Traffic Controlling System for Emergency Vehicle Using IoT Technology

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ABSTRACT

Now a day's traffic is increasing day by day in meteropolitian cities and in this case, though lot of measures taken we are not able to control traffic in effective manner. In this work, an embedded based traffic light controlling hard ware device is proposed and implemented to clear traffic congestion and pave way to emergency vehicle. The proposed device will detect the sound using sound sensor which has ability to detect sound from 3KHZ to 6KHZ and density of vehicle using IR sensor that emits infrared radiation for 300 GHZ to 400 GHZ on roads, it measures the density of vehicle and dynamically switches the traffic lights. During emergency cases, emergency vehicle like ambulance is detected using sound sensor and it triggers the traffic light signal to change from red to green in order to make clearance for its path automatically. Here priority is given to that lane and traffic lights are switched automatically. If suppose there is no arrival of emergency vehicle then the priority is given based on density of vehicle on the lanes. The data of traffic in all lanes of city is stored in cloud which has accurate date time and density in lanes using these data we can monitor traffic in busy hours. This paves the way for smart city by making clearance path for emergency vehicle and reducing vehicle clumsiness in the cities.

Keywords : Cloud Technology, Embedded Systems, IoT, Raspberry, Smart Vehicle

I. INTRODUCTION

Now a day's Traffic becomes the major problem in the metropolitan cities in which it results in the lots of issues. Even though there are a lot of traffic controlling measures we can't able to engage the traffic in an effective manner. Such Traffic results in Wasting of time, it causes many kinds of detrimental impacts on the environment and health, the main hazards are climate change, deterioration of air quality and noise, Roads and parking take a great deal of space. This has a profound effect on cities, from

increased air pollution and carbon dioxide levels, additional wear on vehicles and roads as well as social/psychological impacts such as increased anxiety, stress and road rage.

Currently the traffic is controlled by Timing based. Now, Traffic controlling is done by using timer in which a particular time is allotted for the entire path. For example, if we programmed 60 seconds for all the paths then the green signal timing for the particular path is 60 seconds. Hence it remains constant for the entire path without measuring the density of the traffic. Such can be attained through the entire section and so it has even timing for all the paths. In this proposed model, we can clear the traffic on the density basis. Hence the Traffic got cleared through the method of extending the Green signal timing in which there is no clumsiness due to the dynamic change in the signal. It has an additional feature of detecting the emergency vehicle and give preference to the emergency vehicles.

II. OBJECTIVE

Goal of our project is to design a system which clears the traffic on density basis. To implement the method of extension of green signal timing in which there is no clumsiness due to the dynamic change in the signal.To detect the emergency vehicle using sound detection sensor.To give way for the emergency vechilces by dynamically changing the signal. To store the database into the cloud of the emergency vehicles that are crossing the particular path.

III. LITERATURE SURVEY

3.1 INTELLIGENT TRAFFIC CONTROL SYSTEM FOR EMERGENCY VEHICLE USING TECHNOLOGY.

M. S. D. Sai Varma, P. Prabhu Suneel,G.SivaReddy, N.VeerendraKumar,M.Baji Babu[2020] proposed an

idea about - Road traffic congestion becomes a major issue for highly crowded cities. Emergency service vehicles (like: Ambulance, Fire truck) are one of the major services which gets affected by traffic congestion. To smoothen the movement of these vehicles we have come up with the solution of "Intelligent Traffic Control System for Emergency Vehicles". Here the traffic lights and the emergency vehicles are connected wirelessly by RFID (Radio Frequency Identification) technology which has the range of 10 meter and we can increase the range by using other wireless technology like Zigbee. The basic idea behind the proposed system is, if any emergency vehicles halts on the way due to heavy traffic congestion, RFID installed at the traffic signal (Receiver) detects the RFID tagged vehicle (Transmitter) and sends the data to the Arduino Uno microcontroller (ATmega 328P). The controller IC used here operates the traffic light according to the received data from receiver. Then the particular signal is made Green for some time, till the vehicle passes by the signal and it regains back to its original flow of signalling sequence. This system sends commands to microcontroller for controlling the traffic lights and reduce delay time in emergency periods.

3.2 DESIGN OF INTELLIGENT TRAFFIC LIGHT CONTROLLER USING EMBEDDED SYSTEM

Shilpa S. Chavan, Dr. R. S. Deshpande & J. G. Rana (2009) proposed an idea about- The major goal of the project is to make traffic management system work dynamically using Internet of Things, Infrared sensor and Image Processing in order to make traffic system work efficiently. Traffic management automation systems in the market aims to computerize the traffic lights, operates on a periodic schedule to control the light (red/yellow/green) uses various technologies like GSM, NFC focuses on the basic operation of an electrical switch. Our project plan to provide a automated IR-sense based solution that makes traffic signals to shift the lights (red/yellow/green)

dynamically. We plan on implementing the project for one junction "Proof-of-Concept" for this paper, which includes traffic lights, IR-sensors, Wi-Fi transmitter and Raspberry Pi microcontroller. The sensed data gathered from IR sensor is transmitted by the Wi- Fi transmitter which is received by the raspberry-pi controller.

3.3 SMART TRAFFIC LIGHT CONTROL SYSTEM

Nicole Diaz, Juan Nicola, [2018] proposed an idea about -Describes the design and implementation of an autonomous traffic light system, with traffic-based timing for improving traffic flow efficiency in urban roads. The importance of changing light timing lengths of current traffic lights to timing lengths that vary depending on the number of vehicles in the avenues, and of how the proposed smart traffic light system would help to constantly update these times of automatic way is presented. To achieve this, an IoT system based on the Raspberry Pi platform and PIR sensor will be designed, with expandability in mind, as the design for implementing camera-related functions will be layed out.

3.4 LOW COST TRAFFIC CONTROL SYSTEM FOR EMERGENCY VEHICLES USING ZIGBEE

M.E.Harikumar, M.Reguram, Prathyush Nayar [2018] proposed an idea about-The proposed system is for emergency vehicles, which are in lane filed with traffic. By using ZigBee, a protocol is developed for vehicle-to-vehicle communication to inform the presence of the Ambulance (or other emergency vehicles) to vehicles in lane and finally to traffic lamppost. The proposed system will provide solution for the problem of ambulance clearing the lane due to traffic at critical situation. The main problem in today's scenario is increasing traffic congestion due to many reasons and always it is critical to handle during most emergency conditions. Therefore, we are defining a communication protocol between vehicles

to interact with traffic control unit so that the ambulance entering lanes gets cleared.

IV. PROPOSED SYSTEM

BLOCK DIAGRAM
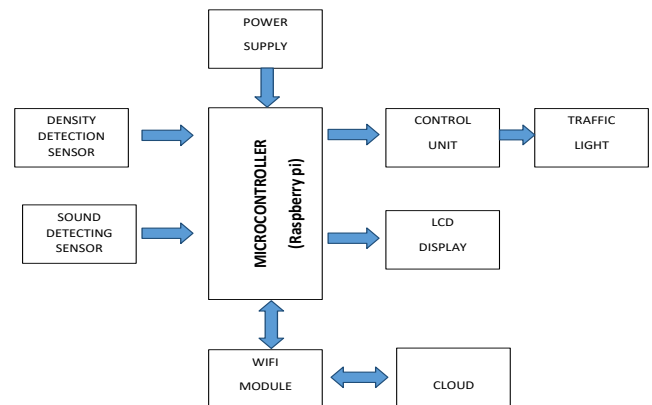
5. SOFTWARE REQUIREMENTS

- CODING
- NODEMCU
- RASPBERRY PI

V. RESULT AND DISCUSSION

The NOOBS OS is booted in the raspberry pi and the sensors (IR sensor and sound detection sensor) are connected to the microcontroller. These sensors are used to detect the sound and density of the emergency vehicle. The WIFI module which is inbuilt in the raspberry pi is used to store data in the cloud by using these data the LCD displays the output graphically. The control unit controls the switching of traffic lights.

VI. CONCLUSION AND FUTURE WORK

Thus, the proposed system was quite easy to adapt and it had framed by using the important feature to give extension in the green signal timing and giving the way for emergency vehicles. By which there is no any other illusion in controlling the system because the programming language is higher so the working of the system can be made easier. Hence the allocation time is varying so that the project can sustain easily and it can easily adaptable by the vehicle users. Emergency vehicles also get huge advantage in implementation of this project.

In future, we have an idea to store the data by using Cloud Computing technology. The data that are collected through the cloud computing technology is in which path the vehicle travelling the most and the details of the emergency vehicle which are crossing on that particular path.

Such technique got implemented through the various Cloud Technologies. So that we can have a detailed description of the emergency vehicle, and the path which get lots of traffic density in a particular time. This may pave the way for a Smart city and along with the development of our Country.

VII. REFERENCES

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