

# E Z Shop-Improving Shopping Experience for Loyal Customers

Kadam Saurabh Anantrao<sup>1</sup>, Thokal Tanmay Ajit<sup>2</sup>, Shaikh Asim Ayyub<sup>3</sup>, Joshi S.G.<sup>4</sup>

<sup>1</sup> Student, Department of Computer Engineering, Vishwabharati Academy's College of Engineering, Ahmednagar, Maharashtra, India.

<sup>2</sup> Student, Department of Computer Engineering, Vishwabharati Academy's College of Engineering, Ahmednagar, Maharashtra, India.

<sup>3</sup> Student, Department of Computer Engineering, Vishwabharati Academy's College of Engineering, Ahmednagar, Maharashtra, India.

<sup>4</sup> HOD, Department of Computer Engineering, Vishwabharati Academy's College of Engineering, Ahmednagar, Maharashtra, India.

## Abstract

*As online shopping became a trend nowadays, the regular shops are losing their customers to online brands. Customers have effortless shopping experience and saving time through shopping online. For competing with those online brands, If shops are providing an online android based application where their customers can shop through internet and get the products directly at the counter in a single click with a number of attractive offers and discount for regular customers it will increase the demand of the mall.*

*A leading supermarket chain planned a smartphone based solution, EZShop to improve shopping experience for its regular/loyal customer EZShop uses geo-location to determine the exact store location where customer is currently shopping. It automatically informs him/her of all the special offers available in that store. It allows the user to view the layout of the store to familiarize him/herself with various sections. User can use EZShop to search and buy for specific items in that store; once found, user can add to his shopping cart and finally at checkout counter user can directly collect his/her shopping basket and make payments. Shopping indeed made easy!*

**Keyword:-** Worklight, Android, Geo-Location, RFM Model

## Introduction

The central idea of the application is to allow the customer to shop virtually using the Internet and allow customers to buy the items and articles of their desire from the store whenever they visit the supermarket in person. The information pertaining to the products are stores on an RDBMS at the server side (store). The Server process the customers and the ordered items are automatically submitted at the counter of the supermarket. The application was designed into two modules first is for the customers who wish to buy the articles. Second is for the storekeepers who maintains and updates the information pertaining to the articles and those of the customers. The end user of this product is a customer and his/her Android Smartphone where the application is hosted and the administrator maintains the database about the available products, ordered products and information about the loyal customers. The application which is deployed at the customer smartphone, the details of the items are brought forward from the database for the customer view based on the selection through the menu and the database of all the products are updated at the end of each transaction. This system can be implemented to any leading shop/supermarket chain in the locality or to multinational branded shops having retail outlet chains. The system recommends a facility to give the layout of different sections of the mall to search for the desired item which is interactive method than the usual and can make customers happy. The shopping application provides attractive discount offers to the customers according to the season and the loyalty of the customer. Since the application is available in the Smartphone it is easily accessible and always available to serve the needs of the regular customers.

## Project Motivation

The motivation for designing this shopping-cart application came because all of us now-a-days love online shopping using smartphones and tablets rather than spending lot of time at physical markets which is time and energy consuming.

Further, using the available stores to sell the products, there is also the possibility of designing one's own customized shopping-cart application from scratch using IBM Worklight Technology because custom designed platforms are expensive. Moreover, we value recent learning about the JQuery, HTML and JavaScript programming languages as well as seeing how powerful and dynamic they are when it comes to application designing. It would be very easy to incorporate the idea of using programming techniques from the available visuals to understand how a piece of code appears on a user interface.

## Literature Survey

Having studied various reference papers and the base paper an individual working on the this topic of online shopping application understands and learns that shopping through an application is easy and interactive experience but the customer thereafter have to wait for a specific amount of time in terms of days and some even wait for months for the delivery of the ordered product. Sometimes it leads to a successful delivery but also it leads to delay in certain cases depending upon the ordered product, delivery area and the accuracy of the shopping application. Another considerable point that one realizes is that usually shopping applications are platform dependent and work on particular chosen platform for which it is made. This matter of concern and inconvenience is solved by EZShop as it is an Hybrid application which works on various platforms and is not limited in working on any particular platform.

The application proposed in this paper is more centred around creating a straightforward, yet finish, application specifically intended for shoppers to shop everything in a solitary snap from the grocery store.

This application performs all the fundamental capacities, for example, selecting a thing and adding it to the shopping basket, client login or enrolling, registration out of the thing, along with the design data about different areas of the shopping centre table online shopping application, organizations need to spend a significant measure of time and cash for planning, creating, testing, and keeping up the application. Most basic shopping basket applications don't permit checkout to be done before any things are added to the truck. Information is frequently put away in an outside database or application-based databases which can be gotten to continuously by the application overseer.

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## Existing System

Shopping-Eye is an innovative information technology (IT) solution developed to help and support the personak who have difficulties when they go on shopping. It allows users to locate appropriate shops inside a shopping mall, checks the availability of items, promotions and discounts of each shop without physically being present at shops, and enables them to maintain a wish list so that they will not forget to buy items which they intended to buy.

## Drawbacks

Shopping Eye which is a similar application which exists today uses the Ibeacon technology which is less efficient than GPS which gives more accurate position of the user and also this application was only made for Android OS. It does not support for other OS like Windows, iOS, Blackberry.

### Proposed System

IBM Worklight provides an open, comprehensive and advanced mobile application platform for smartphones and tablets, helping organizations of all sizes to efficiently develop, connect, run and manage HTML5, hybrid and native applications. Leveraging standards-based technologies and tools, the platform ships with a comprehensive development environment, mobile-optimized middleware, and an integrated management, and analytics console, supported by a variety of security mechanisms.

IBM Worklight enables the creation of rich, cross-platform apps without the use of code translation, proprietary interpreters or unpopular scripting languages, while reducing the time to market, cost and complexity of development and enabling a better user experiences across a variety of mobile devices.

IBM Worklight is part of the **IBM Mobile Foundation** family of products that provides the essential elements needed for complete mobile development, deployment and management within a business.

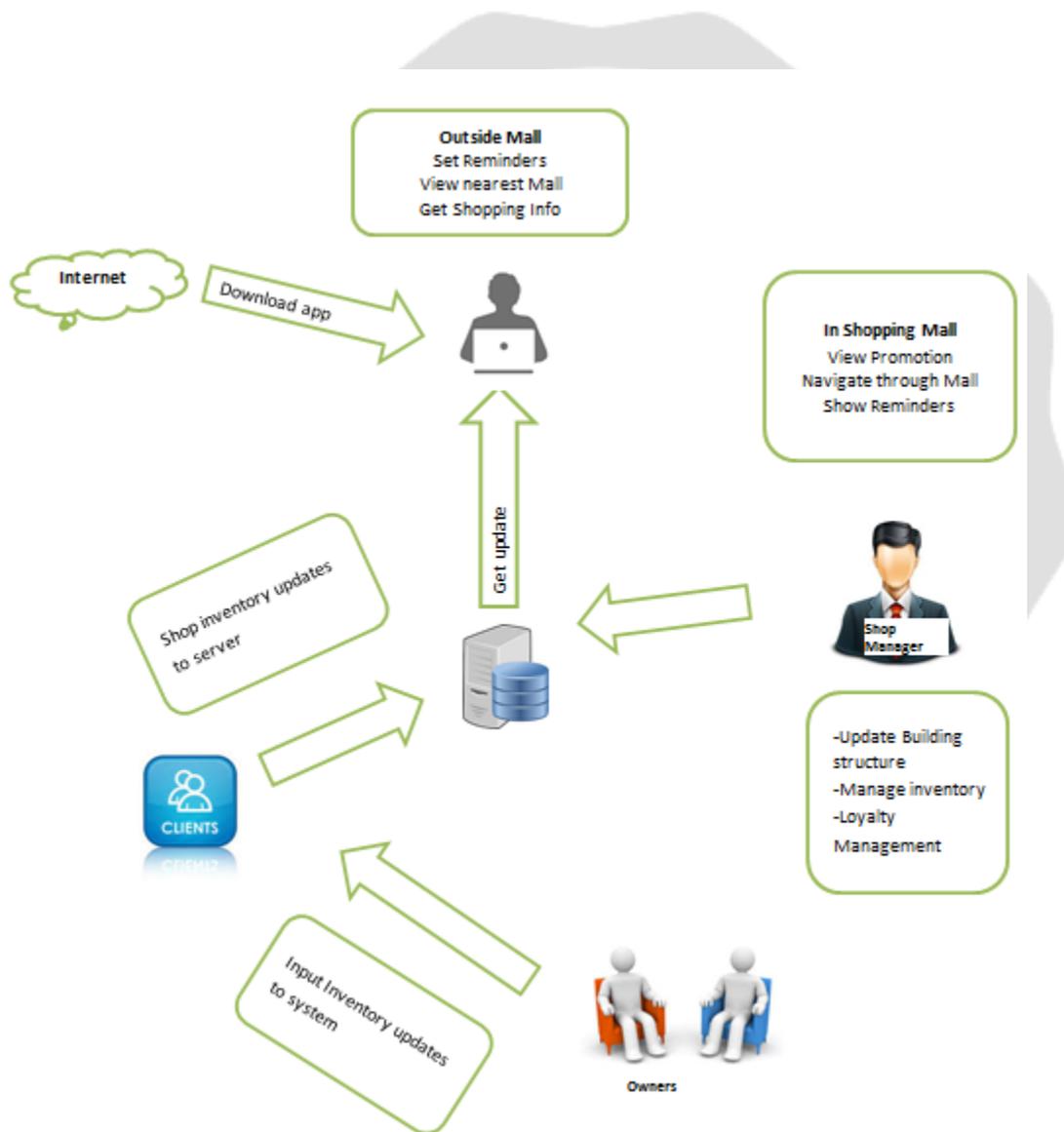


Figure: 1 System Architecture Diagram

## A] RFM Model

In most of the researches, two methods are common for identifying loyal customers, one of them is in terms of demographic variables (such as age, gender, etc.) and the other is in terms of interactive behaviors of customers that are expressed with the so-called RFM. RFM model is proposed by Hughes in 1994, and has been used in direct marketing for several decades. This model identifies customer behavior and represents customer behavior characteristics by three variables:

1. **Recency** of the last purchase which refers to the interval between latest customer purchase and time analysis of customer data.
2. **Frequency** of the purchases which refers to the number of transactions in a particular period.
3. **Monetary** value of the purchase which refers to consumption money amount in a particular period.

RFM model can be used in different areas by different people; Therefore, RFM can mean different things to different people. Classic RFM ranks each customer based on valuable against other customers and an RFM Score will be assigned to each customer. Basically, the RFM model applies for dividing each variable to five levels, so that 20% of customers who makes the most purchase from the company are assigned the number of 5. The next 20% will be assigned as 4 and etc. finally, the database divide into 125 equal parts based on recency, frequency and monetary. Customers who have the most score are profitable.

## B] Clustering

Clustering is the process of grouping a set of physical or abstract objects into similar groups. A cluster is a collection of data objects that are similar to one another within the same cluster and are dissimilar to the objects in other clusters. The clustering algorithms which are used in this paper include K-Means and Two-step. K-means, which at first was known as Forgy method, is one of the well-known algorithms for clustering with top to down approach that desired data objects divide into k groups in terms of its special features and characters. Groups classified based on minimum sum of squares distance between object from center.

This method is dependent on the definition of initial centers, so this algorithm must be run with different centers, and a case is acceptable which has the lowest error rate in terms of Euclidean distance. On the other hand, this algorithm is very sensitive to noise in data. In contrast, Two-step algorithm doesn't need the exact number of clusters which was defined by user and it determines the optimum number of clusters in a range which is defined by user.

## C] Loyal Customer

Loyal customer is the one who has a positive attitude towards the organization and is frequently associated with the organization. Creating a loyal customer is not only about maintaining numbers of customer overtime, but it is creating the continuous relationship with customers to encourage purchasing in the future. Different criteria affect customer loyalty in an organization. Some believe that the key factors that influence customer loyalty in organizations are: relationship quality, trust, satisfaction, purchase development, organizational changes and etc. Also, some evaluate customer loyalty with customer transaction behaviors, including the recency, frequency and monetary which the maximum of these values results in the most loyalty.

## D] Customer Value Analysis

Customer value analysis is a kind of analytic method for discovering customers characteristics and makes a further analysis of specific customers to extract useful knowledge from large data. On the other hand for organizations, Retention cost is much less costly than acquisition cost. Therefore, they want to use techniques for identifying permanent customers with more lifetime value. Kotler (2000) defines Customer Lifetime Value as the profit net present value that one can obtain in a customer's lifetime. Kim et al. (2006) define customer lifetime value as the net income amount of the business during the entire life cycle of a customer. He emphasizes on long-term continued income and cost, instead of the profits from a specific trading activity. Gledy et al. (2009) have presented an approach to predict customer lifetime value with Pareto/NBD model. Mahboubeh Khajvand et al. are obtained customer lifetime value by weighting behavioral variables using analytic hierarchical process.

## E] Algorithm

Step 1. Data Preprocessing

Step 2. RFM Analysis:

In this RFM analysis is applied by defining the scaling of R–F–M attributes.

Step 3. Customer Segmentation:

This step divides customers into numerous groups with similar RFM values, and assigns each customer to an appropriate segment.

Step 4. Prediction

In this step, classification rules are discovered using demographic variables (age, gender, education level etc.)

Step 5. Product Recommendation

The core concept of this work is to extract recommendation rules from each customer group by considering classification rules

## Conclusion

Shopping surely has turned out to be simple by utilizing EZShop application, which primarily keeps running on Android gadgets furthermore on different platforms since it is developed utilizing IBM Worklight innovation. A client can make his/her shopping experience intelligent, less feverish, time and vitality sparing and fun, moreover clients can shop utilizing a solitary navigate this application. In this manner, if the customer is steadfast, EZShop guarantees that he/she will keep on staying faithful when they shop utilizing this application.

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