A Survey on Automatic Tollbooth Reduction and Theft Vehicle Detection Systems

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ABSTRACT: In this system we studied how to make effective and accurate toll collection system which is based on hc2d barcode. To avoid the crowd from the tollbooth we developing the system in which toll will be reducing from account automatically and nobody will have wait on tollboothfor pay toll. In this system camera is used for capturing the image of the barcode. The captured image would be send to barcode decoding process and the toll would be cut from the customer's account and then open the gate. In our system if vehicle stolen then entry has been made incentral database by police and if this vehicle entered in specific tollbooth silent alarm would buzz which would indicate the operator at the toll booth that the vehicle is a stolen vehicle. At the same time the mail would get send toowner of vehicle and police man nearer to the tollbooth. For the identification of the vehicles, the information of thevehicles is already stored on the central database. So captured number will be sent to the server received at the toll

KEYWORDS: HC2D, Transaction, Tollbooth, One Time Password.

I.   INTRODUCTION

In this study we focus on collecting toll according to vehicle and generate real time application which is to scan barcode of vehicle on the entry gate of tollbooth. Automatic toll collection system is one of the most effective and strong system in the real world transport system. In this application we focus on providing safe, secure, effective, reliable tollcollection system. Earlier vehicle users have to wait on tollbooth for pay toll, long time wait to collect toll to collector. Thus many problems created like traffic congestion, pollution, people's frustration. Our proposed system help to avoid traffic congestion avoid unnecessary delay of collection of toll and also focus on unregistered vehicles. Automated toll collection is fast becoming a globally accepted. For effective and fast collection of toll on toll plaza we developed HC2D based toll collection system. When vehicle passing from the tollbooth there is no need to stop in queue and collect the toll instead of that amount of toll will be automatically reduced from vehicle owners account.
However this system works effectively and accurately with best results. The Tollbooth system depends on below component.

- AVC (Automatic Vehicle Classification): AVC automatically verifies the classifications of vehicles as using Image processing automatic toll system.
- Each and every vehicle has been classified at the registration time.
- AVI (automatic vehicle identification): For the effectively access control on the vehicle automatic vehicle identification system has been developed. With the help of barcode recognition of HC2D automatically vehicle has been identify accurately. Barcode identification plays important role inautomatic tollbooth system of identify vehicles and maintaining law enforcement of pubic road and monitoring traffic rules. Each and every vehicle having unique license plate and barcode.
- Central Server: Central system used to store data of every tollbooth and vehicle. All registered vehicle information stored in central database. The required information is registered by tollbooth operator. A central   server stores the data which comes from different toll plaza. A local computer of every toll plaza is connected to a central server through Internet. Each vehicle owner has to be registered in central server and deposit money on account. Automatic toll collection system is totally depends on the high definition 2D barcode generated at RTO office and stick on the front and back side of the vehicle.
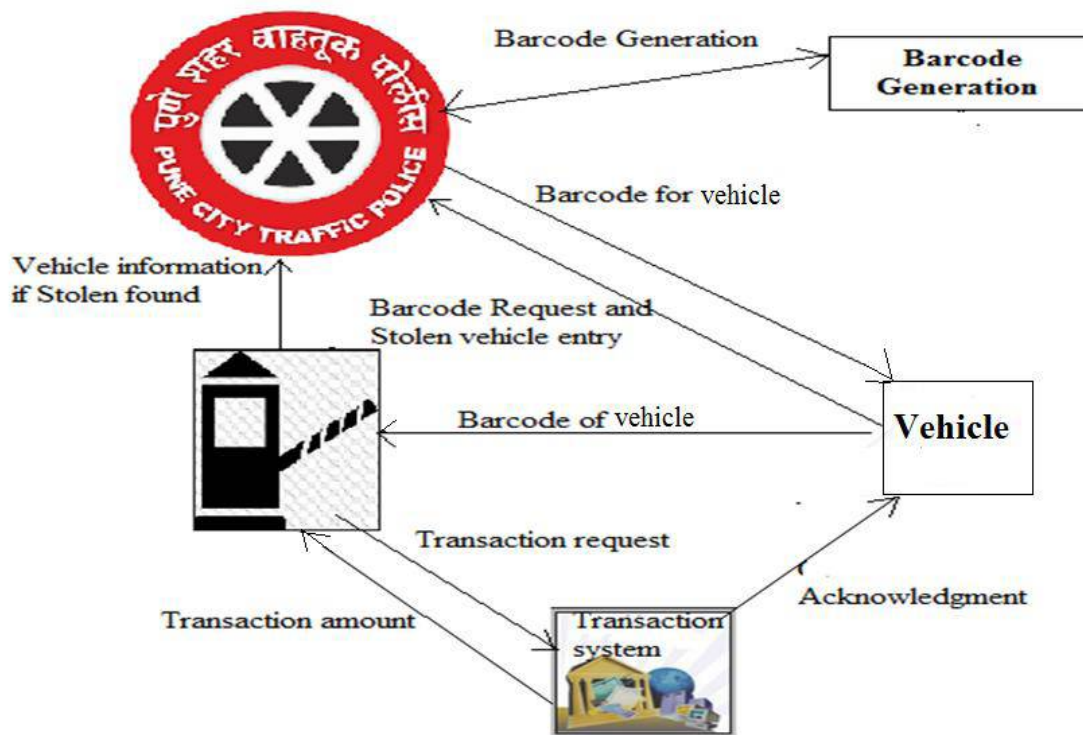
Fig -1 Architecture Diagram

1.1 Benefitsof the system
1. Less or shorter queues at toll plazas by increasing toll booth service Turnaround rates.
2. Faster and more efficient service (no exchanging toll fees by hand);
3.The ability to make payments by keeping a balance on the register account.
4.The use of prepaid toll statements (no need to request for receipts) Other general advantages for the motorists include fuel savings and reduced mobile emissions by reducing or eliminating deceleration, waiting time, and acceleration. Meanwhile, for the toll operators, the benefits include:
1. Lowered toll collection costs.
2. Better audit control by centralizing user accounts.
3. Expand capacity without building more infrastructures.

III. LITERATURE SURVEY AND RELATED WORK

1 "An Implementation of a High Capacity 2D Barcode"
A high capacity twodimensional barcode and its design and the implementation is present in this paper which shape and size are suitable for attaching to the document in the form of paper or print media.
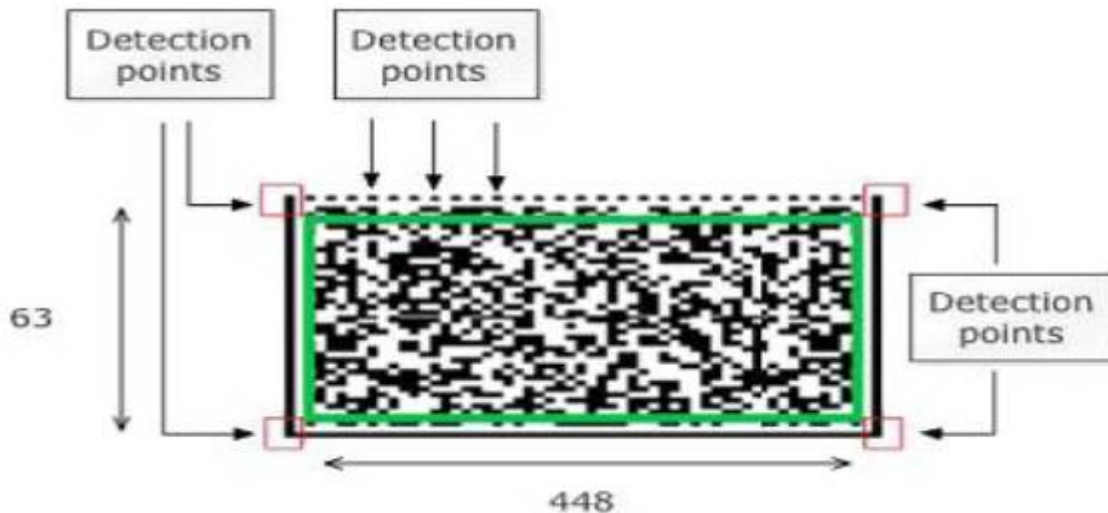
Fig. 2 HC2D Barcode

In proposed system implementation of Barcodes is reduced usage space as compared to other application. Barcode may contain text and binary code. In our system we used high capacity 2D barcode. The proposed systems implement 2D barcode for data compression and increased space efficiency. Hence large amount data and content of data will be stored. After compression, the maximum data size is 24,400 bits

2 "**Understanding 2D-Barcode Technology and Applications in M-Commerce –Design and Implementation of a 2D Barcode Processing Solution**"

There are required more wireless information services and mobile commerce applications as the swift increase of the number of mobile device users. Today people are looking for innovative solutions to use barcodes in the wireless world since various barcodes have been used for decades as a very effective means in many traditional commerce systems. Recently, because 2D-barcodes not only provide a simple and inexpensive method to present diverse commerce data, but also improve mobile user experience by reducing input factors. In our studied examine 2D barcode system concept, types. Most of the mobile applications can support 2D barcode processing system. Moreover, the application examples, and case study using the solution are presents in this system.

3 "A Data Matrix-based mutant code design and recognition method research"

A Data Matrix based mutant code design developed by 2D matrix barcode. By simulating actual environment a distorted image of a mutant barcode was obtained. By barcode localizing the barcode area in the image was acquired. These barcode characteristic parameters were abstracted after the barcode area being analyzed and with the studies image distorted fitting formula was increased. By this way, the barcode recognizing speed is faster than others, and this method was robust, is shown from the actual testing result**.**

4 "Automated Toll Booth And Tracking System For Theft Vehicle".

In this system tollbooth is automatically reduced by using number plates of bike. Stolen vehicle is also detected by using same number plates. The camera device is used to detect the stolen vehicle or forthe tollbooth reduction. The main drawback of this system is that the number plate of bike is visible to ordinary people and he can easily change the number plate. And also one more drawback is there are fixed camera devices are there but angel of that device is fixed so it's very difficult to capture the number plate image if it get hidden of somewhere bend. Also it's too difficult to detect the number for fancy number plates for example number 4141 can be written as DADA in Marathi.

5. "Automated TollBooth System"

The main purpose of this project is to collect the correct toll value, according to vehicle's class, automatically on arrival of the vehicle at tollbooth. It is needed to build a real time application, which recognizes reliable, safe andenvironment friendly. At present, customers have to wait at the tollbooth, for long time, to pay the collector.Automated toll system would successfully remove unnecessary traffic delays; keep an eye on any car that might not be correctly registered or number plates exchanged for theft purpose. Automated toll collection is fast becoming aglobally accepted for toll collection. This system was developed only for tollbooth amount reduction for vehicle.Image processing technique is used to guess the bike number. The bike number is recognized as unique number in this system.

IV. PROPOSED SYSTEM

Now day's vehicle theft is increasing in tremendous amount. There is need to develop the system which can resist this. Also to pay the road toll we need to face the time required due to change. The objective of the proposed system is to develop a handy barcode to detect the stolen vehicle and avoid the time at tollbooth to pay the road tax. Design the system which will automatically reduce the toll amount from the user account.

      1. Using this system, we can detect the stolen vehicles easily.
      2. System will help to reduce the time required at tollbooth

1. Barcode Generation
In this module, when user buys the vehicle, then user gets a barcode instead of number plate.
In this barcode a unique id is present which is very important to detect stolen vehicle and also all user information will include in this barcode.
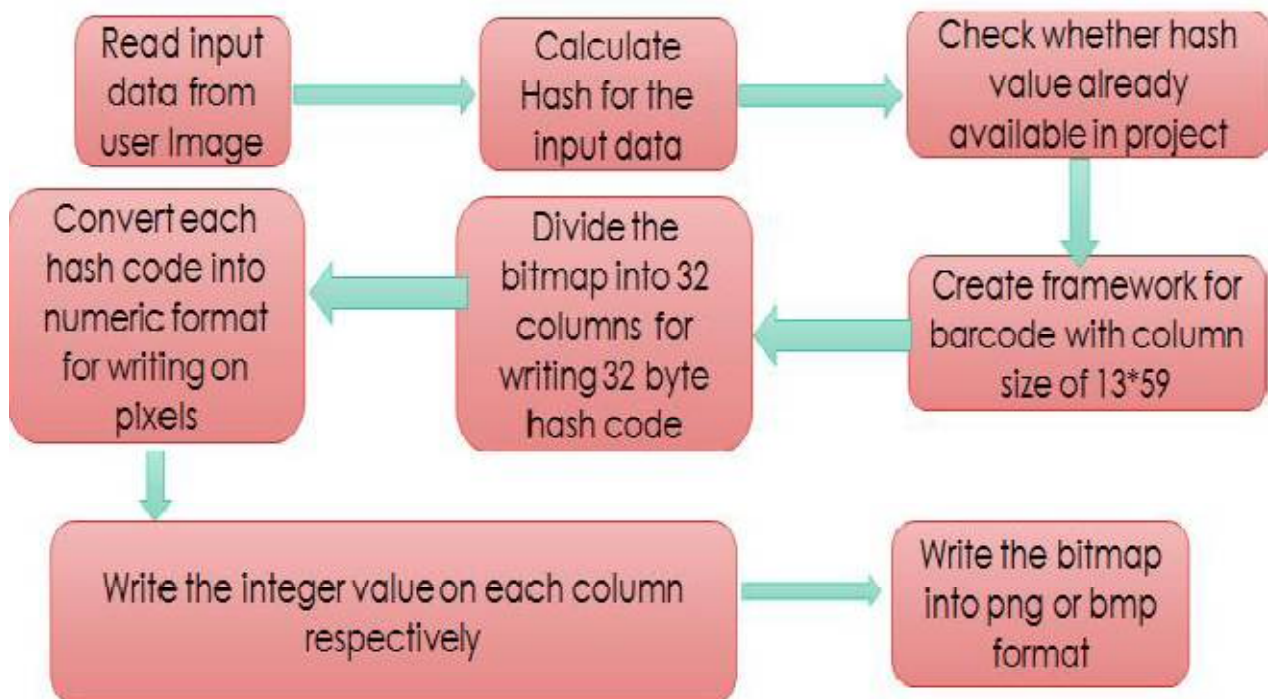

Fig. Barcode Generation

2 Barcode Detection

    1. In this module detection of the barcode will be done.

    2. After detection of the barcode all the information of the user will display to the tollbooth operator.

3 RTO Officers:

    1. When stolen vehicle is detected by stolen vehicle detection system, then RTO officer will get email from tollbooth operator.

    2. Forward the request to barcode generation officer.

4 Vehicle Users:

    1. Vehicle user will get the barcode instead of number plate which contains the unique ID.

    2. If user's vehicle will stole, then he will make an entry to the stolen vehicle detection system.

5 Tollbooth Operators:

    1. It gets the toll charges of vehicle from his account.

    2. Provide receipt to vehicle driver.

    3. Send mail to owner and RTO officer.

V. CONCLUSION

Thus a system for Image Processing Based automatic Tollbooth in Indian Condition which is secure and highly reliable can be obtained. It can be used to remove drawbacks with the current system such as time and human effort and it also doesn't require any tag only required best quality camera and barcodeat the front end of vehicle. This system also helps to detect the stolen vehicle.

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