Design and Development of Intelligent Traffic Control System using RFID and Raspberry pi3.

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*Abstract— **Vehicular activity control at street intersections has dependably involved worry for organizations in numerous present day urban communities around the globe. It is regularly found in the present mechanized activity control frameworks that vehicles need to hold up at a street crossing despite the fact that there is practically no movement the other way. Clog is frequently converted into lost time, missed open doors, and conveyance delays. To beat these issues, in this system, we propose another technique called clever movement control framework (ITCS) utilizing radio frequency Identification (RFID). The ITCS is included RFID per users and a Central computer system (CCS) to control them. The CCS thus contains a central database preparing framework for handling vehicular information and a Decision making system for controlling the activity signals. This technique encourages following of stolen vehicles or vehicles reserved for offenses alongside their opportunity and heading of travel. Allocating differential needs to vehicles encourages effective control of movement. As the framework is completely robotized, it spares expensive steady human inclusion.***

Index Terms—Passive RFID Tag, RFID Reader, Raspberry pi3 and USB-TTL Convertor (Prolific)

I. INTRODUCTION.

Traffic lights play an important role in traffic management. Traffic lights are the signaling devices that are placed on the intersection points and used to control the flow of traffic on the road. The Traffic congestion problem has nowadays become a major problem in the cities area like Mumbai, Delhi etc. To overcome this situation we have proposed the methodology of Design and Development of Intelligent Traffic Control System in our system the management of the traffic is fast and efficient as the tracking of the vehicle is also done and all the details of the vehicle is passed to the database containing the information of the vehicle. The all the management of traffic is done with the help of RFID Tag and the Raspberry pi 3.

II. DETAILS PROBLEM DEFINITION.

The Traffic Congestion is the main problem in the cities areas and the system was proposed in the year 2015 in the paper "Design and Implementation of a Dynamic Intelligent Traffic Control System". In this paper they used the IR Sensor for the management of the traffic but the problem was the sensor was unable to count the some vehicle due to which sometimes the management of traffic was not proper. To beat this issue we have introduce our system to overcome this situation by the use of the RFID Tag and the Raspberry pi 3. The ITCS was also proposed in the another paper which make the use of the Zigbee and the RFID Tag but the transmission of the data was slow of the Zigbee so the data transmission took most time in sending the data. In the prior undertaking there was a same model with the RFID Tag/Reader and Zigbee however the issue is that the Zigbee information rate is little when contrasted with the Wi-Fi module and the distinguishing proof of the unique vehicle was not there and furthermore to discover the stolen vehicle was absent. The prior undertaking was having many burdens like Firstly, having sensors on every one of the streets is exorbitant particularly when we are mulling over a monetarily poor nation like India. Besides, correspondence in remote sensor organize is as yet an exploration field and the information trade between sensors is not solid. At last, the sensors should be hearty so as to make due in Indian climate. In, movement light control utilizing picture handling was proposed. This framework utilized pictures to distinguish the vehicles. The picture succession caught by the camera is examined

utilizing computerized picture preparing for vehicle location, and as indicated by activity conditions out and about movement light is controlled. This framework demonstrated that picture preparing is a superior procedure to control the state change of the movement light and it is likewise more predictable in distinguishing the nearness of the vehicle as it utilizes genuine activity pictures than those frameworks that utilized sensors. In any case, there are numerous disadvantages, for example, establishment issues and cost. Besides, distinguishing blockage requires canny picture handling methods which thus requires talented staff with sufficient programming foundation. What's more, more essentially amid awful climate conditions because of wind, rain, haze and so on the pictures caught by the camera is twisted by commotion and it ends up noticeably troublesome for the framework to distinguish the vehicles. Thus, it can't give 24X7X365 days observation.

III. LITERATURE SURVEY.

Traffic congestion is a major problem in cities of developing Countries like India. Growth in urban population and the middle-class segment contribute significantly to the rising number of vehicles in the cities. Congestion on roads eventually results in slow moving traffic, which increases the time of travel, thus stands-out as one of the major issues in metropolitan cities. In, green wave system which was used to provide clearance to any emergency vehicle by turning all the red lights to green on the path of the emergency vehicle hence is providing a complete green wave to the desired vehicle. A 'green wave' is the synchronization of the green phase of traffic signals. With a 'green wave' setup, a vehicle passing through a green signal will continue to receive green signals as it travels down the road. In addition to the green wave path, the system will track a stolen vehicle when it passes through a traffic light.

The advantage of the system is that it can control the traffic over multiple intersections but it has few drawbacks. Firstly, having sensors on all the roads is very costly especially when we are taking into consideration an economically poor country like India. Secondly, communication in wireless sensor network is still a research field and the data exchange between sensors is not reliable. Finally, the sensors need to be robust in order to survive in Indian weather.

In traffic light control using image processing was proposed. This system used images to detect the vehicles. The image sequence captured by the camera is analyzed using digital image processing for vehicle detection, and according to traffic conditions on the road traffic light is controlled. This system showed that image processing is a better technique to control the state change of the traffic light and it is also more consistent in detecting the presence of the vehicle as it uses actual traffic images than those systems that used sensors. But there are many drawbacks such as installation problems and cost. Secondly, detecting congestion requires an intelligent image processing technique which in turn requires skilled personnel with adequate software background. And more importantly during bad weather conditions due to wind, rain, fog etc. the images captured by the camera is distorted by noise and it becomes difficult for the system to identify the vehicles. Hence, it can't provide 24x7x365 days surveillance.

In it proposed a RFID and GPS based automatic lane clearance system for traffic. The main focus of this project was to clear the lane in which the traffic is travelling by communicating wirelessly with the nearest traffic signal, so that the green light is turned ON and hence the traffic is cleared. The communication between the ambulance and the traffic light controller is done using transceivers and GPS. Here, the use of Raspberry-pi in the traffic distinguishes between the emergency and non-emergency cases. The system is fully automated and can be implemented for the ambulances in service of hospitals that it can't be implemented for Government ambulances because the system needs all the information about the starting point and the end point of the travel.

IV. SYSTEM DESIGN AND ARCHITECTURE.

The architecture and the design of the system is very simple as compared to the other system and the implementation of this system is also very efficient and the installation cost is also low. From the present issue area, it can be seen that, current advancements are inadequate to deal with the issues of clog control, crisis vehicle leeway, stolen vehicle recognition, and so on. To take care of these issues, we propose to execute our Intelligent Traffic Control System. It predominantly comprises of three sections. Initial segment contains programmed flag control framework. Here, every vehicle is outfitted with a RFID tag. When it comes in the scope of RFID per user, it will send the flag to the RFID per user. The RFID per user will track what number of vehicles have gone through for a particular period and decides the blockage volume. Likewise, it sets the green light term for that way. Second part is for the crisis vehicle freedom. Here, every crisis vehicle contains button and the Wi-Fi module will be executed at the movement intersection. The framework will be exchanged ON when the vehicle is utilized for crisis reason. This will send the flag through the Wi-Fi module to the activity controller. It will roll out the activity light to improvement to green. Once the emergency vehicle goes

through, the beneficiary never again gets the flag and the movement light is swung to red. The third part is in charge of stolen vehicle location. Here, when the RFID per user peruses the RFID tag, it looks at it to the rundown of stolen RFIDs.
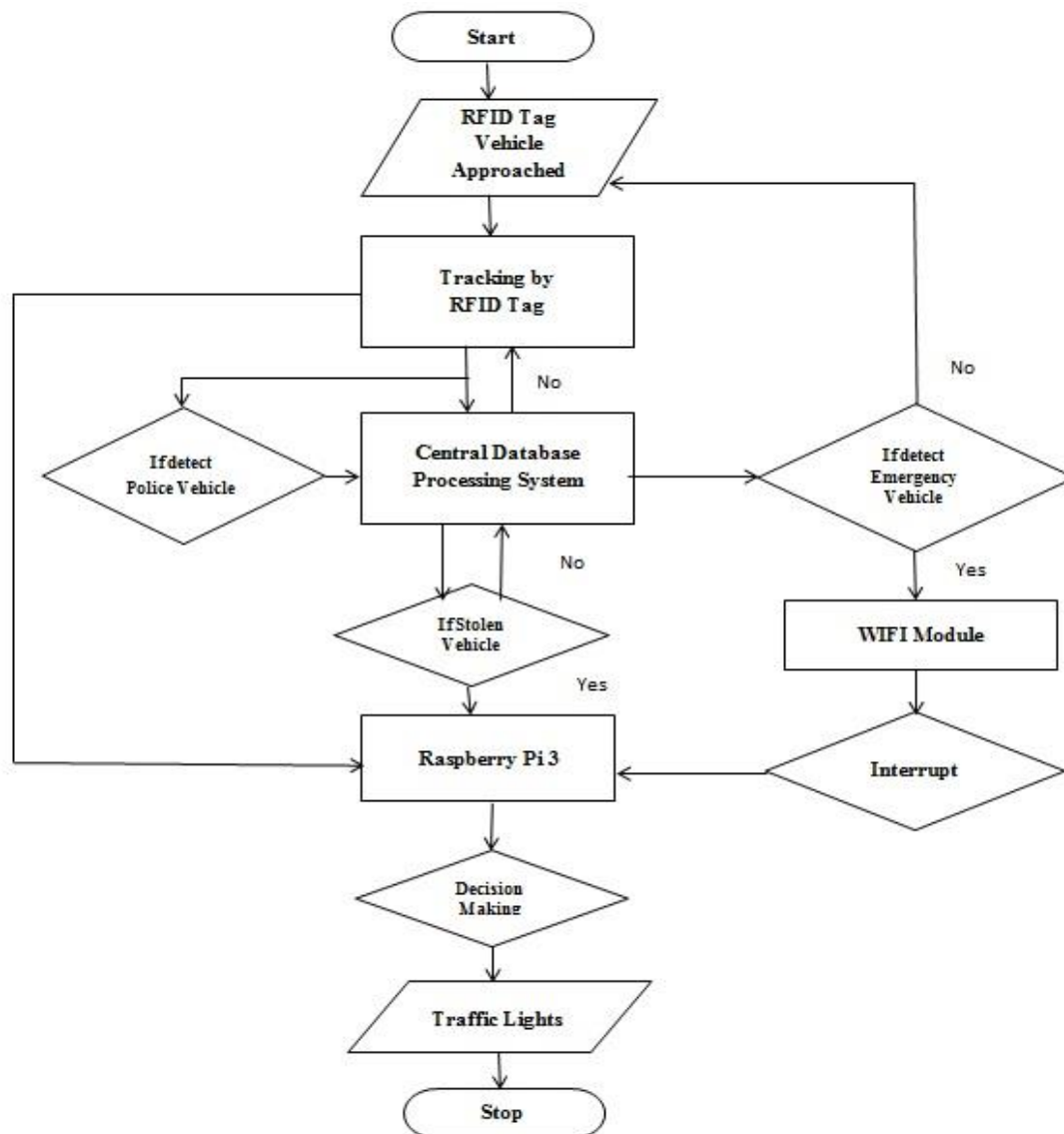

Figure 1. Flowchart of ITCS

The RFID tag is placed in all the vehicle and the RFID Detector is placed at all the lane and whenever the vehicle pass through the lane Wi-Fi module interact with the RFID Tag and sends the data through the module of each an individual vehicle. The tracked RFID or the cloud database can be managed by the CCS or CDPS. The traffic density is measured through the RFID Tag and the management of the vehicle is done with the help of the RFID. The decision making algorithm take the decision according to the density of the vehicle and the Raspberry pi 3 manages the traffic lights and the continuous monitoring of the traffic lights is done by the Raspberry pi 3.

A. Advantages.

1. Reduce Traffic

   The movement administration will be as indicated by the activity in the path if more number of activity are there in one path then it will clear that first and the choice will be appointed for the movement to finish that first then the following choice is taken by the movement.

2. Find the stolen vehicle

Each vehicle consist of a RFID tag this tag has a unique code to each RFID and whenever the vehicle is lost the complaint is done and the RFID reader matches that unique code with the complaint database and when the match is found the local police informed through the SMS of that code.

3. Emergency vehicle clearance

The crisis vehicle is furnished with the button at whatever point there is activity in the way of the movement the client utilizes the versatile application for the exchanging of the movement and the way of it get cleared for the 20 sec. With the goal that it can drive effortlessly in the course to achieve goal on time.

4. Identification of special vehicle by Geo-Location

The unique vehicle are furnished with the GPS for their recognizable proof whenever the vehicle found. This vehicle can be distinguished by the area to keep track just sitting at one place and watching the screen.

5. Fuel Consumption Fuel Consumption

Vehicle fuel utilization speaks to a noteworthy working cost, and is unequivocally impacted by street and activity conditions.

6. Reduce the time standing in traffic

Because of more activity there is a considerable measure of time squander in remaining in the movement and this will diminish the activity time.

B. **Applications**

1. Safety management

The decrease in activity will prompt the wellbeing of individuals and the crisis vehicle like rescue vehicle can likewise reach on time.

2. Traffic flow control

The management of the traffic system will be easy to handle and the traffic will be ultimately gets reduce.

3. Parking Validation access control

The RFID tag can be useful for the recognizable proof of vehicle in the stopping path.

4. Heavy equipment traffic organization

The obligation of the activity director will get lessen and the heap of their work will be simple and would have the capacity to work in proficient way.

V. Results and Discussion.

The flow of the traffic lights is based on the raspberry pi3 which handles the management of the traffic based on the density of the traffic towards the signals. The count of the vehicle is counted in the flow of the signals and according to the count based system the flow of the traffic lights are managed. If the count of the signals 1 is more than the count in the signal 2 the signal 1 is given the green signals and the signal 2 is red according to the density of the vehicle the system is very efficient as it does not waste the time spent in standing the lane. The consumption of the fuel is also decreased by this system the RFID used in the system is also a better opportunity towards the prevention of the vehicle the system manages the database in which user can see his/her vehicle in the real-time from it has been passed and at what date and time. The management of the vehicle will become more efficient by the use of this system. The outcomes of the project is as follows:

✓ Helps in management of the traffic system.

✓ Prevention of the vehicle (i.e. Theft Detection).
✓ Ambulance lane clearance in efficient way.
✓ Status of the traffic on the road in real-time, etc.

The inputs to the system is the RFID Tag and the Reader sense the tag and transmits to the receiver ends and the tag number gets stored in the database according to the signal_id the user details according to the RFID number given is stored every time the user passes the signals, in 37 case when the ambulance approach towards the signals it transmits the data to the another signal containing the ambulance RFID no and the lane for the ambulance is kept open until the it passes the signals.

Figure 2. Prototype of Project

VI. CONCLUSION.

From this system we will be able to control the traffic in the cities. Able to calculate densities of vehicles. System intelligently changes its ON/OFF time according to traffic density. Automatically clear the road for emergency vehicles. If any theft vehicle is detected from its RFID tag then system will send the message to the police control vehicle.

FUTURE SCOPE.

Some additional features can be incorporated into the system. The use of the drone can be helpful for the faster transportation. The drone can work on the electricity and the speed is good enough which can be helpful to us. The use of the drone technology can be used to the transportation. The another work which can be implemented in the project is that we can use the RFID to the toll naka for the deduction of the money the user sitting at the location when crosses the toll the money is deducted from his bank account as the bank account is linked with their details whenever there is detection of money the OTP is prompted to the mobile the user has to provide that OTP for the faster payment of the money. And the management of the traffic can be done in an easy way and also reducing a paper work.

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