

Intelligent Traffic Tracking System Using Wi-Fi

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Abstract— The Traffic congestion is an extreme issue today in numerous advanced urban areas around the globe. A large portion of the traffic lights today include a fixed green light grouping, accordingly the green light succession is resolved without considering the nearness of the crisis vehicles. Along these lines, signal control is an important measure for keeping up the quality and wellbeing of traffic course. The venture is intended to control the traffic light consequently alongside the identification of crisis vehicle which encourages them to go through the gridlocks immediately. The venture is executed utilizing sensors, controller board, Wi-fi and GPS alongside proper programming to control the traffic stream. Unified application is utilized to send the data about the precise area of the emergency vehicle and the hour of appearance to the close by medical clinic and the traffic police.

Keywords: ARM 7 Controller, Wi-Fi, GPS

I. INTRODUCTION

There are a lot of obstacles faced by an ambulance when it is on the way to pick up the patient or on the way to the hospital. When an ambulance hurrying to reach a hospital gets stuck in the busy traffic, there are chances of the patient's condition getting worse. Hence signal control is a necessary measure to maintain the quality and safety of traffic circulation [1].

In a country like India, there are lot of fundamental problems faced due to the heavy traffic. When the road traffic control systems here are compared to the ones in developed countries, say America, there are lot of advancements observed, making it more systematic and problem free [2]. The following are the observed basic changes, they are Indian road traffic is not constant throughout the day, all types of vehicles use common road for travelling, usually roads are single lane, no provision for emergency vehicles, some drivers do not follow the traffic rules, there is no advanced technology used in the traffic system to provide special services for ambulance, fire extinguishing services and VIP vehicles [3].

To solve these problems, we have come up with a solution called "Intelligent Traffic Tracking System Using IOT" with automatic traffic control. This particular project is designed for cities with heavy traffic [4].

When an ambulance encounters a traffic jam in its route, that particular signal is made green to give way to the ambulance and once it is out of the lane, the signal regains its original flow of sequence of signaling. This is implemented using sensors, ARM7 controller, Wi-fi and GPS. Centralized application is used to send an automatic message to a nearby hospitals giving an information about the time of arrival of ambulance at the hospital along with latitude and longitude positions of the ambulance. Delay of ambulance services are reduced, and the ambulance reaches the hospital in time thereby providing good and quick treatment to the patients. According to a survey conducted in India, almost 60 patients

die every day in an ambulance due to the interface conditions [5]. Many of these deaths occur due to the traffic failure when the ambulance gets stuck in the traffic jams. The lives of these patients could have been saved if they were admitted on time. Hence, we need an efficient system which would avoid such problems. Therefore, the system called an intelligent signaling system is designed which controls the traffic signals automatically and allows the ambulance to pass through the traffic without any delay. Hence it increases the chance of saving the precious life of the patients by admitting them to the hospital at the right time [6]. Similarly, in case of a fire extinguishing service, there has been a huge loss of public and personal properties, and also valuable lives of people stuck in those break outs, when the service is not made on time. Even though the fire extinguishing engine would have been intimated about the fire break out, it is sometimes delayed mainly due to traffic jams [7]. These signaling system can also be used to ensure that the fire extinguishing engine to reach the destination without any delay. Hence by introducing such an intelligent signaling system, emergency vehicles are enabled to have a free passage even at the peak hour of the traffic [8].

II. LITERATURE SURVEY

- 1) Ospina et al [1] examines about the plan and advancement of an application that intends to recognize and gauge the quantity of vehicles on a street convergence are introduced, so as to amplify the traffic signal working, with the goal that the holding up time relies upon the traffic needs. Right off the bat, a choice procedure of the intrigue district is applied to the picture successions, duplicating a veil picture with the first picture to center the division in this locale.
- 2) Ding Fang et al [2] portrays about how an astute traffic signal controller manages the dynamic traffic stream. The vehicle delay at the crossing point is diminished by utilizing this technique dependent on the fluffy calculation which is the vehicle stream on the current roadway and the contrast between the length of the holding up traffic group on the following stage and the current vehicle stream, the yield is the green postpone time of the current stage or the base green time of the following stage. The counter sticking capacity of framework is improved by the product plan. Contrasted and the conventional fixed time technique, the plan and lab analyze results show that the proposed strategy cannot just diminish the defer time at the crossing point, yet in addition is significant by and by.
- 3) Salama A S et al [5] depicts about an incorporated insightful framework for the administration and controlling traffic signals dependent on appropriated long-extend photoelectric sensors in separations preceding and after the traffic signals. The framework assists with opening for the traffic that are packed and

- gives a more extended time bigger than the given time for other traffic where the traffic thickness is less.
- 4) Madhavi Arora and V K Banga [13] portrays about traffic signal framework utilizing fluffy rationale controller. Customarily a fixed time controller is utilized which has certain drawbacks. They have predefined cyclic time which plans disconnected on a focal PC dependent on normal traffic conditions. Because of this, there is wastage of time by a green light for same time on a less blocked street as contrast with progressively clogged street.
 - 5) Harshini Vijetha H and Nataraj K R [4] depicts about another methodology for controlling Traffic System is structured. The framework utilizes an idea of Internet of Things. A keen traffic controller is structured with segments like Raspberry Pi, Pi-Camera, RFID, IR sensors. Raspberry Pi is the primary segment, which is utilized to control all, it demonstrations like a controller. Thickness of the traffic will be chosen with the assistance of IR sensors.
 - 6) Varsha Radbe et al [9] examines about the thickness based traffic observing framework. Presently a days because of increment in populace number of vehicles are additionally expanding. Individuals are changing their living of guidelines. In urban territories populace of vehicles are expanding and their control on lanes, interstates and streets are significant issues.

III. SYSTEM MODELLING AND DESIGN

The term architecture refers to firmware of the design or to a combination of hardware and software. The architecture of the system defines its broad outlines and defines precise mechanisms as well. The architecture of the project is shown in the Figure 1.

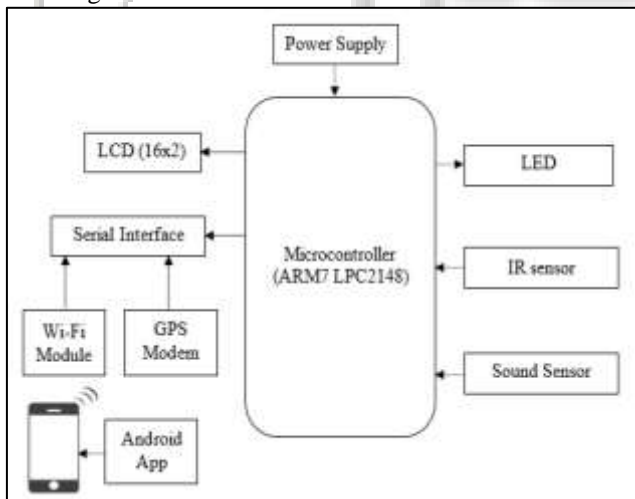


Fig. 1: System Architecture

The system starts with the IR sensor which detects the obstacle indicating the presence of vehicle in the traffic and Sound Sensor which is used to detect the siren of an ambulance. When an ambulance is arriving at the busy traffic, IR sensor and Sound sensor detects the obstacle and sound simultaneously which confirms the presence of an ambulance. When the ambulance is detected, the signals is sent to the ARM7 microcontroller thereby enabling traffic light to turn ON to Green.

The signal remains green until the ambulance passes through the signal. Thus, an automatic message is sent to the nearby hospital giving the information about the arrival of the ambulance and its location through a centralized app. In case if the automatic turning ON of green signal is failed then the message will be sent to the traffic police, thereby manually turning ON the green signal. Thus, the proposed system helps ambulance to pass through the signal without any delay and thereby giving the treatment in time to the patients which saves the maximum lives.

IV. DATA FLOWCHART

A Data Flow Chart is a graphical portrayal of the progression of information through a data framework. They can likewise be utilized for the perception of information handling (organized structure).

It gives no data about the planning of procedures, or about whether procedures will work in grouping or in equal. It shows the stream control through a calculation, permitting a peruser to figure out what activities will be performed, in what request, and under what conditions, however not what sorts of information will be contribution to and yield from the framework, nor where the information will originate from and go to, nor where the information will be put away. The stream diagram beneath shows the working standard of venture is demonstrated as follows.

The working standard of the undertaking where IR and Sound sensors are introduced in this way recognizing the moving vehicle and sound of alarm at the same time and accordingly affirming the nearness of an emergency vehicle in the rush hour gridlock. At the point when the rescue vehicle is identified the sign is sent to the microcontroller to turn the traffic signal to green and this stays green until the emergency vehicle cruises by.

The notice is sent to the close by medical clinic giving the data about the appearance of the emergency vehicle and in this way causes the patients to get the treatment on schedule. In the event that there is no rescue vehicle distinguished, at that point the regular traffic light is followed.

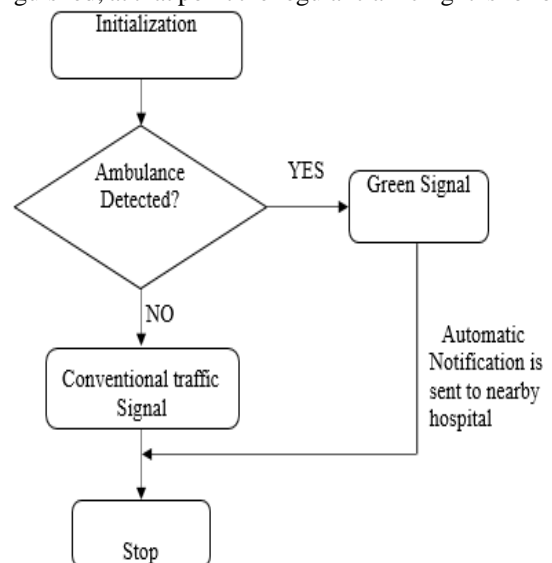


Fig. 2: Data Flow Chart

This process is repeated in a loop for continuous detection of ambulance in the traffic and thus enabling the signal light to green if ambulance is detected.

Figure 3 shows the use case diagram for the proposed system, where the system detects the emergency vehicle using the sensors and traffic signals is changed to Green.

The notification is sent to the nearby hospital giving the information of location which is tracked using the GPS modem. If the automatic turning ON of traffic signal fails, then the notification will be sent to the traffic policeman where he can manually turn ON the signal light to green if there is any information of ambulance arriving in the traffic

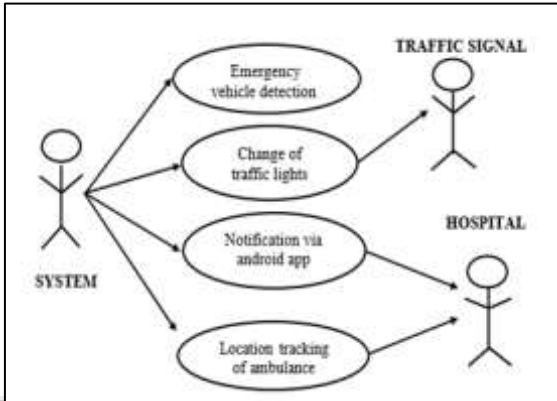


Fig. 3: Use Case diagram

V. RESULTS

The actual view of the entire functioning module is shown in Figure 4. The following implementation is done on a typical two directional double lane road, the reason for this road to be chosen is because most of the traffic congestion happens on such roads. If there is more vehicular traffic congestion, the chances of emergency vehicles i.e, like ambulance, fire extinguishing engines and very important persons vehicles may get stuck in traffic for longer time.

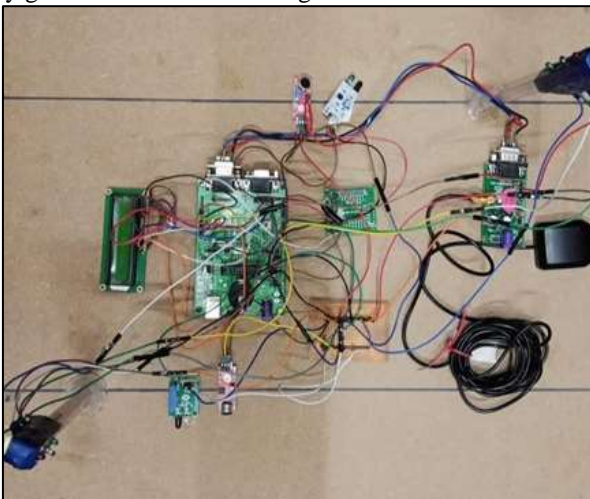


Fig. 4: Project Model

The implementation of our project will provide high priority to the pre-defined emergency vehicles over the other normal vehicles. This is done by providing the main signal with a facility to prioritize the path or direction where the emergency vehicles are approaching and thus making the

respective path green and others red. This will allow the vehicle to pass through the traffic without any problems.

The power supply to the microcontroller is given by using a step-down transformer to convert 230V AC to 5V AC and the full wave rectifier converts the voltage to 5V DC. Further it is given as input to a voltage regulator which produces the +5V DC required by the microcontroller. The SIM28 GPS module requires 12V DC and 1 Amp which is supplied using an adaptor. The data line pins of LCD display are connected to pin numbers P1.20, P1.21, P1.22 and P1.23 of ARM respectively where project output is seen.

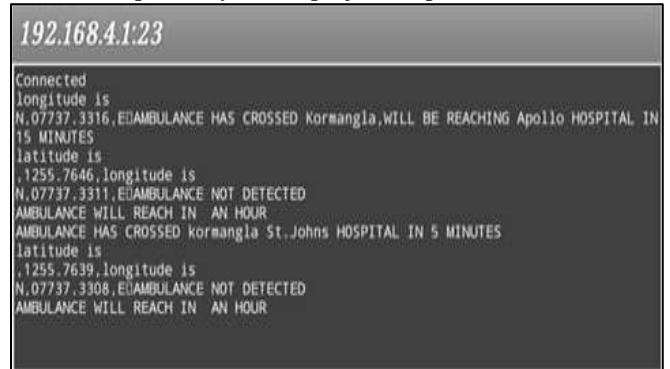


Fig. 5: Notification sent to nearest Hospital

VI. CONCLUSION

The implementation of this project on practical basis can tremendously reduce most of the traffic issues and also the objective of this implementation is fulfilled i.e, to safeguard the life of victims. The main aim of the project is to identify the emergency vehicles in traffic signals and to prioritize them to have an easy flow in the traffic. Now-a-days due to high vehicular density, there is congestion and heavy traffic jams occurring in major part of the cities. Hence, it's too difficult to drive emergency vehicles like ambulance, fire extinguishing engines and very important person's vehicles in metro cities, and it deters the complete facility of emergency vehicles to reach the victimized people. Any delay in its service is unacceptable. To cross one signal to another it takes more than 5 minutes, so there may be chances of the patient's or a victim who has met with an accident to death or even loss of private and public property in case of any firebreak out. To overcome these problems, we implemented this project using the sensors, processor and GPS thus increasing the efficiency of the existing system. The basic idea of using a LED and LCD module and its implementation on a micro controller LPC2148 is to control the traffic light. This system thus enables the easy passage of emergency vehicles even if the traffic congestion rate is high.

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