of the ambulance.

## IX. REFERENCES

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