

Smart Application to Enhance in-Store Shopping

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Abstract—Most of us have spent what seemed like forever in a retail store, waiting for the person in front of us in the queue to bill a large number of items, when we just needed a single item to be purchased. Long lines at the cashier counters can cause people to wait for a significant amount of time, before they can pay for their products, and leave, regardless of the number of items being purchased. We feel that this can be changed, and our idea is to automate the check-out process, enabling automatic payment, striving towards a new-age digital shopping experience. We propose to do this by using a smart phone application that allows the user to scan the products he or she wishes to purchase, generate the bill for all the products scanned, make the payment and simply walk out of the store. This process will ensure easy customer, inventory management and finance handling, making both management and customer happy. This application will help avoid long queues and provide a hassle free checkout. It will not only reduce the amount of waiting time, but it will also reduce or eliminate the need for a cashier. In addition to this, in accordance to today's trend of e-transactions, the entire process will be free of any hard cash.

Index Terms— PayU, Firebase , Smart Shopping, Intelligent Shopping Cart, Digital Cart.

I. INTRODUCTION

Today, Smart phones have become an important asset to us, without which our life would be incomplete. When it comes to shopping, our smart phones are not used as much as booking cabs, movies, buses etc. It is of a great concern, especially in metropolitan cities, where these shopping will be very time consuming as there will be long queues for the payment of bill. The main aim of this system is that the whole system will provide you a way for queue-less shopping and online payment with inventory management. The shopping is usually the most time consuming and provides us our daily essentials, so this system enables you to keep this asset at your fingertips using only your smart phones. Shopping means to feel comfort and ease the steps involved in it. There are various factors to keep in mind when it comes to traditional way of shopping such as products search, billing and payment. In today's world smart phones has become an important asset to us, without which our life would be incomplete. But, when it comes to the shopping our smart phones are not used as much as booking cabs, movies, buses etc. It is of a great concern, especially in metropolitan cities, where these shopping will be very time consuming as there will be long queues for the payment of bill. It is important that you take steps to eliminate the queues in the shopping. Think for a moment just how much more of a hassle it would be to do all of the payment of the bill in one place which will be on first come first serve basis. The main aim of this system is that the whole system will provide you a way for queue-less shopping and online payment with inventory management. The

shopping is usually the most time consuming and provides us our daily essentials, so this system enables you to keep this asset at your fingertips using only your smart phones.

It is important that you take steps to eliminate the queues in the shopping. Think for a moment just how much more of a hassle it would be to do all of the payment of the bill in one place which will be on first come first serve basis. If someone in front of you has two trolley of products and you have only a single product you need you have to wait until the customer before you has completed his payment process. It would be very time consuming and it would quickly become frustrating. Even though you have a single product, it will still be a massive hassle. Overall, it's a hassle that no one should have to deal with. By having the right application to save your time that will be possible. When you have the android application for queue-less shopping it can provide you with more peace of mind, as you will not have to worry so much about how much time it will consume for the bill payment. You know you have the technology to keep it easier and faster to provide you a seamless shopping experience. An android application is developed to provide an interactive environment and enhance the shopping experience. The android application will provide a way for the inventory management and easy selection of the products.

II. LITERATURE SURVEY

To improve the In-stores customers shopping, Terblanche [1] proposed a android application which provides the customers comfort, efficient, and convenient shopping experience. The proposed work developed an Android mobile application that uses the phone camera to capture the product's barcode label and also price labels. By using this mobile application, customers and stores both gain improvement. Store's shopper gets full product information immediately and correctly in a convenient and fast way by only scanning the product's barcode then it can translate this information into several languages. Also, this project serves customer shopping experience in calculating the total cost of their purchases while they are shopping in any store and in any gallery by only capturing the written prices' labels.

Rawabi [2] et al developed a smart app which mainly focuses on navigation to the item's location and automatic billing of the products that the user has purchased. An RFID reader was used to scan the products. Jagdish Pimple[3] et al proposed a Digital Cart which uses the Barcode scanners, LCD display, Keypad and Wi-Fi module to sends the data wirelessly to the main server. It have product details which the customers scans the products on screen in the display connected to Arduino which was situated in Digital Cart. The cart interfaces with the main server and it will have the facility to generate the bill for all products added into the cart.

Zlatko Bezhovski [4] identified a basic optimization scheme to design shopping guide system run on smart phones, with the help of QR code generation and recognition technology. For proficient shopping system, exclusive QR codes are produced to record the article name, number, location, detailing of goods placed. Smart phone reads the QR Code through the camera. REST protocols are used to scan QR codes to complete end to end business process flow execution to complete task at hand. Multiplexing and DE multiplexing algorithm for recognizes QR code image using smart phones. Special Symbols were scanned at receiving end and image was recognized. The image was DE multiplexed to its original QR code pattern with three part Data in each QR code pattern were concatenated back to form the original information message. QR filtering method is used to get the information which is hidden inside the QR code securely. The concept of OTP was also used for security using QR code.

Bhasha Chaure [5] presented a new concept called "SMART SHOPPING TROLLEY" has which consists of Raspberry pi that follows the customer while purchasing the items and ultrasonic sensor maintains the safe distance between the customer and itself. When a person drops any products into the trolley, its bar code will be detected and the price of those products will be displayed. As the scanned products were dropped the cost will get added to the total bill. Thus the billing will be done in the trolley itself. By using this trolley, customer can buy large number of products in a lesser time with less efforts

Rajesh kumar Megalinagam [6] author proposed a system that replaces barcode technology with RFID technology as it does not require perfect line of sight to eliminate long queues. Every customer was given a unique RFID card by paying some amount and the customer's account will be created in an android application through which customers can check their wallet balance. At the end of shopping the final bill is transmitted to the billing section through zigbee communication and the net amount will be automatically deducted from the customer's prepaid balance. The proposed model was based on raspberry pi processor and uses RFID reader and tags for simultaneous billing, thus solves the problem of long queues.

III. PROPOSED SYSTEM

The Smart shopping application is used to provide seamless shopping experience. The Android application is connected to the firebase server where the product descriptions are stored. After the barcode is scanned the product will be retrieved from the firebase server. After adding all the products the bill will be generated. The Payusdk is used for the payment of the bill. The application will generate a hash value which will be used by the payu server for the payment process. After the payment is done the successful payments will be added to the checkout list where the products can be collected by the customer. The manager of the super market can manage the inventory and can view all the orders of the customers. They can add, remove and stock the products in the super market.

Despite the various technologies that have been introduced in providing a seamless shopping experience they require changes in the trolley. These smart trolleys provide a smart way but it requires additional cost as each trolley will have to be changed and they will be complex to use for the new customers. A separate billing system will be made for these smart trolleys rather than common method. It will be heavy for the customer to carry around the super market. The proposed smart system in this project is designed to scan the products and pay the bills through the smart phones which is owned by the customer. This system does not requires any additional cost for its implementation.

The system has three main units. The first is a user unit which is used by the customers. This unit consists of a login page and the products page. The customer will login to the application using the login page. After successful login the products page will be shown. The products page is used to scan the products which the customer needs to buy. The camera of the smart phone is used to scan the products. The products description will be retrieved from the firebase server. The scanned products will be added to the products lists and the customer can generate the bill for the products. The payment unit is used for the payment of the bill. The payusdk is integrated with the application which will be used by the customers for the payment process. The application will generate a hash value for the products chosen by the customer and that hash will be used by the payu server for the payment of the bills. After successful payment the bill will be added to the checkout list where it can be collected by the customer. The admin unit is used for the inventory management and they can be used to add, remove and stock the products of the super market. The admin can also view the checkout products by all the customer of the super market.

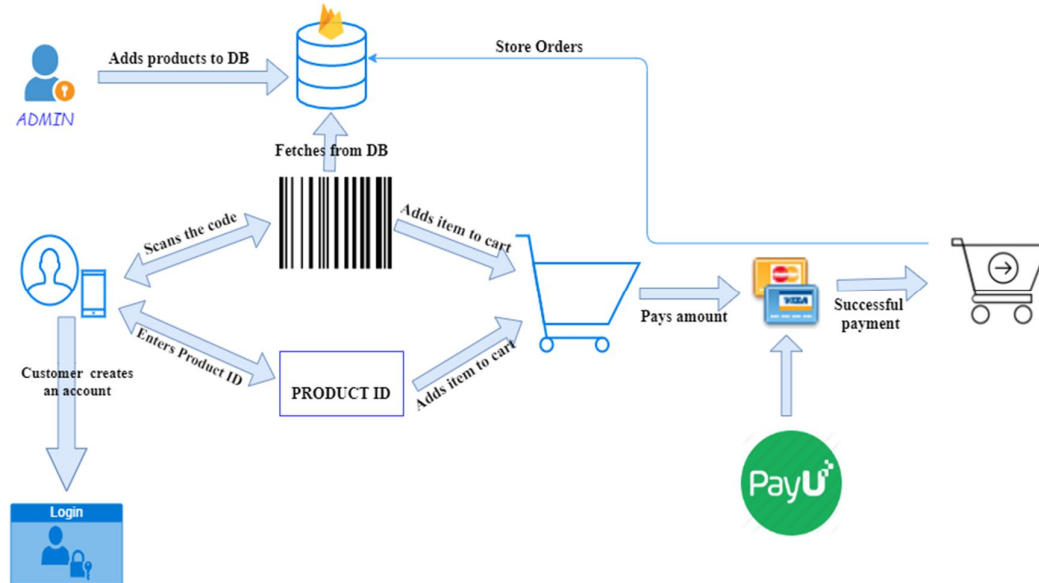


Figure 1. System Architecture for In Store Shopping System

Figure 1, shows the System Architecture of In Store Shopping System. This system is divided into three modules:

1. Shopping Module
2. Payment Module
3. Admin Module

The System Starts with Sign In page as every new customer signs into the application. User uses the same credentials to log into the application. Adding item into the cart can be done in two ways 1. Add Manually with Product ID 2. Scans the Product to add to cart. Once the user adds an item into the cart quantity of the item needs to be entered. These products are stored in the database. Each products assigned with the price. Admin has privilege to manipulate the products. Bill will be auto incremented based on the quantity of the items added. Payment is done through card and Net Banking. Payment phase is initiated by entering the required credentials. Payment is carried over by PayU module. Admin has special privilege to introduce new items into the market and in the application. Admin allocates price to products and also manages the inventory of the products.

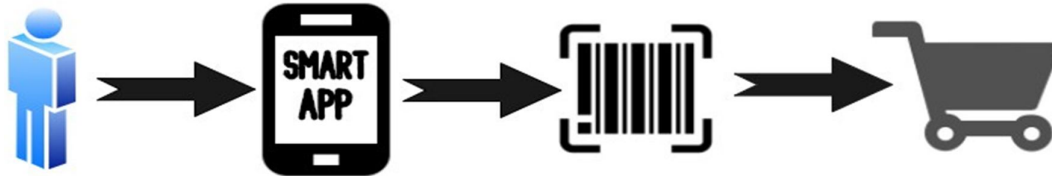


Figure 2. Shopping Illustration

Figure 2, illustrates the process of the shopping application. Initially, customer signs into the application with the Email ID and a Password. Password must have atleast six characters. The Credentials are verified on clicking the register Button. Same credentials are used to log onto the application. Admin has the privilege to add items available in the store and assigns the price to the added items. Customer chooses the items to the cart. This can be done in two ways. One can add item into cart by entering the product ID. Other way is by scanning the QR code of the product. Once the products are added quantity of the respective products are chosen and total amount will be autoincremented as products gets added into the cart.

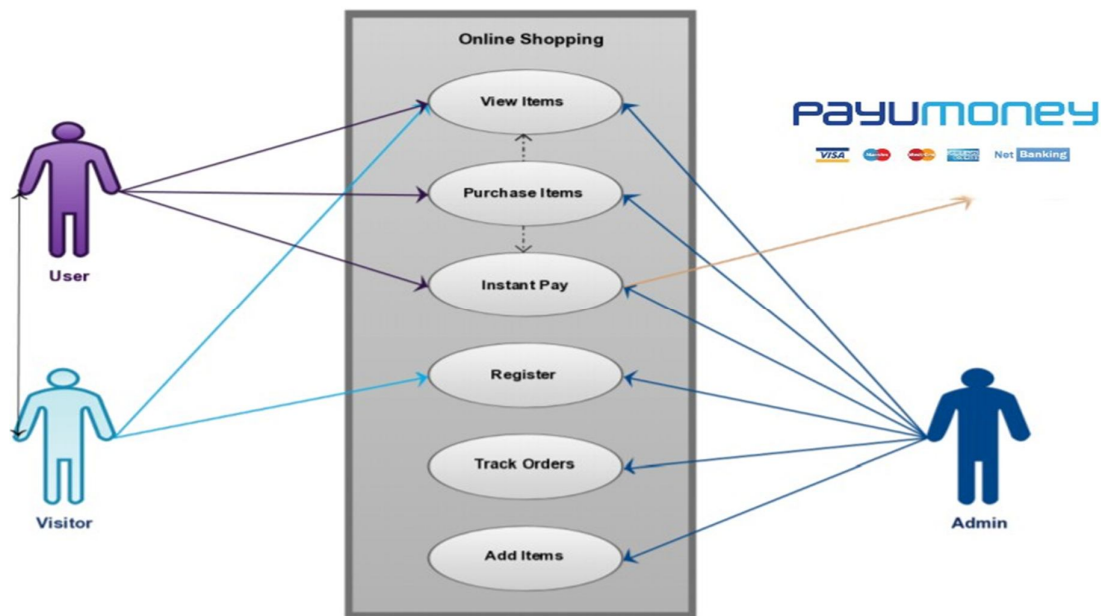


Figure 3. Use case diagram for In-store Shopping

Figure 3, represents the user interaction with the system. Initially User Signup into the application to create an account. Admin has access to all the activities in the system. The user scans the product and add the item to cart. Once all the items were added payment system is processed through Paypal.

IV. RESULT AND DISCUSSION

Our Smart shopping application is used to provide seamless shopping experience. Results are shown below for the application. Initially our application begins with shopping module. Furthermore if the customer has finished shopping payment phase is initiated.

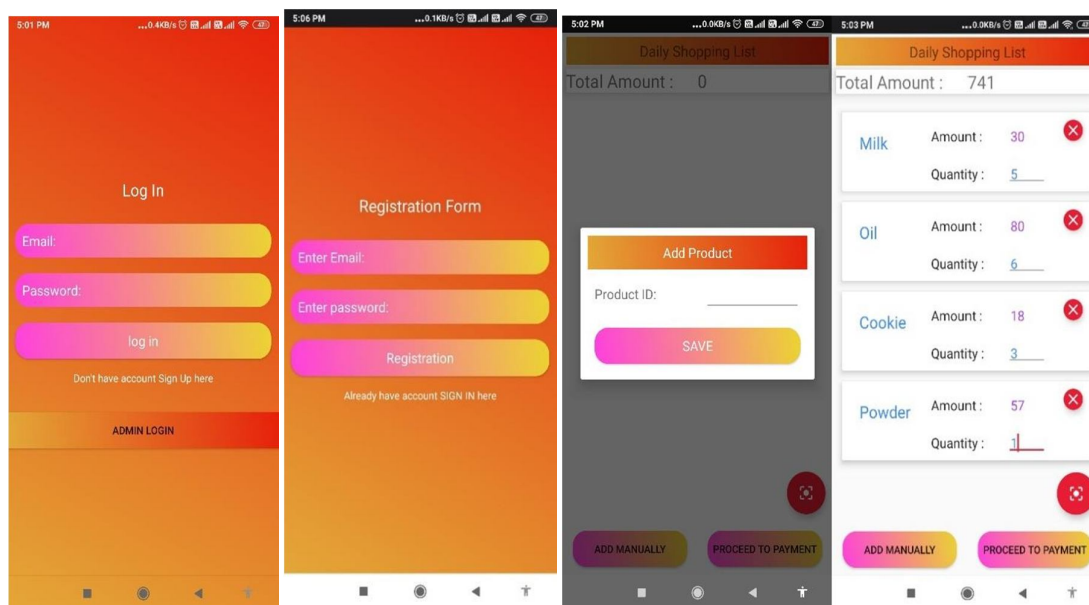


Figure 4. Login and Payment phase of the application

V. CONCLUSIONS

Few supermarkets have digital presence enabling online purchase of items but do not have applications for various instore interactions. Almost everybody owns a smart-phone with a camera which is all that is required to perform the software automation that we propose. In exchange, the speed of shopping and the convenience that the customer gets is immense. This leads to a win-win situation where the customer is happy to come back for the convenience that this system provides, and the management is happy with the customer retention they get. Additionally, the scope of the idea is immense, when used in conjunction with prediction algorithms. By keeping track of the data that the application produces, stores can use data-mining to customize the entire shopping experience to each and every individual, by means of showing the customer personalized messages based on their buying patterns. Also, it could use prediction to prompt the user to what he or she might have forgotten to purchase in the visit to the store.

Our future works are aimed at incorporating the following features into the application. A customized user interface will be provided to the app with artistic features. The app will be extended to make it compatible to serve a large number of users. In order to make the app more productive, hosting it on cloud platforms will be investigated. The app will be designed to suggest personalized offers and discounts to users based on customer shopping patterns. The app will provide more details about the items like product life history, nutritional values, items often bought together etc.

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