CUSTOMER LOYALTY AND PROXIMITY MARKETING USING BLE BEACONS

ISM 6124 – Advanced Systems Analysis/Design
Group Project Report

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Abstract

Marketing strategies have evolved drastically over the years, beginning from the earliest forms of marketing which was individual advertising of products where merchants used to setup their products and engage people passing by hoping to make a sale. The medium for dissemination of information changed from town criers to newspapers, which were then replaced by radio and Television. Since then, the rapid development of Internet and Software, has entirely changed the way merchants interact with their customers and vice versa. Through the internet companies can now market their products and services to the entire world. Information Technology has significantly improved the scope and quality of advertising and information exchange.

Companies right now do not need to care about the reach and exposure of their marketing campaigns as it is already addressed by worldwide marketing capabilities through the internet. So, they have now started focusing on what is called proximity marketing. So how did proximity marketing come into the marketing mix?

Conversion rate is a measurement of how many times a marketing medium is viewed by potential customers versus how many of those views resulted in the completion of a goal. With conversion rate companies can now gauge the effectiveness of each specific marketing campaign. It has been found that there is a higher conversion rate near brick and mortar locations and with geo targeting, companies can reach local customers through online media and get them to store. In a way marketing has gone full circle from individual to local, to world and now a focus back down to individual engagement is taking place.

Executive Summary

Problem

Loyalty programs are at the heart of many merchants' customer engagement strategies. Supported by advanced mobile technologies and services, a loyalty program can build a sense of affinity between consumers and brands and merchants, leading to greater customer retention, interaction and sales.

The reach of loyalty programs for small and medium business is very less or indeed negligible due to the technology hurdles and high operating costs. Over 80% of the big business which are using the loyalty programs are using them in the form of credit cards or special punch cards. As the world is moving towards digital and mobile-first payments, the nature and scope of loyalty programs are to be shifted from cards to mobile app. It is very difficult to carry different cards for different loyalty program, instead a simple mobile app can do the job

As individual consumers interact with many different merchants and brands, it becomes very difficult for the consumers to organize many loyalty cards. Consumers need a straight forward and consistent approach to interacting, organizing and experiencing their loyalty programs.

Solution

A simple cloud based web and mobile application which helps small and medium business to get into the loyalty program, big business to convert the traditional cards based to mobile app and consumers for a straight forward, consistent interaction with their different loyalty programs

Market Scope

Retailers, restauranteurs, hoteliers, entertainment providers, parking providers, pharmacies, airlines

Challenges

- The mobile loyalty solution needs to be able to identify consumers rapidly at point of sale (POS) so that they can accumulate the rewards points and redeem it without having to wait.

- The solution must work online and offline, so the customer isn`t waiting for the service to connect and enable to process the offline messages in batches.

- Identification of each customer while redeeming the rewards.

Software Requirement Specification (SRS)

Functional Requirements

Customer Mobile App (IOS & Android)

Registering a new User

A new user can register by using their mobile number, to which they will receive a onetime password for authentication, after entering the OTP they can set up a password for their account and change their personal details and preferences.

Mobile Number → OTP to that mobile number → set password → sign up

Sign In

Mobile Number → Password → forgot password

Home Screen

- List all the shops the customer is associated with in that city as cards. Each card should contain store name and outstanding points available

- Search Bar to search for stores

- Option to change the City

- Top left corner button for user profile

- Top right corner button for QR code

Each Store Screen

- Banner Image with Name of the store

- Distance from the user location (on the banner image)

- On click of the distance, maps should open to show the directions

- Timings, open or closed based on timings (on the banner image)

- Rating (On the banner image)

- On top right corner button to display QR code

- Button to make payment

- Tabs - "Activity", "Details", "Profile"

- The Activity tab should contain

    o Total Outstanding points

    o No of visits

    o Total points redeemed

    o Loyalty level (silver, gold, platinum)

    o Points to be gathered for entering next level

    o All details of available rewards, if any

- The Details tab should contain

    o All the individual transaction details done by the customer in that store. Means each transaction of point's addition and point's redemption.

    o Each detail should contain date, address, points count, added or redeemed

- The Profile tab should contain

    o Name of the store

    o Various places where the stores are in that city, with phone numbers

    o Each Loyalty level`s explanation

    o Other store details

Profile Screen

On click of profile button in the home page

- Header should contain Total store count, total visits, Profile pic

- Should Contain Three tabs "Profile", "My Activity", Notifications

- Profile tab should display the following fields and option to edit them

    o First Name

    o Last Name

    o Date of Birth

    o Email Address

    o Phone Number

- o Option to change password

- o Gender

- My Activity tab should contain the details of all the transactions of all stores in that city.

- Notifications will store all the notifications send to that user

- Top right corner should contain button for QR code

- Option to add payment details

Vendor – Business App

Sign-in

Email id → Password (No registration is required here because the business registrations are done via website only)

Should Contain

- Two tabs "Add points", "Redeem points"

- In Add points tab

    - o Bill amount field

    - o Phone number / scan QR code field

    - o Button beside scan QR code.

    - o On click of the button QR reader should open in app

- In redeem points tab

    - o Scan QR code field (points cannot be redeemed unless the user has app in his phone)

    - o After scanning the QR code, show total outstanding points, Customer basic info and a text box to enter the number of points to be redeemed.

    - o Redeem button

Vendor – Web Application

Request Register

- Popup will contain one field "Email address"

- Okay button. "Send verification email"

- After clicking the verification link from email, will redirect to registration form

- Registration form will contain

  - Set password

  - Shop Name

  - Shop type

  - Add outlet`s address, phone numbers

  - Add different logins for different outlets

  - Define Loyalty points for three levels. Amount: points ratio, any other benefits of individual levels

- Button for "Submit request"

Login

- Email Id, password fields

Store Dashboard

- Dashboard will contain the following menu

  - Overview

  - Transactions

  - Campaigns

  - Members

  - Billing

  - Settings

- **Overview**

  - Total Visit count

  - Total Members

  - New members this month

  - Active members in each tier

  - Contribution of sales by each tier members

  - Total annual sales

- **Transactions**
    - Add points
    - Redeem points

- **Members**
    - Total Members
    - Search Box
    - Sortable data table with columns
        - Check box
        - Profile pic
        - Name
        - Phone number
        - Email id
        - Status
        - Outstanding points
        - Last visit
        - Membership from date
    - On click of each row a pop up should come with following details
        - Name, profile pic, Email, Date of Birth
        - Add points, text box for amount and add button
        - Total visits
        - Total points added
        - Total points redeemed
        - Total revenue made by the customer
        - History of visits

- **Campaign**
    - Data table of number of campaigns done till date with columns date, message, members
    - Create Campaign Button
    - On click of Create Campaign button

- Text box for campaign message

- Select member using filters like All, Silver, Gold, Platinum, Birthday etc.

- Send Button (If the customers are using app the message will be sent as notification else it will be sent as message)

- **Billing**

  - Outstanding bill Details in data table format with pay button in each row

  - Bill downloadable as pdf

  - Credit Card details. Add/Remove cards

- **Settings**

  - Editing of details like

    - Store Name

    - Store type

    - All the outlets address, phone numbers, email id and login ids

    - Loyalty points ratio, benefits of tiers

Use Case Diagram

There are three different actors in this system.

1) **Customers**

- Register themselves to the program with mobile app

- See notifications from vendor

- Make a payment to vendor

- View activity which includes

  - Purchases

  - Rewards

  - Transactions

2) **Vendors**

- View activity dashboard

- Design Loyalty program

- Design Campaigns

- Push Campaigns

- Add/Redeem points to a customer
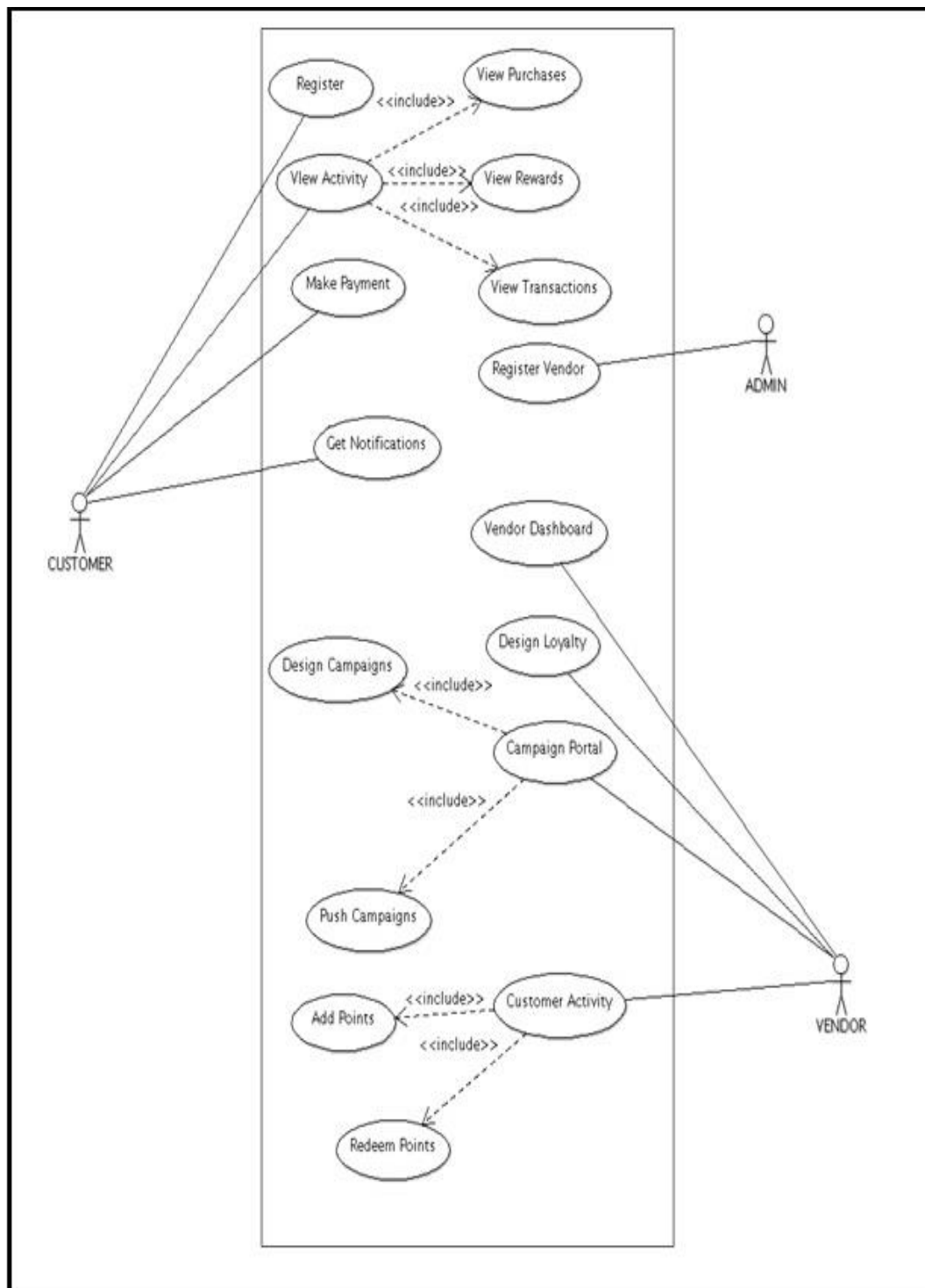
3) **Admin**

- Register a new Vendor

Fig 1: Use Case diagram

Class Diagram

This diagram represents attributes and methods of different classes designed. The following are the classes, with their attributes and actions.

1. **Customer**

   - ID – Unique for each customer – Integer

   - Mobile – Registered mobile number - String

   - Email – Registered Email Id – String

   - Password – Password to login – String

   - FirstName – First name of the customer - String

   - LastName – Last name of the customer - String

   - Gender – Male/Female - String

   - DOB – Date of birth of customer – String

2. **Vendor**

   - ID – Unique for each vendor – Integer

   - Name – Name of vendor – String

   - Type – Type of business – String

   - Website – Website of business – String

   - Checkin – Points for each check in – Integer

   - Transaction – Points for each dollar spent – Integer

3. **Outlet**

   - ID – Unique for each outlet – Integer

   - Vendor – Vendor to which the outlet is tagged – Vendor

   - Email – Registered Email – String

   - Password – Registered password – String

   - OutletAddress – outlet`s Address – Address

4. **Address**

   - ID – Unique for each address – Integer

   - LineOne – Line one of address – String

   - LineTwo – Line two of address –String

   - City – City – String

   - State – State – String

   - ZIP – ZIP –Integer

5. **OutletTiming**

   - ID – Unique for each timing - Integer

   - Outlet – Outlet associated –Outlet

   - Day – Day of week – string

   - Open – Opening time – String

   - Close – Closing time – String

6. **Transaction**

   - ID – Unique for each transaction - Integer

   - Customer – Customer associated – Customer

   - Outlet – Outlet associated – Outlet

   - Type – Type (Add/Redeem) – String

   - Amount – Amount associated – Integer

7. **Campaign**

   - ID – Unique for each campaign – Integer

   - Vendor – Vendor associated – Vendor

   - Customer – Customer associated – Customer

   - Title – Tile of campaign – String

   - Message – Message to be campaigned – String

8. **Summary**

- ID – Unique for each summary – Integer

- Vendor – Vendor associated – Vendor

- Customer – Customer associated – Customer

- Transaction – Transaction associated – Transaction

9. **Beacon**

- ID – Unique for each beacon – Integer

- Outlet – Outllet associated with the beacon – Outlet

- Namespace – 32bit code associated with beacon – String

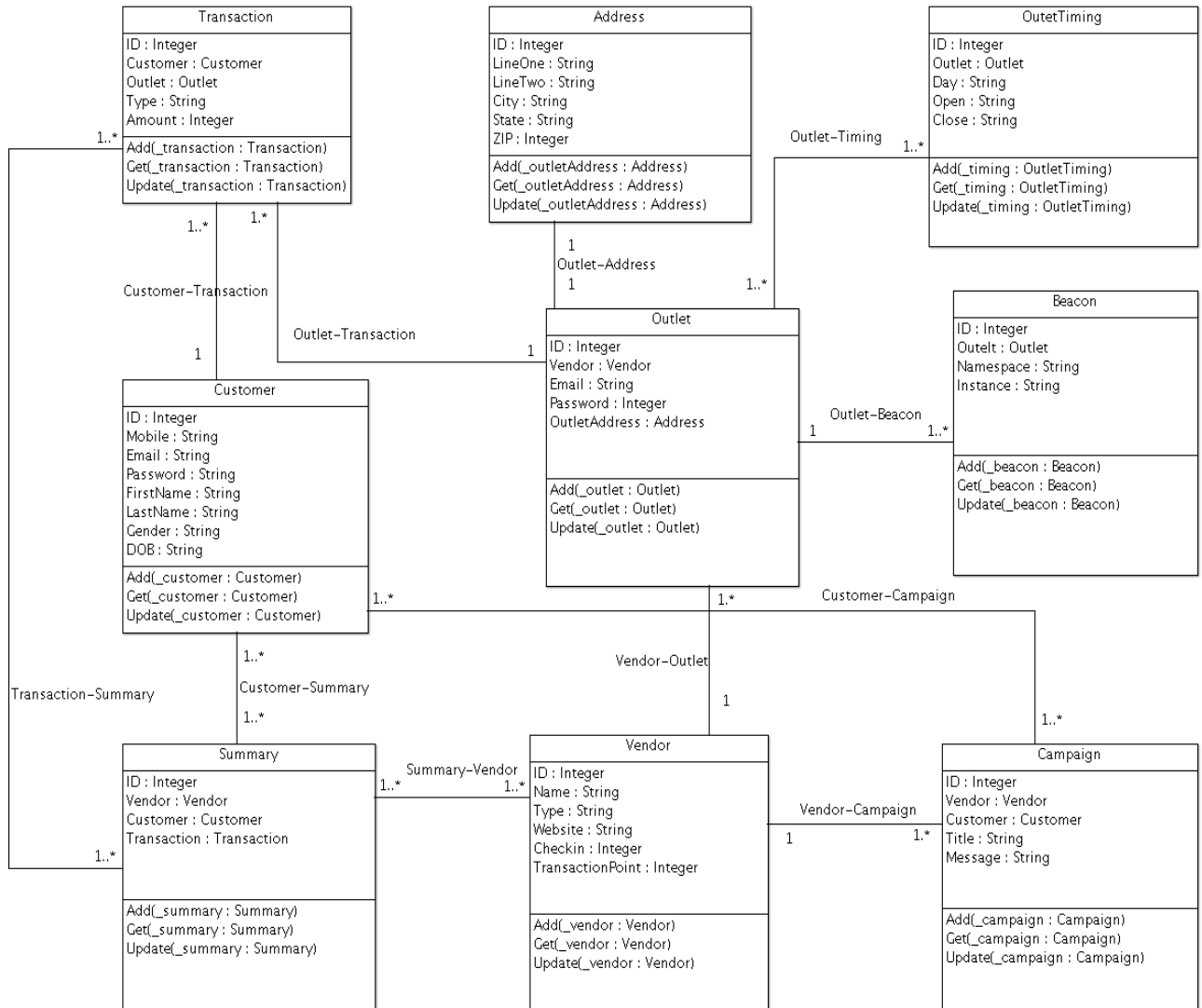- Instance – 16bit code associated with beacon – String

Fig2: Class diagram of the system

Relationship between classes

- **Vendor – Outlet:** An outlet will be associated to only one vendor while a vendor can have one or more outlets

- **Outlet - Address:** An outlet will have only one address and an address will be associated with only one outlet

- **Outlet – Timing:** An outlet will have many timings for different days of week. Same timing can be associated with many outlets

- **Outlet – Beacon:** An outlet can have many beacons associated. On the other hand, a beacon should be linked to only one outlet

- **Vendor – Campaign:** A vendor can have multi campaigns. While a campaign can be associated with only one vendor

- **Customer – Campaign:** A campaign can be associated with multi customers. Similarly, a customer can receive many campaigns

- **Summary – Vendor:** A Summary may contain details of many vendors. A vendor can be present in many summary records

- **Customer – Summary:** A Customer detail can be present in many summary records. Similarly, a summary record can have many customer details

- **Outlet – Transaction:** An outlet can have many transactions. A transaction will involve only one outlet

- **Transaction – Summary:** A summary record can have details of many transactions.

- **Customer – Transaction:** A customer can involve in many transactions. While a transaction will involve only one customer.

State Chart Diagrams

State chart diagrams describe the behavior of the designed system. There are two state chart diagrams for the designed system. One for Customer and other for Vendor. These two diagrams are shown below
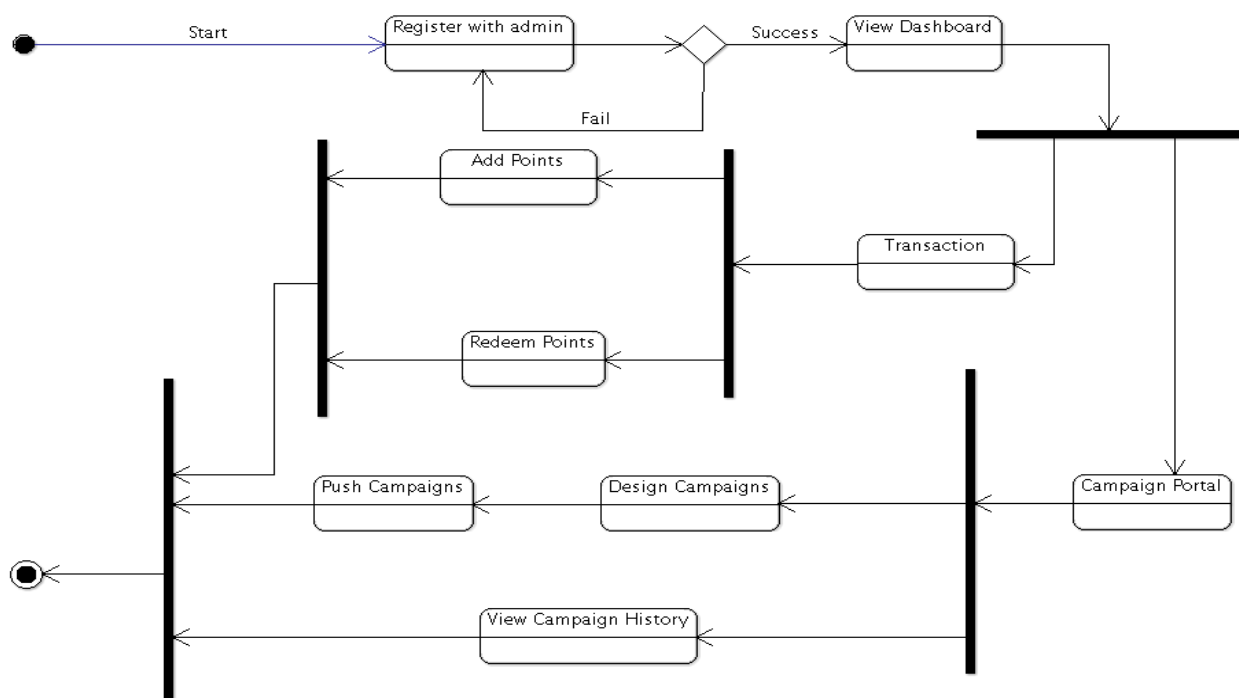
Vendor State Chart
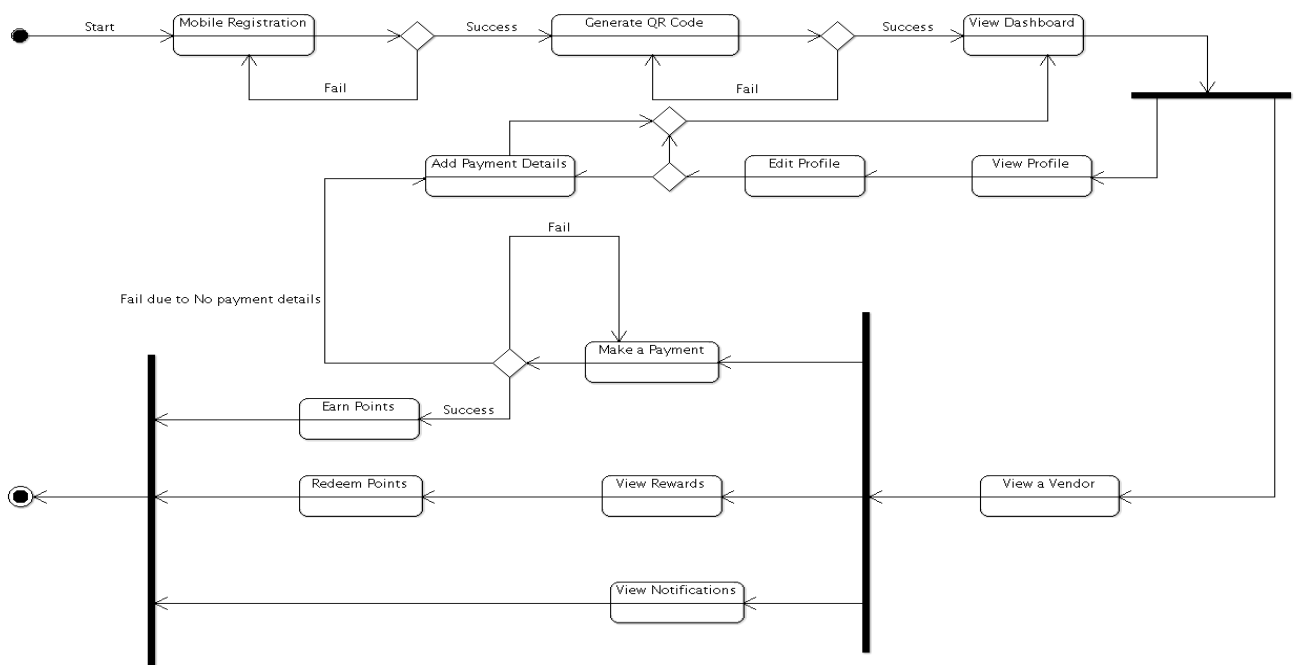

Fig3: Vendor State Chart

Customer State Chart

Fig4: Customer State Chart

External Interface Requirements

User Interface:

Mobile App Interfaces

LoyalPouch
Welcome! Please set up your LoyalPouch
Mobile Number
NEXT

LoyalPouch
Welcome! Please set up your LoyalPouch
OTP
NEXT

LoyalPouch
Welcome! Please set up your LoyalPouch
First Name
Last Name
Gender
Date of Birth
Set up my LoyalPouch

LoyalPouch
We are setting up your LoyalPouch.

Screen 1

12 Businesses 141 Visits

Ryan Mathews

Activity Notifications Businesses

Star Bucks Coffee
10 points added
21st Mar 2015, 02:15P.M

Narayana Pharmacy
20 points added
22nd Mar 2015, 02:15P.M

Star Bucks Coffee
5 points redeemed
25th Mar 2015, 02:15P.M

Screen 2

12 Businesses 141 Visits

Ryan Mathews

Activity Notifications Businesses

Star Bucks Coffee
New Menu launched. Visit your nearest outlet to experience it

Narayana Pharmacy
Now we are open 24x7

Eva Design Studio
Come visit us and take a look at festival collections 2016

Screen 3

12 Businesses 141 Visits

Ryan Mathews

Activity Notifications Businesses

Star Bucks Coffee
10 Outstanding points
5 redeemed points

Narayana Pharmacy
20 Outstanding points
50 redeemed points

Eva Design Studio
50 Outstanding points
50 redeemed points

Screen 4

LoyalPouch

Search

Star Bucks coffee
0.2 km away
★ 100 points to spend

Narayana Pharmacy
5.1 km away
★ 264 points to spend

Eva Design Studio
5.8 km away
★ 897 points to spend

Femina Health Studio
6.4 km away
★ 675 points to spend

Screen 5

12 Businesses 141 Visits

Ryan Mathews

Activity Notifications Businesses

Star Bucks Coffee
10 points added
21st Mar 2015, 02:15P.M

Narayana Pharmacy
20 points added
22nd Mar 2015, 02:15P.M

Star Bucks Coffee
5 points redeemed
25th Mar 2015, 02:15P.M

Screen 1 — Femina Health Studio (Activity)

Femina
Beauty Parlour

Femina Health Studio
📍 6.4 km away ★ 675 points to spend

OPEN

Activity	Details	Profile

675 Outstanding Points

05 Visits

125 Points Redeemed till date

Silver Level

400 more to Gold Level

Screen 2 — Femina Health Studio (Details)

Femina
Beauty Parlour

Femina Health Studio
📍 6.4 km away ★ 675 points to spend

OPEN

Activity	Details	Profile

25 points	Added at kormangala 21st Mar 2015, 02:36 P.M
100 points	Added at BTM 25th Mar 2015, 07:42 P.M
25 points	Redeemed at kormangala 21st May 2015, 02:36 P.M

Screen 3 — Femina Health Studio (Profile)

Femina
Beauty Parlour

Femina Health Studio
📍 6.4 km away ★ 675 points to spend

OPEN

Activity	Details	Profile

Store Addresses

Store Timings of all days of week

Phone number, email ids

Silver, gold, platinum level amount to points ratio

Other store details

Screen 4 — LoyalPouch

LoyalPouch

Search

Star Bucks coffee
📍 0.2 km away
★ 100 points to spend

Narayana Pharmacy
📍 5.1 km away
★ 264 points to spend

Eva Design Studio
📍 5.8 km away
★ 897 points to spend

Femina Health Studio
📍 6.4 km away
★ 675 points to spend

Screen 5 — Femina Health Studio (Activity)

Femina
Beauty Parlour

Femina Health Studio
📍 6.4 km away ★ 675 points to spend

OPEN

Activity	Details	Profile

675 Outstanding Points

05 Visits

125 Points Redeemed till date

Silver Level

400 more to Gold Level

Screen 6 — Edit Profile

Edit Profile

Profile pic

First Name

Last Name

Gender

Date of Birth

Email Id

Web App Interfaces

LoyalPouch — Eva Design Studio

Overview | Add/Redeem | Members | Campaigns | Billing | Settings

Profile   Points   **Outlets**   Logins

Address

Address Line One	Address Line Two
City	State
Country	ZIP Code

Day	Opening	Closing	Is Closed
Mon			☐
Tue			☐
Wed			☐
Thus			☐
Fri			☐
Sat			☐
Sun			☐

Contact Details

Phone Number 1   Email id

Phone Number 2

Phone Number 3

Add another Outlet   Cancel   **Save**

LoyalPouch — Eva Design Studio

Overview | Add/Redeem | Members | Campaigns | Billing | Settings

Profile   **Points**   Outlets   Logins

Silver Level

Points   Points for every   Rupees   Rupees spent

Gold Level

Points   Points for every   Rupees   Rupees spent

Platinum Level

Points   Points for every   Rupees   Rupees spent

Cancel   **Save**

We ensure that your customers follow the below percentage for the tiers
• Silver Tier   :   65% of total customers
• Gold Tier   :   30% of total customers
• Platinum Tier   :   5% of total customers

LoyalPouch

Eva Design Studio

| Overview |
| Add/Redeem |
| Members |
| Campaigns |
| Billing |
| **Settings** |

Profile   Points   Outlets   Logins

Store Name

Website

Banner Image   Click here to upload a pic

Cancel   Save

LoyalPouch

Eva Design Studio

| Overview |
| Add/Redeem |
| Members |
| Campaigns |
| **Billing** |
| Settings |

Spend Summary

6.63K INR

5.55K INR

1.24K INR

Last Month
(Apr 2016)   Month-to-Date
(May 2016)   Forecast
(May 2016)
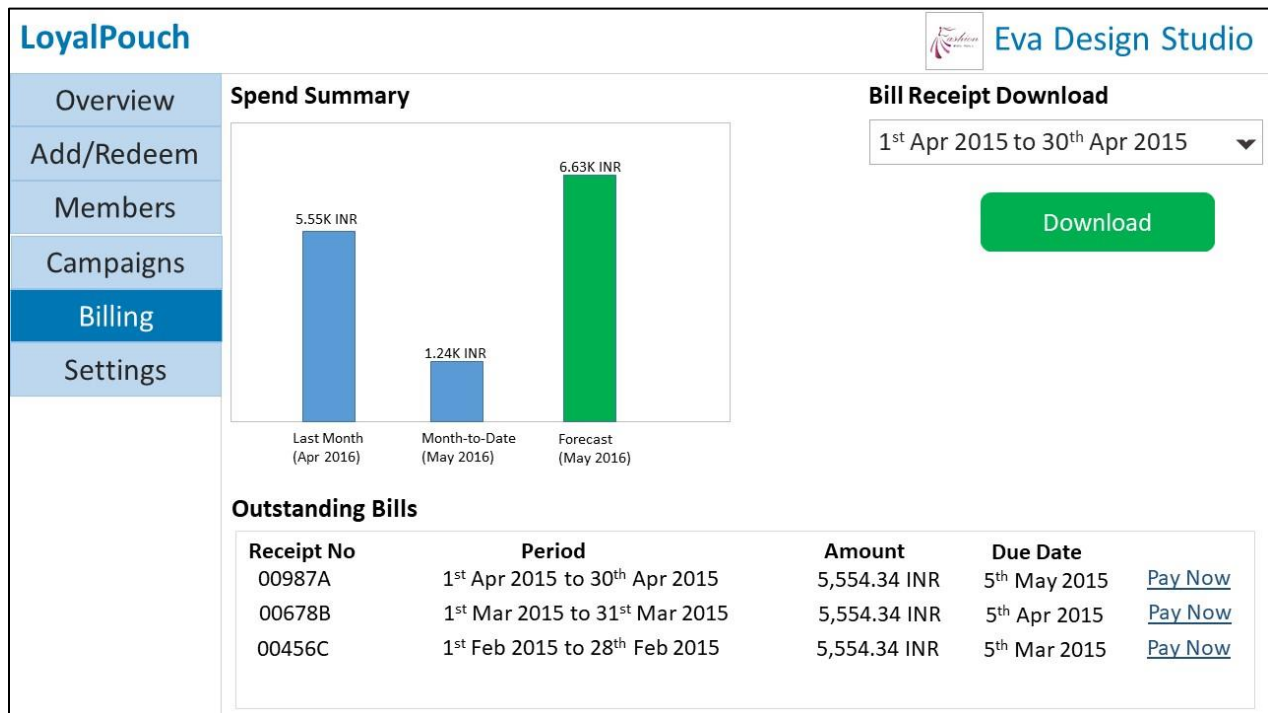
Bill Receipt Download

1st Apr 2015 to 30th Apr 2015   ▼

Download

Outstanding Bills

Receipt No	Period	Amount	Due Date	
00987A	1st Apr 2015 to 30th Apr 2015	5,554.34 INR	5th May 2015	Pay Now
00678B	1st Mar 2015 to 31st Mar 2015	5,554.34 INR	5th Apr 2015	Pay Now
00456C	1st Feb 2015 to 28th Feb 2015	5,554.34 INR	5th Mar 2015	Pay Now

LoyalPouch　　　　　　　　　　　　　　　　　　Eva Design Studio

	Overview
	Add/Redeem
	Members
	Campaigns
	Billing
	Settings

All Members ▼　　　　　　　　　　　　　　　　Search

	Name	Phone Number	Outstanding Pts	Level	Last Visit
☐	Ryan Mathews	8767898767	654	Gold	23rd Mar 2016
☐	Ryan Mathews	9876765654	764	Platinum	21st May 2016
☐	Ryan Mathews	9456787654	171	Silver	23rd Mar 2016
☐	Ryan Mathews	9778667234	342	Gold	23rd Mar 2016

Title

Message

Cancel　　Send

LoyalPouch　　　　　　　　　　　　　　　　　　Eva Design Studio

	Overview
	Add/Redeem
	Members
	Campaigns
	Billing
	Settings

Total Members **10,656**　　Silver Members **6,296**　　Gold Members **3,197**　　Platinum Members **533**

All Members ▼　　　　　　　　　　　　　　　　Search

Name	Phone Number	Outstanding Pts	Level	Total Amt Spent	Last Visit
Ryan Mathews	8767898767	654	Gold	60,635.56	23rd Mar 2016
Ryan Mathews	9876765654	764	Platinum	85,198.45	21st May 2016
Ryan Mathews	9456787654	171	Silver	234.87	23rd Mar 2016
Ryan Mathews	9778667234	342	Gold	58,987.47	23rd Mar 2016
Ryan Mathews	8997576645	287	Gold	55,789.98	23rd Mar 2016
Ryan Mathews	8675679876	345	Silver	7,456.68	23rd Mar 2016

LoyalPouch   Eva Design Studio

Overview
Add/Redeem
Members
Campaigns
Billing
Settings

Add Points   **Redeem Points**

Phone Number [   ]   Submit

Name	Phone Number	Outstanding Pts	Level	Total Amt Spent	Last Visit
Ryan Mathews	8767898767	654	Gold	60,635.56	23rd Mar 2016

Or
Looks like customer has not signed up yet to program

Available Points: 654   Redeem Points [   ]   Submit

Successfully redeemed 500 pts. Remaining points after redemption: 154
Or
Points entered is more than available points. Please enter points less than Available points

---

LoyalPouch   Eva Design Studio

Overview
Add/Redeem
Members
Campaigns
Billing
Settings

Add Points   Redeem Points

Phone Number [   ]   Submit

Name	Phone Number	Outstanding Pts	Level	Total Amt Spent	Last Visit
Ryan Mathews	8767898767	654	Gold	60,635.56	23rd Mar 2016

Or
Looks like a new customer

Amount [   ]   Date [   ]   Submit
                                  Default will be today`s date

Successfully added 70 pts corresponding to Rs 5689 spent in Gold Level

LoyalPouch

Eva Design Studio

| Overview |
| Add/Redeem |
| Members |
| Campaigns |
| Billing |
| Settings |

46,757
total visits

10,656
total members

157
new members this month

All Locations (4) ▼

Active Members

Silver
2 pts/Rs 100

| This Month | +34 |
| Total | 6,926 |

Gold
5 pts/Rs 100

| This Month | +89 |
| Total | 3,197 |

Platinum
7 pts/Rs 100

| This Month | +23 |
| Total | 533 |

Total

| This Month | +146 |
| Total | 10,656 |

Sales Contribution
This month

Rs 2,40,055.20
or 45%

Sales Contribution
This month

Rs 1,86,709.60
or 35%

Sales Contribution
This month

Rs 1,06,691.20
or 20%

Total Sales this month

Rs 2,40,055.20

Requirements for Supported Software

Software	Recommended	Minimum	More information
PHP	5.6 or 7.0 +	5.3.10	https://secure.php.net
Supported Databases:			
MySQL	5.5.3 +	5.1	https://www.mysql.com
SQLite	3.7.11 +	3.2	http://www.sqlite.org/
Supported Web Servers:			
Apache	2.4 +	2.0	https://www.apache.org
Supported Mobile Devices:			
Android	5.0	4.2	
IOS	9	8	

Non - Functional Requirements

Performance:

Response Times
- The system should have a screen load time of less than 4 seconds after a user creates an action.

Query and Reporting Times
- Queries should take no longer than 10 seconds to load after a user submits query.

Availability:

- The system should be available 24/7. Users and Vendors should be able to login to the system from anywhere with a stable internet connection.

Security:

- Only authorized users shall be able to use the system.
- Only authorized vendors who are registered into the system by an Administrator can access the vendor system.
- All Payments must be made through a robust and highly secure Payment Gateway.

Limitations

After thoroughly inspecting and understanding the system, we identified the following limitations:

- User intervention is required for check-ins
- Cannot record in-store product preferences of the customers
- Lack of more specific marketing techniques like proximity marketing

Recommendations

Use of Bluetooth Low Energy(BLE) beacons in the system to overcome the above limitations

BLE Beacons

These are hardware transmitters - a class of Bluetooth low energy (LE) devices that broadcast their identity to nearby portable electronic devices. This technology enables smartphones, tablets and other devices to perform actions when in close proximity to a beacon.

Check-Ins

BLE beacons can be placed at the entrance of the store, such that any mobile device with the app cross the beacon gets recognized and automatic check-in can be done without user intervention

In-Store product preference

These beacons can be placed near each product in the store. When any mobile device enters the range of the beacon, the beacon registers the time spent by the mobile device in the beacon`s range. With this, the customer`s in-store preferences can be tracked, and appropriate targeted ad campaigns can be designed and pushed.

Proximity marketing

Currently push notifications regrading rewards, offers and discounts are delivered to customers at a specific time in a day, but this might not lead to much customer interaction since customers have a lot of things going on and might decide to act on it at a later stage and eventually forget.

BLE beacons can detect any mobile device in a particular radius around the store. With this the customers can be notified with instant rewards or discounts when they are in the vicinity of the store. This achieves much more specific targeting of customers for ad campaigns and has been proven to be more affective in persuading customers to make purchases.

Modern shoppers tend to enjoy customized experiences and personalized experiences. Proximity marketing has the power to transform the customer experience, increase brand affinity, and drive sales. It's a novel approach to engage with consumers and provide incentives for shoppers to enter a particular store, stay for a while, and hopefully make purchases.