An Alternate Way Of Tracking Products Using Quick Response Code

B.R.Shunmugapriya[1], S.Venkataraman[2], R.Krishnamoorthy[3], D.Kalaichezhian[4], R.Rajakumaran[5],

[1]Assistant Professor(M.Tech,PhD), Department of Information Technology, SRM Valliammai Engineering College, Potheri, Tamil Nadu.[2,3,4,5]Final year, Department of Information Technology, SRM Valliammai Engineering College, Potheri, Tamil Nadu.

Abstract- *This paper talks about the real time capturing system for consumer supplies using Quick Response (QR) code in a android smart phone. In recent years, extensive research has been carried out on vision based automatic identification technology that recognize the authenticity of any product. Using Multiplexing and de-multiplexing process encode and decode the information from single QR code with special symbols and split the data back to their QR code pattern where these QR code pattern can be read by android smart phones. Standard image codes like one- dimensional barcode are not effective in retrieval of data. QR code is generated by encoding the message in binary bit stream, representing the bits by binary code pattern of 2*2 blocks and injecting the patterns into the target image by a novel image-block luminance modulation scheme. Thus the QR code generated can be used for billing process.*

Key Points- *QR code, data encoding, data decoding, android application, billing process.*

1. INRODUCTION

QR code is a 2-dimensional code. QR code is made of black and white patterns which became widely known and used for it's reading speed. The QR code contains information in both horizontal and vertical directions. The maximum data capacity if version 40 QR code is 7,089 numeric characters or 4,296 alphanumeric characters. Here we are developing an application based on QR code. First process is the generation of the QR code. The generated QR code is used for the billing purpose. We are proposing a new way for billing system using Quick Response (QR) code. Since using of barcode during the billing process is a tedious process. The read accuracy of bar code is low. The bar code is scanned only in horizontal manner. Hence the data retrieval rate is low. With the help of QR code the problem is solved. For using barcode a

separate module is needed with the hardware equipment. For scanning QR code the inbuilt camera in the smart phone is more than enough. The scanner part section is made of android application. The authentication of the application is provided. The steps for authentication is as same as the other e-commerce websites. In order to successfully establish this project internet connection is required. After the generation of QR code the codes are placed on the products. Customer who comes for shopping first installs the android application in the smart phone. The customer has to register in that application in order to scan the products. Here we are providing the advantage of bill generation to the customers. After purchasing the customer can check in the products and the bill is generated. The payment process is given in to ways, using pay pall as well as cash on delivery.

2. METHODOLOGY

The information to be encoded in QR code is divided to form string of characters, into n parts, where n is the number of QR code pattern that can be formed by string of characters. Here we are going to see how to encode the data in the QR code. In our project we are going to create a Java servlet Page Web application QR generator. There are many versions of QR code. There version of QR code is decided based on the amount of information that we are encoding. There are different modes in Encoding the data. The first step in encoding data is to decide the error correction level. There are four different level in error correction level L,M,Q,H. Each of them has their own error recovery percentage. For L Recovers7% of data. For M recovers 15% data. For Q recovers 25% data. For H recovers 30% data. Higher level of error correction will results in increase in size of the QR code. Second step is to determine the smallest version of QR code. The size of version 40 QR code is 177*177 pixels. Each version is 4 pixels larger that the previous one. Each version has a maximum capacity and the capacity is based on the mode of encoding. Further the capacity is also reduced by error correction levels. In our project we use only numeric and alpha numeric character encoding. The next step is the addition of mode indicator. This mode indicator indicates the type of encoding that is used. For numeric mode we use 0001 and for alpha numeric mode we use 0010. Next step is the addition of character count indicator. It is a string of bits that represents the number of character that are being encoded. Count the number of characters in the original input text, then convert that number into binary. The length of the character count indicator depends on the encoding mode and the QR code version that will be in use. To make the binary string the appropriate length, pad it on the left with 0s. For example if encoding **HELLO WORLD** in a version 1 QR code in alpha numeric mode, the character count indicator is 9 bits long. The character count of hello world is 11. In binary 11 is 1011. Pad it on the left to make it 9 bits long:000001011. Put this after mode indicator to get along the bit string:0010 000001011. The next step is encoding process using the desired mode. In order to encode the name of the product alphanumeric mode is used. The alphanumeric mode is explained using the above mentioned instance. Consider the word HELLOW WORLD. First is to split the word into pairs H,E etc. Each alphanumeric character is represented by a number. For each pair of characters, get the number representation of the first character, multiply it with 45 and add the number of the second character to it. Now convert it into a 11 bit binary string. Padding on the left with zero's if necessary. For odd number of characters convert it to a six bit

binary string. In order to encode the numbers in QR code numeric mode encoding is used. First, group the numbers in a pair of three(or fewer than three). Convert them to binary. Now add mode indicator and character count indicator before the binary data. Till now the name and price of the product is encoded. Next step is to make the data perfectly fit in the QR code so padding of 0 may be necessary. For example take the above instance, the length of the word is 74 bits. The maximum capacity of the QR code is 104 bits. To achieve the maximum capacity padding of zero bits are done. First thing is the addition of some bytes 11101100 00010001. These bytes are equivalent to 236 and 17 respectively. Form the above instance we see that the total length is 80 bits long. The remaining bits are add by calculating the difference between total capacity and the present length and then divided by 8. Thus the desired capacity for the QR code is generated. Following this error correction coding is done.

3. SYSTEM ANALYSIS

3.1 EXISTING SYSTEM:

Barcodes are often intended for consumer use where using a barcode device, a consumer can take an image of a barcode on a product. The barcode must be read using computer vision techniques and barcode can hold information, it makes this vision task in consumer scenarios unusually challenging. Barcode decoder can give the vision algorithm feedback, and develop a progressive strategy of the product.

Disadvantages:

System software failure may cost more delays and a light beam might be refracted by water particles suspended in the atmosphere, resulting in focus distortion. In laser scanning, durability and cost are the two disadvantages and a barcode becomes scratched or crumpled the reader may not be able to read it. If the scan rate of a reader is exceeded by the speed of movement of the bar codes, a loss of reading accuracy, together with failure to read a bar code. A bar code reader cannot read a bar code if there is any obstacle between the reader and the bar code.

3.2 PROPOSED SYSTEM:

In the proposed system, we are using Multiplexing and de-multiplexing algorithm for recognizes QR code image using smart phones to provide various services that can recognize the authenticity of any product. So QR code verifies products by capturing it through the smart phone, then decodes and sends it to the server for authentication. The customer forwards the selected product list to the server that enables the consumer to decide based on the products authenticity.

Advantages:

A simple scan captures the desired information. The Decoded data can be stored in the server and can be viewed by the cashier. High accuracy in image capturing. Customer can easily detect the QR code image, via his Android mobile itself.

## 4. MAIN FEATURES OF THE THE SYSTEM

4.1 GENERATION OF QR CODE

In this session are creating QR codes for encoding the information about the products. The product contains name, code, quantity and price. Each pattern is encoded and represented each module in QR code with black and white special symbols. QR code can hold information more than other bar codes. The format of QR Code includes unique Finder Pattern (Position Detection Patterns) located at three corners of the symbol and can be used to locate the positioning of the symbol, size and inclination.

The generation of QR code follows series of steps. The original information is divided into small parts. These small parts are converted into patterns. These information are bind into single digital code which constitutes the QR code image. The above diagram shows the general structure of the QR code. This diagrams describes about how the information are arranged in the QR code and also tells about the data retrieval process. The information are encoded in the middle of the QR code. The information are encoded in black and white patterns. There are three way points from which the data can be taken. The data are arranged in orderly manner using alignment patterns. The three important points are connected using the timing patterns. The timing patterns are used as the pathway forthe data transfer process. The data transfer rate is high since the timing patterns acts as the path way for data transfer.

4.2 QR CODE SCANNER

This module is used to scan the QR code and read the value of the QR code inside the mobile. QR code is a matrix bar code designed to be read by Smartphone. The code contains of black modules arranged in a square pattern on a white background. The information encoded may be text, a URL, or other data. If the user selects the product, the details will directly forward to the server. While scanning the QR code De-multiplexing process takes place. De-multiplexing means conversion the encode information into to original information. The encoded Information is again converted into patterns and then the original message is obtained.
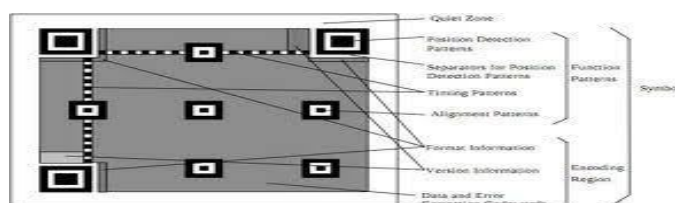
4.3 SIMPLICITY

The proposed work provides a simple and efficient way for bill payment process in real time super markets. The android application is integrated with secure payment gate for providing secure payment transactions.

5. IMPLEMENTATION

The proposed method includes two main phases of works: 1) signal-rich-art code image generation; and 2) message extraction. In the first phase, given a target image T_I and a message M, a signal-rich-art code image IC is created by four major steps:

Step 1.1 - transform message M into a bit stream B of codes;

Step 1.2 - transform every three bits of B into four bits and represent them by a binary pattern block, resulting in a *pattern image P_I*;

Step 1.3 - modulate each pattern block I_t of P_I by two *representative values* calculated from the Y-channel values of the corresponding block I_b of target image T_I, yielding a *modulated* pattern image IP';

Step 1.4 - replace the Y-channel of target image T_I with P_I' to get a signal-rich-art code image C_I as the output. In the second phase, given a camera-captured version C_I' of a *paper or display copy* of the signal-rich-art code image C_I, a message M', which is supposed to be identical to M, is extracted from C_I' by four major steps:

Step 2.1 - localize the region C_I'' of the original part of the signal-rich-art code image C_I in C_I'; Step 2.2 -correct the geometric distortion in C_I'' incurred in the image acquisition process, yielding a corrected image C_I''';

Step 2.3 - identify the unit blocks in C_I''' automatically and divide C_I''' accordingly into pattern blocks,×2uniteachblocks;with2

Step 2.4 - binarize each pattern block of C_I''', recognize the result to extract the bits embedded in it, compose all the extracted bits to form a bit stream B, and transform B reversely to get a message M'.

The first step is that creation of database. The database is creased for the following properties 1) Registration 2) administrator authentication 3) Product details. The registration is given as an android application authentication. The customer needs to register in market's android application. The android app is integrated with the scanner.The camera acts as a scanner. Camera is converted into a scanner with a simple capture function. The QR code is generated for the product using QR code generator a JSP application. The JSP application is designed using the above mentioned algorithm. The message is converted into binary bit stream and encoded in the QR image. This image is scanned and the information is retrieved from the QR code image. The above algorithm is used for the generation of the QR code. IP address is used for client server interaction. First the customer login application and proceed for scanning the products. After finish purchasing the scanned products can be viewed by view products option.

There the payment mode can be selected and proceed for bill payment process. The PayPal is a developer payment software that shows how the net transfer is done. PayPal also generate the bill payment confirmation message to the registered phone number. The direct pay enables the customer for cash on delivery option.
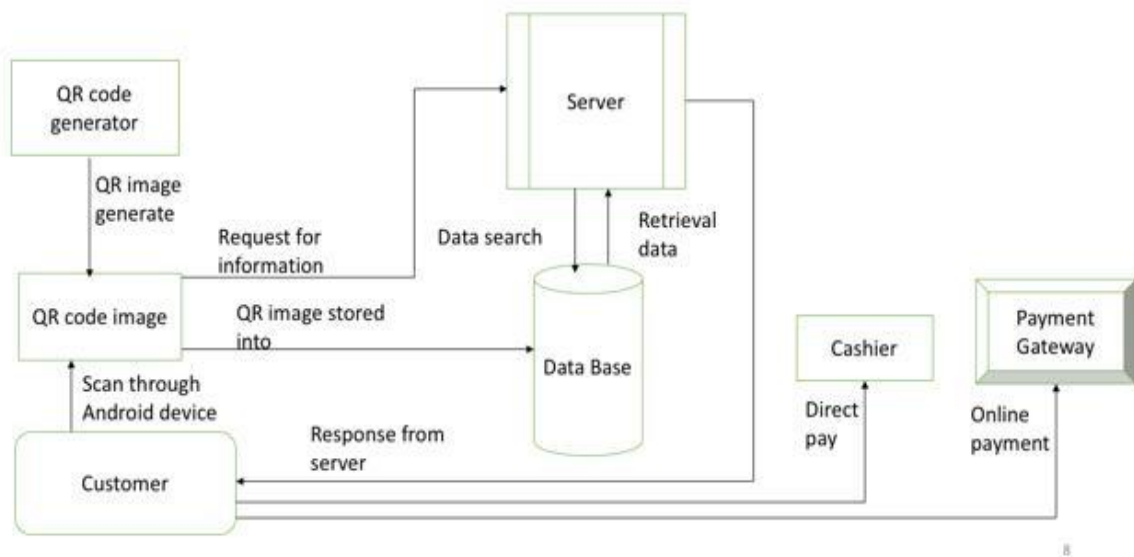
6. TECHNOLOGY USED

Java: Java is Platform Independent. Java is an object-oriented programming language developed initially by James Gosling and colleagues at Sun Microsystems. It implements a strong security model, which prevents compiled Java programs from illicitly accessing resources on the system where they execute or on the network. Popular World-Wide Web browsers, as well as some World-Wide Web servers and other systems implement Java interpreters. These are used to display interactive user interfaces, and to script behavior on these systems.

ANDROID: Android is a complete set of software for mobile devices such as tablet computers, smartphones, electronic book readers, notebooks, set-top boxes etc. It contains Linuxbased OS, middleware and key mobile applications. It can be thought of as a mobile operating system. But it is not limited to mobile only. It is currently used in mobiles, tablets, televisions etc.

XML: XML is a mark up language for documents containing structured information. Structured information contains both content (words, pictures, etc.) and some indication of what role that content plays (for example, content in a section heading has a different meaning from content in a footnote, which means something different than content in a figure caption or content in a database table, etc.). Almost all documents have some structure. A mark up language is a

mechanism to identify structures in a document. The XML specification defines a standard way to add mark up to documents.

MYSQL SERVER: Microsoft SQL Server is an application used to create computer databases for the Microsoft Windows family of server operating systems. Microsoft SQL Server provides an environment used to generate databases that can be accessed from workstations, the Internet, or other media such as a personal digital assistant (PDA). MySQL is a popular choice of database for use in web applications, and is a central component of the widely used LAMP open source web application software stack—LAMP is an acronym for " Linux, Apache, MySQL, Perl/PHP/Python". MySQL works on many different system platforms, including AIX, BSDi, FreeBSD, HP-UX, eComStation, i5/OS, IRIX, Linux, Mac OS X, Microsoft Windows, NetBSD, Novell NetWare, OpenBSD, OpenSolaris, OS/2 Warp, QNX, Solaris, Symbian, SunOS, SCO OpenServer, SCO UnixWare, Sanos and Tru64. A port of MySQL to OpenVMS also exists. MySQL is primarily an RDBMS and ships with no GUI tools to administer MySQL databases or manage data contained within the databases. Users may use the included command line tools,[citation needed] or download MySQL front-ends from various parties that have developed desktop software and web applications to manage MySQL databases, build database structures, and work with data records.

7. SYSTEM REQUIREMENTS

The purpose of the Software Requirement Specification is to produce the specification of the analysis task and also to establish complete information about the requirement, behavior and other constraints such as functional performance and so on. The goal of Software Requirement Specification is to completely specify the technical requirements for the software product in a concise and unambiguous manner.

7.1 SOFTWARE REQUIREMENTS

The operating system that is used here is windows 10. The technology used here is android jelly bean. The IDE used here is Eclipse 3.4(min). The emulator used here is Micro emulator 5055. Plug in used here is ADT plug –in. The tools used here are Android SDK 1.2

7.2 HARDWARE REQUIREMENTS

The minimum version of the process the is required to do the calculation is Intel Pentium 4. The version of motherboard required is Genuine Intel. The minimum amount of ram required is 1 Giga byte. The space required for the execution of the project is 80GB.

8. RESULT

We are currently working on the development of a full fletched android based mobile application. Nowadays there are many advancement in smart phones which enables us to use QR code efficiently. Also we are exploring to expand this concept in different OS platforms.

We also developed a advanced level billing system. This system can be implemented in the real time shops with minimum cost. We finished developed an android application for the mobile and is currently under testing phase. Soon a working model will be ready for presentation.

9. CONCLUSION

This paper talks about the usefulness of QR code. This also describes the functions and applications of the QR code. In starting the papers tells about the basic properties of the QR code. The abstract tells about the generation of the QR code. The algorithm also explained in a detailed manner. The Encoding of information also shown. The technology and the language used is also explained in detail. The module that a going to be implemented and the architecture diagram is explained in a detailed manner. It concludes with the significance – a real time capturing system using QR code in android smart phones. The future enhancements are the increasing information in the QR code using multiplexing. The other enhancement is that of developing customer application in IOS.

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