Project

on

SMART TAFFIC MANAGEMENT SYSTEM

Submitted in partial fulfillment of the
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Under The Supervision of
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I/We hereby certify that the work which is being presented in the project, entitled **"SMART TRAFFIC MANAGEMENT SYSTEM"** in partial fulfillment of the requirements for the award of the **BACHELOR OF TECHNOLOGY IN COMPUTER SCIENCE AND ENGINEERING** submitted in the School of Computing Science and Engineering of Galgotias University, Greater Noida, is an original work carried out during the period of **JULY-2021** to **DECEMBER-2021**, under the supervision of **Mr Himanshu Sharma Assitant Professor, Department of Computer Science and Engineering**,of School of Computing Science and Engineering , Galgotias University, Greater Noida

The matter presented in the thesis/project/dissertation has not been submitted by me/us for the award of any other degree of this or any other places.

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This is to certify that the above statement made by the candidates is correct to the best of my knowledge.

Supervisor

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CERTIFICATE

The Final Thesis/Project/ Dissertation Viva-Voce examination of ANJALI MISHRA -19SCSE1010230 , VAIBHAV KUMAR - 19SCSE1130005 has been held on _____ and his/her work is recommended for the award of Bachelor Of Computer Science and Engineering.

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Signature of Project Coordinator **Signature of Dean**

Date: DECEMBER, 2021

Place: Greater Noida

ABSTRACT

Traffic congestion may be a major downside in several cities of Asian nation along side different countries. Failure of signals, law social control and dangerous traffic management has cause traffic congestion. one in every of the key issues with Indian cities is that the prevailing infrastructure can not be distended more, and so the sole possibility offered is best management of the traffic. holdup incorporates a negative impact on economy, the atmosphere and also the overall quality of life. thence it's time to effectively manage the traffic congestion problem. There are numerous ways available for traffic management similar to video knowledge analysis, infrared devices, inductive loop detection, wireless sensor network, etcetera of these ways are effective methods of good traffic management. however the matter with these systems is that the installation time, the price incurred for the installation and maintenance of the system is extremely high. thence a replacement technology known as frequency Identification (RFID) is introduced which may be as well as the prevailing signal system that may act as a key to smart traffic management in real time. This new technology which will need less time for installation with lesser prices as compared to different methods of holdup management. Use of this new technology can cause reduced traffic congestion. Bottlenecks are going to be detected early and thence early preventive measures may be taken so saving time and cash of the driver.

Keywords :
RFID, GSM, Traffic congestion.

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Acronyms

RFID	Radio Frequency Identification
iSMART	Smart Traffic Management System
POC	Proof of Concept
IOT	Internet Of Things
RSA	Road Side Assitant
ETC	Electronic Toll Collection

CHAPTER-1

INTRODUCTION

Traffic congestion on road networks is nothing however slower speeds, accumulated trip time and increased queuing of the vehicles. Once the quantity of vehicles exceeds the capability of the road, traffic congestion occurs. Within the metropolitan cities of Asian nation traffic congestion may be a major problem. Traffic jam is caused when the demand exceeds the obtainable road capacity. This is often referred to as saturation . Individual incidents similar to accidents or abrupt braking of a automotive in a very swish flow of significant traffic have moving ridge effects and cause traffic jams . There are even severe security issues in traffic system thanks to anti social parts that additionally ends up in stagnation of traffic at one place. In country like Asian nation, there's associate degree annual loss of Rs 60,000 crores thanks to congestion (including fuel wastage). Congestion in India has also crystal rectifier to slow speeds of freight vehicles, and accumulated waiting time at checkpoints and toll plazas . The typical speed of vehicles on key corridors like Mumbai-Chennai, Delhi-Chennai is a smaller amount than 20kmph, whereas it's mere 21.35kmph on Delhi-Mumbai stretch. As per the transport corporation of India and IIM, India’s freight volume is increasing annually at a rate of 9.08% which of vehicles at 10.76%, however that of road is barely by 4.01%. This has resulted in reduced road house in accordance with the quantity of total vehicles .The average fuel mileage in Asian nation is only 3.96kmpl. The main

reason for this is often traffic jam .India is that the second most inhabited country once China in Asia, so with increase in population, the number of vehicles additionally increase .The economic process has actually has had an impression on urban traffic. Because the financial gain rises, a lot of and more individuals begin to travel for cars instead of 2 wheelers .Hence there's a desire to manage traffic in a very good manner because the management of traffic with the traditional way similar to the communication system isn't having a significant result in kerb congestion of conveyance traffic.Traffic related issues are day by day increasing to significant extent. During peak hours, in metro cities travelling by road by own vehicles, easily takes around 1-hour time for a distance around 10 to 15 Km. Please refer figure 1 which has shown typical traffic jam situation during peak hours in small to large cities. Considering this, in an average, most office employees who travels by car for commute between office and home, with in 15 km distance, can spend almost 10 to 15 hours' time in a week, in travelling alone. Poor road infrastructure, inefficient traffic management, ineffective traffic rules and shortage of traffic control staff are some of the main reasons for traffic problems. Thus, efficient traffic management system for effective handling of traffic related issues is no longer desire but has become necessity now a days. In Smart Cities around the world, to deal with traffic issues, intelligent Traffic Management System is typically used. Intelligent Traffic Management System analyses the traffic flow in real time fashion and suggests drivers the most optimized route to reach to the destination. It also facilitates recording the traffic footage, informing the latest traffic incidents to relevant stakeholders, providing

traffic data for offline analysis, assisting in collecting toll taxes, Signal Controls, displaying signs, warnings and necessary messages at relevant spots across the roads and may other functionalities which can help all the travelers and traffic control staff The Smart Traffic Management System is a complex and comprehensive system to design, build and implement. There are varieties of Smart Traffic Management Systems in place from different organizations. The typical Smart Traffic Management System does not only help in controlling the vehicle traffic but also does variety of other jobs. Apart from traffic control and monitoring the other most important goal of Smart Traffic Management System is to provide safe and secure travel across roads and reduce risk for road stakeholders including drivers, cyclist, pedestrians, operators and vehicle occupants travelling along the roadways .

To ensure meeting this objective, the major activities carried out by Smart Traffic Management System includes following.

Incident Management
Road Side Assistance
Traffic Control and Monitoring
Emergency Management
Electronic Toll Collection
Crash Prevention and Safety

Route Optimization and traffic diversion information From the above listed bullet points it is very well cleared that the modern Smart Traffic Management Systems do variety of jobs including smart and effective traffic control and management. Please refer figure 2 which has shown some of the key infrastructural components of typical Smart Traffic

Management System. It should be noted that the IT Infrastructure for Smart Traffic Management System including Servers, Wi-Fi Routers, Ethernet Switch, Internet Cables, Display Screens, LED banners etc. can be part of existing IT infrastructure of the Smart City and can be used on sharable and configurable basis. This can further makes deploying and using Smart Traffic Management System convenient as well as Cost effective in most of the cases. However still it is complex task and requires human intervention and supervision on periodic basis. Let us briefly analyse the major activities carried out by the Smart Traffic Management Systems.

Incident Management

It takes care of incident identification, reporting and handling. Typically, the Cameras, Video Surveillance System and Traffic controllers keep watch on traffic movement and activities across roads. If any incident such as accident, fire, theft, natural disasters, traffic blockage, vehicle failure on roads, mob gathering, attacks, etc, happened anywhere across the roads then such incidents are recorded in the system and processed according to set rules and regulations as per traffic laws.

Road Side Assistance (RSA)

RSA involves assistance to vehicle drivers in rectifying the problems with the failed vehicles on roads as well as towing such vehicles away from the roads, in case required.

Traffic Control and Monitoring

This is one of the main important functions of Smart Traffic Management System where system ensures smooth traffic movement by effective controlling the traffic flows, avoiding of traffic congestion, controlling the traffic diversion and monitoring the traffic movement for needful analysis. Various Sensors, IT components and Control Servers plays an important role in carrying out this important function in collaborative manner.

Emergency Management

Any serious incidents which needs immediate attention of authorities falls under Emergency Management category. It can include emergency scenarios across roads such as fire, flood, incidents due to natural disasters, accidents involving heavy to very heavy vehicles etc. In such scenarios the Smart Traffic Management System immediately flashes the Emergency Situation message to all the stakeholders on the available communication medium including cell phones, display screens, LED Banners etc. Note that Emergency Management is very different from Incident Management and it is handled with highest attention and care

Electronic Toll Collection (ETC)

It typically includes automatic toll collection at toll gates without requiring the vehicles to stop. This is typically done via the chip enabled ETC Card which facilitates toll charges debit from ETC Card. The Smart Traffic Management System issues such cards to Vehicle owners/drivers after registeringthem with the system. It is like prepaid card and the card owner needs to charge the card periodically to

maintain enough balance. Note that vehicles which doesn't have ETC card can't use ETC facility and for such vehicles manual toll collection is required.

Crash Prevention and Safety

It facilitates detecting the road blockages and unsafe driving conditions and accordingly warns the travellers well ahead of time to avoid crashes. It provides prior alerts for traffic approaching dangerous turns, restricted overpasses, rail crossings, pools, off ramps. work zones etc and thus causes driver to take appropriate action. Many times, these warnings are provided through running sign boards, LED Banners, Displaying Messages over Display Screens and even through static boards. Using Sophisticated electronic systems and sensors made it possible of detecting presence of pedestrians, animals, bicyclists on the road well ahead of time.

Route Optimization and traffic diversion information

It includes activities related to alerting the vehicle drivers about traffic diversion in case of traffic diversion situation has arisen. The Alerts can be sent via mobile app, over loud speakers or through displaying messages over LED running board, Display screens etc. Through a dedicated mobile app (similar to Google map) and with assisted GPS and coordination with Traffic monitoring system it is also possible to update the driver over the best optimised route available to reach to the destination at given time.

CHAPTER - 2
LITERATURE SURVEY

Increased number of commercial vehicles as well as personal vehicles and limited road infrastructure has risen the traffic problems. In developing and developed countries dealing with traffic related issues on daily basis, has become very common. This ever-increasing traffic related concerns has triggered worldwide scientists, engineers and researchers to discover innovative techniques and solutions for effective and efficient traffic management specifically for today's Smart Cities. In this section, some related work is analyzed and reviewed for better understanding of existing solutions and technologies used in developing Smart Traffic Management Systems.

AI in Advanced Traffic Management System

A typical Traffic Management System controls the operation of Signal Indicators according to decided logic. However, in this paper authors have discussed the use of Artificial Intelligence in Traffic Management System covering the operations of the overall transportation system of surface streets, interstate highways, public transportation, and emergency vehicle response etc. Authors have claimed that Artificial Intelligence based Knowledge sources in the system addresses problems in traffic congestion, incident management, traffic control and monitoring. Authors feel that Artificial Intelligence based knowledge gathering exploit neural network representations, rules, script frames to solve individual traffic management Problem.Authors have also

successfully proved that the resulting traffic management decisions based on Artificial Intelligence are implemented and evaluated through simulations.

Advanced Traffic Management System Data

In this chapter, authors have presented a holistic view about Intelligent Traffic Management System and successfully clarified that the intelligent traffic management system in a whole consist of various subsystem components such as Incident management, Transit Management, Electronic Payment, Traveler Information, road infrastructure operations and maintenance, freeway management, emergency management, crash prevention and safety and road weather management. Authors have argued that for smooth functioning of intelligent management system, all these components should be in place and each subsystem cannot be deployed in standalone fashion while dealing with overall transportation system. Authors have also clarified that building a complete intelligent traffic management system requires time, money, institutional arrangements and lot of collaboration among stakeholders. All the integrated subsystem components then can result in synergistic effects. simulations.

Intelligent Traffic Information System Based on Integration of Internet of Things and Agent Technology

In this paper, author has presented traffic management and administration system based on IoT. Author has claimed that such system is better compare to the traditional traffic management system in terms of cost, upgradation, scalability

and compatibility. The proposed Traffic management system makes use of Internet, an active radio-frequency identification (RFID), object ad-hoc networking, wireless sensing and detection technologies to realize the intelligent recognition on the tagged traffic object, monitoring, tracking, managing and process automatically. Author has proposed the system architecture that integrates IoT with agent technology in single platform where the agent technology handles interfacing and communication among large number of heterogeneous, highly distributed and decentralized devices within the IoT. simulations.

Traffic Management for Smart Cities

Here authors suggested that traffic related large data is already available from various Sensors installed for road traffic observation. If this data is properly organized and processed it can provide various useful information to the road users such as travel time, real time traffic states, travel pattern dynamics and so on. Authors have claimed that by using proper data filtering, algorithms and modelling techniques the meaningful information for road users can be extracted and such data can also be used for wide area traffic control. Authors have also pointed out using the data for analysis which is shared among vehicles over link within cooperative systems. Such data analytics can help us deciding better traffic control strategies

Research on Urban Intelligent Traffic Monitoring System Based on Video Image Processing

In this paper, Author has proposed Video and Image processing technology for intelligent traffic monitoring system. The paper has described in detail the functional design of Smart Traffic Monitoring System with video image processing and database analysis. In this paper author has claimed that proposed video and image processing solution can provide intelligent analysis to the traditional traffic control system with the association of relevant data analytics. This can save lot of manual monitoring and control processing besides real time analysis can also offer very high efficiency. The proposed solution by Author, processes the image data of Vehicle License Plate with the help of high definition camera. The Author has proposed solution using the object recognition algorithm based on Haar features combined with AdaBoost classifier. Author feels that Training the classifier for vehicle detection by a large number of images at the car tail can achieve the rapid and effective identification of the front vehicle in the high-grade highway environment. The relevant image processing also considers the data analysis with respect to Vehicle speed, Vehicle body color etc. The combined results are stored and analyzed.

CHAPTER - 3

METHODOLOGYS

Inductive Loop Detection:

Inductive loop detection works on the principle that one or additional turns of insulated wire are placed in a very shallow cutout within the roadway, a lead in wire runs from margin pull box to the controller and to the electronic unit situated in the controller cabinet. Once a vehicle passes over the loop or stops, the induction of the wire is changed.

Because of change in induction, there's change in the frequency. This alteration in the frequency causes the electronic unit to send a symptom to the controller; indicating presence of the vehicle .Inductive loop detection is helpful in knowing the vehicle presence, passage, occupancy and even the quantity of vehicles passing through a specific space .

However there are few issues with this method. These embrace poor dependableness because of improper connections created within the pull boxes and due to application of sealing material over the cutout of the road. If this system is enforced in poor pavement or wherever excavation of the roads is frequent then the matter of reliability is aggravated.

Video Analysis:

Video analysis consists of a wise camera placed that consists of sensors, a process unit and a communication unit . The traffic is incessantly monitored employing a good camera. The video captured is then compressed so on cut back the transmission bandwidth. The video analysis abstracts scene description from the raw video data. This description is then wont to calculate traffic data points. This statistic includes frequency of the vehicles, average speed of the vehicles furthermore because the lane occupancy .The issues related to video analysis are – (a) the value of the system is kind of high (b) the system gets affected just in case of significant fog or rains (c) already dark police investigation needs correct street lighting .

Infrared Sensors:

Infrared sensors are wont to observe energy emitted from vehicles, road surfaces Associate in Nursing alternative objects. The energy captured by these infrared sensors is concentrated onto an infrared sensitive material exploitation an optical system that then converts the energy into the electrical signals. These signals are mounted overhead to look at the traffic. Infrared sensors are used for signal control, detection of pedestrians in crosswalks and transmission of traffic data . The essential disadvantages of infrared sensors are that the operation of the system additionally be|is also} affected because of fog; also installation and maintenance of the system is tedious .

CHAPTER - 4

FUNCTIONALITY

Detection and Management of Traffic Congestion:

Additionally to the sooner methodology of traffic congestion detection, an added method is used. A server can be maintained which may receive bound crucial knowledge calculated by the Controller of the signals. The most aim is to implement a system that may trace the time period of individual cars as they pass the margin manage mentler and cipher a median trip time employing a rule-based system to choose whether or not the realm is full or uncongested. If congestion is perceived then system would control traffic signals / generate automatic re-routing messages to chose approaching vehicles.
The proposed Smart Traffic Management System, “iSMART” is based on IoT based sensors, secured communication, GPS and Client Server Technologies. This system is prototyped to showcase how effectively existing IT infrastructure of Smart City can be leveraged to design, build, operate and maintain a cost effective but powerful Intelligent Traffic Management System. Let us explore the architecture and major building blocks of iSMART

Automatic Detection of Speed Limit:

We will use this system to calculate the speed of a automobilist and to detect if he violates the prescribed/set

speed limit. If the motorist violates the rule, a warning message are sent to the motorist via audio and/or video interface and penalty will be calculated within the server and beaked monthly to the vehicle owner . .

Automatic billing of core Area/Toll Charges:

Automatic toll assortment and automatic ―core area charge‖ collections also are done exploitation constant framework. Controller unit are placed at toll-booth and on the motor ready roads round the core space which can find every individual vehicle unambiguously among its zone by capturing their device ids and can keep records of the time throughout that the vehicle was seen by those Controllers within its reading zone. This data will be sent to a main server. Consequently the most server will calculate the costs and lift bills against the vehicle ids In India NPCI has developed the NETC (National Electronic Toll Collection) program which facilitates automatic toll collection through moving vehicle which is attached with a RFID Tag known as FASTag. FASTag enables a customer to make the toll payments directly from the account which is linked to FASTag. The FASTag based Electronic Toll Collection allows toll payment without stopping the vehicle at Toll Gate. It is an independent system and doesn't have any direct link with iSMART system Still today not every Toll Gate in India has been enabled with Toll payment through FASTag based system. Meanwhile, to further simplify the operation iSMART has proposed much simpler process. The iSMART Mobile App can facilitate the payment of toll charges for the specified Toll Gate over selected route electronically. For this purpose, it is necessary

to integrate the iSMART App with the payment Gateway. The payment Gateway can facilitate online payment transaction depositing the collected toll charges with in the NETC enabled account. The successful payment will generate an online receipt with the payment transaction number. This number will be required to make available with Toll Gate Server for verification and record. Once the Vehicle approaches to the Toll Gate, the payment transaction number can be verified at Toll Gate.

CHAPTER - 5

WORKING

RFID Controller

The RFID controller consists of RFID inquisitor. This interrogator is employed for the communication with the RFID tag. The RFID controller then gets the signals/data received by the interrogator.Electronic communication interference is used to send commands and information messages from the controller components. Controller core is gift within the RFID controller. The controller core listens to the interrogators and relying upon the configuration; the controller core will perform read/write operations upon the RFID tag or can do each listening and playing operations .The RFID controller can have serial interface through that external GSM/GPRS devices can be interfaced with it to create a twin radio device.RFID controllers are simple and easy to use RFID technology-based hardware component that efficiently reads radio-frequency identification (RFID) tags, which enables to open door locks. The RFID controllers provide an efficient access control solution to restrict the entry of an unauthorized person within your premises or facilities. Mivanta brings innovative stand-alone RFID controllers that have a built-in RFID reader, internal memory system to store the list of RFID identification tags in an approved list of IDs, and a microprocessor. The devices offer excellent

transmission performance to utilize them for access control applications.

Radio Freqency identification (RFID)uses electromagnetic fields to automatically identify and track tags attached to objects. An RFID system consists of a tiny radio transponder, a radio receiver and transmitter. When triggered by an electromagnetic interrogation pulse from a nearby RFID reader device, the tag transmits digital data, usually an identifying inventory number, back to the reader. This number can be used to track inventory goods.

RFID Tags

RFID tags are wireless devices that make use of frequent magnetic force fields to transfer data, which is employed for characteristic and pursuit of the objects. RFID tags are of 2 types: Active and Passive . Active RFID contains a battery installed, which the passive RFID doesn't have. Passive RFID has got to depend upon external supply for working. Tags info are often keep during a non-volatile memory. Tag consists of a frequent transmitter and receiver. Every tag can be assigned a singular serial variety.

Working of RFID Tags

An RFID tag works by transmitting and receiving information via an antenna and a microchip — also sometimes called an integrated circuit or IC. The microchip on an RFID reader is written with whatever information the

user wants. There are two main types of RFID tags: battery-operated and passive. As the name suggests, battery-operated RFID tags contain an onboard battery as a power supply, whereas a passive RFID tag does not, instead working by using electromagnetic energy transmitted from an RFID reader. Battery-operated RFID tags might also be called active RFID tags.Passive RFID tags use three main frequencies to transmit information: 125 – 134 KHz, also known as Low Frequency (LF), 13.56 MHz, also known as High Frequency (HF) and Near-Field Communication (NFC), and 865 – 960 MHz, also known as Ultra High Frequency (UHF). The frequency used affects the tag's range. When a passive RFID tag is scanned by a reader, the reader transmits energy to the tag which powers it enough for the chip and antenna to relay information back to the reader. The reader then transmits this information back to an RFID computer program for interpretation. There are two main types of passive RFID tags: inlays and hard tags. Inlays are typically quite thin and can be stuck on various materials, whereas hard tags are just as the name suggests, made of a hard, durable material such as plastic or metal.Active RFID tags use one of two main frequencies — either 433 MHz or 915 MHz — to transmit information. They contain three main parts, including a tag, antenna, and interrogator. The battery in an active RFID tag should supply enough power to last for 3-5 years. When it dies, the unit will need replaced, as the batteries are not currently replaceable. There are two main kinds of active RFID tags: beacons and transponders. Beacons send out an information ping every few seconds, and their signal is readable from several hundreds of feet away. Because they are sending out data so frequently, their battery

tends to deplete quicker. Like passive RFID tags, transponders require the use of a reader to transmit information. When within range of one another, a reader first sends out a signal to the transponder, which then pings back with the relevant information. Because they only activate when near a reader, transponders are much more battery-efficient than beacons

Examples of RFIG Tags

Since an active RFID is constantly sending out a signal, it makes an excellent choice for those looking for up-to-the-minute live tracking, such as in tolling and real-time vehicle tracking applications. They are an expensive product, but they do offer a long read range, which may be preferred depending on their application.Passive RFID tags are a much more economical choice than active RFID tags, and cost around 20 cents each. This makes them a popular choice for supply chain management, race tracking, file management, and access control applications. While a passive RFID tag does not require a direct line of sight to the RFID reader, it has a much shorter read range than an active RFID tag. They are small in size, lightweight, and can potentially last a lifetime.Since active RFID tags feature a larger, more rugged design than passive RFID tags, they are better suited for applications where durability is required. They are frequently used in toll payment transponder systems, cargo tracking applications, and even in devices used to track people.

Disadvantages of RFID Tags

RFID tags aren't ideal compared to other tracking labels for a number of reasons. Some problems with RFID include different security and technological issues.Because an RFID tag cannot distinguish between readers, the information can be read by almost anyone once it has left the original supply chain. Because RFID readers are so portable, and the range of some tags so great, scammers can gather information they would otherwise not have access to. This means that anyone can collect potentially sensitive information without a person's knowledge.Another security concern for consumers is that RFID tags can be linked to individual credit cards, creating the potential for financial theft and fraud.Technology-wise, RFID tags are problematic largely because there are no real global or industry standards. Since they operate on radio frequency, RFID tags and their systems can also easily become jammed or disrupted, reducing their usability. This results in longer wait times and decreased productivity in both retail and warehouse settings.There are also signal issues that can occur with RFID inventory systems, including collision when signals from two or more readers overlap, and interference caused by metal, water, or other magnetic fields in the surrounding area.An RFID system is also time-consuming and labor-intensive to set up. Companies need to test various hardware and tag systems to determine the best fit, which can take months to arrange. In addition to the cost of the RFID system itself, such as RFID tags and scanners, an increase in time and labor also means an increase in cost.These types of disadvantages are

often avoided with the use of barcodes, which is why they are still a popular data collection and inventory control choice for many businesses.

Pseudo Code:

Input:
*Max_red denotes the utmost time that the signal will be red.
* Max_green denotes the maximum time for which the signal can be green.
* Min_freq_count denotes the minimum frequency of vehicles passing per second hold on statically in controllers.
*Act_freq_count denotes the particular frequency of the vehicles passing per second = ∑vehicles/second.
*Timer denotes the actual timer count

When the signal turn green.

While (Timer<Max_green and Timer is not 0) do

If (Act_freq_count>Min_freq_count)

Keep the signal green

.

Decrement timer count by 1.

Else if (Act_freq_count<=Min_freq_count)

Goto 2.

END

Make the signal red. Turn the adjacent signal green. Goto 1.

System overview:

Firstly we intialize the timer to the maximum set value.Now if the timer count is less than the maximum time for signal to be green and the timer count is not zero if this happens the turn the signal red and then move to the adjacent signal making it turn green.Secondly If the actual frequency of the vehicle passing per second is greater than the minimum frequency of vehicle passing per second then decrement timer count to 1or turn the signal red the move to adjacent signal making it green.As shown in figure no -1

Each vehicle will be put in with a RFID tag. This RFID tag would store all the data relating to the vehicle corresponding to the vehicle number, and so forth RFID tags will be employed in distinguishing every vehicle unambiguously and additionally facilitate the motive force to receive some traffic messages. The present sign system can be including the RFID controller. As represented in figure 1, each signal can have the information regarding each vehicle that passes by it. Therefore once a vehicle passes by a signal, the signal can mechanically keep the count of the vehicles passing by it, and help in detection of traffic congestion.

Every signal ought to be keep with a threshold value that it should be red and green. Currently relying upon the frequency of the vehicles passing by the signal per second, the timer will be dynamically controlled. Every controller of the signal should be stored with a price of minimum frequency of the vehicles passing by the signal. As before long as this minimum frequency is reached, the controller should send a command to the signal to show red. Therefore the signal is controlled dynamically.

For example, suppose for a sign, most time for which a signal will be red is about to be thirty seconds and most time that the signal will be inexperienced is set as twenty seconds. The controller is keep with the worth of minimum frequency of vehicles passing by it per second as 5.Currently suppose the signal turns green, the timer starts with a maximum value of 20. At first the frequency of the vehicles passing the signal per second is ten, when 10 seconds this frequency reduces to 5, then mechanically the RFID controller sends a command to the signal to show red. Therefore the signal turns red and its adjacent signal therein junction turns green. This method continues in an exceedingly cycle.Therefore dynamic dominant of the signal helps in reducing the wastage of time. This additionally helps in avoiding holdup as priority is given to a high traffic road. This method helps in detection of traffic congestion. If the frequency of the vehicles passing the signal per second remains above the worth set despite the fact that No the utmost value of the timer is reached, Then the congestion has occurred at that point. Once thecongestion has been detected, the RFID controller will send a message to its preceding signal's controller notifying it to quickly stop traffic on that stretch. When receiving the message from its successor signal the RFID controller can placed on the red signal for that stretch towards that engorged crossing purpose for a predefined time period. Once the congestion is free at the crossing, the individual signal's controller will send another message to its earlier controller indicating to resume the traffic flow once more therein direction. Accepting this message the controller of the preceding signal place the red light-weight OFF and inexperienced signal ON and restart the signal cycle as before. In figure 2

CHAPTER - 6

PROJECT DESIGNS

Flowchart :

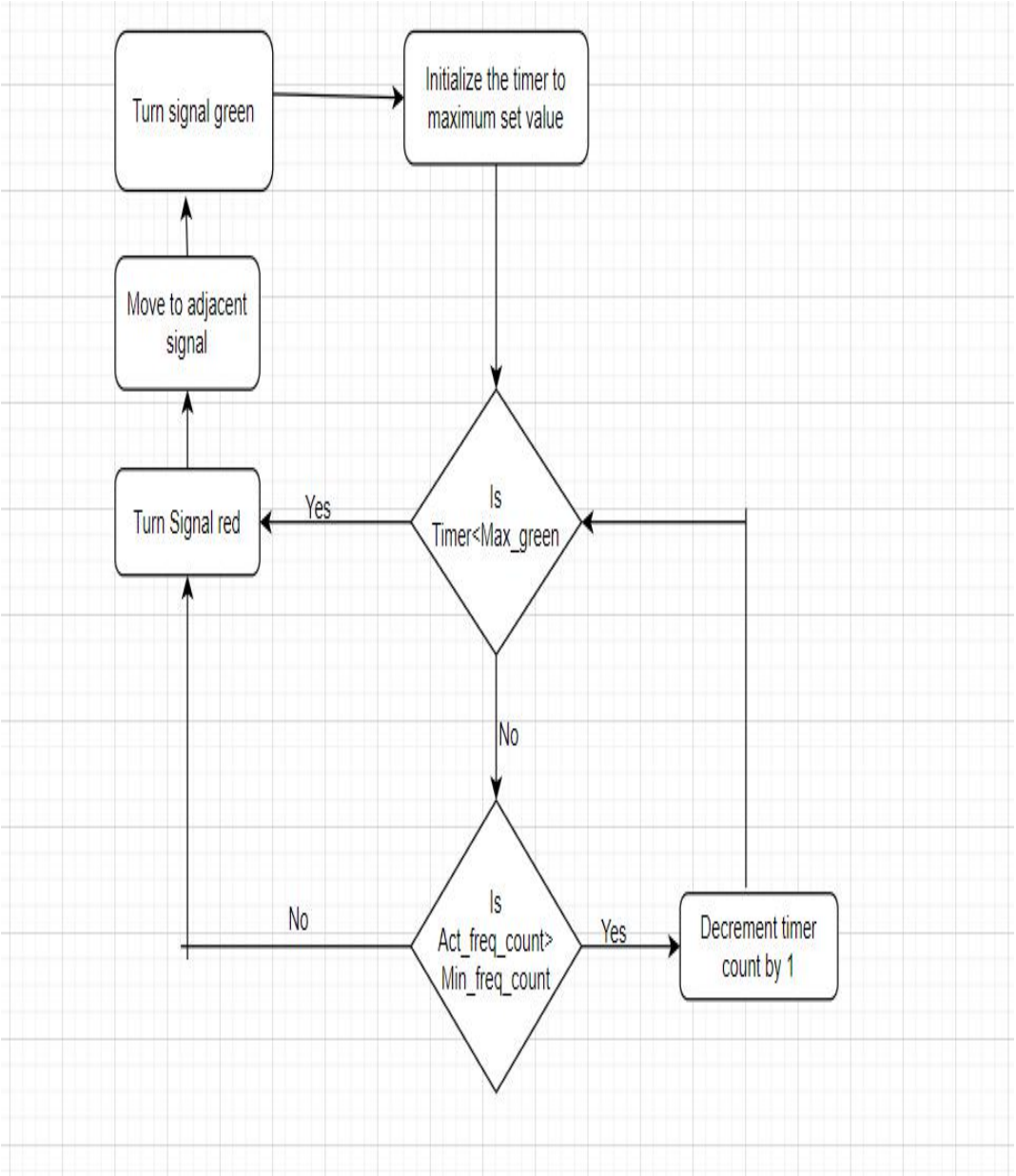

Figure No - 1

Animated View :

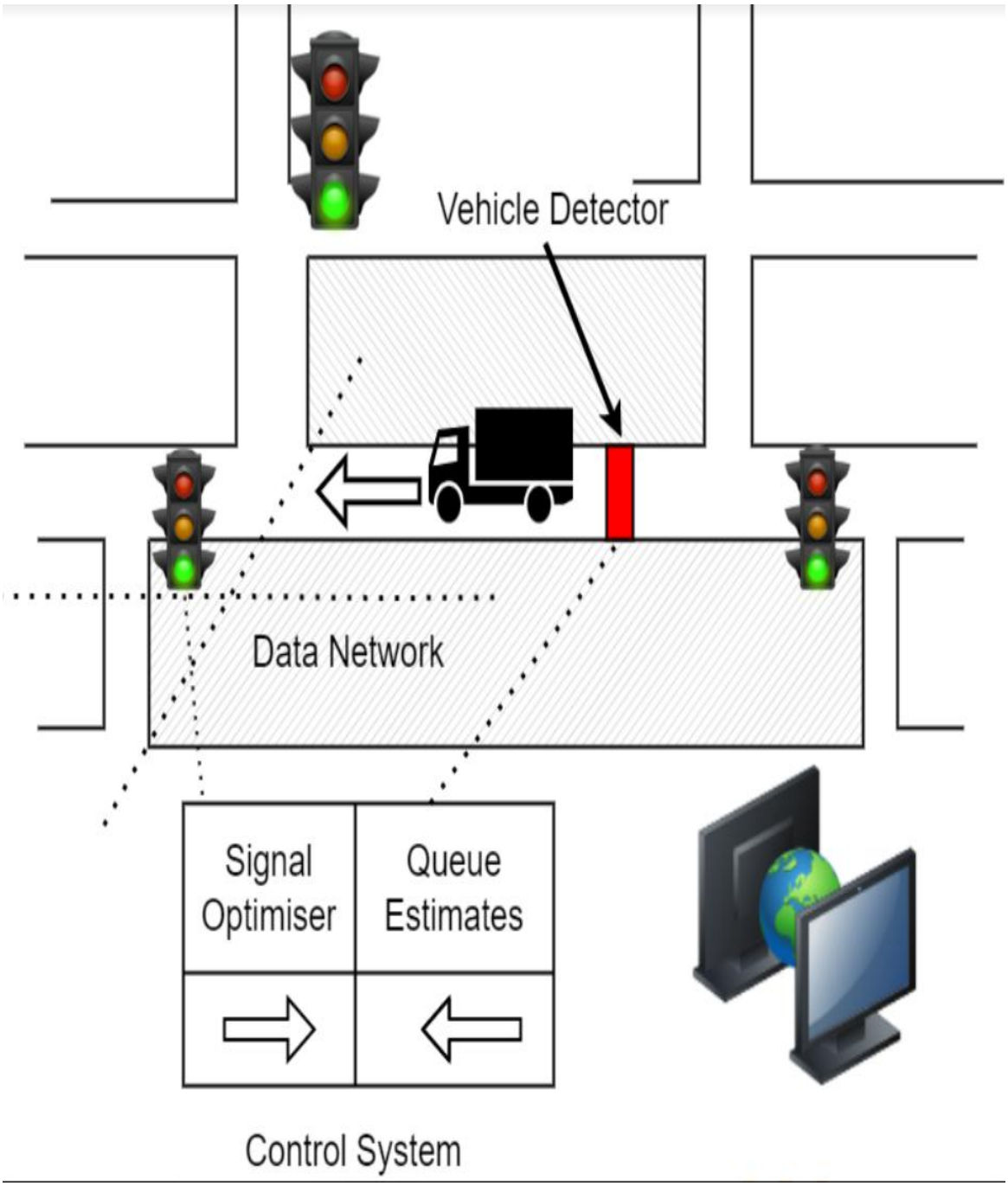

Figure No - 2

CHAPTER - 7

RESULT AND DISCUSSION

The iSMART Proof of Concept (POC) is designed keeping in mind some of the most essential features of Smart Traffic Management Systems used for Traffic Control and Management in Smart Cities. The iSMART POC is tested in laboratory environment with simulated traffic data, traffic video footage captured of real traffic scenarios and the map data obtained through apps like Google Map. COTS Items including the Vision Sensors, Freeware Software and development tools and High-end desktop machine operating with Windows are mostly used to implement the POC. The initial test results are found very encouraging. The iSMART Mobile App is developed to operate with Android Mobile Phones only. This App is a handy tool for drivers and passengers for an easy interface with iSMART System. Though many of the features are tested with simulated data, there is a good scope of further improvement with iSMART given the fact that many of the features and functionalities are still remained to be implemented in the system.The POC was discussed and concept was demonstrated in front of some users for quick feedback. Users appreciated the concept considering the short time for overall development and use of free license Software tools and low-cost hardware items to build up the overall solution. Users also made some useful suggestions for further improvement. Some of the suggestions made are as follows.Updates of real time traffic using V2V Network: Use of Public Address System may not be an

effective communication mechanism for large and distributed group of stakeholders (Drivers, traffic Controllers, Vehicle Passengers, operation and maintenance staff etc.) Vehicle to Vehicle communication channel over dedicated frequency band should be used to update the vehicle drivers and passengers to update on the various traffic scenarios and situations like possible traffic jams, road closed, traffic diversion etc.Route Optimization: Apart from recommendations on best optimized route based on real time traffic data, it is also good to provide the additional information considering past historical data such as Typical Traffic Scenarios for the specified journey date and time, in pastPossibility of traffic jamsTypical time to reach to destination with specified vehicle type and load carrying by the vehicleToll gates on the specified route and possible toll charges to be paidiSMART App should be made available with other mobile operating systems as well specifically for IOS Phone.The iSMART system should also provide access to some kind of dashboard system where the real time traffic updates and historical data trends (seasonal traffic data, weekly data updates etc.) are available and can be visible to authenticated users for better planning of their long journey trips in advance.Apart from Vehicle passengers, drivers, traffic controllers and other stakeholders, traffic alerts and notifications should also be made available to smart city residents of the respective affected areas over mobile phone for situation alerts and better preparations in case required. If this facility can be provided to registered users (Smart City citizens) it can have a larger positive impact in the better interest of larger stakeholders of Smart City.

CHAPTER - 8

CONCLUSIONS

The projected work focuses on good Traffic management System mistreatment RFID which is able to eliminate the drawbacks of the prevailing system resembling high implementation value, dependency on the environmental conditions, etcetera The proposed system aims at effective management of traffic congestion. It's additionally cost effective than the existing system. Furthermore, the study presents the issues in metropolitan areas everywhere the planet caused by congestions and therefore the connected sources. Congestions developed to a problem , that affects economies worldwide. Significantly metropolitan areas are worst hit underneath these conditions.The purpose behind iSMART system was to demonstrate the concept of intelligent and or Smart Traffic Management System for today's Smart Cities. The Smart Traffic Management System has become a necessity now a days for effective control and better administration of city-wide traffic and its associated operations. iSMART POC has successfully proved and demonstrated that how a low cost, Smart Traffic Management System can be designed and built by using available IT Infrastructure, Off the Shelf Embedded Hardware Boards, Sensors and Free license Software. Though the POC has not full-fledged implemented all the features and functionalities of Smart Traffic management System, it is undoubtedly proved the usefulness of Smart Traffic Management System and some of its essential features. It has also provided insights

on how we can implement and use various useful features of today’s Smart Traffic Management System.It should be noted that today’s Smart Traffic Management System's role is not limited to only traffic control and monitoring but it goes well beyond it. Latest technologies such as IoT, Machine to Machine communications, Advanced Video and Image processing, Secure Data Communication and Transmission, Advanced Data Analytics have made it possible to have recommendations of best routes well ahead of start of journey, paying of toll charges with vehicle moving, traffic situation alerts and notifications at right time, collaboration among vehicle drivers/passengers through V2V Communication, better incident management, effective handling of emergency situations on roads etc.

CHAPTER - 9

FUTURE WORK

The POC of iSMART: Smart Traffic Management System has undoubtedly proved the usefulness of having Smart Traffic Management System in place. To have the full benefits being offered by iSMART system, it is recommended to implement the overall iSMART System as per iSMART specifications, in future. It is also proposed to undertake following value-added improvements in present iSMART System

Route Optimizer with additional information such as nearby Parking lots, possible time to reach to destination and estimation on Toll charges

Apart from Android, iSMART APP for IOS Mobiles.

Toll charges payment through iSMART APP

Access to Traffic Dashboard via Central Traffic Server for authenticated users i.e. Smart City Residents

Traffic Alerts and Notifications for Wider stakeholders including Smart City Citizens for the respective traffic areas. Such Alerts and notifications can be enabled or disabled by the Smart City Citizens based on the applicable settings.

CHAPTER - 10

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