Priority Based Traffic Management System

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Abstract- The internet of things (IoT) is a computing concept that describes the idea of everyday physical objects being connected to the internet and being able to identify themselves to other devices. The main theme of the project to use each and every second efficiently to save a human life while travelling in an ambulance. This project comprises of two prototypes: (i) The Congestion Control Module comprises of controlling the traffic light to reduce the traffic density and to provide congestion free path for ambulance to reach hospital within a short time. (ii) The Blynk Application Module comprises of ON Button and OFF Button. The Blynk application is integrated with the traffic signal using ESP8266 wifi module. This application will be controlled by the ambulance driver to change the traffic signal. Before certain distance, the ambulance driver will switch on the button in the application. When he switch on the application, the signal will changes into blue colour which indicates the approach of the ambulance so that the people in the traffic signal will make a way for the ambulance by clearing the congestion. After the ambulance crosses the traffic signal, the traffic signal will function normally. This will reduce the time complexity.
Keywords: - Traffic Signal, Internet of Things, Congestion Control, , Blynk Application, Blue color.

I. INTRODUCTION

The fast improvement of IoT innovation makes it workable for interfacing different questions, for example, sensors associating through the web and giving more information interoperability techniques to application reason. The Internet of Things (IoT) is the interconnection of extraordinarily identifiable inserted processing gadgets inside the current Internet framework. Crisis administration ought to be given effectively at the required time. He/she ought to be taken to the doctor's facility as prior as would be prudent and treatment as to complete quick to spare his life. This venture is essentially in view of correspondence amongst emergency vehicle and different gadgets, for example, cell phones, healing facility PCs and activity flags so the likelihood for sparing the life of the poor individual will get expanded. The web page is a server application that enables the doctors to get an updated status of the patients which in turn enables them to make prior arrangements before they reach the hospital in the ambulance.

The concept Internet of Things (IoT) was first introduced by Kevin Ashton in 1999 [6]. IoT identifies with various unmistakable articles and their virtual portrayal in the internet. IoT introduce a world where all objects around us which is resulting from a natural impulse or tendency & they are connected to each other and communicate with each other. The objective of IoT is to make a superior world for the individuals [2]. IoT is the new and winds up plainly evident model. The IoT connects the physical world and the virtual world. The major objectives for IoT are the creation of smart environment based on self-aware thing for new and innovative things [4]. The IoT includes the expanding predominance of objects and elements provided with novel identifiers and it has capacity to exchange information naturally over a systems administration of the vehicles. The Internet of Things is the system of physical gadgets, vehicles, structures and different things which are implanted with hardware, software, and sensor and system connectivity. IoT= Physical Object + Controller, Sensor, Actuators + Internet.

This paper is organized as follows. Section II illustrates the Related Works. The proposed work makes use of Internet of Things in order to solve the problem faced by emergency vehicles. In the related works, a variety of methods have been prescribed by various authors to solve this problem. The major contribution of this work takes advantage of Region of Interest of vehicles in that locality, which is also time dependent and location dependent. In our proposal Blynk Application are being used to control the traffic signals. System methodology of Proposed Work is described in Section III; the Section IV illustrates the hardware implementation, the section V illustrates the Health Monitoring logic, the section VI illustrates the experimental results and section VII illustrates the Conclusion and future Enhancement.

II. RELATED WORKS

Nikita Tendulkar, Komal Sonawane,Darshana vakte, Deepti pujari, Ghanshyam Dhomase proposed a methodology named, “A Review of Traffic Management System Using IoT” which comprises of modules such as Wireless sensor networks, RFID and GSM-GPS for controlling the traffic.The wireless sensor network function is to monitor or sense the physical parameter, process and communicate the data collected to nearby sensor nodes in order to form a network of sensor nodes.RFID tracks the location of the ambulance.

Sagar Sukode and Shilpa Gite proposed a methodology named "Modern Approach for Vehicle Traffic Monitoring and Signal Management System in ITS" which can process current information status of traffic and useful for traffic control rooms to analyse and improve the traffic efficiency.

Dr.Sanjeev Sharma1,Vaishnavi Giradkar ,Aarti Sanap ,Snehal Sarolkar proposed a system named "IOT Based Traffic Light Controller in Smart City" which includes raspberry pi, IR sensor and LCD display. Raspberry pi is used to control all performance multitasking. IR sensor is used to monitor the density of traffic. The collected data will be made available on website which display the traffic status. so that people will know the traffic density earlier and congestion will be avoided.

Mr.P.Sivasankar and B.Brindhavathy proposed a system named "IoT Based Real Time Data Collection for Dynamic Road Weight Measurement" which uses Raspberry Pi to act as a cloud server for collecting,managing and monitoring traffic situations through the web browsers and also remotely controls the vehicle data. The handheld devices such as ARM Controller, RFID reader and GPS antenna were used.

Yashashree Joshi, Ashwini Joshi, Neha Tayade, Priyanka Shinde, Prof.S.M.Rokade proposed a paper named "IOT Based Smart Traffic Density Alarming Indicator". This system use infrared sensors which provides the traffic status to the drivers earlier. By knowing the traffic density, emergency vehicles will be saved from the congestion.

Kasukurthy Uday Bhanu,Achanala Puneeth Krishna, Suganthi Brindha.G proposed a methodology named "Innovative Congestion Control for Ambulance Using IOT" which consist of an IR sensor, WIFI module (ESP 8266) and TIVA C launchpad. It determines the network congestion and turns on the green light duration for that path. When an ambulance is approaching the junction, it will communicate to the traffic controller in the junction to turn ON the green light. So that people in the congestion will know the arrival of ambulance earlier.

Tejashri Gadekar, Priyanka Chavare, Komal Chipade and P.S Togrikar proposed a system named "Implementing Intelligent Traffic Control System for Congestion Control, Ambulance Clearance, and Stolen Vehicle Detection" which consist of an sensor network , RFID reader and tags. Sensor network is used to detect the traffic density and ARM7 system-on-chip to read the RFID tags attached to the vehicles. In addition, when an ambulance approaching the junction, it will communicate the traffic controller in the junction to turn on the green light. This module uses Zigbee modules on CC2500.

Tanvi Tushar Thakur, Ameya Naik, Sheetal Vatari, Manjiri Gogate proposed a methodology named "Real Time Traffic Management using Internet of Things" which uses the density of traffic for the optimization of the traffic signal.

Rajeshwari Sundar, Santhosh Hebbar, and Varaprasad Golla proposed a methodology named "Implementing Intelligent Traffic Control System for Congestion Control, Ambulance Clearance and Stolen Vehicle Detection" which uses RFID tag to determine the traffic congestion and turn on the green light. If the ambulance approach certain distance before the signal, it will communicate to the traffic controller in the junction and turn on the green signal.

III. SYSTEM METHODOLOGY

The general design of the proposed framework is portrayed in figure-1. This framework is essentially partitioned into two modules namely, Congestion control module and Blynk Application Module.

The Congestion Control Module comprises of controlling the traffic light to reduce the traffic density and to provide congestion free path for ambulance to reach hospital within a short time .In the Blynk Application Module, the Blynk application is integrated with the traffic signal using ESP8266 wifi module. This application comprises of the On Button and Off Button. This Blynk application will be controlled by the ambulance driver to change the traffic signal. When the ambulance driver switches on the application, the blue colors light will appears which the indication of the arrival of ambulance. The Figure 1, Represents the Block diagram for the proposed system.

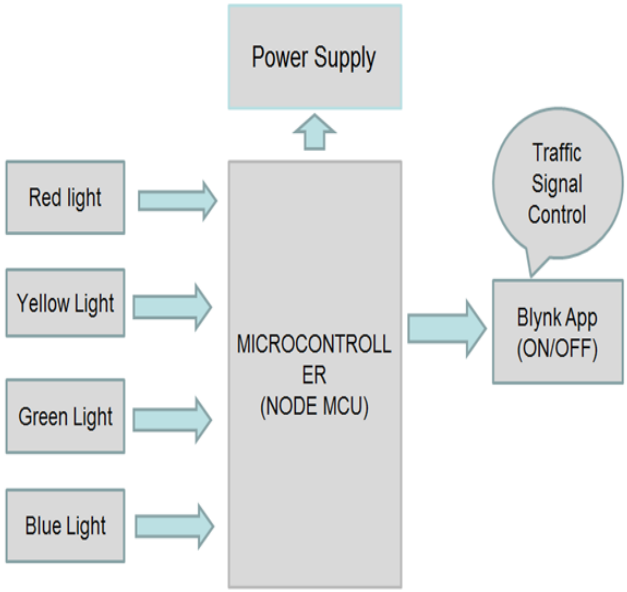

Figure 1. Block Diagram

The hardware module is connected in the following manner: The electrical energy from the power supply is given to the 12 volt transformer. The transformer in turn sends the 12 volt current to the rectifier. The rectifier consists of capacitors, diodes, 2 voltage regulators (each 5 volt), and resistor. The capacitor which stores the electrical energy will supply the current to the voltage regulator, in case of any failure in transformer.

When the current is passed through the rectifier, the voltage regulator will regulate the current to 5 volts. This 5 volt current from each voltage regulator will be transmitted to NodeMCU (Version 12). The NodeMCU, technically referred as ESP8266 is used for providing Wi-Fi connectivity to the entire module. The ESP8266 is connected to the Blynk Application to control the traffic signal by the ambulance driver.

When the ambulance struck in the traffic, the delay caused by the traffic will cause death of the patient. To avoid the delay caused by the traffic, the congestion can be cleared by the people by the before indication of blue color light. When the ambulance reaches certain distance before the traffic signal the ambulance driver changes the signal to blue which indicates the arrival of ambulance. So that people in the congestion will know the arrival of ambulance and they can clear the congestion. The Figure-2 represents the Architecture diagram for the proposed system.

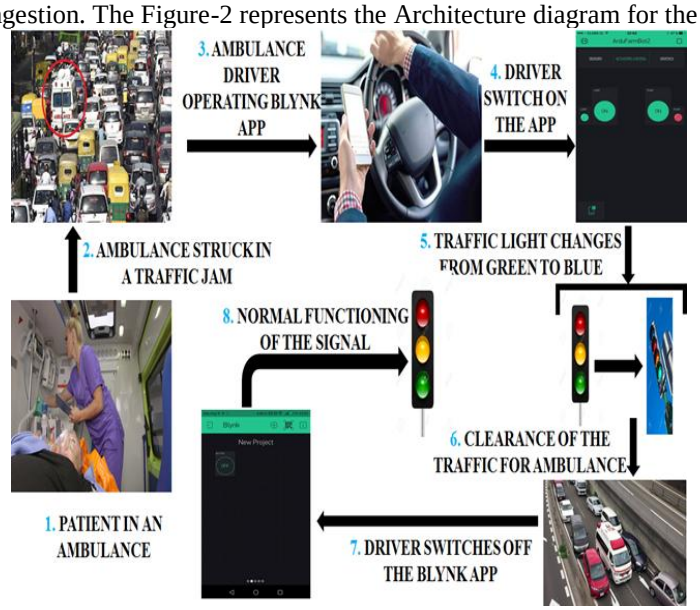

Figure 2. Architecture

IV. HARDWARE IMPLEMENTATION

Hardware's used for Implementation are:

- Node MCU
- Transformer

4.1 NODE MCU

NodeMCU is an open source IoT platform. It includes firmware which runs on the ESP8266 Wi-Fi SoC from Espressif Systems, and hardware which is based on the ESP-12 module. The term "NodeMCU" by default refers to the firmware rather than the dev kits. The ESP8266 module is a IoT device consisting of a 32-bit ARM microprocessor with support of WIFI network and built-in flash memory. This architecture allows it to be programmed independently, without the need of other microcontrollers like the Arduino. The Figure-3 depicts NodeMCU. NodeMCU is a complete environment of hardware and software for IoT prototyping consisting of the following items:

➢A controller board consisting of a ESP8266 module.
➢Micro USB Port to power (5 volts) and programming.
➢10 digital inputs GPIOs operating at 3.3V.

Figure -3 Node MCU

4.2 TRANSFORMER

The transformer used in this module supplies a 12 V. It is a device that is used to either raise or low voltages in current in an electrical circuit. It is used for supplying 12 volts current to the rectifier volt current (12 volt Transformer).A power supply is an electronic device that supplies electric energy to an electrical load. The primary function of a power supply is to convert one form of electrical energy to another and, as a result, power supplies are sometimes referred to as electric power converters. Some power supplies are discrete, stand-alone devices, whereas others are built into larger devices along with their loads.

Figure -4 TRANSFORMER

V. EXPERIMENTAL RESULTS

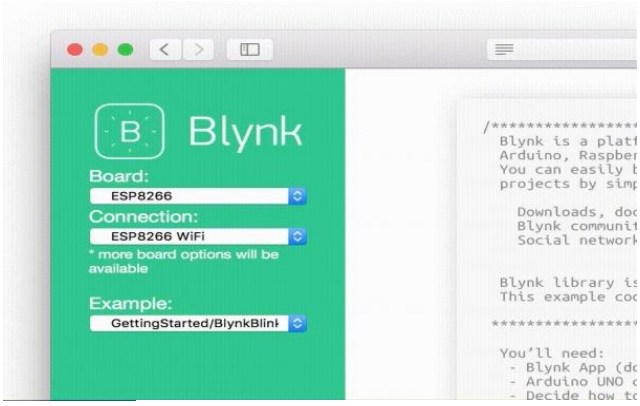

Figure 5. Blynk Setup

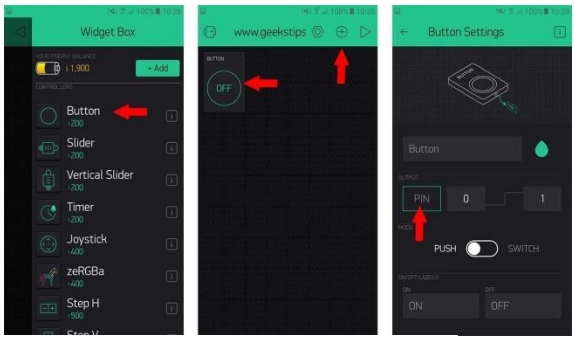

Figure 6. Blynk Connection

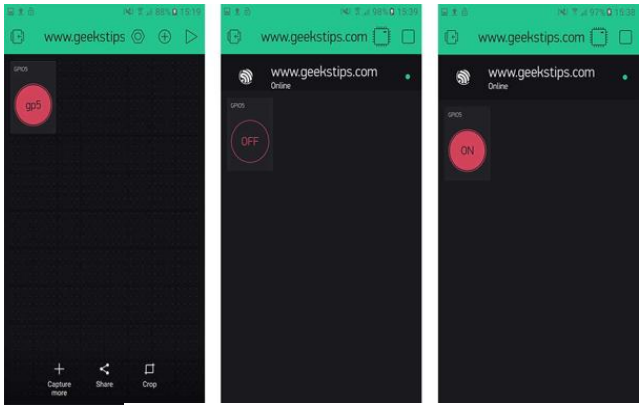

Figure 7. Blynk ON and OFF Button

Figure 8. Blue Light signal

VI. CONCLUSION AND FUTURE WORK

Human life is valuable and must follow safety in the real time applications. The application mainly depends on measures very conscious in all aspects. The need for present day emergency need is fulfilled with ease. Once it is implemented it will have great revolution in the emergency field. This system is easy to implement in the present day scenario and it saves the human life which is lost due to the time delay caused by traffic congestion.

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