QR BASED E-SAFE MARKET AND DELIVERY

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Abstract

Online shopping is popular from year 2010 and is getting faster and wider among the public in day to day life. In the entire equation of E-commerce supply chain, delivery people play a vital role. All the promises the company make to acquire or retain the customers to a large extent lies on these people. Besides toiling hard, delivery guys also face abuse or even physical assault. Now there is another side of the story too, and it's about the end consumers, who often come across scary situations. There have been numerous instances of stalking of female customers by delivery guys. In most cases customer's alertness and timely intervention of authorities has prevented the worse. This system is proposed using embedded systems, Python IDLE by using QR code and Android application using JAVA and Android Studio.

Keywords: Embedded systems, Android Studio, Python IDLE, QR code

1. Introduction

Online shopping is the process whereby consumers directly buy goods or services from a seller in real-time, without an intermediary service, over the Internet. It is a form of electronic commerce. The customer orders a product from an online website or a web application. The web application can be implemented in the form of an android application with web view. The customer orders the product and the customer details are sent to the seller. The product is packed and delivered to the customer address. This is the existing system we use in the common life. It has various issues when it comes to safety of customer. The customer's personal details are open to the delivery people involved. This causes a major safety issues to the customers. There are many cases where delivery person involves in crime activities using the details of the customer. In such cases it causes a trust issue in case of safety.

Hence in this project we are introducing an E-commerce and delivery automation based on QR code. In this system, when the customer orders a product the customer personal detail and the product detail goes to the data base and this data base is shared with the dispatch store. The respective product been ordered by the customer is kept at the dispatch store by the seller. The dispatch store is placed by the E-commerce platform. The app generates a QR code while ordering a product. The dispatch store has a QR code decoder and a fingerprint sensor which recognizes the QR code and delivers the product to the customer. We use finger print sensor as additional feature to achieve more safety to the product. The regular customers are mostly looking for cheaper products online. This system allows the customer to shop virtually using the Internet and allow customers to buy the items and articles of their desire from the store. This method is more advantage compared to the usual delivery system.

This system can be implemented to any shop in the locality or to multinational branded shops having retail outlet chains. The system recommends a facility to accept the orders 24*7 and the safe delivery system which can make customers happy. If shops are providing an online portal where their customers can enjoy easy shopping from anywhere, the shops won't be losing any more customers to the trending online shops such as amazon, flip cart or eBay. Since the application is available in the Smartphone it is easily accessible and always available.

2. Related works

This paper [1] [5] presents an efficient method for QR code recognition. This method automatically detects the QR code and displays the complete information of the product. This method is developed in python environment using Open CV library. In this paper [7] the importance of QR code and how will it is handy is

explained. The QR can store large amount of data as compared to 1D barcodes and it can be decoded at high speed using any handled device like phones.

Today and Tomorrow Vending Machine culture is introduced by Japan. [8] This paper initializes the placement of vending machines in street corners for food, groceries and cloths services. This paper explains about the future possibilities towards advanced vending machine service culture.

In this paper [3] fingerprint sensors are used to validate the person by either sending picture password or OTP via SIM using GSM module to the user registered mobile number saved in the database that is local SD card in order to access the door. If the entered password matches, door will be opened automatically otherwise a message show incorrect password that will be displayed on TFT display and a notification will be sent to the owner that the security was tried to be breached.

In this paper [4] the presence of surveillance camera compromises the security of using passwords in public places. Hence the usage of QR code extension is used to communicate in public using their smartphones and camera interface. [6] The working of the QR codes and the collection of data is only based on encrypting and decrypting of the QR.

## 3. Proposed method for QR based Delivery system

In proposed system, we are introducing a model of a dispenser which dispenses ordered items to the consumers. It is based on QR code generation through mobile app. The dispensers are to be owned by the E-commerce platforms and are to be filled with the delivery package on the time of requirement. The product delivery confirmation and the QR code are provided by the mobile app to the consumers. The consumer can pick their product at any time from the dispenser using the QR code and fingerprint. Once the QR code matches with the product's QR code, the dispenser box opens and the product can be taken by the consumer. The processing details are displayed using LCD. The proposed system consists of Hardware as well as the software parts. The software part includes the QR code generation and decoding process and the hardware part includes the QR matching and Fingerprint authentication system.

The QR code consists of black squares arranged on white background, which can be read by using the camera as scanner and then processed using the Reed-Solomon error correction method for the proper interpretation of the image. The information is stored in both horizontal as well as vertical components of the image. Hence there will be more data available rather than using a barcode. The QR code system consists of a QR code encoder and decoder. The encoder is responsible for encoding data and generation of the QR Code, while the decoder decodes the data from the QR code. Figure 3.1 shows the overview of the QR code working. The plain text, URL, or other data are given to the QR code encoder, and it generates the required QR code and when we want to access the data of the QR code, QR code is decoded via QR Code decoder (scanner) which retrieves the data of QR code. The steps in encoding process of QR code are explained in Figure 3.2.

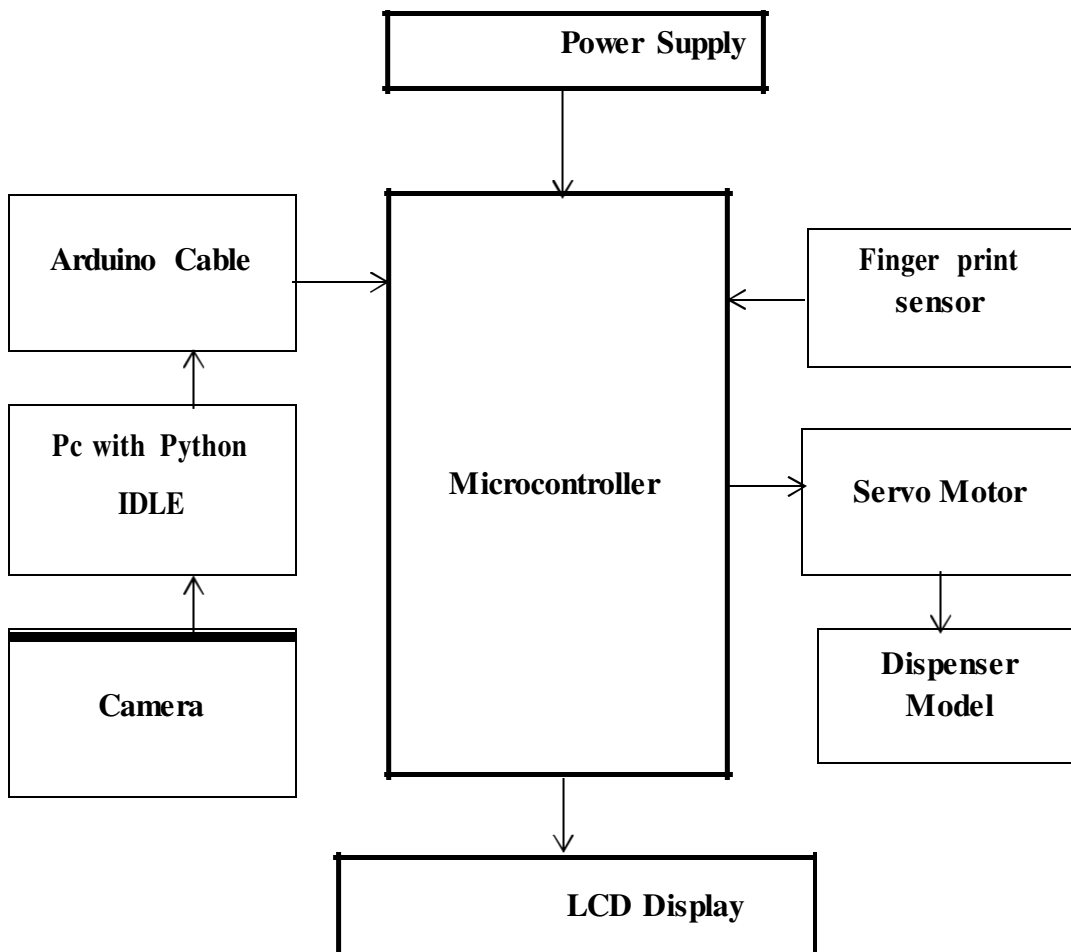

Figure 3.1 Overview of QR code

• Data Analysis: The QR code consists of a string of text. It may be of numeric, alpha numeric, byte and Kanji. Each mode of data can be encoded as 0's and 1's. Each mode has unique method to convert to bits. The data are encoded based on least possible bit as well as least bothered method. Hence the first step is the determination of which step or method to be used to encode the bits and then to determine the least bothered and easy method.

• Data Encoding: Once the method is determined the encoding process must be carried out. In this process the text is converted to the string of bits. These bits are split into data code words that are 8 bits long each.

• Error Correction Coding: Error correction is used in QR code. The error correction bits are generated using the string of bits we obtained as a result of encoding process. These error correction code words are obtained using a process called Reed-Solomon error correction. During scanning process the scanner scans both the data code words as well as error code words. By comparing both the data and error code words the data can be read and using this comparison the data can be read correctly.

• Structure Final Message: The data and error code words are to be arranged in the proper order based on the QR specifications.
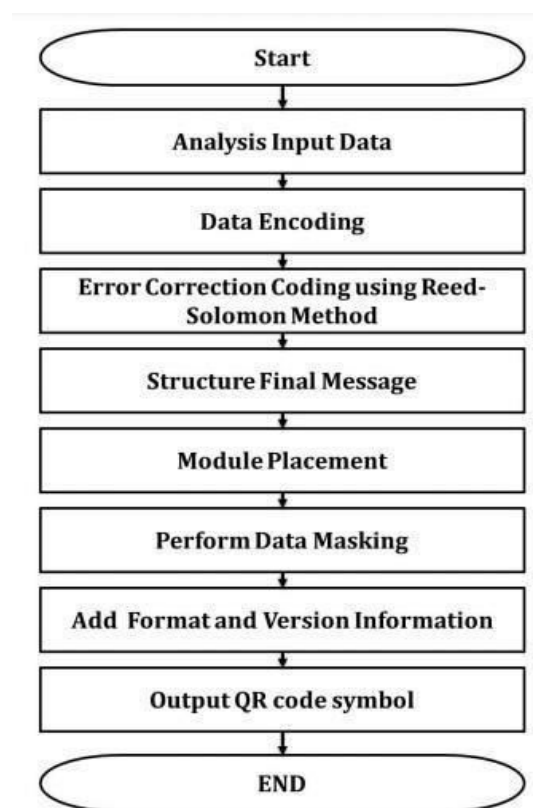
Figure 3.2 QR code encoding

• Module Placement in Matrix: Once the data and error code words are arranged in proper order the bits must be placed in the QR code matrix. It should be arranged based on the specific way.

• Data Masking: The pattern of the QR code changes based on the amount of data coded and the arrangement pattern. At some cases these pattern is difficult for the scanner to scan. Hence to overcome this disadvantage eight masking patterns are initialized. The QR code acts according to the corresponding masking pattern.

• Format and Version Information: Finally the format and the version information are added to the QR code. It is done by adding the pixels in particular area of the codes.

The block diagram of the proposed system Figure 3.3 is explained as follows. The camera scans the QR code and it acts as a scanner. The QR code is decoded using the program fetched in the PC. The decoded data is the fed to the Atmega328p micro controller placed at the Arduino Uno board. The microcontroller is given with a power 12v supply. Microcontroller is fed by the Embedded C program. Once the QR code is scanned the microcontroller moves to the next step and asks for the authentication. The guidance is provided by the LCD display connected to the microcontroller. The authentication required is the finger print. Once the fingerprint data matches with the data of the QR code the pulse signal gets generated and this pulse signal makes the servo motor to rotate and make the dispenser model to open.

Figure 3.3 Block diagram of proposed system

Decoding data from the QR code is the reverse of the encoding procedure. Figure 3.4 shows an overview of the decoding process.

- Recognizing Modules: Recognizes the color code and identify the bits 0's and 1's.
- Extract Format Information: The format information along with the masking pattern is decoded from the bits of data once the Error correction code is applied.
- Determine version information: The version information is decoded from the QR code.
- Release Masking: The decoded masking pattern should be removed from the data.
- Error Detection and Correction: Error is corrected using the error correction code words.
- Restore Data and Error Correction Code words: The Error correction code added during the encoder process should be removed from the data code words.
- Decode Data Code words: The data code word is then segmented according to the mode indicator and character count indicator. And finally the output is obtained in the form of text.
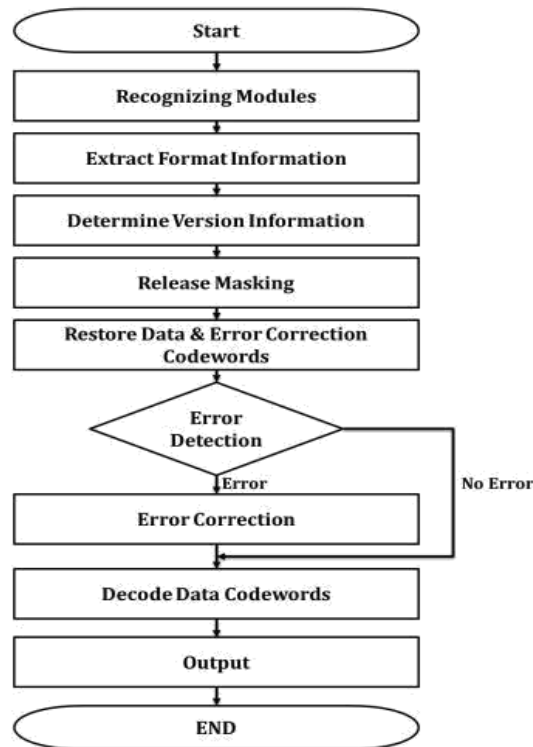
Figure 3.4 QR Code Decoding

4. Results and Discussions

The result and discussion derived from the QR code based E-safe market and delivery is discussed in this section.

4.1 QR code generating and obtaining of customer details

The QR code for the verification of customer ID is generated using JAVA. The generated QR code is scanned and the customer detail is displayed on the screen which is shown in Figure 4.1.
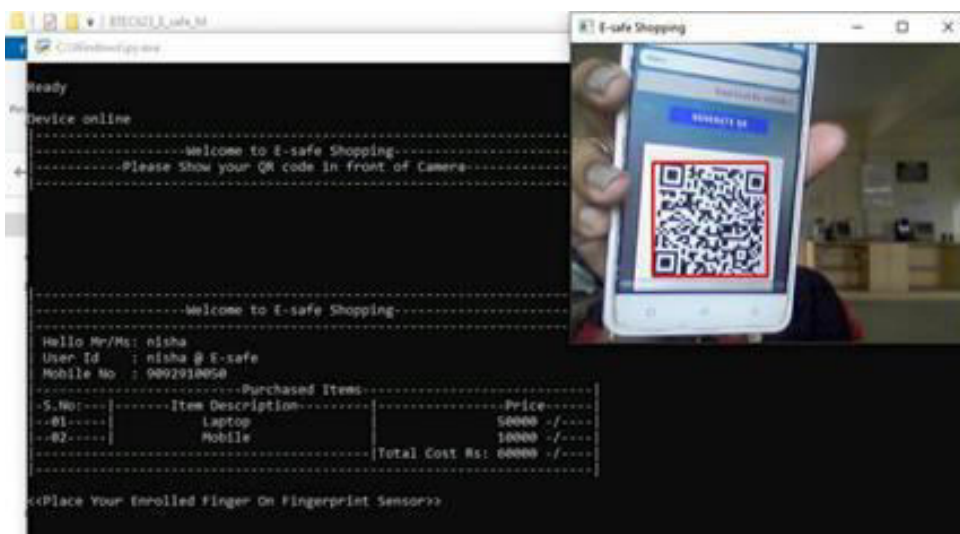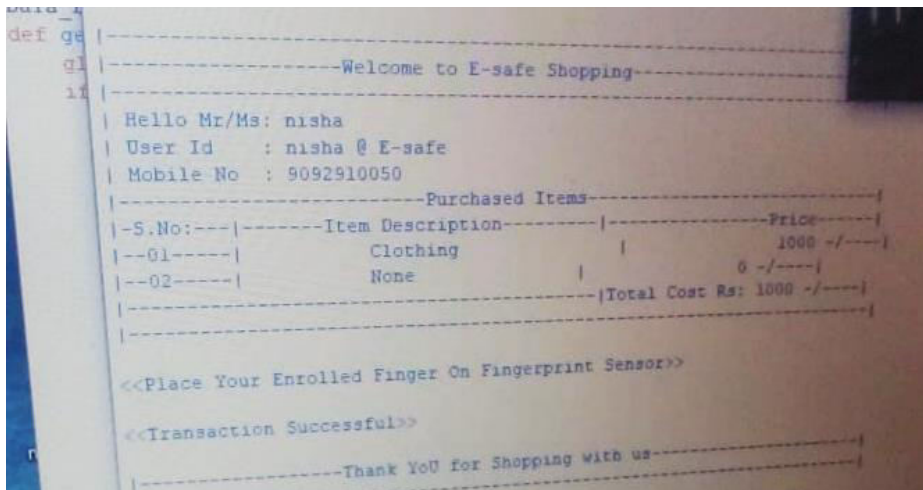

Figure 4.1 QR code scanning process

4.2 Authentication process

The customer details are authenticated using fingerprint scanning process which is also displayed on the PC screen is shown in Figure 4.2.

Figure 4.1 Authentication of Finger print process

4.3 The dispenser model

Once the customer ID is verified to be true the servo motor runs and the dispenser model opens. Otherwise the authentication fails which is displayed in the PC and the servo motor does not run disabling the dispenser model to be opened .

5. Conclusion

The proposed system of QR based E-safe market and delivery can achieve safety to the customer especially women. The two-step authentication system for easy delivery of the product to the customer is accessed using QR code generation that is QR code encoding and QR code decoding using python program. For the decoding of QR the scanning process should be done and this is achieved using the pc camera. The two-step authentication method also provides the ease of access and the 24x7 delivery time feature. The Finger print sensor is used for the secure product delivery. In India, about 68.1% of the population uses online shopping by the year 2021. Among which 43% of the people faces tough situations during product delivery. There are about twenty thousand crime cases that is been booked in the cyber-crime as well as police station by the end of year 2021. Most of the cases been booked are women harassment and child abuse. Therefore with the use of the proposed system the chance of the women and child abuse can be reduced to 15%-20% and even less with proper development in this system.

5.1 Future enhancement

This project has a wide scope for future development because the requirements of the end user are always dynamic. The system can be further refined by extending the data bases for large online shopping network.. Instead of dispenser model vending machines and Conveyer belts can be implemented. Instead of two step authentication for safety purpose extra authentication can be included like OTP generation, Iris scanning or face recognition.

References

1. Arju Aman. Aryan Singh. Ayush Raj and Sandeep Raj. (2020) 'An Efficient Bar/QR Code Recognition System for Consumer Service Applications', Indian Institute of Information Technology, Bhagalpur, 813210, India.

2. Angulakshi, M. Brindha, K. Deepa, M. Rathi, R. and Sudha, S. (2020) 'QR de noising using a Hop field Network', Vellore, India.

3. Bharath, S. Dikshit, K, J. Meenakshi, N. and Monish, M. (2019) 'Arduino Based Smart Fingerprint Authentication System', Hindustan Institute of Technology and Science, Chennai, India.

4. Hsin Jui Yeh. Gaurav Sharma. Irving Barron. and Karthik Dinesh. (2020) 'Dual Modulated QR Codes for Proximal Privacy and Security', Graduate Student Member and Fellow, IEEE.

5. Jairo Enrique Serrano Castaneda. Jorge Franco Ibanez. and Juan Carlos Martinez Santos. (2018) 'An IOT Camera System for the Collection of Data Using QR Code as Object Recognition Algorithm', Facultad de Ingenieria, Cartagena, Colombia.

6. Nitin Rakesh. and Partiksha Mittra. 'A Desktop Application of QR Code for Data Security and Authentication', Amity University, Uttar Pradesh, Noida, India.

7. Sumit Tiwari. (2016) 'An Introduction to QR Code Technology', Dept. of Technical Education, SITS Educators Society, Jabalpur, Madhya Pradesh, India.

8. Toshio Yokouchi. (2010) 'Today and Tomorrow of Vending Machine and its Services in Japan', Directforce Association, Japan.