

# Customer Loyalty Program

W A T S Kumara<sub>1</sub>, W G D S De Mel<sub>1</sub>, J A D M Jayakody<sub>1</sub>, D J C Jagoda<sub>1</sub>, W A Kalana Heshan<sub>1</sub>  
K A Dilini T Kulawansa<sub>2</sub>, Dinuka Chathuranga Hettiarachchi<sub>3</sub>  
Faculty of Information Technology, University of Moratuwa, Sri Lanka  
Department of Computational Mathematics, University of Moratuwa, Sri Lanka

**Abstract**— The customer loyalty programs are becoming popular as a powerful tool of relationship marketing. Customer loyalty is helpful for the success of any retail organization. This concept has been limited among the large-scale companies. Although large-scale companies have the ability to maintain a customer loyalty program, mid-scale and low-scale companies are unable to handle such customer loyalty program with an IT section. In order to address the said problem, we developed a generic customer loyalty program which can be handled by any merchant who owns different types of companies, without an IT section. This paper comprises an attempt to introduce a full generic loyalty system for any scale of company.

**Keywords**— generic customer loyalty program; large-scale; mid-scale; low-scale

## I. Introduction

Relationship marketing uses the loyalty programs as a powerful tool to encourage customer loyalty, it has become a popular technique [5]. Loyalty programs give benefits to both customers and companies. The success of any retail organization is highly depending on customer loyalty. It is a proven fact that it is really expensive to drawing new consumers than having existing ones. Online retailers lose their own customers every year on average 25% that has estimated by Singh & Imran and profits can be increase by more than 25% with a small increase in customer retention [4]. The loyalty customers are always ready to forget and ignore any other competitors offer, because of that relationship marketing aiming is focused on making life time customers [3]. This process will be helpful in customer's decision making, will reduce the information process, will achieve a greater cognitive consistency in decisions, and will reduce the predicted risks which have binded with future decisions so the customers themselves will automatically motivated to follow this process.

A company must think about what they can do to keep their customers coming back to their company. This system will be an easy way to keep their customers with them for a long time. Currently most large-scale companies use this loyalty system program. There is less ability to use a loyalty system for mid and low-scale companies. In our generic system, it is applicable for any scale of company. We intend to make a database which stores the promotion of each merchant and information of customers who registered with the merchant.

In different companies, there are various types of loyalty programs for building loyal customers [2]. Loyal buying behavior is encouraged by loyalty programs it creates marketing efforts that reward and that is potentially

beneficial to the firm that mean to the company [4]. The customers who frequently make purchases will be offered by rewards programs by the company. The loyal customers who have rewarded with loyalty programs will have faster access to newly created products, special sale coupons and free merchandise. Personal information should be provided by the non-registered customer to register as a loyalty customer to the company.

This research paper focuses on how this generic loyalty system will help to maintain the customer relationship. Section I gives the introduction to the project. Section II describes the reviews of others' work. It will discuss the key features of those systems. Section III is on the technologies we expect to use in the project. Section IV explains approach that we used to implement the system. Section V provides details of the analysis and designing of the system we proposed. It will provide all the information about the structure of our system. Section VI discusses the method of implementation of the proposed system. Section VII will include the details of feedback analysis of the project. Section VIII is dedicated for the conclusion and further work which gives a summary about project.

## II. Related Work

Our software system is a loyalty system, the word 'loyalty' can be heard frequently because there are so many similar projects as ours in Sri Lanka as well as in other countries [11]. Before we create our system, we have decided to take a look and search about other similar projects. Our expectation is to gather information and after gathering that information, we can compare our system with those systems and can recognize drawbacks in our system. We can study about their advantages and disadvantages. We can remove those drawbacks from our system and can add new values to the system. At the end we will be able to present a fully prepared product which can ensure almost all the services that should be in a loyalty system. We have studied about the ODEL loyalty, The diamond club, starbucks' starbucks rewards, oneloyalty, Nexus loyalty as similar approaches to our project [12].

When we compare our system with these systems mentioned above, there are similar features and also different features. Whereas the goal of these all systems are same, that is to retain loyal customers and reward them. Most of the software which we have studied is not generic. We understand that there is an IT panel to handle this loyalty system. Therefore, these types of loyalty systems are not applicable for mid-scale and low-scale companies who are

not strong with financial side or resources to create a loyalty program. Some software is created only for textile companies, beverage shops etc. Most of the loyalty systems are created in a good standard and more focused on the merchant. But it should not only have focused on the merchant, it should have focused on customer as well. In our system it can be easily handle by the owner, staying by any place because our system creates a mobile application to be updated with the promotions by both the customer and the owner.

Identified weaknesses of the existing systems are listed as follows:

- Loyalty systems are not generic
- Some customers are not satisfying with what they got
- Competition between merchants to give the best loyalty program
- Giving some inferior goods to customers as rewards
- Demotivated customers with the loyalty system
- Customer's expectations about endless rewards

In above we discussed about the weaknesses of those systems. By introducing our product, we hope to give solutions for those existing problems. The system we build is a generic system which can be used by any merchant

The following is a comparison between existing customer loyalty program.

- A- One Loyalty
- B- Starbucks' Starbucks Rewards
- C- ODEL Loyalty
- D- The Diamond Club
- E- Nexus Loyalty

Characteristics

- 1- Online shopping cart
- 2- View promotions through a mobile app
- 3- Register merchant through a web application
- 4- Setting promotions
- 5- Loyalty customer registration
- 6- Feedback on most attractive reward program
- 7- Add and redeem points
- 8- Merchant information database
- 9- Multiplatform integration
- 10- Product data analysis
- 11- Fully Generic

TABLE 1. COMPARISON TABLE FOR SIMILAR SYSTEMS

Similar Approaches Characteristics	A	B	C	D	E
1	✓	✓	✓	✓	✓
2	✓	✗	✗	✗	✓
3	✓	✗	✗	✗	✗
4	✓	✓	✓	✓	✓
5	✓	✓	✓	✓	✓
6	✗	✓	✗	✗	✗
7	✓	✓	✓	✓	✓
8	✓	✓	✓	✓	✓
9	✓	✗	✗	✗	✗
10	✗	✗	✗	✗	✗
11	✗	✗	✗	✗	✗

### III. Technologies Adopted

The purpose of our software project is to create a generic loyalty program which can be used by all the types of merchants in the business world. In our project there is a one main database which store information about the promotions of each merchant and the personal information about the customers who registered to merchant. We used MySQL to create the database. In this database we stored the customer's name, address, NIC number and phone number, Date of birth and Email. When a customer registers as a loyal customer they have the ability to download mobile application. By this mobile application customers can check day to day promotions decided by the promotion panel of the company. To create the mobile applications, Android technology has been used. There are web based interfaces in our system given to super admin, promotion panel of the company, POS and new merchant, loyalty customer. The web interfaces in our system developed by using Vue.js, HTML and Bootstrap technology. The application programming interface (API) created by Java and we used spring boot framework for that.

### IV. Modular approach to customer loyalty program

In our proposed System there are number of procedures to follow that each procedure has a combination of operations to be done. Our Proposed system is a generic program which can be used by any kind of merchant. So we have designed

the system by dividing those operations or tasks into modules. The combination of those modules will present the whole proposed system. Our system has five main modules. These modules are further divided into sub modules depending on the tasks that have to perform by each module.

Our proposed system consists of 5 modules, namely, Loyalty Admin Module, Promotional Panel Module, Registration Module, Customer and Merchant Management Module and Review Module. Loyalty admin module registers a merchant and Promotional Panel module adding promotions, qualifying customers for that promotion and redeeming them for rewards. The Registration Module registers the customer and there are 2 types: either Point of Sale Registration or Online Registration. Customer and Merchant Management Module connect the customer and the merchant, and the Review Module facilitates the customer, Point of Sale (POS) and the merchant to check available promotions and to check the customer points

promotions and offers. They should evaluate customer buying behavior and make decision reports.

**Database** - Database include every information about the customers (personal information), merchants, promotions and decision reports.

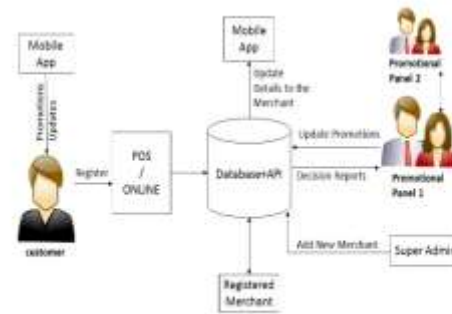


Figure 1. Top level architecture of the proposed system

## v. Analysis and Design

Most of the IT related problems are now solved using diagrams because the diagrams can simplify the problem. We can use diagrams in order to solve IT related problems. UML diagrams plays a major role in drawing diagrams. We can clearly and logically demonstrate how our system works using diagrams. We can clearly identify the segments of our software system using these diagrams [7]. Use case diagram illustrates functionality provided by the system and functional requirements of a system by including actors and relationships among use cases. Class diagram shows different entities, static structure and implementation of classes [8]. Sequence diagram shows the detailed flow of use cases in detailed [6]. Activity diagram can interpret a procedural flow of control between two or more classes while doing an activity. Context diagram clarifies boundary between system and its environment how it interacts with entities [9]. ER diagram illustrates relationships of entity sets stored in database, cardinality of them and how data is related to each other. The actual functionality of the system is delivered in the analysis. Our project is a loyalty program, so we are directly focusing upon the customer requirements.

**Registration** - In our system registration is happening in two ways. Merchants who are willing to use our loyalty program should registered first with our system. Then the loyalty customers should register through each merchant by downloading the mobile app. Registration can be done by online also.

**Mobile app** - There are two mobile apps. One for the merchant and the other one for the customer. These mobile applications will be updated by promotions. Merchant and the customer can check promotions, offers by this.

**Super Admin** - Super admin have the ability to add a new merchant.

**Promotional Panel**- Promotional panel is group which include high level managers who can decide about

## vi. Implementation Of Our Proposed System

First of all, we gathered requirements to start our project by visiting our company. Then we frequently visited to the shops which use this loyalty programs. Then we identified the major features of a loyalty program. Then we designed our system as per the requirements [10]. Initially we designed the ER diagram. Then we designed use case diagram, Activity diagram, sequence diagram, class diagram. We used the knowledge of object oriented analysis and design, software engineering methods to create this diagram. We used waterfall method as the software development process because the requirements are fixed by the clients.

We have implemented two web interfaces separately for the merchant and the customer using Vue.js technology. Any merchant can register to the Eternal loyalty program by sending an email to the super admin through merchant web interface. A customer who wish to register to the loyalty system can enter to the system through web interface and enter the details and submit it. There is a verification system when a customer is registering to the system. Registered customer can view available points and promotions through the customer web interface. A registered customer can easily sign up to the system using the phone number and the password. When a customer enters the details, there is a verification system to identify the customer.

There are customer types in the system and the view promotion facility vary according to that customer type. After selecting the customer type by the system, the customer can easily check the available promotions. The registered customer can check the available points any time by login to the system. There are two android applications for the merchant and the customer. Merchant can view promotions by the application and imply ideas to the promotion panel. There is facility to register through the android application for any customer by a verification

system after downloading the application. Any registered customer can download this application and view available promotions, points to the loyalty system after verifying the phone number and the password.

figure out people's tendency towards the proposed customer loyalty program. The survey's accuracy has been rated as 4.07 which is an excellent value.

## VII. Evaluation

Our system is mainly privileged by customers and merchants. The performance of the system was tested using 35 users, in five different evaluation aspects and responses were taken as a five-stage rating. Customer's questionnaire has been evaluated the customer comments on five different aspects such as easiness of the registration process through online, usefulness of the mobile application and website to find promotions and details of the points, easy access of the mobile application and also the responding speed of the mobile application.

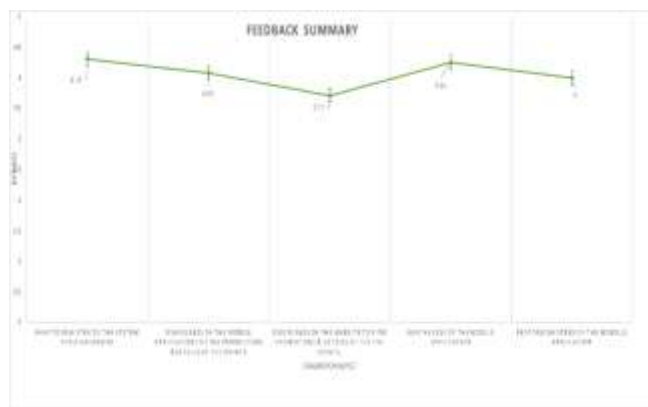


Figure 2. Summary of feedbacks

The statistics revealed that the system has its maximum rating for easiness to register to the system through online which is 4.31. Almost all the factors we checked about the system had got ratings above 4.00 except one factor that is usefulness of the mobile application to find promotions and details of the points. It is important to mention here that the website can be used by users who do not have any android phones.

It can be seen from Figure 8 that the average rating for the first evaluation aspect: Easy to register to the system through online is about 4.31, which lies between 4 and 5, where "4" stands for "Good" and "5" stands for "Very Good". Likewise, the average rating for the second evaluation aspect: Usefulness of the mobile application to find promotions and details is about 4.08 and it is also lies between 4 and 5. Third evaluation aspect is the usefulness of the website to find promotions and details about points, which is about 3.71 average rate, lies between 3 and 4. That aspect has the lowest average rating among other ratings. Easiness of accessing the mobile application is about 4.25 average rate, fifth evaluation aspect: Responding speed of the mobile application is about 4 average rating where "4" stands for "Good". Here by using above graph we can understand the aspects where we should pay our attention to improve our system's functionality. We can have a better idea about the user requirements which we should pay more attention. The team carried out a successful survey to

TABLE 2. TABLE FOR USER FEEDBACK ANALYSIS

No.	Evaluation Aspect	Rating					Total Score	No. of responses	Rating
		Very Good 5	Good 4	Satisfactory 3	Poor 2	Very Poor 1			
1.	Easy to register to the system through online	16	14	5	0	0	151	35	4.31
2.	Usefulness of the mobile application to find promotions & details of the points	11	16	8	0	0	143	35	4.09
3.	Usefulness of the website to find promotions & details of the points	6	14	14	1	0	130	35	3.71
4.	Easy access of the mobile application	14	16	5	0	0	149	35	4.26
5.	Responding speed of the mobile application	10	17	6	2	0	140	35	4
		57	77	38	3	0	713	175	4.07
Overall Rating of the Whole System = 4.07									

### A. Limitations

There are certain limitations in our proposed system. In our system we give promotions only considering about the loyalty, without considering their time of being a loyalty customer. Another limitation we have is, our mobile app is only for android users. Promotions are limited, and we can add any promotion according to the merchant's need. Also, our system does not have any interaction between two merchants and therefore it is not possible to merge their loyalty programs. Customer should connect online with the system to get notifications about the promotions.

### B. Further Work

Our proposed customer loyalty program can be further improved by adding promotions based on brands of the goods and iOS users will be able to use customer mobile app. By analyzing user feedbacks, we realized that suggestions which were given by users can be further improved such as develop a SMS notification system about new promotions which can easily send to loyalty customers.

## VIII. Conclusion

We have built a full generic system which can be used real time. A customer loyalty program can help the business retain customers and provide valuable insight into the

motivations and habits of customers [1]. By providing valuable rewards in exchange for valuable information, businesses can reach out and touch customers like never. This concept has been limited among the large-scale companies. Although large scale companies have the ability to maintain a loyalty program mid-scale and low scale companies are unable to handle a customer loyalty program with an IT section, addressing above problem we developed a generic customer loyalty program which can be handled without an IT section. This solution has been designed with four modules, namely developing the presentation layer on Customer side, developing the presentation layer on Merchant side, developing the Server Side and developing the proper logic. Presentation layer on Customer side and presentation layer on Merchant side has been implemented by HTML, Bootstrap, Android and Vue.js. We have used MySQL to develop the Server Side. Our Application Programming Interface (API) has been created by Spring boot framework. The users of our system are super admin, merchant, customer and promotion panel. The inputs of our system are such as add and remove merchant and customer with details, modify details of customer and merchant, add remove and modify promotions and give permission to the promotional panel. The outputs of our system are namely display promotions, count of points of the customers, details of the customer and details of merchant. There are several processes in our system which are redeem points, add points, allowed discounts, make reports, save details of customers and merchants in the database, save promotion details in the database and authentication by QR code or verification code. We have clearly demonstrated how our system works using UML diagrams. In implementation waterfall method has used as the software development process because the requirements are fixed by the clients. In order to measure the level of user satisfaction we designed a questionnaire and gathered feedback from 35 users. We evaluated five aspects for measuring accuracy level of system and we obtained 4.07 average rate. Using these all information and techniques we developed a full generic system system satisfying all the functional and non-functional requirements. We have done a module testing to check whether all the functionalities of the system work accurately. Our proposed system has two special features, one is product data analysis part and the fully generic behavior which are not seen in the existing similar approaches.

### **Acknowledgment**

We wish to express our deepest, heartfelt and sincere gratitude to all who provide us the possibility to complete this second-year project-Eternal Loyalty for any merchant to retain their loyal customers. We wish to thank Mr.Amal Somaweera of Sayanu for facilitating us to carry out this project work.Especially for our batchmates who helped us in many ways.The completion of this project will not be a success without all of your support and dedication.

### **References**

- [1] Potter-Brotman Jennifer (1994), "The New Role of Service in Customer Retention", *Managing Service Quality: An International Journal*, Vol.4 Iss: 4, pp. 53-56.J. Clerk Maxwell, A Treatise on Electricity and Magnetism, 3rd ed., vol. 2. Oxford: Clarendon, 1892, pp.68-73.
- [2] Roking(2005), "CustomerRetentionPrograms" [www.saleslobby.com/Mag/0601/FERK.asp](http://www.saleslobby.com/Mag/0601/FERK.asp)
- [3] Reinatz Wener, Krafft Manfred & Hoyer D. Wayne (2004), "The Customer Relationship Management Process: Its Measurements and Impact on Performance", *Journal of Marketing Research*, Vol. XLI-August
- [4] Sharp, Byron; Sharp, Anne (1997) "Loyalty Programs and their Impact on Repeat-purchase Loyalty Patterns", *International Journal of Research in Marketing*, Vol 14, No. 5, p.473-486
- [5] Singh Roopa & Khan Imran (2012), "An Approach to Increase Customer Retention and Loyalty in B2C World", *International Journal of Scientific and Research Publications*, Volume2, Issue 6.
- [6] [www.blog.hubspot.com/blog/tabid/6307/bid/31990/7-Customer-Loyalty-Programs-That-Actually-Add-Value.aspx](http://www.blog.hubspot.com/blog/tabid/6307/bid/31990/7-Customer-Loyalty-Programs-That-Actually-Add-Value.aspx)
- [7] [www.blog.hubspot.com/blog/tabid/6307/bid/31990/7-Customer-Loyalty-Programs-That-Actually-Add-Value.aspx](http://www.blog.hubspot.com/blog/tabid/6307/bid/31990/7-Customer-Loyalty-Programs-That-Actually-Add-Value.aspx)
- [8] [www.diamondclub.lk/aboutus.php](http://www.diamondclub.lk/aboutus.php)
- [9] [www.infoq.com/articles/microframeworks1-spring-boot](http://www.infoq.com/articles/microframeworks1-spring-boot)
- [10] [www.istqbexamcertification.com/what-is-waterfall-model-advantages-disadvantages-and-when-to-use-it/](http://www.istqbexamcertification.com/what-is-waterfall-model-advantages-disadvantages-and-when-to-use-it/)
- [11] [www.news.lk/news/business/item/3227-sri-lanka-s-pioneer-loyalty-programme-nexus-introduces-nexus-mobile](http://www.news.lk/news/business/item/3227-sri-lanka-s-pioneer-loyalty-programme-nexus-introduces-nexus-mobile)
- [12] [www.nexusmobile.lk/](http://www.nexusmobile.lk/)
- [13] [www.odel.lk/LOYALTY\\_TERMS\\_AND\\_CONDITIONS.pdf](http://www.odel.lk/LOYALTY_TERMS_AND_CONDITIONS.pdf)
- [14] [www.oneloyalty.co/landing/customer-loyalty-card-program.aspx?gclid=CLTs6f-ezNQCfcoTaAodIIAKZw](http://www.oneloyalty.co/landing/customer-loyalty-card-program.aspx?gclid=CLTs6f-ezNQCfcoTaAodIIAKZw)