IOT Based Ambulance Friendly Traffic Management System

Pragati Ingole[1], Mayur Kasat[2], Uddhav Zende[3], Prof. Vineeta Philip[4]

Student[123], Professor[4], Electronics & Telecommunication, All India Shri Shivaji Memorial Society's Institute Of Information Technology, Pune, India[1234]

***Abstract:* -The increasing daily fatalities are due to traffic jams and critical situation which result in delay of ambulance reaching the hospitals and desired locations. This is due to vehicle traffic on the roads. The ascent of the Internet of Things has offered urban communities a chance to definitely advance their traffic circumstance by utilizing the web to help ease their traffic issues. The internet has likewise assisted by introducing advancement, and with development came effectiveness and common sense. Numerous peoples have started utilizing programming and applications for ease of traveling. This paper aims at creating an ambulance friendly traffic system, by regulating the traffic with the help of the mobile application installed in the ambulance driver's phone works according to the traffic density on the specific street.**

Keywords: - Internet of Things, Blynk, Cloud Computing, Aurdino Mega, Smart Traffic Management.

I INTRODUCTION

In the present world, everybody is in a rush. This eventually turns out as uncontrollable traffic on the streets. Metro urban areas, specifically, are where population on roads and traffic congestion are a regular occurrence. This couldn't influence any person or thing, more than ambulances. We have seen a tons of cases, where ambulances get caught in the mid of the practically unfaltering traffic, leading to delay in arrival at the spot of crisis on schedule. This is something abominable, as it could cost lives. This project aims at creating an ambulance friendly traffic system, by regulating the traffic with the help of Mobile application installed in the mobile of ambulance driver. According to the traffic density present on the particular road the driver can change traffic light to green until the passage of ambulance through traffic. The ascent of the Internet of Things has offered urban areas a chance to radically advance their traffic circumstance by utilizing the internet to help reduce their traffic issues by introducing development and with advancement came proficiency and cost-effectiveness. Numerous people have started utilizing programming and applications to design their courses to sidestep clogged streets and expressways.

II LITERATURE REVIEW

The literature survey conveyed 64 percent of the world's population will be living in cities by 2025, approximately 5.2 billion people. By 2035, roughly 66%, or 6 billion people will live in urban areas. This not just addresses a monstrous test by the way we construct and oversee urban areas however critical freedom to improve the existences of billions of individuals. [1].Thus various techniques of solving the problem statement like using IoT, cloud computing, detections using sensors. Many smart city projects are working on this system using centralized systematic planning for achieving a smooth ambulance friendly city[2]. The applications like apache help in establishing IoT communication interface. Another paper illustrates about revolutionary development in the field of Internet of Things (IoT) and how it can be seamlessly & widely in large number of end system where subset of a large amount of data can be accessed and processed easily and powerfully [4] .The Internet of Things (IoT) is the communication of exceptionally recognizable installed calculating gadgets inside the current Internet architecture. Emergency services must be delivered efficiently and on schedule. He/she should be taken to the hospital as speedy as possible and treatment as to carry out fast to save his/her life.[5]Integration of cloud computing with internet of things : challenges faced and open issues gives us a deep perspective and definition of the cloud computing and internet of things . The communication is established, the storing of data and the processing capabilities of both the technologies, also explores various new models and their application. The paper likewise clarifies the difficulties which we can face and how to beat them. [6] low profile and minimal expense material for pressure detecting and position planning we became acquainted with ,the plan and alignment of the pressing factor cushions and its interfacing with Atmega is clarified exhaustively get acknowledge with the application of pressure sensor and its structure . The capacities and efficiency of sensor is also tested in this paper.

III METHODOLOGY

The framework has isolated into 3 sections the initial segment incorporates pressure pads that is pressure sensors that are introduced on the roadsides which gather the traffic density information. The subsequent part is introduced on the traffic light, has a microcontroller and a Wifi module that collects data from the sensors. Signal light's current colour status and transfers it to the cloud. The last part is interfaced with the cell phone application which will be operated by the ambulance driver. The application shows the traffic density on forthcoming streets or paths and the current traffic light status. The driver can choose the path he needs to go through and turn its signal green as indicated by using the emergency buttons on the application.

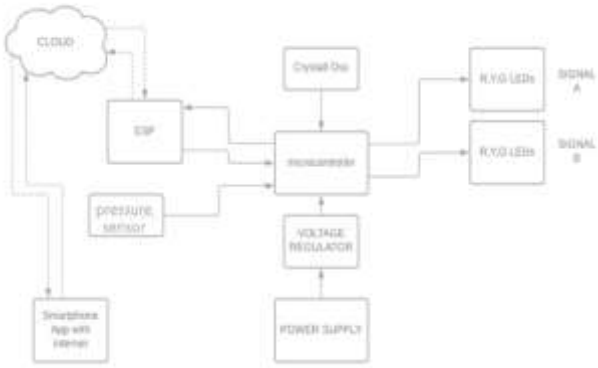

Fig.1- Architecture of IOT based traffic control system.

A. Pressure Sensors

The pressure pads (weight sensors) will be installed on the road; the sensors will be separated into two portions; if the first 50 meters are occupied by cars, the sensor will be regarded 50% occupied. If both portions of the road are fully filled that is another 50 meters, the occupancy indicator will read 100%. If there are fewer vehicles, the density will be zero percent.

B. ARDUINO MEGA 2560 microcontroller

At the traffic signal, there is a microcontroller. The current traffic signal status is likewise transferred to the cloud, and it receives power supply from a voltage regulator.

C. Traffic Signal-

At each traffic signal, a set of LEDs (RED, YELLOW, GREEN) indicating traffic lights are connected to a microcontroller.

D. ESP 8266

The data from the pressure pads will be wirelessly sent to the cloud using an ESP 8266 wifi module. The wifi module is linked to the traffic signal's microcontroller. The current traffic light status is likewise being sent to the cloud.

E. MOBILE APPLICATION-

The application interface will display the traffic density. The driver can then select the appropriate lane. By clicking the emergency button on the app, the current traffic signal state will be changed to green the ambulance passes by.

B. Hardware Design- Electronic Circuit

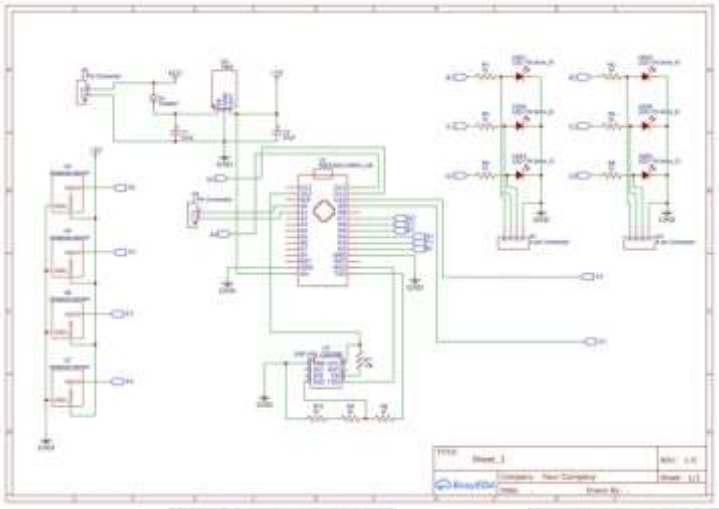

Fig.2- Circuit Diagram

A.ELECTRONIC POWER SUPPLY CIRCUIT

In order to provide adequate voltage levels for each circuit part, the power supply circuit is designed. It is possible to check the use, to protect the controller circuit from over voltage peaks [3].The circuit has a power supply that converts the incoming AC voltage to the DC voltage (5 V), voltage required by the pressure pads module. The voltage regulator IC7805 is linked to the microcontroller's pin Vin for power.

B. ARDUINO MEGA 2560 microcontroller.-

The ATmega2560 is the foundation for the Arduino Mega 2560 microcontroller board. There are 54 digital I/O pins, 15 PWM outputs, and 16 analogue outputs on the board. This Arduino board is a microcontroller board that is free source. Because of the 4x hardware serial, the Arduino Mega is chosen. The ESP8266 WiFi module can be directly plugged into the Arduino board's Rx/Tx pins, or a voltage divider circuit too can be used to achieve 5 to 3.3V. On a software level, too Arduino is simple to connect to an ESP8266.

C. Wi-Fi (Wireless Networking) ESP8266-

Wi-Fi is a well-known wireless network technology that uses radio waves to provide high-speed Internet and network connectivity without any need for wires. To ensure that the internet is easily accessible on smart phones, the wireless acquired skills must not only be new technology, but it must also be inventive and capable of solving problems, reducing costs, and increasing efficiency for both owners and consumers[7].The ESP8266 hardware and subsystems are based on the ESP-12 module. It also offers you access to GPIO (General Purpose Input/Output) for development process. The ESP8266 module is designed to take use of such a low-cost Wi-Fi chip.

IV SYSTEM SOFTWARE

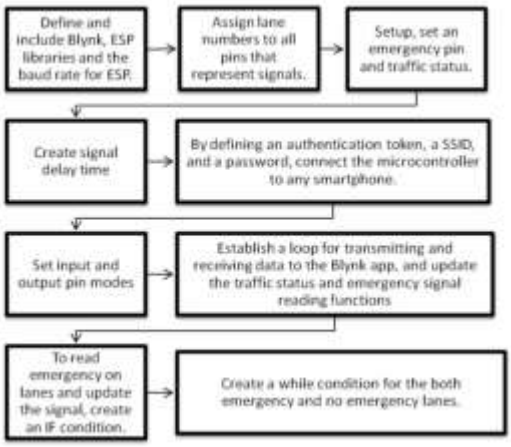

Fig.3- Flow chart of software program (Blynk App.)

According to the Blynk website, Blynk is an Android and iOS platform that can run a variety of hardware modules, including Raspberry Pi, Arduino, NodeMCU, and over 400 others. Furthermore, Wi-Fi, Ethernet, Cellular, USB, serial, and Bluetooth are all viable options for connecting the hardware module device to the internet. Blynk allows users to create many applications and use them to control multiple connected boards tethered to a device with internet connection from anywhere in the globe using a Smartphone (Todica, 2016)[6]. The Blynk App's GUI (Graphic User Interface) on the Smartphone is very basic and user-friendly, allowing users to add widgets that they want to use and control them [7].

V APPLICATION USER INTEFACE

Install the Blynk application on a mobile device and sign in with your email account and secret phrase. Create a new project and add the features that the project requires. The authentication key will be generated by the software and sent to the registered email id. Using that key, enter it into the software program along with the Wifi name and password that the ESP8266 will be using to connect to the internet. The data from the pressure pads will be uploaded to the cloud via the Wifi module, and the cloud and the Blynk Application will be linked due to the authentication key. The host will generate a QR code that will be transmitted to the ambulance drivers, and the ambulance drivers will be able to scan it and access the system.

Fig.4- QR code sent to drivers

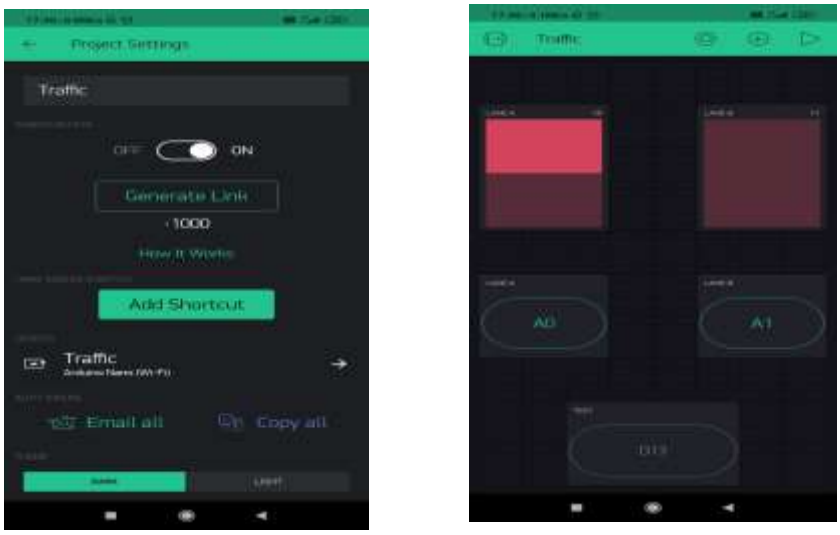

Fig.5- Application User Interface Layout

SECURITY – The QR code will only be issued to registered ambulance drivers by the system's host. To ensure that ambulance drivers have access to the host system, the access should be ON at all times. If something goes wrong, the host can terminate the connection, and the drivers will be unable to access the system.

ADVANTAGES - 1) This system can be used at each signal on the way to the hospital so that the ambulance does not have to stop anywhere along the way due to traffic.

2) This device should also be made available to traffic cops so that they may manage automobiles ahead of time before ambulances arrive at the square.

VI CONCLUSION

We have effectively assembled and tested the plan outlined through the paper. The objective of giving mobility to the ambulance through the traffic can be achieved using a mobile phone and cloud computing. The framework is easy to understand and simple to use without any intricacies that is user friendly. After some preliminary research and fact-checking, we came to the conclusion that, rather than IR and other sensors, pressing factor cushions or pressure pads would be a good fit for the task of vehicle detection presence. The project would reduce the risk of postponement due to traffic congestion on the streets and allow people to stay on schedule away from postponing treatment. While working and conducting testing, we discovered that this framework is more open than we had anticipated. It can also be used by traffic cops in heavy traffic, emergency situations, or when a VIP vehicle passes by. Finally, we can state that this project is self-explanatory and that we are free to allude to and forward our work in order to make further advancements on this assignment.

VII FUTURE SCOPE

We can use a variety of sensors to ensure that the traffic density is accurate. Using GPS to acquire continuous traffic data by following the position of vehicles. PC vision has a significant advantage above other traditional automobile estimating technologies. NodeMCU can be used in place of the Atmega 2560[8]. It is a high productivity and greater visual information; video picture preparation can be used instead of other fixed sensors. We can create a new structure for the rescue vehicle board that is in sync with the traffic executives and set up a new control room.

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