AUTOMATIC TOLL COLLECTION USING
QR CODE SCANNING

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ABSTRACT

Day by day because of increase in standard living and increase in economic power of people, they own many automobiles like cars and motorcycles which leads to traffic. Therefore, traffic issues will be a big challenge for controlling the traffic network. During the rush hours, it is difficult for drivers to drive from congested places. An embedded system based on the quick response code, web cam and application program is developed for toll collection in minimum time to overcome the traffic problem. Capturing QR code by using web cam and recognize it. When web cam capturing QR code, and if the QR code is correct means that person's vehicle is authorized. Then the barrier is automatically opened and the car is allowed to pass Web cam is video camera, which is used to capture image. It is also called as a digital camera that is directly connected to a computer. It can send live pictures to another location by means of the internet. In this paper we use QR code as a live picture so web cam will first capture each vehicle's unique QR code and then will scan it as soon as it passes through toll plaza After recognizing the string from QR code it will then perform the task of transaction The amount of toll tax is then reduced from account number registered with vehicle at the time of vehicle registration.

Keywords: QR code, Web Camera, Java, vehicle

I. INTRODUCTION

The previous works for extracting QR code from an image do not consider a non-uniform background. Here we are implementing   the applications of QR code and an efficient algorithm is proposed to extract QR code from the non-uniform background

All this methods are very much time consuming and expensive hence our paper uses QR code(Quick Response Code) that overcomes this problem. QR code is an alternative for the existing system which is based on RFID tags.

QR code reduces the data space in database; it also reduces the cost of as compared to other existing system. It has strong encoding and error correcting function.

Some of the existing system used RFID technology. Thus every car has to be provided RFID tags and RFID reader at toll collection and other existing system uses GSM and INFRARED technology. We design and implement the prototype of a Automatic toll collection using QR code(ACQR).

It can only detect the vehicles for toll collection and not to detect fraud vehicles. Our paper mainly focuses on the QR code. We are going to generate the QR code in the application which will be more help full from security point of view and will make the communication easy and using the application more comfortably.

At sender side the data that is encoded first is divided into various smaller parts. QR code pattern is generated

for each part. Each pattern is multiplexed and represent each module in QR code with black and white symbol

At receiver side ,QR code with black and white symbol is decoded to give same no of QR code patterns that was multiplexed. These decoded QR code pattern is read by general QR code reader and then data can be displayed on the screen

Here we are focusing on Capturing and Scanning of QR Code for reducing traffic. The system allows user to register their vehicles for toll collection. The main purpose of this paper   is to help researchers to learn, under-stand and research on their topic of interest , which in our case is, Automatic Toll Collection. In this paper we are using algorithm that generate and scan QR code.

QR code generation involves:

STEP 1:Start

STEP 2: Input the source file

STEP 3: Call source file

STEP 4: Compress source file into zip file

STEP 5: Create an empty string data

STEP 6: Convert zip file into string and store in 'data'

STEP 7: Then image for QR Code to be generated

STEP 8: Input Correction Level of error

STEP 9: To get BitMatrix object 'bitmatrix'convert 'data' by using zxing library method

STEP 10: In image Write bitmatrix

STEP 11: End

II. RELATED WORK

2.1 Demonstration of Bar code to QR Code through Text

using Document Software(Dr. Neeraj Bhargava , Anchal kumawat , Dr. Ritu Bhargava)

The process of scanning, decoding and reading the content of   QR code, using a camera phone is known as mobile tagging. To capture a QR code we must have QR code scanner who capture QR code and convert it into the readable text

Advantages:

• User can generate and print their QR Code so that others can scan and can use by accessing one of several pay or free QR Code-

generating sites or apps.

• It is not so expensive

Disadvantages:

☐ Data is completely lost ,if network failure occurs

☐ It is very time consuming.

2.2 2D Barcode and Augmented Reality Supported English Learning System(Tsung-Yu Liu*, Tan-Hsu Tan* and Yu-Ling Chu)

This system mainly focuses on an English learning management system and a mobile learning tools system. It uses the HELLO server which consists of two subsystems that is learning server and the m-Tools which is a

software application. System administrators and teachers use personal computer to connect with HELLO server via using the Internet.

Advantages:

☐ The hello is mainly used to easily understand English learning system.

☐ 2D barcodes and augmented reality technology are used for

providing context-aware learning experience

Disadvantage:

☐ Because of students bad feedback it can't be applicable

☐ It leads lots of effort and hard work.

2.3 A Survey on QR Codes: in context of Research and Application(Kinjal H. Pandya1, Hiren J. Galiyawala)

Here the original data that we need to encode is mostly divided into various smaller parts **.** For each part QR code pattern is generated in its standard form. Each pattern is then multiplexed and it represent each module in QR Code. Then QR code is decoded at the receiving end, to give back the same number of multiplexed QR Code patterns. Decoded QR Code pattern is read by the QR Code reader using smart phones and concatenation of data is done back to form its original
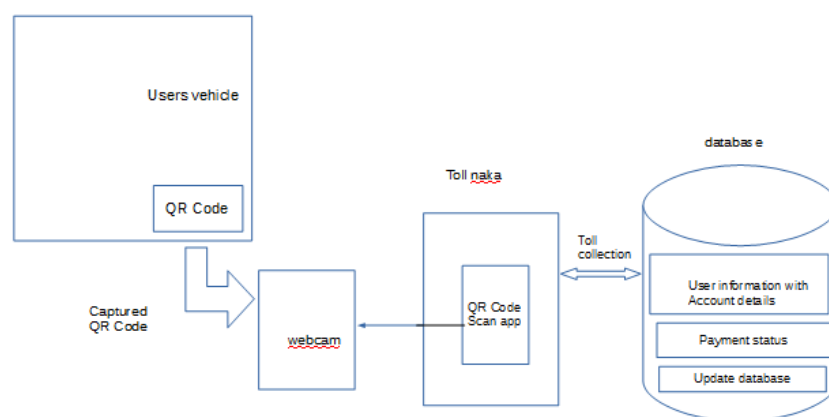
Advantages:

☐ It gives high reliability

☐ It provides maximum storage capacity

Disadvantages:

☐ It is difficult to prevent QR Code that is damaged

☐ Difficulty in recovery

2.4 A new encrypted Data hiding algorithm inside a QR Code implemented for an Android Smart phone system(Sayantan Majumdar, Abhisek Maiti, Biswarup Bhattacharyya, Asoke Nath)

For maintaining the authenticity of the file over the network & media, cryptographic method should be applied to verify the information that is modified. Method used is RSA encryption which is very flexible, popular and widely used.

Advantages:

☐ Encryption and decryption is very easy

☐ It is very reliable

Disadvantages:

☐ It has limitation over the storage capacity

It is impossible to split a large file and then generate them in not more than one QR Code

III. PROPOSED SYSTEM

Steps for detecting QR Code:-

Step 1: Create qr.jpg image that contain structure of QR code. Convert that image into Bit Matrix form. Bit Matrix form represents 2D matrix of bits . Bit Matrix is class of Zxing

Step 2: For detection we use MultiDetector(class of Zxing). With its object

MultiDetector detector = **new** MultiDetector(imgBitMatrixObj);

Step 3 For detection we also need to call detect() method of MultiDetector class

DetectorResult dResult = detector.detect();

Step 4: If your image contain 2D barcode it return data of QR image otherwise give null

Step 5: To get result we use DetectorResult class of Zxing Suppose it is object of DetectorResult then

dResult!= null(qr.jpg contains QR image)

dResult== null(qr.jpg does not contain QR image)

➢ Steps for encoding:

• Input data is encoded according to the most efficient mode and then formed bit stream

• Bit stream is then divided into blocks and error correction code words of each block

• All these code words are put into matrix and mask with mask pattern

• Finally function pattern are added into QR symbol

• QR code symbol formed

Decoding: It is reverse of encoding

In this paper we are focusing how the toll is collected automatically by QR code scanning. Here we are first making registration of each and every car. We are using database in which we store all the users personal details. Also we are placing   QR code at the car's rear mirror. As soon as the car passes through toll plaza. The process of scanning takes place which is done by web cam which is inbuilt in laptop placed at toll plaza. It first captures and then scans the QR code.

Then the further process of transaction takes place, money is deducted from user's bank account. Confirmation mail then goes to the respective user about the successful transaction. Then finally the barrier is opened and the authorized user is allowed to pass through toll plaza. If the vehicle of particular user is not authorized he have to manually pay the money at toll plaza and also the respective user's details is registered on the spot and then he is allowed to pass through toll plaza

IV. TECHNOLOGIES

Technologies used in our paper are, visual cryptography, NFC, java, Application program for transaction

For security purpose we use NFC technology that uses low frequency radio signals embedded in microchip or smart tag similar to QR code

NFC similar to Bluetooth or wifi data can only transmit between very short distance of no more than few centimeters.

An offline authentication mechanism for QR code based on technology of visual cryptography, it should be possible to verify the identity of accessing to the QR code and to control the permission to protect data

Uses Reed Solomon error correction until image is appropriately interpreted

Application program is written in java. Task of Application program is to perform transaction on database

Webcam have connectivity with central database which includes information regarding vehicle number, details of vehicle registration

V. CONCLUSION

This paper conclude that there are many ways for collection of toll but by using QR code scanning it is the best way to prevent time complexity. QR code shows easy recognition , storing of large data in small space, low cost for generation and scanning is easy to understand. Automatic Toll Collection Using QR Code Scanning show flexibility, reliability and easy use that control the traffic and make collection of toll easy

VI. ACKNOWLEDGEMENT

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