

Exploration of IoT based Intelligent Traffic Management System

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Abstract : Traffic is the major problem in so many cities of India and there are so many countries facing the same problem now a days . the problem of the traffic is the failure of the signal lights and the bad traffic management has to lead to traffic congestion .And how it is the high time to manage the traffic congestion problem . with the various methods we can control the traffic management system and there are wireless sensor network and inductive loop detection and video data and analysis and sensors and there are many more like these etc. but there is the only problem with this that was the it occurs too much of cost and it takes so much of time and the maintenance of the system is also very high rated .

A better result in the short period of time itself to overcome from these challenges a new method raises called Radio frequency . Identification (RFID). After applying this we can expect that traffic will become less and the traffic will be monitored and management.

Keywords: traffic management, smart area traffic density, vehicle ID

I. Introduction:

In order to avoid the accident sand environment pollution, etc .Internet of Things is appears to be a new trend setter for intelligent traffic management due to advancement of data communication through internet, cloud utilization using various machine learning methodologies.

It will reduce the traffic tensions for civilians such as vehicle drivers , elderly peoples, ambulance , and shipping services.

This is the kind of intelligent traffic management system based on the IOT leads that to smart city management in the future.

It includes an effective traffic information acquisition, suitable processing, analyzing various conditions and the categories of bulk traffic information in the crowded areas which takes to modern traffic management.

II. LITERATURE SURVEY:

Intelligent traffic management:

IOT based intelligent traffic management system is divided into three types those are traffic monitoring, pedestrian crossing, emergency clearance.

Traffic monitoring:

Traffic monitoring is one of the major factors in intelligent traffic system . It deals with vehicle to vehicle communication and vehicle to the various infrastructure communications for enhancing the availability of roadways those will needs major financial budget from the government to construct and maintenance

An IOT based intelligent traffic congestion control system for road crossing is to reduce the urban areas road congestions. Architecture has two modules

1.)Traffic Density Monitoring Module (TDMIM)

2.) Traffic Management Module(TMM)

The main work of the traffic management module the set of the traffic signal timings based on the traffic destiny measured during to the traffic destiny monitoring module

Pedestrian crossing:

One of the major considerations on the intelligent system is efficient pedestrian crossing monitoring in order to decrease hectic traffic issues in urban areas and to support the elderly peoples to walk without depending on others

to cross the major roads. There are some of the several researchers to come forward to implement the efficient pedestrian crossing management using IOT support

An pedestrian safe smart crossing system based on IOT with object tracking for safe pedestrian crossing over roads based on IOT with object tracking for the safe pedestrian crossing over roads. The architecture is built on three different major modules.

- 1.) Preventing
- 2) Detecting
- 3) Recusing pedestrian

It includes the various sensors and CCTV for effective identification of the pedestrian crossings and initiates the system to stop vehicle for few seconds until the civilians crossed the pathway. The algorithm worked on principle of background subtraction and if the resulted image is beyond the threshold, it initiates the system to take further action for the smooth pedestrian crossing .

Emergency clearance:

Life is very important in this world. Saving a life is equivalent to god's work. It is really a challenge for emergency vehicles like ambulance to cross the hectic traffic to reach the hospital to save life of the patient in the crowded urban areas. This leads to pave optimized way to the ambulance during the emergency situations in the traffic areas.

Usha .N S et al was proposed a research article titled and make a way for ambulance using IoT to provide an appropriate way of the making path to emergency vehicles to pass through the crowded traffic. The system uses GPS module to monitor the ambulance arrival and use of sound sensor to find out the frequency of ambulance siren. These modules are connected to the mode MUC for making adjustment in the traffic light to make ambulance to pass the crowded traffic.

III. Proposed System:

Technologies to Implement ITMS:

The direct communication between vehicles is using an Ad Hoc network is compared to as inter-vehicle communication (IVC) communication types. Vehicle-to-Vehicle communication that will allow vehicles to exchange messages between them on the road. Vehicles can communicate with infrastructure deployed alongside the roads using Vehicle-to-Infrastructure communication. Each vehicle has Onboard Unit that similar to the vehicle computer with extra features allowing the services and layers of VANET. The infrastructure is a network of Roadside Units that is installed on the roadside.

The next generation of the VANET is referred as the Internet of Vehicles that will extends the functionality of VANET and inherits some many features of the Internet of Things . IOV involves Vehicle-to-Pedestrian, allowing the communication with vulnerable road users ,Vehicle-to-Sensor, on the inside of the vehicle ,Vehicle-to-Home, of the owner of the vehicle, Vehicle-to-Building, the surrounding buildings in the smart city. Vehicle-to-Grid, for electric charging, Vehicle-to-Device, for all the onboard devices, and Vehicle-to-Road signs.

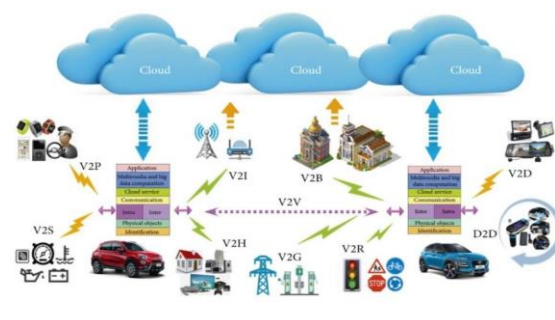


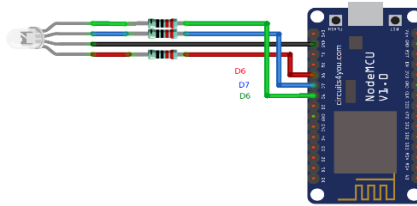
Figure 1: vanet diagram.

IV. Design and development:

In method of collecting data for this project and I have refer so many sites to work on it . most of the information I have got it from articles and some of the web sites in chrome and journals about the topic of intelligent traffic management system.

Hardware parts of intelligent traffic management system :

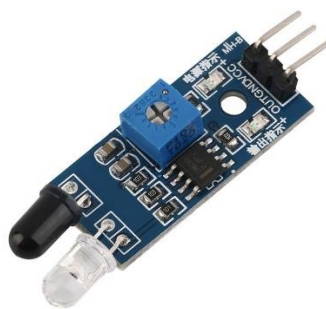
1. RGB LED:



2. USB CAMERA:



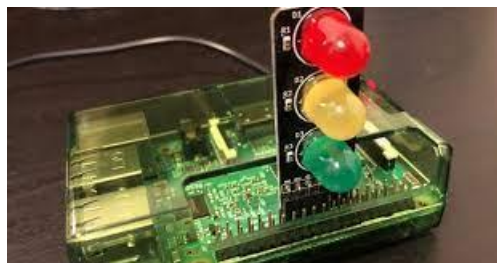
3. IR SENSOR :



4. RASPBERRY PI 3 B+:



5. Traffic light LED with circuit:



V. IMPLEMENTATION TECHNIQUES :

After gathering all the information and main parts for the traffic signal management system here are three components: traffic lights, queue detectors buried in the road and/or cameras, and a central control system. Main components in traffic management system :



Figure 1: traffic signals

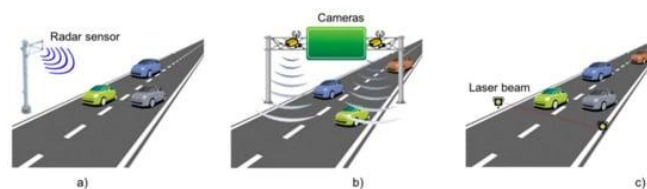


Figure 2 : Queue detectors buried cameras:

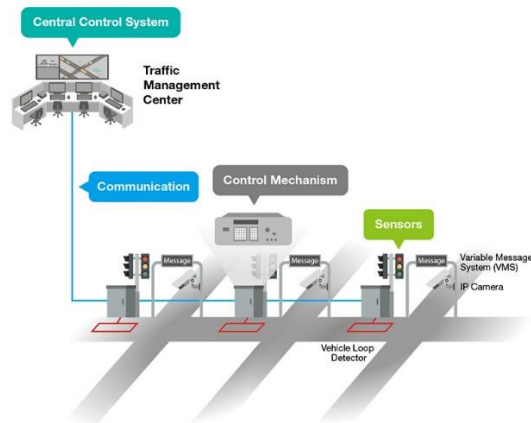


Figure 3: Center control system :

The implementation of the project intelligence traffic management system is the by connecting the raspberry pi 3 B+ and ir sensor an then it start working.

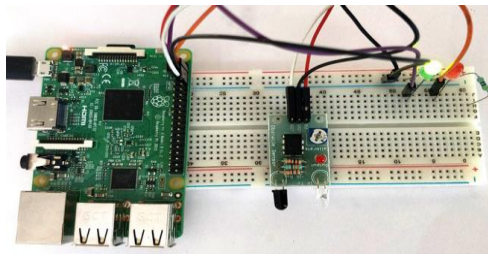


Figure 4: RASPBERRY PI 3 B+ and IR sensor

This the connecting image of those both and then when we add the RGB LED to those both and the it works as shown in the figure :



Figure 5: RASPBERRY PI 3 B+ and trafficligh LED with circuit.

And then it get started working and it gets started working as per our given instructions and if we attaches the USB camera to those and then it captures the picture of any vehicle while crossing the signal when it says to stop as per shown in the picture



Figure 6: pic from the traffic signal camera.

And then this the over view of the intelligent traffic management system



Figure 7 : over view of the intelligent traffic management system

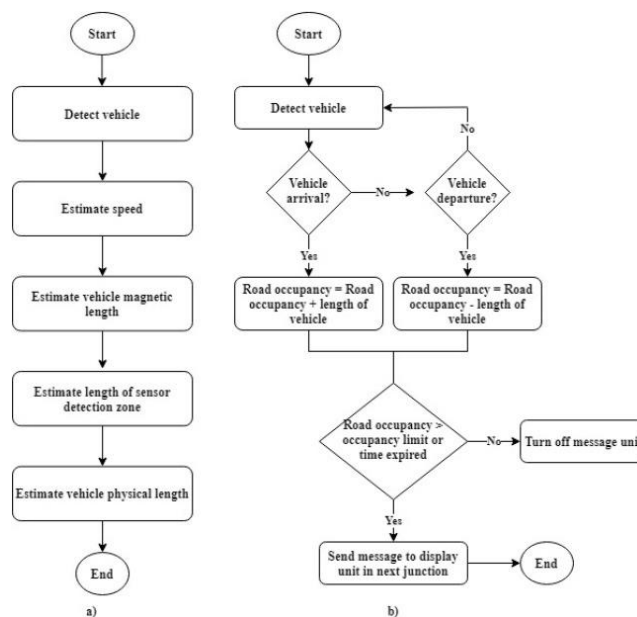


Figure 8 : flow chart

Raspberry pi is used to program with python codes where it is inter connected it sends the data collected and display the output using GUI by pushed the button on it. We should wright a program some of its the library by gathering firstly and organizing data to work with and build secondly and test a predictive model. And at last we use the model to capture and recognize images which we come across the basic things that are around us connecting a camera before of the stick.

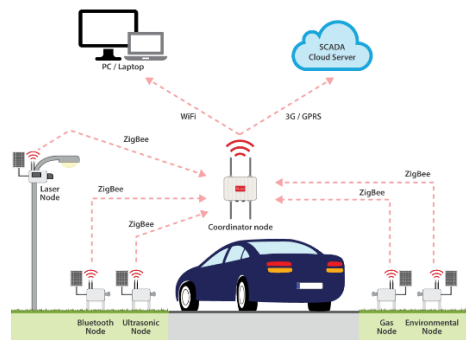


Figure 9: Intelligent traffic management signal monitoring system using vehicles counts.

Results:

This research of this project we have tested everything that we used in the project we have firstly checked the raspberry pi and IR sensor and then it is working and then we checked RGB led and USB camera by attaching them and it worked properly .

And in this intelligent traffic management system we have been used python programming language .we have tested on camera and it took photograph of the man and over speed when they don't follow the rules and then buy using the WIFI signals of the poll it send the picture to the control room and then the worker who are working there they will send them the picture and ask to pay fine . these is how the we tested the camera and every thing.

Conclusion:

Hence, the project named as the intelligent traffic management system and it has been successful and we have tested everything and the sensors are also working great. And the main process of the project that intelligent traffic management system and how it work means if any one crossing the signal rashly and or going very speed or any one crossing the on the zebra lines when it is in green light then and there only the camera it will take a photograph and sends to the control room and sensors also will make one sound right there . it is very useful to keep those in and near traffic signals .

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