CUSTOMER TRACKING SYSTEM FOR PROMOTIONS AND OFFERS

Project Id – 19-081

Project Proposal Report

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B.Sc. (Hons) Degree in Software Engineering

Department of Software Engineering

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DECLARATION, COPYRIGHT STATEMENT AND THE STATEMENT OF THE SUPERVISOR

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The supervisor/s should certify the proposal report with the following declaration.

The above candidates are carrying out research for the undergraduate Dissertation under my supervision.

Signature of the supervisor: …… Date 12/03/2019

(Ms. Manori Gamage)

ABSTRACT

Although focusing on offers and promotions is not new to customer, the focus on such services has increased significantly with the arrival of new technologies like internet, location-based services, etc. We searched on systems which improves customer attraction towards offers and promotions. We have found few systems related with our idea. When doing further research, existing problems of those systems were identified. Groupon.com and Webengage.com are two web applications containing merchants' offers. But those are not location-based systems and there are no proper categorizations on the listed down offers in those sites. Nowadays merchants' focus on sending details about their offers once customer purchases something from them. But the issue with that is people are neutral about those messages if they are away from those shops. Therefore, we decided to implement a location based mobile application to overcome with this problem. There will be four main features in the proposing system. There will be two type of users for this application namely merchants and customers. Filter out offers from merchants' websites or public Facebook pages, send location-based notifications containing details of offers, Search predictions for offers and Recommendations for improve business of merchants according to customer behavior against offers are the four main functionalities of this system. We are going to use modern technologies like Machine Learning, Deep Learning, Natural Language Processing to build the solution for this problem. Modifications will be done for existing text extraction techniques using machine learning algorithms to extract offer related text from images. Data models will be trained using machine learning to use in search predictions an offer prioritization. Natural Language Processing will be used to analyze customer reviews. When discussing about the advantages of the proposing system, customers will attract more towards the offers since they will receive them in a location-based way. As we are going to extract information from their websites, merchants have not to spend extra time and effort on publishing offers on our system. Merchants will get recommendations and statics about the customer behavior as an added advantage.

TABLE OF CONTENTS

LIST OF FIGURES

page

LIST OF TABLES

1. INTRODUCTION

1.1 Introduction of the System

In this modern world people do shopping every day in their lifestyle. People do shopping for various reasons. Likewise, shopping has now been evolved and now it's in the era of online shopping. Even though people do online they too do shopping by visiting the shops and find what they want in their choice of brand, price and quality.

When it comes to shopping people waste hours and hours of time to find a shop which gives them good offer and best price for the goods they purchase. Likewise, people wants to get a reasonable value for what they want buy as they don't proper way to get updated with current offers and promotions due to various reasons such as lack of offer awareness or busy with other works.

Considering the topic of a shopping area, if there is a system to find out the promotions and the offers when customers moving near the shops inside the specified area it will be benefited to customer as well as the shop owners. We conducted a survey targeting 75 people and collect the ideas about this problem. According to the data of the survey we found out more than 75% of people prefer to visit shopping complexes and more than 95% of them is liked to have a system that they can get aware on offers while moving near the shops. According to the survey they believe that it will be useful for them to fulfill their requirements while engage in shopping.

We did some research on a bit similar kind of project in ODEL Colombo which was done using Beacons but we found out some issues with that mainly due to the cost of the Beacons. The initial charges for Beacons is considerable and considering about iBeacons, we have to buy the SDK as well which will be an extra expense. The other issue that we found was that when there are objects between transmitters, the rays will be reflected. So, cannot make sure whole area will avoid interfering objects between transmitters. Groupon.com is another a bit similar kind of website which is listing down offers. The drawbacks of this system are, it is not a location-based system, no proper categorization and recommendations in searched results. Therefore, we identified a research problem on sending notifications for special offers and promotions for customers who are moving near the shops which will be useful for both customers as well as the shop owners

As a solution we propose to notify customers when they are moving near shops inside a shopping complex which the user can get aware about offers easily through a mobile application. Also end users can search on special offers and merchants can have statistical data and charts about trending offers, response of customers against the offers at the end of each month as additional features.

1.2 Literature Review

In year 2018 Mohit M.Kanfade, Sukriya D.Ambade, Amol P Bhagat published a research paper called “Location Based Notification System” [1]. They have proposed a system for an android mobile application which can serve location-based services. According to their research the proposed system was consist of functionalities for location reminder and friendly suggestions and system registered shops’ offer notifications. And also, there is a admin panel. By using that admin can log into the system and can add and delete shops. shop manager is able to add offers on a panel. can As the methodology of their research they have used GPS and LBS to track users. They havent mention the way that their published the offers to their mobile application. In future they will going to improve the system. As the future improvements they will include following applications in their mobile application: vehicle tracking system, billing system , weather forecasting , use of e-card through mobile no , Tracking the user path , Emergency services , and automatic toll/parking.

In year 2018 Wei Jie Phua , Malcolm Yoke Hean Low , Neelakantam venkatarayalu and jared Koh published a research paper called “[2]”. They proposed efficient patient discharge workflow to hospitals. In typical hospital environment patient discharge process is time consuming. Because of that this leads to long waiting time for patients and also there will be a queue to assign patients to a bed. They did a research to solve that problem. They tried to minimize turnaround time upon discharge of a patient. They proposed NFC based system to achieve their goal.They developed Android-based mobile application. This mobile application is used for both nurses and housekeepers. One of the key functionalities of the mobile application is send notifications. Notification service is automated. To send notifications they used Telegram Bot API. When the patient leaves the hospital notification will send to housekeepers through the system. That notification includes cleaning request and viewing of bed status. And also, after cleaning of the bed it informs admissions office. According to this system instead of using discharge slip use NFC tags. Nurse assign the NFC tag to discharging patient. Instead of using deposit basket at the nurse counter uses NFC card reader to read NFC tags which are assigned to the discharge patients. Mainly they used NFC tag reader and it is connected to the Raspberry Pi and internet access is needed. That system needs low cost and can be easily deployed.

In year 2017 Prasanta Saikia and James she published a research paper on “Effective mobile notification Recommendation using Social nature of Locations” [3]. They proposed a mobile notification recommendation system which is location-based service. They proposed a news recommendation method. It collects user preferences for different news categories at different locations. They group locations by analyzing two location grouping methods such as manual and other is based on similarities. They identified types of a location using GPS geolocation data. They mention as their future works determining the optimal number of localities without having to evaluate the optimization model for each location grouping method would be studied.

In year 2015 Takaaki Tsunoda proposed a novel task for utilizing review analysis to suggest product advertisement improvements [4]. They use the review analysis technique. By using review analysis technique, they determine which aspects can be included in a blurb of the product. show aspect candidates that could be incorporated into the blurb ordered by their importance to users for a given product is the goal of their task. As the review analysis technique, they break their task into two sub tasks. aspect grouping and aspect group ranking. They are assigning aspect expressions to aspect groups to manage aspects at the semantic level. They next score aspect groups to suggest only important aspect groups. For the aspect grouping they used one of the semi-supervised learnig methods. Those methods are described by zhai et al in year 2010. For the aspect group ranking they used aspect ranking method. That method proposed by lnui et al in year 2013.

In year 2018 Y.Gopi , Varikallu Sumalatha published a research about Tele comm. Customer data analysis using Multi-Layer clustering model [5]. They are main goal is to verify the high homogeneity of individual clusters, and also the high degree of unsimilarity among individuals, given the appropriate segments. They are first collecting and segmenting individual customer's contributions, personal preferences, overall customer profile and other factors. They used data mining technology and two-layer clustering model in their research. Marketers can use pre-analysis and data mining to target their customers and also marketers can sell the company's products and services with accurate marketing. As they use two-layer clustering model there are two layers. The first layer examines customer value. And the second layer uses customer behaviour features. The second layer is used for further grouping. The two-layer customer model that they are proposed provides a macro and micro perspective to assist mobile CRM.

In year 2015 can yang , zhiye chen , Tianyi wang and pengfei sun published a research on sentiment analysis of customer reviews based on the ontology of phone [6]. They developed FOBPRM (Feature Ontology Based Product Review Miner) system. They extract and summarize customer reviews on products. This process is ontology based. The proposed system has three parts. Firstly, all the data containing reviews must be pre-processing. Then after use lexicon to enrich the computing term special degree and similarity to construct an ontology tree. Next method of information entropy used. That is used to select high correlation feature-sentiment pairs and compute their polarity. That is compute by using frequency. Finally, summary will be an output. This summary contains feature and sentiment.

In year 2011 Abhijit Raorane & R.V. Kulkarni published a research on "Data mining Techniques: A Source for consumer Behaviour Analysis" [7]. Their main objective is to know consumer behaviour. They study why person wants to buy a certain product at the time of he is purchasing a product. They use data mining as a technology to analyze consumer's behaviour. First, they are choosing an organization to test and do their experiments. After they collect data from different organizations they search various methodologies and algorithms to analyze consumer's behaviour. Then after they decided to use association rule for checking association between the several products which are brought by the consumers.

The patent on "**System and method for providing recommendation of goods or services based on recorded purchasing history**"[**8**] is developed on how to goods and service are recommended utilizing distributed network for potential customers selection based on past purchase history.They provide recommendation of goods and services according to customer interest based on customer profile and personal information such as age,profession, gender,etc… when creating user profile.This invention allows customer a distributed network to obtain recommendations of goods and services that may be interest of user by reducing the inputs from user compared to prior systems.Instead of relying in personal information by user for recommendations this system user history database to determine the recommendation.

In this paper("**Mobile Advertising : Does Location-Based Advertising Work**?")[**9**] we examine consumer reactions to different advertising strategies (Location based versus location independent) advertising using the mobile phone as new platform to omit the barriers between user and business offerings by getting closer to particular shop.Even Though such advertising is convincing it also can be identified as unwanted.This paper examines effectiveness of such through an experiment which manipulate the locations.These finding are discussed in form of how,when and where to advertise using mobile phone. We explore the conflict between convenience and intrusiveness which may create a dilemma about how to react. We examine the moderating impact of location type and contextual type.

We report an experimental study to decide these location-based advertising influence the effectiveness of these strategies in getting user response to the promotional offer. The responses are discussed as effects of such advertising strategies usefulness.

In 2008 Ankur Gupta and Rajni Jindal conducted a study regarding ranking algorithms in search engines [10]. The aim of this study was to provide an overview of different work done in this field. In this study, they have identified the need for ranking algorithms and they have presented a survey conducted on major ranking algorithms used in search engines. In this paper, mainly their focus was to explore how search engines prioritize results relevant to the user when using different algorithms. PageRank, Hubs and Authorities, Hilltop, Query sensitive page ranking are few of the algorithms they have touched upon. Also, they have provided an overview of algorithms that have built by modifying the PageRank algorithm which is used by the Google search engine. In this study, they have identified in terms of speed and memory requirements PageRank algorithms is the most efficient. Also, they have identified that when using personalized ranking algorithms there is a trade-off between efficiency and making results more relative to user preferences.

In 2006 Eugene Agichtein, Eric Brill and Susan Dumais published a conference paper on "Improving web search ranking by incorporating user behaviour information" [11]. In this article, they have shown how Implicit feedback (User actions when interacting with the search engine) affect the ordering of the search results. They have used 2 approaches when cooperating user behaviour into ranking

algorithm. First, they studied the ranking when implicit feedback is used separately. Then implicit feedback integrated with the ranking algorithm. They have used a model called “implicit user feedback model” to obtain noisy user interaction from a web search engine as vector features to use with the ranking algorithm. For this study, they have used over 12 million user interactions. In conclusion, they have shown that there was a 31% improvement in the final ranking when user behaviour is considered.

“Personalized Search Based on User Search Histories” conference paper is authored by Mirco Speretta and Susan Gauch [12]. They have studied how user data such as user profile and user interests can be used to improve personalized search results. Furthermore, they have examined different ways to gather user data. As a result, they have implemented a wrapper called GoogleWrapper. Which can implicitly create user profiles by using user search queries, search results and click data through a search engine. From this study, they were able to prove that the information that is readily available to search engines are sufficient for improve personalized searching and also the use of users’ data in search will improve the rankings.

1.3 Research Gap

As discussed previously there are several existing systems and research approaches for promotions and offers. But through the research we understood there are some issues in previously done projects and researches.

There is a one similar kind of project in ODEL colombo. For that project they are using Bcons to track customer and send notifications containing offers and promotions. But we found there is an issue of Bcons. Cost of Bcons is the main problem. We have to buy the SDK as well. Other issue of project in ODEL colombo is when there are objects between transmitters, the rays will be reflected.

Groupon.com is another similar kind of website which is listing down offers. But it is not a location-based system. There are no proper categorization and recommendation in search result.

Webengage.com is also another similar kind of website. Main issue of their site is offers can add only to their site.

But the system that we are proposing here is little bit different than other existing systems that we mentioned previously. The idea behind our research approach is newer and also, we will reduce problems which are contains in previously done projects and researches.

In our proposed system we sent location based notifications to customers with promotions and offers given by the shop.To track the customers instead of using Bcons we will use GPS. And also, we prioritise offers and promotions according to customer preferences. Other thing is through our mobile application we provide a search functionality. By using a search functionality of a mobile application

customer can search offers. Search result will suggest by considering customer's previous searchings and also informations will gather related to search result from various sources. Such as from public facebook advertisements and shops website advertisements which are related to promotions and offers provided from shop.. That's would be an added advantage to customers.

And other thing is merchants can also use our mobile application using their logins. Merchants also can improve their shops by considering recommendations given by the mobile application.

Table 1.3.1 shows a summary comparison of features in the proposed system and existing systems and approaches

	Feature	Proposed System	ODEL	Groupon.com	Webengage.com
1	Location based	yes	yes	No	No
2	Gather existing offers using public FB pages and shop's website	yes	No	No	No
3	Prioritize offers according to customer's behaviour	yes	No	No	No

Table 1.1: comparison between the proposed system and existing systems.

1.4 Research Problem

In the present business world, there is a competition among shops and supermarkets. Due to this reason they try to give offers, promotions and discounts to attract more customers. Because of this customer face some problems when trying to find the best place to buy something. As an example, customers might have to do some research about different shops that provide the same service to find out best shop that suits them. They might have to visit the websites of each shops and read other users experience with them. When analyzing data that we gathered from a survey, more than 95% of the participants said that they would like an feature which will give them notifications about special offers when they are near a shop.

2. OBJECTIVES

2.1 Main Objective

Use Location based offers and promotion system which notify users with offers and promotion relevant to particular shops in shopping complex.Also search option on special offers.Statistical data charts about trending offers of merchant and response of customers against the offers at the end of each month will be offered for merchants.

2.2 Specific Objectives

- Customers will be able to review products and give feedback about shops and their services.

  Customer experience with products and shops is shared with other users.

- Customers will be able to find the best product that suits them.

  Purchase history of the user and other users that have similar interest will be used to provide best product suggestions.

- Customer will be notified with offers and promotions once they go near a shop based on different scenarios

- Merchants can inform about trending offers less value offers and so on.
- According to customers behavior automatically create a statistic for a month and give it to merchants. Based on those statistics give recommendations for next month to the merchants for offers and promotions
- Merchants can know the attitudes of customers towards their shops

Based on customer reviews and feedback for each shop give suggestions to merchants for improvement of the shop.

- System will go through the websites of the registered merchants and will identify the offers among the uploaded content.
- Data related to offers fill be filtered out and all the identified offers will be displayed in a separate interface for customers.

3. METHODOLOGY

3.1 Functionality of Research

3.1.1. Search predictions

The main responsibility of this functions is to provide personalized search suggestions for users by analyzing search history, purchasing patterns of this particular user and users which share similar interests.

Data extracted in following ways will be used to improve predictions;

- When registering, users will be provided with a small questionnaire which will help to get an idea about the interests of the user.
- With the permission of the user, search history data will be collected and will be used with the algorithm for making search predictions.
- Users will be given the option to share reviews and experiences with shops and products with other users.

According to the analyzed data users will be put into target groups for each product category. When searching this will be helpful to give more personalized search result for users.

User feedback and ratings also will be considered when providing search results. Search results will be prioritized according to user interest as well as user feedback using ranking algorithms.

3.1.2. Offers and promotion notifier

The main functionality of this research component is to notify user with offers and promotion once they are near a shop in a shopping complex based on the seasons and their interest.

This predictor will be trained by using data extracted by following ways

- when user get registered with the app the user has to fill an form with some basic questions and some question related to their interest.
- through user recent search history

3.1.3. Filter out offers and promotions

The main functionality of this functions is to identify and filter out offers and promotions from merchants' websites or public Facebook pages.

Images will be identified using a tool like Web Scraper.

Data will be extracted from identified images by modifying existing text extraction methods with machine learning algorithms.

A data model will be trained to identify offer related details from extracted data.

3.1.4 Analyze customer behavior

The main functionality of this function is to analyze customers monthly data on offers and represent those data on statistical chart. monthly data include customers behavior / Customers interest. statistical data include trending offers, less value offers and so on. And also, according to statistical data give recommendations for next month through the mobile application.

Following ways are used to analyze customers behavior

- analyzing previous search history
- analyzing customers purchasing patterns
- When customer registers to mobile application provide small questions to identify customer's interest.

This will be most helpful to merchants.

3.1.5 Review analysis

The main functionality of this function is to analyze customer reviews and give recommendations to merchants for improvement of the shop.

Review will be analyzed using suitable NLP and machine learning algorithm.

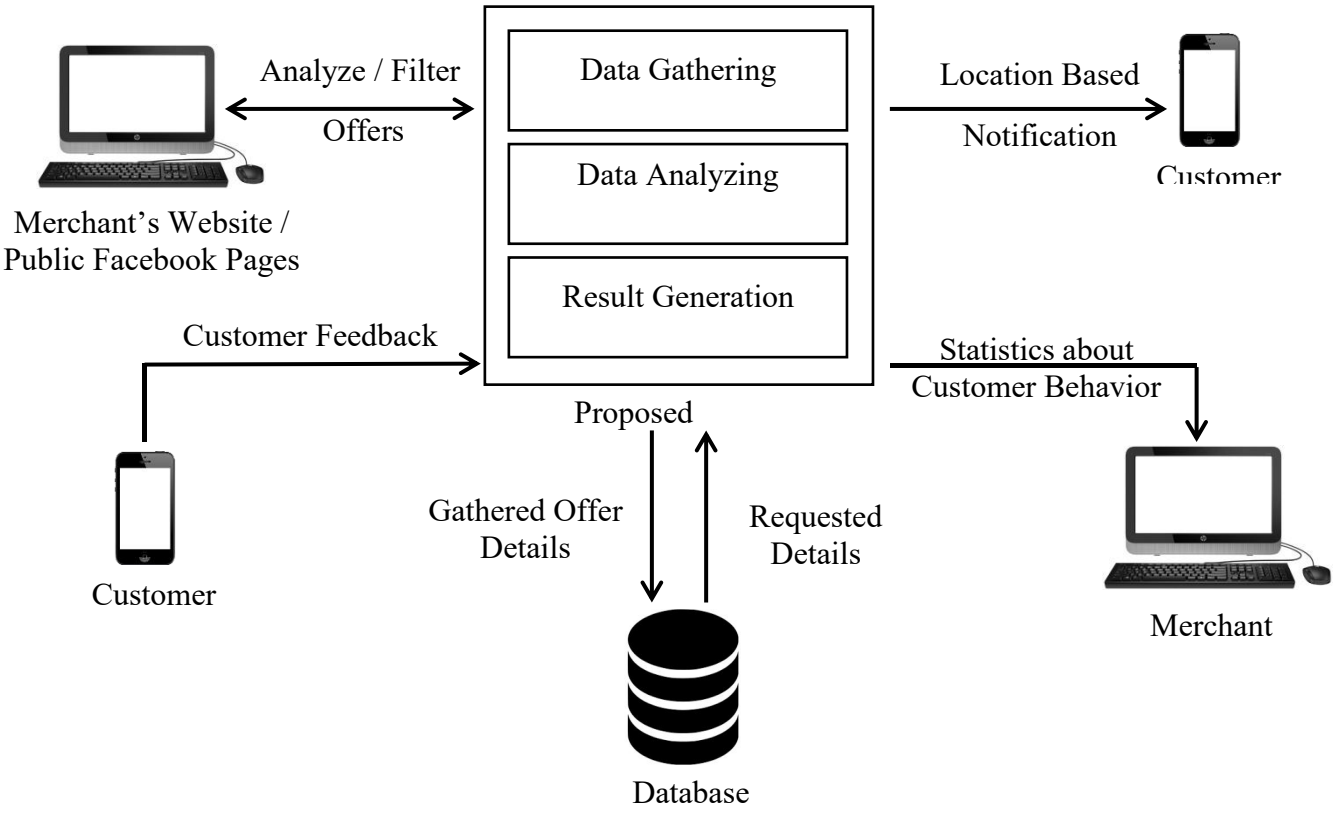


Figure 3.1: System Overview

3.2 Flow of the Project

3.2.1 Project development process

The iterative, incremental model will be used as the software development lifecycle in our research project.

3.2.2 Feasibility study

As the first step of the final year research, we have discussed a number of research ideas with our supervisor and eventually came up a with an idea according to the supervisor's guidelines and team members' preferences. Also, technological feasibility and economic feasibility was considered during the topic selection.

We have decided to propose a location-based customer tracking system for promotions and offers, which will send offers to customers while they are moving near shops. Only a prioritized list offers will be sent according to the customer preferences. Since our target based on an application for both android, IOS users we will get a cross-platform approach to our solution.

Under technological feasibility, after doing literature reviews we have decided that our system can be developed using modern technologies such as natural language processing, machine learning and deep learning, again a sub component in machine learning. We have identified some existing algorithms related to our research components. With the modifications of the found algorithms we can find out the solutions for our research problem. Web API and a mobile application proposed to be developed. Therefore, the system is technologically feasible.

Under the economic feasibility, there are two types of end users in our system. Customers and Merchants both have to use a mobile phone which has GPS. Normally nowadays most of the people have smartphones. Therefore, the end users will not want to spend extra cost on purchasing new hardware/software components. So the system will be economically feasible for users. Open source software will be used in the implementation. Therefore, there will be no extra cost for the development. So, the system will be economically feasible.

3.2.3 Requirement analysis and specification

We have read several research papers related with our research idea. Then we identified the main functionalities, raised problems, remained sections in the previously done researches which related to our idea. After studying similar kind of researches, we discussed furthermore about the functionalities with the team members and had a clear idea about the functionalities of our research project.

We have conducted a survey to collect data from users which helped us to get the idea about the customer requirement as well. We collect the users' comments and ideas through the survey and add some features to our idea. Also, we have polished up our idea under the supervision of the supervisor.

After analyzing the topic, the system divided into four main components. The components were distributed among the team members according to their interests for further studies.

3.2.4 Design

After the requirement analysis every team member got a clear idea about how the actual system working according to the gathered requirements. With the proper understanding on main and sub processors, and how individual components join with other components, we have to work in the design phase. In this phase, we have to

design Use Case Scenarios, Use Case Diagrams, Database, Process Diagrams. When considering the applications, to get an idea about the application flow wire frames will be designed.

3.2.5 Implementation

In the implementation phase needed APIs and the mobile application will be implemented. For the development of web API, ASP.Net will be used. Visual Studio Code will be used as the IDE and React Native will be used as the cross-platform technology when developing the mobile application.

3.2.6 Integration and testing

The final outcome will be the combination of four main components. Github will be used to integrate the components.

Testing is done to ensure whether the system meets the gathered requirements in the SRS document. Unit testing will be done to individual components and after integrating integration test will be done. There will be alpha testing and beta testing.

3.2.7 Maintenance

After product delivered to the customers and merchants if there is any maintenance that should be done in this phase. Corrective maintenance is done when there is an error which did not recognize during the system development. Perfective maintenance will be done to improve the existing system. Adaptive maintenance will be done to modify the system for a new or changing environment.

3.3 What data is needed for the project and how will they be collected

When it comes requirement phase collecting data plays a vital role. Because from data only we can get a clear idea of our system and to train our machine learning module,

3.3.1 Google survey

Using the Google survey form which included a questionnaire, we got an idea how end users think about location based offers and promotions. The

questions and the summary of the responses show below.

- **when there are special offers, if you can get to know about them easily, will it be valuable to you?**

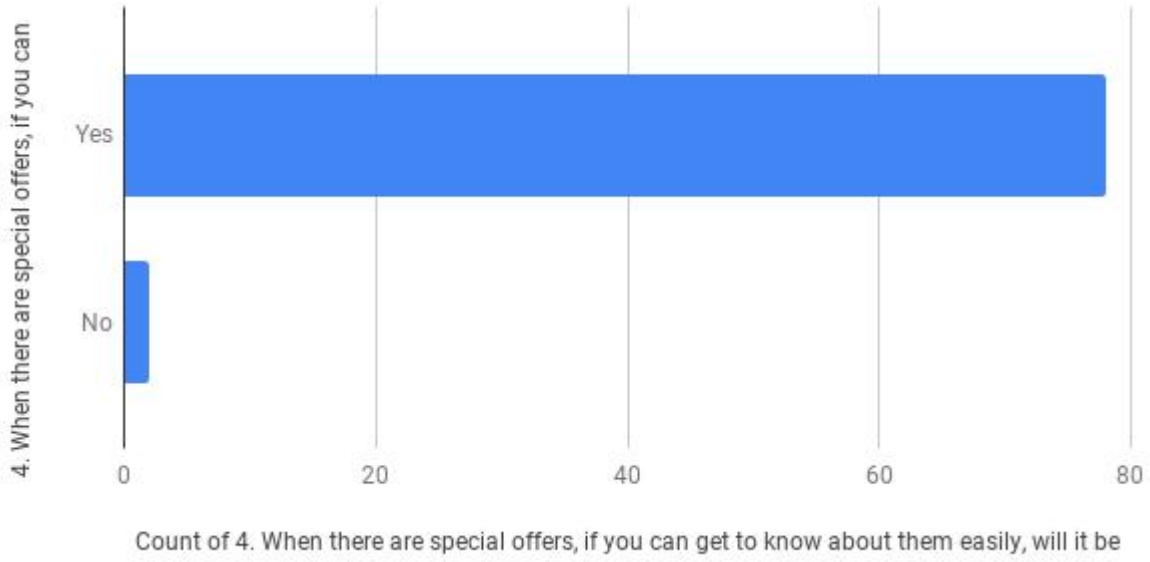


Figure 3.2: Google form response 1

The question was when there are special offers, if you can get to know about them easily, will it be valuable to you. more than 70 people responded yes.

- **what do you think about a system that you can get notifications containing offers and promotions, when you are moving near a shop?**

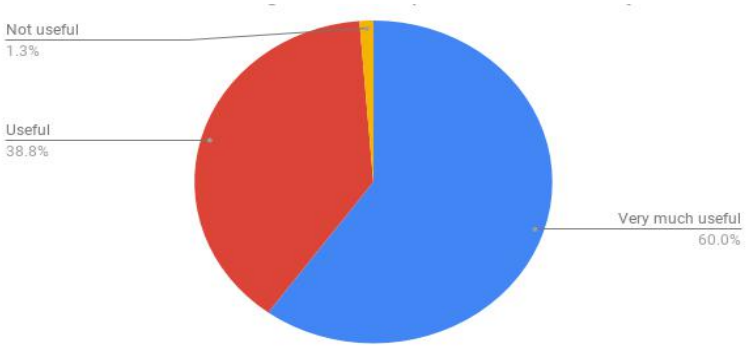


Figure 3.3: Google form response 2

The question was, what do you think about a system that you can get notifications containing offers and promotions, when you are moving near a shop. 60% of people responded that very much useful.

- **Suggestions about the system mentioned in the above question?**

Should recognize the customer patterns
it's better if you can categorise items; whether its about fruits or vegetables, or dairy items or sanitary items etc
It is really essential.
Its very time effective shopping method rather than going individual shops
Having notification is a disturbance.because people buy thinngs when they have money only.open a page in social media is better.then people will follow that page and they can get know about promotions
It is realy essential
No.
The people should be informed all the details, as an instance what are the offers , and for what type of things they are offering, how the offering ranges change within each shop, etc through the notification system.
Some leading private organizations send multiple promotion ads.. Sometimes it irritate me lot.. If the promotion is related to my taste or needs it will be more helpful.
Better to use bluetooth , or wireless technologies also sms alerts

Figure 3.4: Google form response 3

People responded with feedbacks that they like a system that they get informed about offers and promotion based on location. Also, to train the machine learning algorithms we are planning to get data sets from google surveys as well as from creating dummy data based few scenarios.

3.4 Work Breakdown Structure

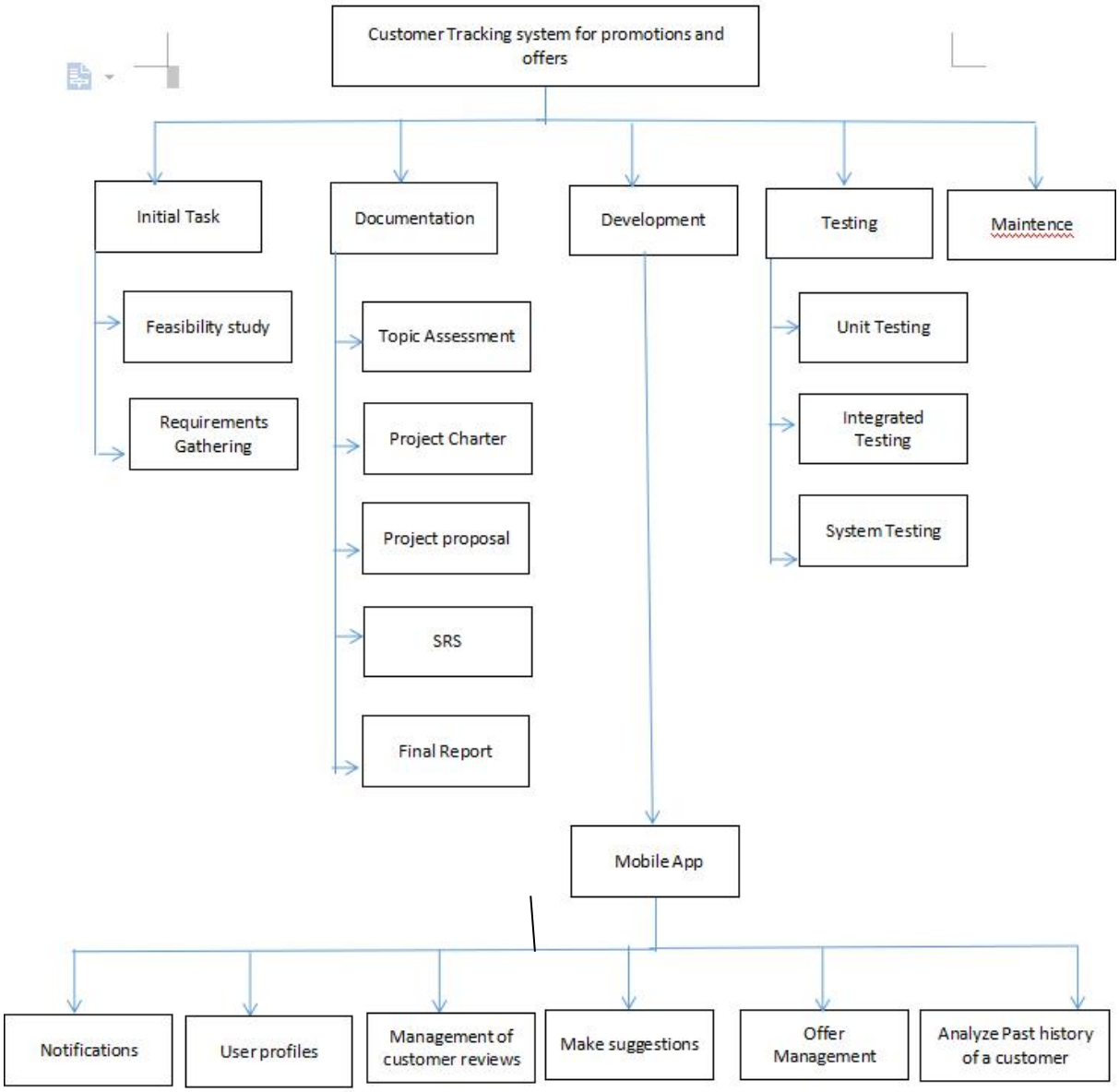
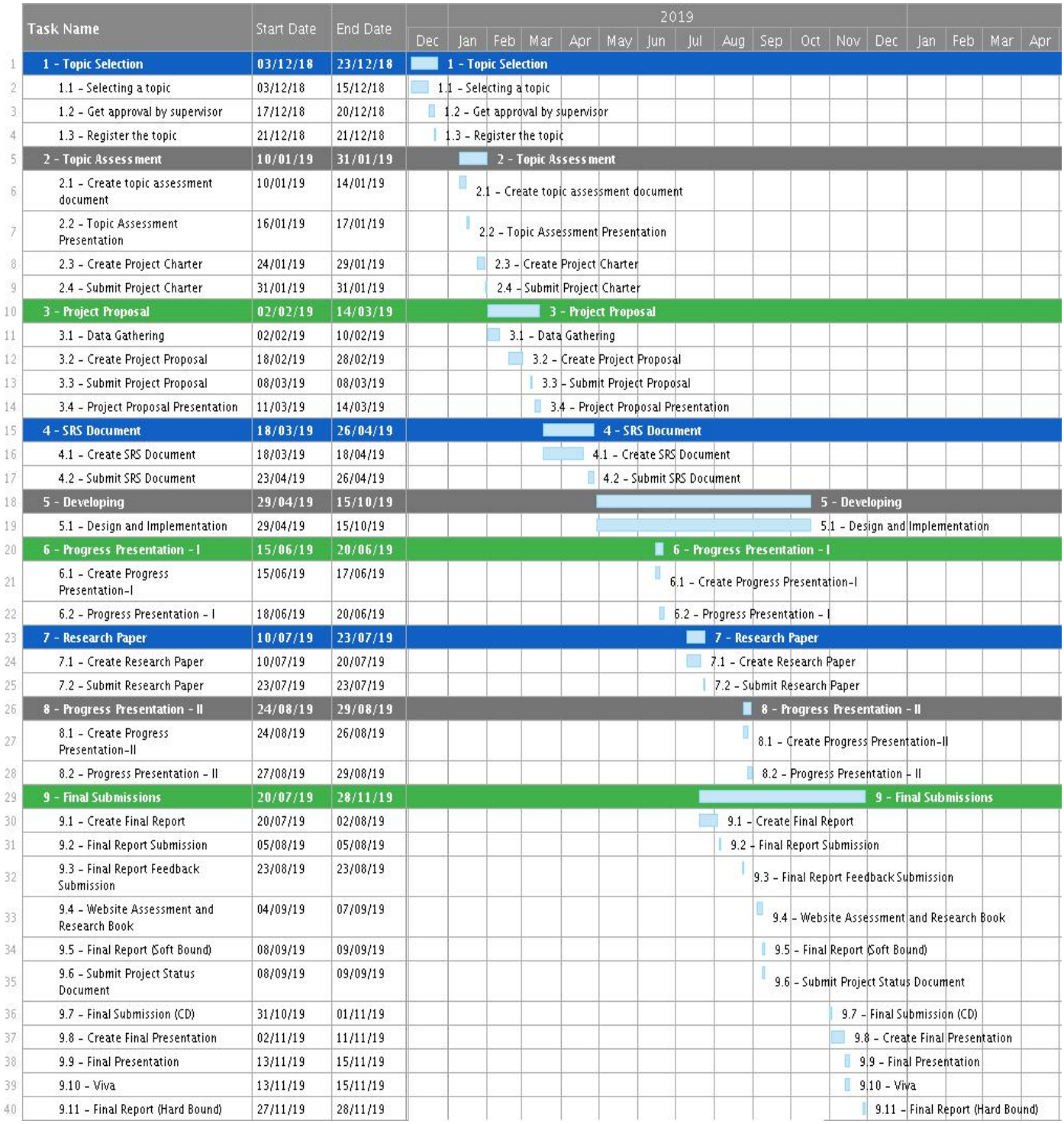


Figure 3.5: Work breakdown structure

3.5 Gantt Chart



	Task Name	Start Date	End Date
1	**1 - Topic Selection**	**03/12/18**	**23/12/18**
2	1.1 - Selecting a topic	03/12/18	15/12/18
3	1.2 - Get approval by supervisor	17/12/18	20/12/18
4	1.3 - Register the topic	21/12/18	21/12/18
5	**2 - Topic Assessment**	**10/01/19**	**31/01/19**
6	2.1 - Create topic assessment document	10/01/19	14/01/19
7	2.2 - Topic Assessment Presentation	16/01/19	17/01/19
8	2.3 - Create Project Charter	24/01/19	29/01/19
9	2.4 - Submit Project Charter	31/01/19	31/01/19
10	**3 - Project Proposal**	**02/02/19**	**14/03/19**
11	3.1 - Data Gathering	02/02/19	10/02/19
12	3.2 - Create Project Proposal	18/02/19	28/02/19
13	3.3 - Submit Project Proposal	08/03/19	08/03/19
14	3.4 - Project Proposal Presentation	11/03/19	14/03/19
15	**4 - SRS Document**	**18/03/19**	**26/04/19**
16	4.1 - Create SRS Document	18/03/19	18/04/19
17	4.2 - Submit SRS Document	23/04/19	26/04/19
18	**5 - Developing**	**29/04/19**	**15/10/19**
19	5.1 - Design and Implementation	29/04/19	15/10/19
20	**6 - Progress Presentation - I**	**15/06/19**	**20/06/19**
21	6.1 - Create Progress Presentation-I	15/06/19	17/06/19
22	6.2 - Progress Presentation - I	18/06/19	20/06/19
23	**7 - Research Paper**	**10/07/19**	**23/07/19**
24	7.1 - Create Research Paper	10/07/19	20/07/19
25	7.2 - Submit Research Paper	23/07/19	23/07/19
26	**8 - Progress Presentation - II**	**24/08/19**	**29/08/19**
27	8.1 - Create Progress Presentation-II	24/08/19	26/08/19
28	8.2 - Progress Presentation - II	27/08/19	29/08/19
29	**9 - Final Submissions**	**20/07/19**	**28/11/19**
30	9.1 - Create Final Report	20/07/19	02/08/19
31	9.2 - Final Report Submission	05/08/19	05/08/19
32	9.3 - Final Report Feedback Submission	23/08/19	23/08/19
33	9.4 - Website Assessment and Research Book	04/09/19	07/09/19
34	9.5 - Final Report (Soft Bound)	08/09/19	09/09/19
35	9.6 - Submit Project Status Document	08/09/19	09/09/19
36	9.7 - Final Submission (CD)	31/10/19	01/11/19
37	9.8 - Create Final Presentation	02/11/19	11/11/19
38	9.9 - Final Presentation	13/11/19	15/11/19
39	9.10 - Viva	13/11/19	15/11/19
40	9.11 - Final Report (Hard Bound)	27/11/19	28/11/19

Figure 3.6: Gantt Chart

Task Name	Start Date	End Date
1 - Topic Selection	**03/12/18**	**23/12/18**
1.1 - Selecting a topic	03/12/18	15/12/18
1.2 - Get approval by supervisor	17/12/18	20/12/18
1.3 - Register the topic	21/12/18	21/12/18
2 - Topic Assessment	**10/01/19**	**31/01/19**
2.1 - Create topic assessment document	10/01/19	14/01/19
2.2 - Topic Assessment Presentation	16/01/19	17/01/19
2.3 - Create Project Charter	24/01/19	29/01/19
2.4 - Submit Project Charter	31/01/19	31/01/19
3 - Project Proposal	**02/02/19**	**14/03/19**
3.1 - Data Gathering	02/02/19	10/02/19
3.2 - Create Project Proposal	18/02/19	28/02/19
3.3 - Submit Project Proposal	08/03/19	08/03/19
3.4 - Project Proposal Presentation	11/03/19	14/03/19
4 - SRS Document	**18/03/19**	**26/04/19**
4.1 - Create SRS Document	18/03/19	18/04/19
4.2 - Submit SRS Document	23/04/19	26/04/19
5 - Developing	**29/04/19**	**15/10/19**
5.1 - Design and Implementation	29/04/19	15/10/19
6 - Progress Presentation - I	**15/06/19**	**20/06/19**
6.1 - Create Progress Presentation-I	15/06/19	17/06/19
6.2 - Progress Presentation - I	18/06/19	20/06/19
7 - Research Paper	**10/07/19**	**23/07/19**
7.1 - Create Research Paper	10/07/19	20/07/19
7.2 - Submit Research Paper	23/07/19	23/07/19
8 - Progress Presentation - II	**24/08/19**	**29/08/19**
8.1 - Create Progress Presentation-II	24/08/19	26/08/19
8.2 - Progress Presentation - II	27/08/19	29/08/19
9 - Final Submissions	**20/07/19**	**28/11/19**
9.1 - Create Final Report	20/07/19	02/08/19
9.2 - Final Report Submission	05/08/19	05/08/19
9.3 - Final Report Feedback Submission	23/08/19	23/08/19
9.4 - Website Assessment and Research Book	04/09/19	07/09/19
9.5 - Final Report (Soft Bound)	08/09/19	09/09/19
9.6 - Submit Project Status Document	08/09/19	09/09/19
9.7 - Final Submission (CD)	31/10/19	01/11/19
9.8 - Create Final Presentation	02/11/19	11/11/19
9.9 - Final Presentation	13/11/19	15/11/19
9.10 - Viva	13/11/19	15/11/19
9.11 - Final Report (Hard Bound)	27/11/19	28/11/19

Figure 3.7: Gantt Chart Explain

3.6 Hardware software requirements

Hardware requirements

- An Android mobile device will be used to test the mobile application.
- Personal computers will be used to develop the Mobile application.

Software requirements

- Jetbrains Webstorm
- MongoDB
- GitHub
- Microsoft Word 2016
- Microsoft PowerPoint 2016

4. DESCRIPTION OF PERSONAL AND FACILITIES.

Name	ID Number	Research area	Functions
Saluwadana S.M.R.B (GROUP LEADER)	IT16072848	Natural Language Processing, Machine learning	● Identify Customer's behavior ● According to customers behavior for month on offers create statistics and give it to merchants. ● Give recommendation to Merchants for a next month ● Analyze customer reviews for each shop. ● Based on the customer reviews and feedback for a shop give suggestions to merchants for improvement of the shop.
Jayasinghe L.M.R	IT16113978	Deep Learning, Machine Learning	● Develop system login as well as Facebook login functionality. ● Identify an efficient text recognition method. ● Develop an algorithm by modifying existing algorithms to identify offers or promotions. ● Go through public Facebook pages or websites of registered merchants and identifying offers. ● Design an interface containing all offers.

Hemachandra K.A.N.W	IT16139640	Machine learning	● Develop search functionality ● Develop an efficient algorithm to provide search predictions. ● Gathering customer reviews about products and shops. ● Analyze gathered data for predictions. ● Develop payment handling functionality.
Ahnaf H.M	IT16139718	Machine learning	● Develop offer and promotion notification functionality ● Develop a classification machine learning algorithm to categorize offers. ● Develop a prediction machine learning algorithm to notify only the relevant offers and promotions to user

Table 4.1 : Description of personal and facilities

5. CONCLUSION

This proposal document proposes customer tracking system for promotions and offers and how to implement that system and how to create related documents. Our main Research areas are machine learning, deep learning and natural language processing.

Finally, a customer tracking system that customers can get notifications about offers and promotions while they are moving near the shop will be developed. The final output is a cross platform mobile application which runs on android and IOS mobile devices

In this proposal document we clearly mention introduction, objectives, research gaps and methodology. Those are used to develop the system. Under methodology part we mention about our research area and work breakdown structure with time scheduling (Gantt chart). The final goal is to give offers and promotions according to customers behavior.

6. COMMERCIALIZATION/POTENTIAL FOR ENTREPRENEURSHIP

These are the benefits that customers and sellers could get from using the system. Customers will receive following benefits:

- Customers will get to know products or offers that suits them.
- Customers will get location-based notification regarding special offers that selected specifically for that customer.
- Customers can view other user's experience with a product or a shop

Sellers that get registered with our service can get detailed reports, which will help them to identify:

- Trending products and offers
- Less interested products
- Frequently searched products.
- Brands that customers prefer.

Main objective of this proposed system is to provide users a satisfactory service maintaining a rich user experience. It is expected to charge a small fee monthly from the sellers for the services provided.

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