Smart Traffic Management System

Anjali Mishra[1], Vaibhav Kumar[2]

[1,2]School Of Computing Science & Engineering, B.Tech(CSE), Galgotias University Greater Noida ,India

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.

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.

2-EASE OF USE

2.1-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 controltraffic signals / generate automatic re-routing messages to chose approaching vehicles.

2.2Automatic Detection of Speed Limit:
We will use this system to calculate the speedof 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 .

2.3Automatic 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.

3-BACKGROUND:

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 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.

4-RELEVENT PSEUDOCODE AND WORKING:

Following Input Terms Used:
1)Max_red: It denotes the maximum time for which the signal can be red.
2)Max_green:It denotes the maximum time for which the signal can be green.
3)Min_freq_count:: It denotes the minimum frequency of vehicles passing per second storeD statically in controllers.
4)Act_freq_count: It denotes the actual frequency of the vehicles passing per second = $\sum$vehicles/second.

Pseudocode:
When the signal turn green.
  While (Timer<Max_green and timer is not 0)
    If (Act_freq_count>Min_freq_count)
   Keep the signal green.
Decrement timer count by 1.
 Else if (Act_freq_count<=Min_freq_count)
End
Make the signal red. Turn the adjacent signal green.

Working:
 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.

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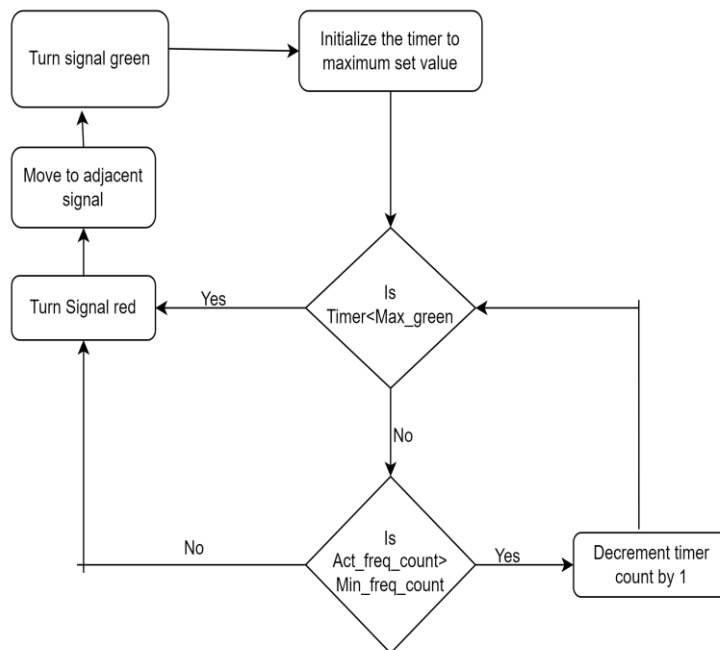
Figure No – 1

5 SYSTEM OVERVIEW:

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 there in

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 hold up 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 the

congestion 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.As shown in figure no -2.
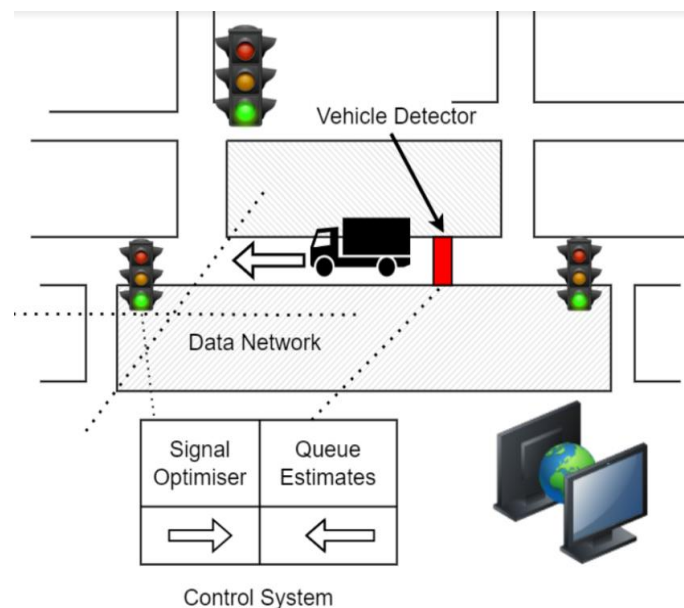

Figure No- 2

6-EXISTING METHODOLOGY

6.1-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.

6.2-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 .

6.3 Infrared Sensors:

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

7-CONCLUSION :

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.

Congestions have a negative impact on the money scenario of a country, on the atmosphere and thence the general quality of life. The projected system may be increased by mistreatment the other powerful communication network nonetheless GSM.

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