

Review Paper on Intelligent Toll Tax System for the Smart Cities

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Abstract - Now a day's with the rapidly growth in technologies and innovations, world moving towards digitalization. In smart cities traffic management issues is most important. For the smooth traffic management, the cashless concept should be implementing especially on toll tax offices. Most of the toll tax offices are now working manually. On National Highways, millions of vehicles are travelling in a day. Each vehicle required at least 5 minutes for the paying the toll tax, which causes unnecessary delay to reach at workstation, traffic jams, accidents etc. The manual process for paying toll tax is leading to the corruption also.

In this review paper, by studying the different techniques for the toll tax ticketing in the world, we have an algorithm for the toll tax payment by using the Internet of Things. In conclusion we discussed the major drawbacks of current existing systems and its possible solutions also.

Keywords:--- IoT, RFID, E-Toll Tax, RFID Tags

I. INTRODUCTION

India is one of the digitally fastest growing nation in the world. Internet of things is an emerging technology which widely uses for the betterment of smarter human life. In most of the developing nation traffic management is one the serious issue.

The slower transportations on national highways cause the delay to reach on workstations and also there is waste of fuels, which indirectly impact on the economy of the nation.

Toll tax collection on the national highways in India is completely manual process, which is time consuming. In India, most of the toll plazas are showing faulty records of the vehicles and toll tax collection which leads to the million rupees corruption.

In this paper we proposed the electronic payment system on toll tax which is inexpensive and secure. This methodology is also used full for the tracking the number of vehicles passing on highway, by which corruption in toll taxes can completely removed.

II. LITERATURE SURVEY

In this paper, Automated Number Plate Recognition technique is to gather the basic information of the vehicle. Here author suggested some restriction on the owner such that, clean number plate is required which linked with the credit card details and email id. The wide range cameras were used to capture the images of the

number plates. Optical character recognition technique is used to identify the licence plate of vehicle. This information passes to server system for the pattern matching and identification of the vehicle. After successful reorganization of vehicle, toll tax payment is deducted from the owner credit card account and confirmation mail is sent to owner. [1]

In this paper authors implemented a low cost and efficient technique called Electronic Toll Collection using RFID modules that automatically collects the toll from moving vehicles when they cross the toll plaza. Authors also assume that an owner maintains a prepaid account, so that toll tax is deducted automatically from the driver's account at toll plaza. If the balance in the owner's account is low or if the vehicle is not equipped with an RF system, the toll gate remains close. In such a case vehicle owner will have to pay the toll tax in cash and collect the receipt. The owner receives an SMS message on his/she mobile about the details of the payment and there is no need for him to stop the vehicle. [2]

This paper will propose a new image recognition technique for inspecting the validity of car Road Tax information in Malaysia based on Neural Network. The development of vehicle Road Tax Recognition (RTR) System will result in greater efficiency for vehicle monitoring system at Toll Gates in Malaysia. In Malaysia, the usage of recognition system is limited to the vehicle plates. It means that the system is unable to detect Road Tax stickers. Therefore, The Implementing of the Image

Recognition of The Road Tax and Monitoring the License Plate Number Identification system helps to automatically detect the Road Tax sticker information and plate number.[3]

In this paper by using RFID technology the vehicle gets the information about the traffic congestion in the city. In this system the RFID tag reader collect the data from the vehicle and calculate the average speed of each vehicle from source node to destination node. This data transmit to the central server which uses the Dijkstra's algorithm to identify the fastest route to all junctions by considering each node as the initial point in the city. This data then accessed by the user through the interface module placed in the vehicle.[4]

In this paper the image processing technology which used for the Vehicle Number Recognition (VNR). In this system the vehicle first detected and the image of number plate is captured. After the image segmentation , template matching is used to recognize the characters on number plate and it compared with the database. After successful reorganization, the toll tax is deducted from the prepaid account of vehicle owner.[5]

III. PROPOSED ALGORITHM OF IITS & RECOMMENDATION

For the implementation of IITS, here some recommendations are suggested. At time of RTO passing, unique RFID tag is assigned to the vehicle and an additional post paid account should be created which link with the vehicle registration number. This account is purely dedicated for the payment of toll tax payment. All toll tax server systems are connected to the Central Server which stored the all record of each every toll plaza in the country. Here we propose the algorithm for the IITS for e-payment.

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RFID reader read the tag m
If true
{
Entry gate open
Collect the information of vehicle
Add bill amount in vehicle account
Vehicle passes toll plaza
Infrared sensor reads vehicle
Open the exit gate
Confirmation SMS sent to owner
}
Else
{ Entry gate remain Closed
Vehicle forces to Shift on manual lane.

```

Complete the process.

Infrared sensor reads vehicle

Open the exit gate

Confirmation SMS sent to owner

}

For handling breach, when a vehicle does not have an RFID tag, a vehicle's ID number is not found in the database, two toll gates are suggested on each lane, one is present on entry and second is on exit . Before 20 meter of entry level gate, the RFID reader tries to read a tag on the vehicle. Once valid information is received by the toll plaza server , it generate the signal for the entry level gate, and gate will open. The server system module adds the toll payment in the vehicle owner post paid account. When the vehicle passed from toll plaza the Infrared sensor sense the vehicle and opens the exit gate. A confirmation SMS is sent to the owner's registered mobile number mobile number.

If the vehicle does not have a RFID tag or information is not properly validated then vehicle force to Shift on the manual lane. The working of this lane is completely manual operation, in which vehicle owner paid the amount in cash.

IV. POSSIBLE ADVANTAGES OF IITS

This system may achieves the following:

- i) Maintenance of smooth traffic flow on highways.
- ii) Increase the average speed of vehicles
- iii) Maintain the transportation record each vehicle on highways.
- iv) Avoid the corruption at toll plazas.
- v) Easy tracking of the stolen vehicles.
- vi) Convenient payment at toll plaza

V. CONCLUSION

As concept of Smart Cities, here we proposed the concept of IITS with an IoT technology. In this system RFID tag, Infrared sensors, Microcontroller and software module are used. IITS is very use full to avoid the traffic congestion on the highways. This system reduces the transportation time, human power and efforts. By using IITS keep record of each vehicle, Also government can keep the watch on the financial transaction on toll plaza. IITS is very inexpensive and easy to implement.

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