



Smart Shopping using QR

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Abstract:

The great rise in the living standards has led to a huge growth in the construction of shops with ample goods and variety of products. It has become a great concern for the vendors and customers to build a fast, simple and convenient shopping system. Since digital economy has been gaining lot of popularity in recent times, this study focuses on a concept of shopping system that can be designed on smart phones with the help of QR code generation and recognition technology. This study aims on placing unique QR codes on the product samples, the customer will have to scan the QR code of the product to add the product to the virtual cart. The customer will receive the details of the product and the bill of the complete shopping and can make the payment according to customer's choice. This paper is a study on the shopping systems which uses QR code.

Keywords: QR Code, Android, shopping, virtual cart, mobile phones.

I. INTRODUCTION

Now-a-days purchasing and shopping at big malls is becoming a daily activity in metro cities. We can see huge rush at malls on holidays and weekends. The rush is even more when there are special offers and discount. People purchase different items and put them in trolley. After total purchase one needs to go to billing counter for payments. At the billing counter the cashier prepare the bill using bar code reader which is a time consuming process and results in long queues at billing counters. But this tedious ritual may become a thing of the past. With the improvement of living standards, most big shopping malls experienced reconstruction and scale expansion. Currently, shopping malls are bigger with more abundant goods and more variety of wares. People are in the pursuit of high quality consumer goods. At the same time, the pursuit of efficient shopping is gradually revealed. To solve the difficulty in customer shopping, large stores have launched a mall layout map, Touch Mall shopping system, and other shopping guide newsletter [1]. In recent years, shopping guide has become a hot career. Shopping guide mall layout map is most common in the mall as a shopping guide, which shows the customers position and the layout of mall section directly. However, it may be little help for those first time customers or customers with bad sense of direction. Touch mall shopping guide system is the electronic version of shopping guide and mall layout map. This system is rare in domestic malls with high maintaining cost, thus is not suitable for small and medium sized shopping centers. Express Shopping newsletter notifies the customers with recent promotions, and can provide convenience for shopping. Yet the newsletter imposes threat to resource and environment, for its color ink printing paper[2]. On the other hand, the rising living standards is reflected in the mobile phone popularization. The phone is upgrading with each passing day, and now the Internet access, picture taking has become the basic function of a mobile phone. GPS (Global Positioning System) function is implanted in smart phone, and the built-in electronic map can help its holder acquire the surrounding information and make a choice. Wireless music, mobile games, mobile entertainments and reading has become the major applications. Significant increase is in mobile phone

shopping. With the ever changing mobile phone functions, the production cost of smart phones is continuously reduced. For common users, the innovative shopping will be very popular if the cost is lowered enough. This paper presents a proposal of shopping guide service using smart phone as the carrier. The system which we are going to develop is implemented using an Android application. In Offline mode, the customer needs to scan the product which he/she wishes to purchase. The application mentioned here would read the scanned QR Code of the product(s) add it to the shopping cart in the application. It provides methods to change the quantity of product/s purchased and edit the list. Along with this the customer would be informed about the on-going offers in the store. Payment can be according to customer convenience. Our aim is to develop a system that can be used in shopping malls to solve the above mentioned challenge. It will consist of a QR Code reader. All the products in the mall will be equipped with QR-Codes.

II. RELATED WORKS

This chapter contains the review of the relevant literature for this dissertation which describes the previous works performed related to the usage and implementation of QR code. Shopping is a tiresome and prolonged job. It has been observed that growing trend of online shopping has reduced some load, but there is a great difference in actually going to shops and checking products with our own hands to get the feel of their quality and features, which we cannot experience online. Customers also think twice to carry out online purchases due to fear of less secure transaction process which might lead to hacking of user's sensitive data, insecurity of credit/debit cards, unreliability or breach of privacy. These days digitalization is gaining lot of significance and so such rise in the living standards is also reflected in mobile phone popularization. These days picture taking has become the basic function of a mobile phone with each passing day. In traditional shopping, the customer has to wait in long queues at the cash counter. The cashier scans barcode for every individual product and then generates the bill. This utilizes lot of time and energy of both the shopper as well as cashier. This

system considered in this study targets at removing flaws of both kinds of shopping, and bridge the gap between physical and virtual world. It would provide a better shopping experience for the customers by saving their time at the shopping mall just by using their smart phone. This system would also allow the vendors to track the customer purchases. This study ought to use smart phone applications that allows the user to scan the products they wish to purchase, generate the bill for the products they have selected, and make the payment. Instead of using bar codes, this study proposes to use Quick Response codes to identify each product. A barcode is an optical machine-readable exemplification of data relating to the object to which it is committed. Primitively barcodes represented data by varying the widths and spacing of parallel lines, and may be referred to as linear or one-dimensional. Later they evolved into rectangles, dots, hexagons and other geometric patterns in two dimensions. Barcodes fail for a lot of reasons. The reasons barcodes fail fall into two broad categories: they either fail because of poor image quality or because of flawed data quality. Shrink wrap or lamination often causes barcode scanning problems, especially when the over-wrap heat seal impinges on the barcode or quiet zones. Poor print quality due to excessive press gain is a common cause of barcode failure. The bars and spaces in a barcode can tolerate a certain amount of gain or loss in width, but when the printing process exceeds that tolerance, the barcode will fail. QR code stands for Quick Response Code, Which is the trademark for the type of matrix barcode which was invented by the Japanese corporation Denso Wave. QR code has a number of features such as large capacity data encoding, dirt and damage resistant, high speed reading, small print out size, 360 degree reading and structural flexibility of application. QR code is a two dimensional i.e. matrix type symbol with a cell architecture arranged in a square. Fig.1 shows the structure of QR code. QR codes consist of different areas that are reserved for specific purposes. Finder, separator, timing patterns and alignment patterns comprised function patterns.

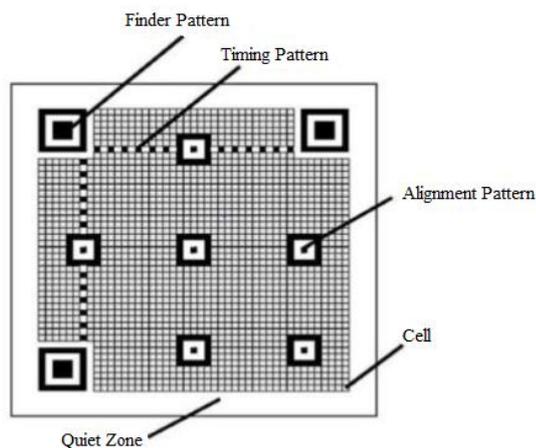


Fig.1: Structure of QR Code

Figure.1. Structure of QR Code

The process of bill generation will be automatically carried out. Once all the items are scanned and the user confirms the purchase order, the final bill is generated and the user is redirected to payment options. The customer can pay the payment according to his/her convenient options. "Recognition of QR code with mobile phones" by Yue Liu and Ju Yang, 2008 [6]. It describes Quick Response Code has been widely used in the automatic identification fields. In order to adapt various sizes, a little dirty or damaged, and various lighting conditions of bar code image, this paper proposed a novel implementation of real-time Quick Response Code recognition

using mobile, which is an efficient technology used for data transferring. An image processing system based on mobile is described to be able to binarize, locate, segment, and decode the QR Code. Their experimental results indicate that these algorithms are robust to real world scene image. They came to a conclusion that even if bar code is a fast, easy, accurate and automatic data collection method and it enables products to be tracked efficiently and accurately, the implementation price of two-dimensional bar code reader is expensive. "Conception and Implementation of a Supermarket Shopping Assistant System" by Antonio Marin, Luis Felipe, 2012 [7]. They proposed a system which is based on the interaction of three different kinds of electronic devices: a) mobile devices that users carry with them (smart phones or electronic tablets), b) autonomous mobile robots assisting users by displaying information and carrying groceries, c) the supermarket technological infrastructure (database servers, Wi-Fi and Bluetooth access points, etc.). These components interact through a common technological platform, allowing the user to prepare his/her shopping list, and then using it with the robot as an assistant, during his/her shopping process. Over last year's robots have evolved from manufacturing cells, to museum guides, passing successful commercial applications, such as vacuum cleaners, lawn movers and pool cleaners. As both, robot's hardware and software became more complex, new applications, particularly to serve humans in a closer way, are projected. Service robots should have the ability to move and interact with their environment, but mainly with their users, common people, in a friendly way. "Cloud based shopping guide system using QR code" by R. Anand, R. Regan, V. Mohanraj 2012 [8]. This paper states that with the improvement of living standards, shops are growing bigger after constructing with more abundant goods and more variety of wares. Therefore, building a simple, fast and convenient shopping guide system has become a mutual concern of merchants and customers. In recent times mobile phone has become a popular consumer product, a simple optimization method was given to design shopping guide system run on smart phones, with the help of QR code generation and recognition technology. For efficient shopping system, unique QR codes are created to record the location of goods placed. Phone recognizes the QR Code through the camera. After being recognized, the code will be compared with the data in the cloud. It provides different services according to the customer's choice and customers receive the latest promotions of businesses and can find the best route from his current location to the destination. "Design of Advanced Shopping Trolley based on QR Code" by Prof. Dr. S. R. Patil, March 2016 [7]. This system proposes advanced shopping trolley based on Quick Response (QR) code. This is done by Android smart phone. It reduces the wastage of time during shopping as it is a day to day regular activity. This system is divided into two sections- Transmitter and Receiver section. In this system, billing of product done automatically by using android app. The customer will have to put the product in front of QR Code scanner; it scans the Code and saves the information of the product in microcontroller. They have used LCD for the display of product information to customer. After that this information is sent to the counter PC via Zigbee, in case customer does not have smart phone, he can pay at the counter. "A novel approach for encoding and decoding of high storage capacity QR code" by Ashwadeep Singh, Vikas Verma, Gaurav Raj, 2017 [11]. This paper states that with the enhancement in mobile technology, QR (Quick Response) codes became popular. QR codes are widely used in our daily life from social media websites to cashless shopping wallets, ERP (Enterprise

Resource Planning) software implementation to display advertising and digital marketing etc. In this paper they have focused upon one major issue with the QR codes. They have focused upon various techniques used to increase data storage capacity of QR code. This paper introduced the basics of QR codes, their versions, creating and scanning process, its various applications, features of QR codes and its structure to understand its basic functionality. Thereafter they have compared three different kinds of bar code, quick response code and color quick response code, on the basis of its storage capacity, error resistance, 360 reading and other factors. They have mentioned various techniques used by researcher to increase data storage capacity of QR codes. They have also proposed encoding and decoding algorithm, which will result into high storage colored QR code.

III. SYSTEM DESCRIPTION

Our application runs with the below deployment setup comprising of Android phones, Windows 7 laptop with MySQL installed, a wireless router for connectivity and an existing client web server. **Android Phone:** It is most important component and must have to the user. User uses his/her Mobile phone to scan the QR code to get the details of the product and do the shopping as per his/her requirements. Employees also must have android phones as all the work is to be done through it. The details of the shopping will be directly sent to the employee through whom he/she can perform his/her work. **Router:** A router is a network infrastructure device which connects separate networks, allowing information to route from one to the other. Users (customers or employees) can fetch information from server by connecting to the network without internet.

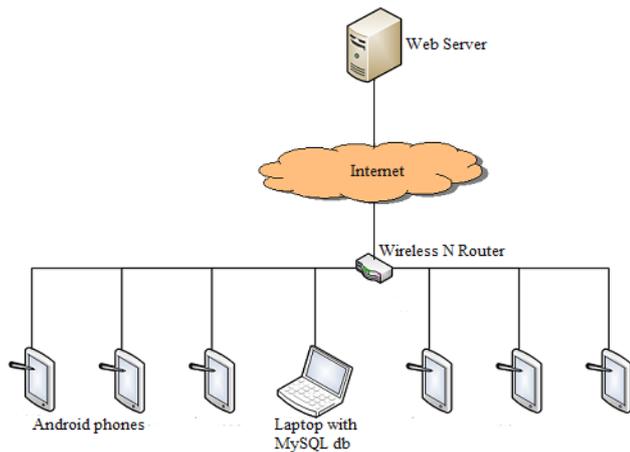


Figure.2. Architecture of proposed system

Server: A server stores, retrieves and send files and data to other devices on a network. It provides the necessary data of the product scanned by the user. Thus user can do shopping easily.

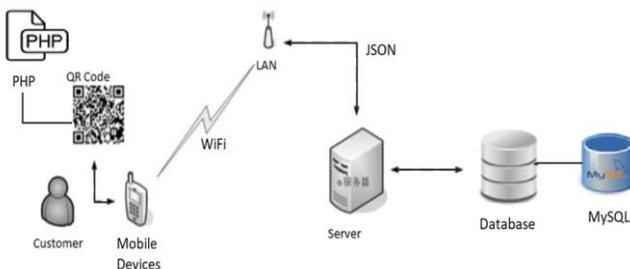
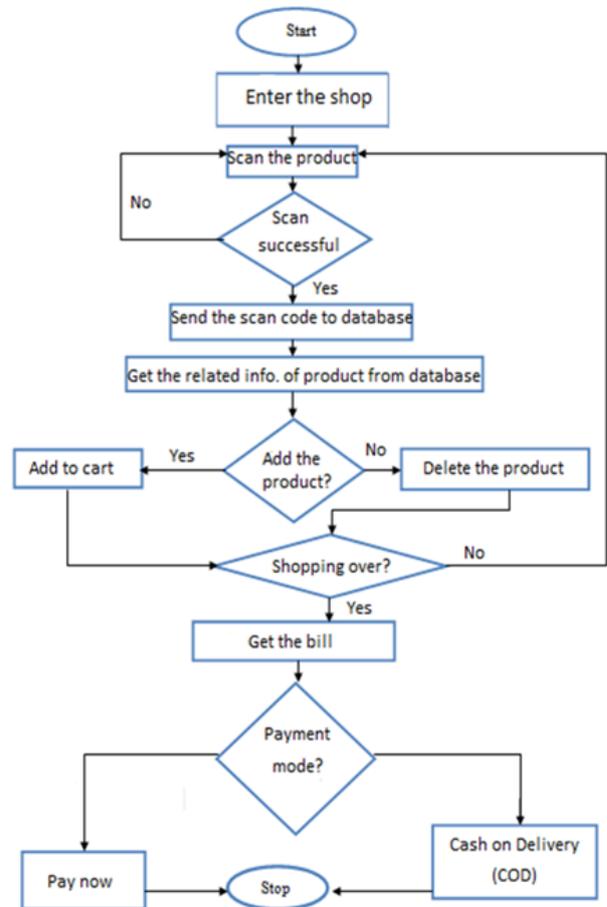


Figure.3. Block diagram of proposed system

IV. SYSTEM MODULES

- **Login Module:** Admin enters the Login Id and password. System Checks login Id and password is valid or not. Admin is directed to next page where he can add, delete or update the products.
- **User Module:** Customer enters their details to create new account. Then customer scans the QR code of the purchasing product using camera of his/her android phone.
- **Cart Module:** User can select any number of products and add to the cart. He/she can also remove from the cart if he dislikes it later or user can add more number of products to the cart. Records of product will be fetched to the employee for further process.
- **Employee Module:** As soon as customer adds a product to his/her cart, it will be shown to employee and thereafter employee will add that product to his shopping bag.
- **Billing Module:** This module describes the payment done by the customer. The payment information can include information like the model purchased, quantity, mode of payment, total amount of bill etc. And at the end it will display the payment done by the customer and will store his billing record in database.

V. SYSTEM WORKING



VI. CONCLUSION

The Proposed product will be easy to use, economical and does not require any special training. With camera feature in it, the user can scan the QR code of the item to be purchased and then directly add it into the cart. It will provide easy shopping in less time (saves time) as user has not to stand in the queue for billing. The billing will be done automatically as user will

select the product and the price of that product will be get added directly and customer will able to see the amount of shopping he has done after buying each product. This provides easy billing. Also customers don't need to carry trolley while shopping. The items so far purchased by the customer will be maintained in the app that can be used by the customer in the next purchase. It will also provide home delivery to customers so that if customer want his shopping bag at home and wants to pay at home he can. Also customer has not to maintain the hard copy of his Bills.

VII. FUTURE SCOPE

In future we can use Google Glasses instead of mobile phones which will directly scan the product. Also we can use Virtual Reality Technology in which customer just has to wear Virtual Reality Headset and he can get the real effect of Shopping just by sitting at home, So customer need not to visit the shopping mall. In future we can take the accessibility of customers ATM card or Debit card and amount of bill will be cut from it s customer has not to pay even the bills. And further we can use Adhar card of a customer to take the record of his shopping since Adhar card is now linked with the mobile numbers, So we can scan the QR Code on Adhar card of the customer and we can get all the history and records of that customer.

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