

Vivekanand Education Society's Institute of Technology

Department of Computer Engineering

Academic Year 2018-19



Mini Project Report On

INTELLIGENT CART

In partial fulfillment of the Third Year, Bachelor of Engineering (T.E.) Degree in Computer Engineering at the University of Mumbai Academic Year 2018-2019

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(2018-19)

Vivekanand Education Society's Institute of Technology
Department of Computer Engineering
Academic Year 2018-19



Certificate

This is to certify that *Amey Pimple* , *Jyoti Raina*, *Nisha Purswani* and *Abhinav Velidi* of Third Year Computer Engineering studying under the University of Mumbai have satisfactorily presented the project on “**INTELLIGENT CART**” as a part of the coursework of MINI PROJECT for Semester-VI under the guidance of *Mrs. Lifna C.S.* in the year 2018-2019.

This Project Report entitled (*Intelligent Cart*) by (*Nisha Purswani* , *Jyoti Raina*, *Abhinav Velidi* and *Amey Pimple*) is approved for the degree of *Third Year, Bachelor of Engineering (T.E.) Degree in Computer Engineering*.

Programme Outcomes	Grade
PO1,PO2,PO3,PO4,PO5,PO6,PO7,PO8, PO9, PO10, PO11, PO12 PSO1, PSO2	

Date:

Project Guide: _____

Project Report Approval

For

T. E (Computer Engineering)

This mini project report entitled (*Intelligent Cart*) by (*Jyoti Raina, Nisha Purswani, Abhinav Velidi, Amey Pimple*) is approved for the Third Year of **Computer Engineering**.

Internal Examiner

External Examiner

Head of the Department

Principal

Date:

Place: Chembur

Declaration

We declare that this written submission represents our ideas in our own words and where others' ideas or words have been included, we have adequately cited and referenced the original sources. We also declare that we have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in our submission. We understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

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We wish to express our profound thanks to all those who helped us in gathering information about the project. Our families too have provided moral support and encouragement at several times.

Computer Engineering Department
LAB OUTCOMES FOR T.E. PROJECT

Learners will be to,

Course Outcome	Description of the Lab Outcome
LO 1	Acquire practical knowledge within the chosen area of technology for project development
LO2	Identify, analyze, formulate and handle programming projects with a comprehensive and systematic approach
LO 3	Contribute as an individual or in a team in development of technical projects
LO 4	Develop effective communication skills for presentation of project related activities

Lab Outcomes	Overall Grade
LO1,LO2,LO3,LO4	

Project Guide:

Abstract

Today's world thrives on making the human life easier than it already is with every passing moment. The proposed smart cart, while shopping ,is another step taken in same direction.The project is based on development of a project with the aim to reduce the time spent in the store and to make shopping of day to day items an experience instead of a headache. In order to avoid long queues and unnecessary hassle to find items in the shopping mart one can easily shop easily and conveniently using the smart cart with navigating features. It helps the consumers to utilise the time saved in other fruitful activities instead of wasting their time by standing in long queues at the checkout counter.

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CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

Today's world thrives on making the human life easier than it already is with every passing moment. The proposed smart cart, while shopping, is another step taken in same direction. The project is based on development of a project with the aim to reduce the time spent in the store and to make shopping of day to day items an experience instead of a headache. In order to avoid long queues and unnecessary hassle to find items in the shopping mart one can easily shop easily and conveniently using the smart cart with navigating features. It helps the consumers to utilise the time saved in other fruitful activities instead of wasting their time by standing in long queues at the checkout counter.

1.2 MOTIVATION

In present era, people are always in hurry due to their work, commitments etc. However, they land up spend their precious time in big shopping queues for billing and for searching the items inside the mall. Hereby, we as developers, are making this application so that customers get suggestions and they don't end up In big shopping queues. Our application will be suggesting items to the user, shows whole navigation of the area, i.e. which thing is kept where, online billing section and bill calculation is done with scanning i.e. as soon as item is scanned it is added into cart and bill.

1.3 PROBLEM DEFINITION

In present era, people are always in hurry due to their work, commitments etc. However, they land up spend their precious time in big shopping queues for billing and for searching the items inside the mall. Hereby, we as developers, are making this application so that customers get suggestions and they don't end up In big shopping queues. Our application will be suggesting items to the user, shows whole navigation of the area, i.e. which thing is kept where, online billing section and bill calculation is done with scanning i.e. as soon as item is scanned it is added into cart and bill.

1.4 EXISTING SYSTEMS AND ITS COMPARISON

- Shopping in the present day usually involves waiting in line to get your items scanned for checkout. This can result in a great deal of wasted time for customers. Furthermore, the technology currently used in checkouts, ie, barcodes - is from another era, developed in the 1970s.
- The most important factor that is involved in barcode scanning is that the product should be in the Line of Sight (LOS) of the reader in order to get the barcode printed on the product scanned.

1.5 LACUNA OF THE EXISTING SYSTEMS

The existing project of this type has a huge expenditure as it has special hardware required to implement and it becomes difficult for store owners to implement, whereas our project has less expenditure as our project has no extra hardware except cart which already exist in every shop because it is mandatory for shopping. So it becomes easy to implement and use. And it avoids the external barcode scanner and computer system for calculating the bill and scanning the items, it just requires a person to check the cart of the customer.

1.6 RELEVANCE OF PROJECT

- Help users to find products of their relevance and easy navigation of the users through the crowded busy super markets.
- Provide users an ease to find the products they need and match with their earlier bought history
- Suggestions help in providing the users a vision of wiser variety of products for their use.

1.7 METHODOLOGY USED

The project uses concepts of Cloud computing and Machine Learning. The project aims at creating a smart shopping cart which will detect different items placed in it. This will be done with the help of a microcontroller say Barcode scanners. Barcode scanners will detect the items kept in the cart and their prices. The items are stored in the Cloud. Predictive analysis would be performed thus to determine the next move of the customer. Also the cart screen would show the total pricing of the items placed in the cart.

- **Android Development:** An app is developed for the users to interact with the system by creating a interface with keeps track of all the items bought and determining the current position of the customer.
- **Indoor Map:** An SDK of the indoor map consisting the data points and navigation of the interface system to the actual workspace of the supermarket is generated .
- **Machine Learning:** For providing suggestions on various items to be bought and that can be bought is given by the Market Basket Analysis Algorithm, that is the Apriori Algorithm.

CHAPTER 2

LITERATURE SURVEY

2.1 RESEARCH PAPERS REFERRED

2.1.1. Intelligent Shopping Cart , Raju Kumar , K. Gopalakrishna , K. Ramesha. [1]

The proposed system intends to assist shopping in person that will minimize the time spent in shopping as well as intended to aid the store management with real-time updates on the inventory. The emergence of new technologies, such as Radio Frequency Identification (RFID) and wireless networks, makes the shopping processes faster, transparent and efficient. Our aim is to develop an intelligent shopping cart (embedded system) which can be used in shopping malls to solve the problem mentioned above. The Intelligent Shopping Cart is equipped with Radio Frequency Identification (RFID) for product identification and a consistent Wi-Fi connection with the shop's server. Besides, it also has an LCD display that informs customers about product prices, discounts, offers and the total bill.

Inference Drawn

The recommendations given by User Based Apriori algorithm are more relevant and easy to obtain than the traditional recommendation system. Hence, using this algorithm in our project proved to be very useful for implementing the core feature of our project.

2.1.2. Paper on Association Rule, Wanjun Yu, Xiaochun Wang , Fangyi Wang, Erkang Wang , Bowen Chen [2]

Educational Data Mining is an emerging discipline, concerned with developing methods for exploring the unique types of data that come from educational settings, and using those methods to better understand students, and the settings which they learning..Association rule mining has been applied to web-based education systems from two points of view: 1) help professors to obtain detailed feedback of the e-learning process: e.g., finding out how the students learn on the web, to evaluate the students based on their navigation patterns, to classify the students into groups, to restructure the contents of the web site to personalize the courses; and 2) help students in their interaction with the e-learning system: e.g., adaptation

of the course according to the apprentice's progress, e.g., by recommending to them personalized learning paths based on the previous experiences other similar students.

Inference Drawn

The experimental results show that this approach outperforms traditional market based analysis Apriori algorithms in terms of both the preprocessing time and the query processing time without sacrificing the level of accuracy. To implement , Apriori algorithm must be used for faster and improved results.

2.1.3 Autonomous multi-floor indoor navigation with a computationally constrained MAV, Shaojie Shen , Nathan Michael , Vijay Kumar

In this paper, we consider the problem of autonomous navigation with a micro aerial vehicle (MAV) in indoor environments. In particular, we are interested in autonomous navigation in buildings with multiple floors. To ensure that the robot is fully autonomous, we require all computation to occur on the robot without need for external infrastructure, communication, or human interaction beyond high-level commands. Therefore, we pursue a system design and methodology that enables autonomous navigation with real time performance on a mobile processor using only onboard sensors. Specifically, we address multi-floor mapping with loop closure, localization, planning, and autonomous control, including adaptation to aerodynamic effects during traversal through spaces with low vertical clearance or strong external disturbances. We present experimental results with ground truth comparisons and performance analysis.

Inference Drawn

In this paper, we considered the problem of autonomous navigation with a micro aerial vehicle in indoor environments. In particular, we discuss autonomous navigation in buildings with multiple floors. To ensure that the robot is fully autonomous, we require all computation to occur on the robot without need for external infrastructure, communication, or human interaction beyond high-level commands. We presented a system design and methodology that enables autonomous navigation with real-time performance on a mobile processor using only onboard sensors.

CHAPTER 3

REQUIREMENT GATHERING

3.1 DEFINITION OF REQUIREMENT GATHERING

Requirements are also an important input into the verification process, since tests should trace back to specific requirements. Requirements show what elements and functions are necessary for the particular project. Defining requirements specifies the capabilities, features or attributes of the project's deliverables. Requirements are prioritized to determine which requirements will be included and excluded from the project.

Any coherent and reasonable project must have requirements that define what the project is ultimately supposed to do. Requirements are instructions describing what functions the software is supposed to provide, what characteristics the software is supposed to have, and what goals the software is supposed to meet or to enable users to meet.

The official definition of a functional requirement is that it essentially specifies something the system should do. Non-functional requirements specify the "systems quality characteristics or quality attribute". They specify criteria that judge the operation of a system, rather than specific behaviours. Non-functional requirements cover all the remaining requirements which are not covered by the functional requirements. Any project's requirements need to be well thought out, balanced and clearly understood by all involved.

3.2 FUNCTIONAL REQUIREMENTS

- An application to navigate around a supermarket to help customer make better choices while shopping.
- The above client application can be run on any Android platform.
- When connected to network, the client app should authenticate into a central database.
- The central database should verify the user and the information
- The user should be able to generate ebill after scanning the products.
- The central database should provide the required data to the user.

- The department should keep a record of all transactions happening for better understanding of the business.
- The user should get suggestions based on previous purchases.

3.3 NON-FUNCTIONAL REQUIREMENTS

- User-friendly
- Robust
- Scalability
- Reliability
- Low response time
- Availability
- Maintainability
- Security
- Validating the platform independent format before inserting it into the centralized repository (database).
- The data stored can be encrypted locally to protect from any local copy or theft of device(laptop/handheld device).
- If possible create another sample application which uses the same system but works independent of this application.The architecture should be highly scalable and the application should be tuned for better performance at the peak time.
- Application should be highly customizable and flexible enough to easily deploy.

3.4 CONSTRAINTS

- The barcode scanner may fail to scan , if the barcode tag on the item is not attached/sticked properly.
- The Fire base connectivity will fail if there is no internet connection on customer's phone.
- One cannot get help in navigation via app, if there is no internet connection on customer's phone.
- Customer can get around and may place unscanned items into the cart.

3.5 HARDWARE AND SOFTWARE REQUIREMENTS

- **Domain-** App Development, Machine Learning
- **Database-** Firebase
- **Technologies Used-** Android Java, Indoor map-generator(3rd party application)
- **Server-** Firebase Server.

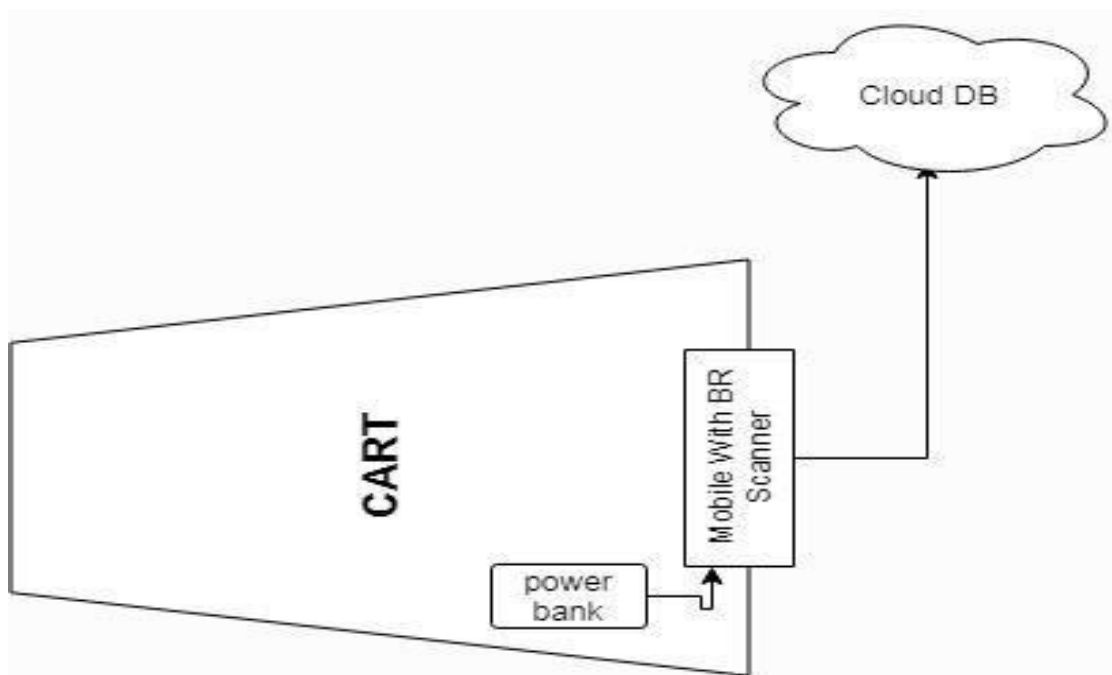
3.6 SELECTION OF HARDWARE, SOFTWARE, TECHNOLOGY AND TOOLS USED

- The primary software or technology that we are using is App Development. We have chosen Android as a technology for this project as it is appealing to the users. Visiting websites is feasible these days almost for all the people. They can use our application and shop as per their requirements.
- To implement our core feature of recommendations, we have used Machine Learning as the feature could be easily implemented by using Apriori algorithm.
- Indoor Map Atlas 2 was used for the creation of the indoor maps with the implementation of way points for wayfinding and identification of different sections of the supermarket. It can be further used for navigation in the Mart for the given key word/ product.

CHAPTER 4

PROPOSED DESIGN

4.1 BLOCK DIAGRAM

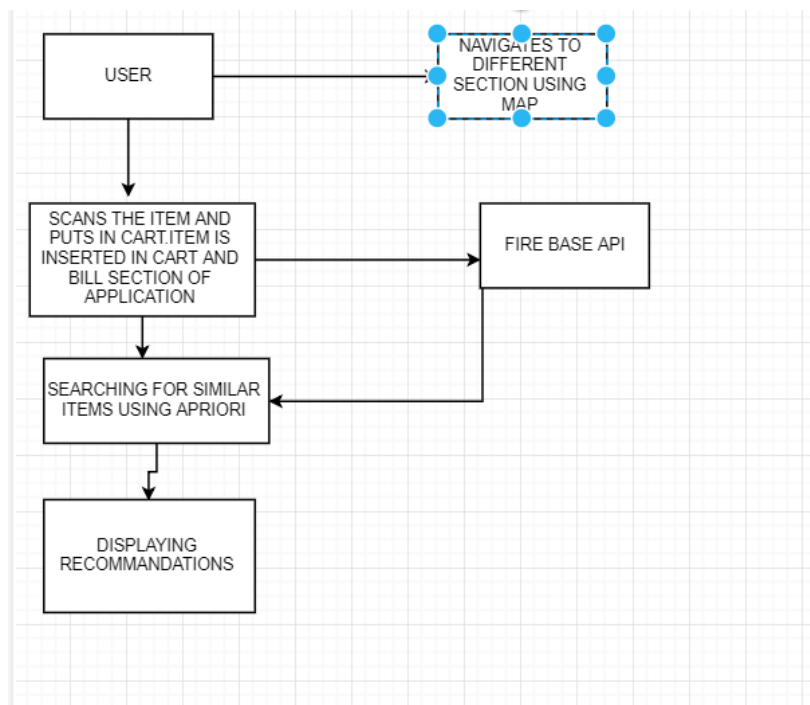


4.1.1 block diagram for the intelligent cart

The figure below shows the block diagram of our system. We have a product where user can search for a item and navigate through the supermarket. The user can search for a product name directly or type the category of the product. This input is then given to the cloud and the server gives the results accordingly. In addition to this, the user can navigate through the supermart to find the product or browse through the suggested options. The server then gives the appropriate results. After the user is logged in, the user can update his/her cart list depending upon the item he/ she has bought showing the entire item list of the

products present in the cart.. Also, the user can have a look at the products recommended for him/her based on the previous search or history .

4.2 MODULAR DIAGRAM



4.2.1 Modular diagram showing the working of Firebase

The above diagram shows the diagram of the recommendations module. We have used market based analysis apriori algorithm to implement this. When the user chooses the option of recommendations, the algorithm is used to display the previously purchased items by the user that the logged- in user has chosen. Then,apriori algorithm is used to find the purchased items that are most similar items . Their items are given as recommendations to the logged-in user.

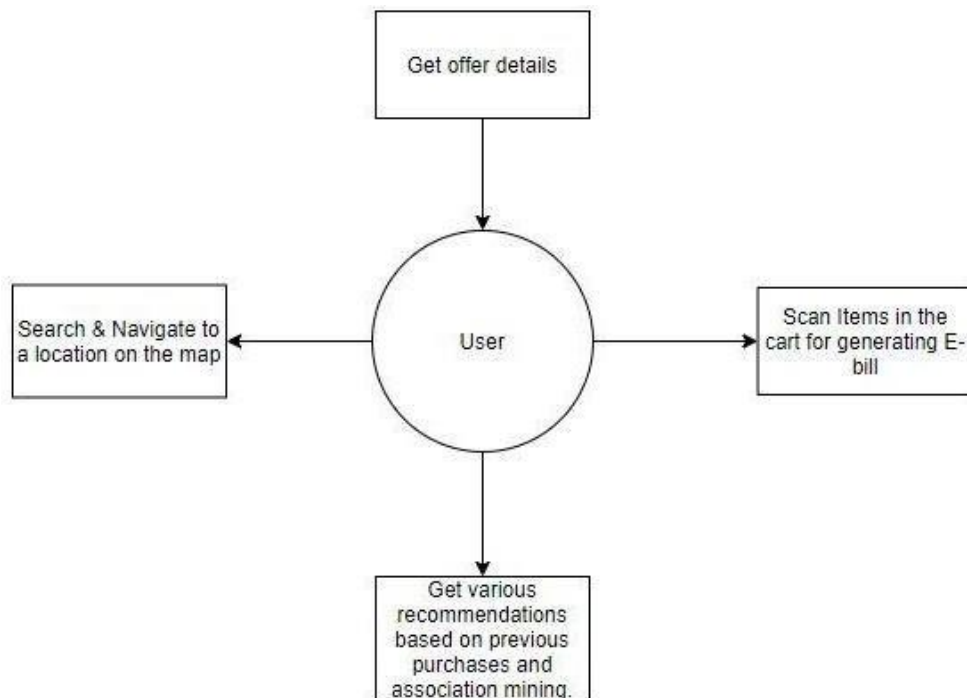
4.3 DETAILED DESIGN



4.3.1 DFD LEVEL 0

The DFD Level 0 briefly shows the overall functionality of the system. It only has one process – the Mobile Application, which basically is the main component of the whole system. The user gives the input and in output, various products searched according to various filters or recommended.

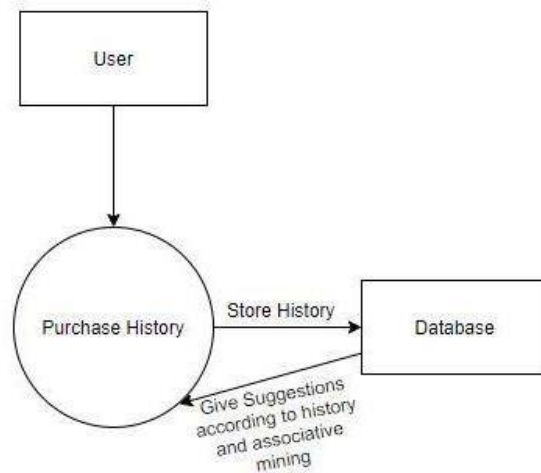
4.3.2 DFD LEVEL 1



4.3.2 DFD LEVEL 1

DFD Level 1 shows the functionality of system that user is benefitted from.

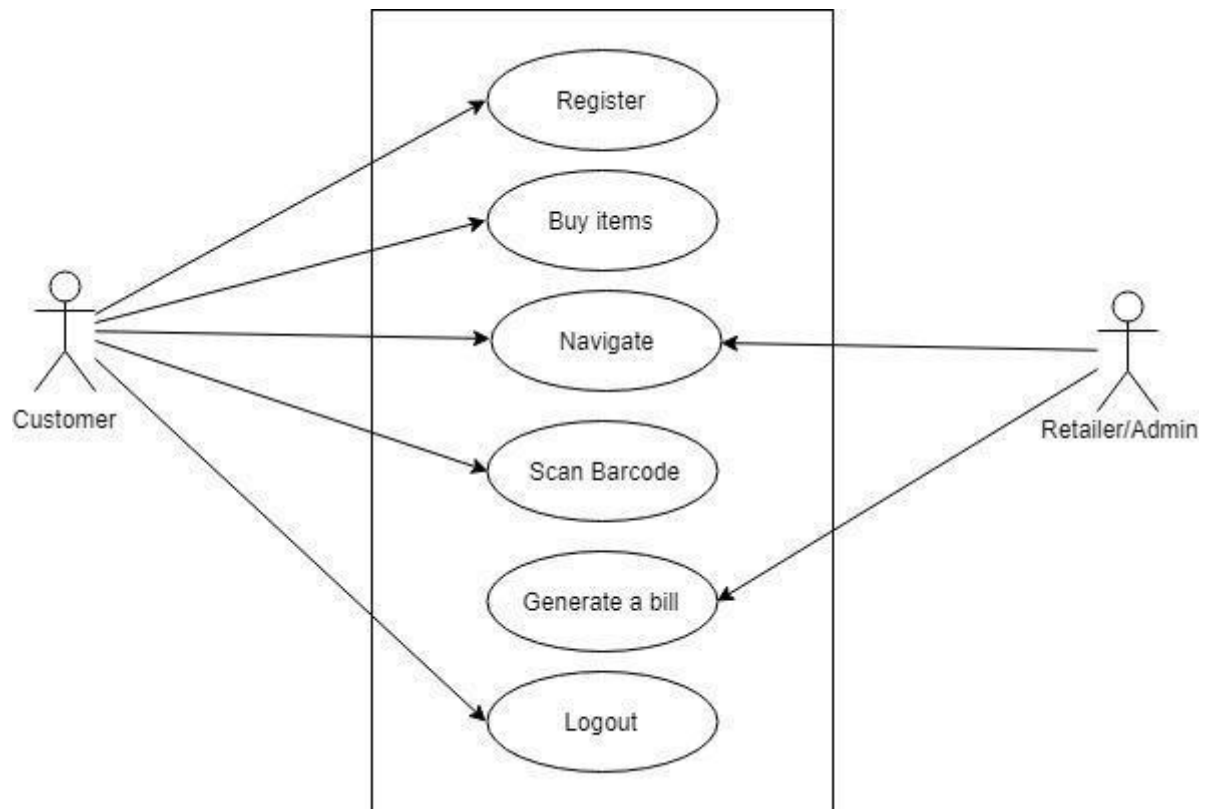
4.3.3 DFD LEVEL 2



4.3.3 DFD LEVEL 2

Level 2 shows the functionality of core feature of the system where suggestions to the user can be made. This is also done on the basis of the data processed of the several other customer behaviour.

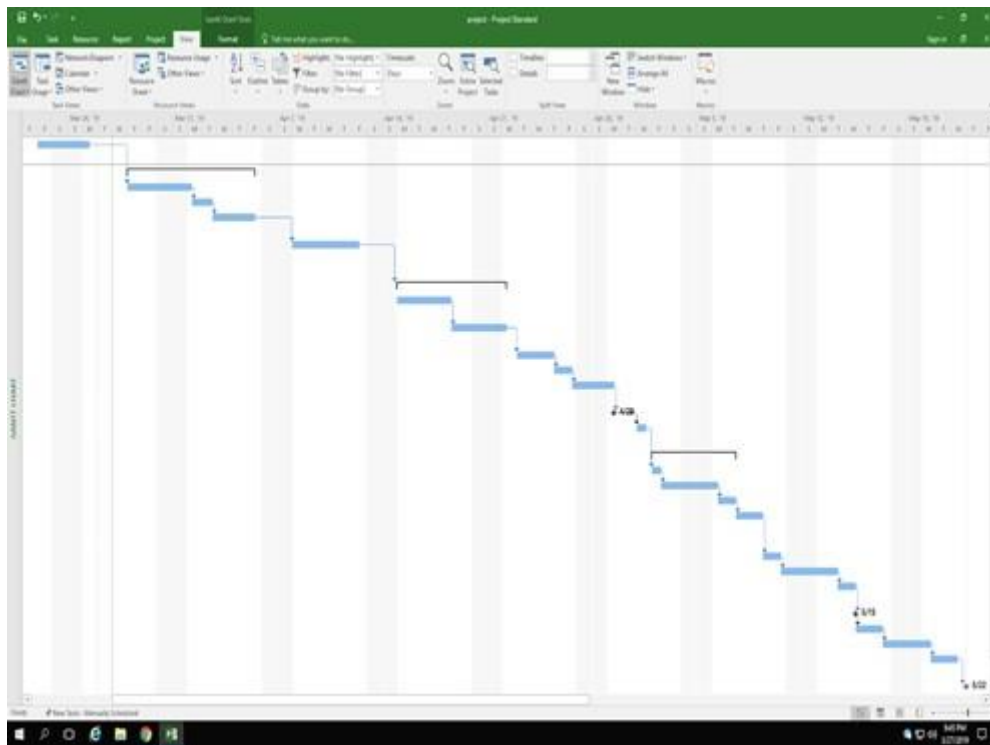
4.3.4 USE CASE FOR INTELLIGENT CART



4.3.4 USE CASE FOR INTELLIGENT CART

Features available to the users include that user registration can be done through Google or Facebook. Once the user enters the premises suggestions based on data processing can be provided. Also the user can search for an item within the Supermarket and the App can also be used to navigate the customer through the supermarket. Further for easy and quick processing of the bill at the checkout system the products are scanned before hand to estimate the bill calculation and provide an easy access to the customer. The admin can access the navigation the system and they are used to process and check the billing of the system.

4.4 PROJECT SCHEDULING AND TRACKING USING GANTT CHART



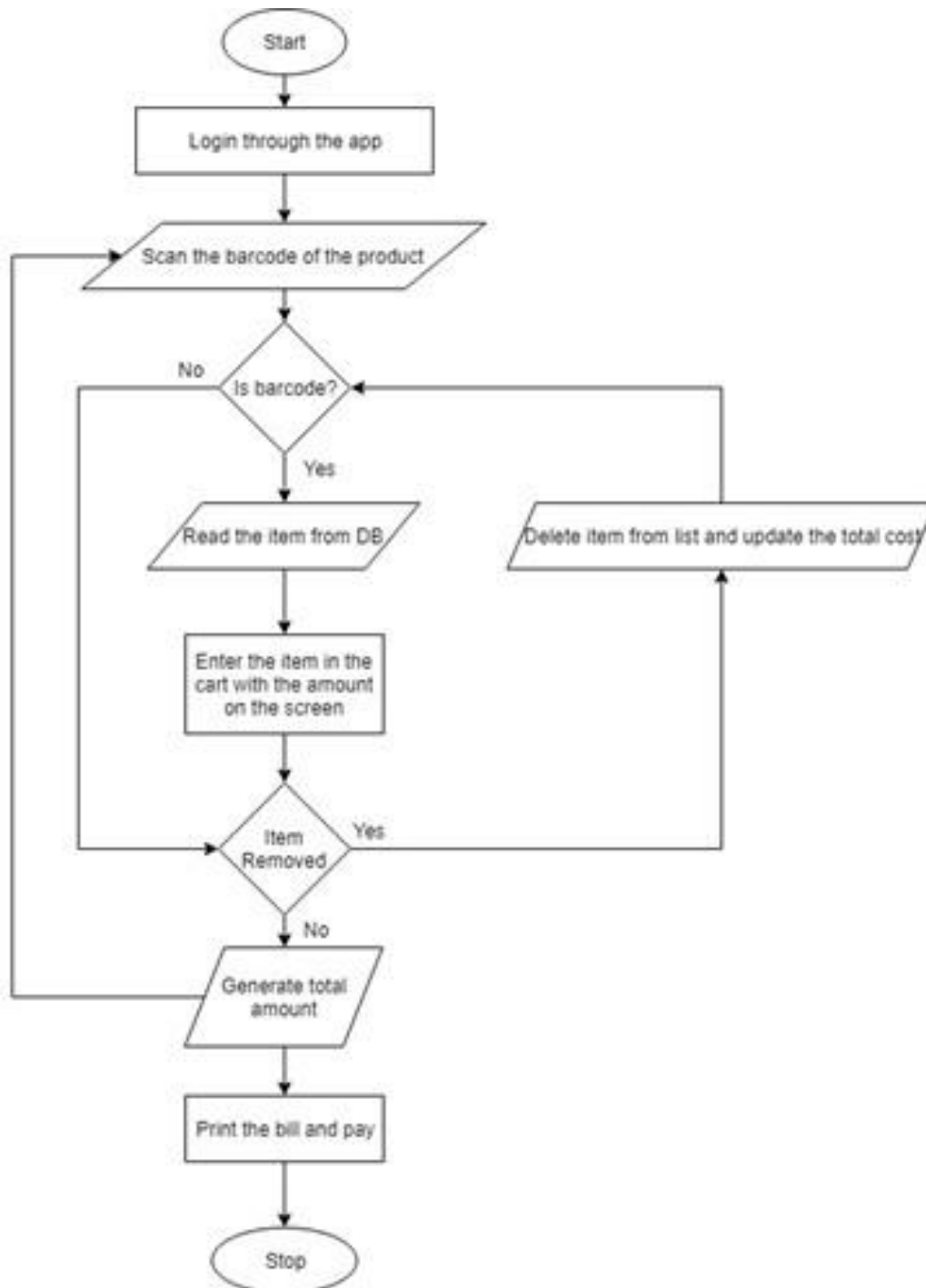
4.4.1 GNATT CHART STATING PROJECT SCHEDULING

A Gantt chart is a type of bar chart that illustrates a project schedule. This chart lists the tasks to be performed on the vertical axis, and time intervals on the horizontal axis. The width of the horizontal bars in the graph shows the duration of each activity. Gantt charts illustrate the start and finish dates of the terminal elements and summary elements of a project. Terminal elements and summary elements constitute the work breakdown structure of the project. Modern Gantt charts also show the dependency (i.e., precedence network) relationships between activities. Gantt charts can be used to show current schedule status using percent-complete shadings and a vertical "TODAY" line as shown here. Gantt charts are sometimes equated with bar charts. Gantt charts are usually created initially using an *early start time approach*, where each task is scheduled to start immediately when its prerequisites are complete. This method maximizes the float time available for all tasks.

CHAPTER 5

IMPLEMENTATION DETAILS

5.1 OVERALL FLOWCHART OF THE SYSTEM



5.1.1 flow chart for intelligent cart

This flowchart explains overall working of our project right from user login to every module it shows how every module is linked.it shows reading the item in database and updating it. it states every loop in project i.e consecutive scanning of items items entered in cart. generating bill amount to exiting the app.

5.2 ALGORITHMS USED

APRIORI

They were used to implement the recommendations feature. The code for the same was written in Python.It is as follows:

Step 0. Start with itemsets containing just a single item, such as {apple} and {pear}.

Step 1. Determine the support for itemsets. Keep the itemsets that meet your minimum support threshold, and remove itemsets that do not.

Step 2. Using the itemsets you have kept from Step 1, generate all the possible itemset configurations.

Step 3. Repeat Steps 1 & 2 until there are no more new itemsets.

APRIORI: Apriori is an algorithm for frequent item set mining and association rule learning over transactional databases. It proceeds by identifying the frequent individual items in the database and extending them to larger and larger item sets as long as those item sets appear sufficiently often in the database. The frequent item sets determined by Apriori can be used to determine association rules which highlight general trends in the database: this has applications in domains such as market basket analysis.

Apriori is a classic algorithm for learning association rules. Apriori is designed to operate on databases containing transactions (for example, collections of items bought by customers, or details of a website frequentation).

Other algorithms are designed for finding association rules in data having no transactions (Winepi and Minepi), or having no timestamps (DNA sequencing). The whole point of the

algorithm (and data mining, in general) is to extract useful information from large amounts of data. For example, the information that a customer who purchases a keyboard also tends to buy a mouse at the same time is acquired from the association rule below:

Support: The percentage of task-relevant data transactions for which the pattern is true.

$$\text{Support (Keyboard} \rightarrow \text{Mouse)} = \frac{\text{No. of transactions containing both Keyboard and Mouse}}{\text{No. of total transactions}}$$

Confidence: The measure of certainty or trustworthiness associated with each discovered pattern.

$$\text{Confidence (Keyboard} \rightarrow \text{Mouse)} = \frac{\text{No. of transactions containing both Keyboard and Mouse}}{\text{No. of transactions containing (Keyboard)}}$$

The algorithm aims to find the rules which satisfy both a minimum support threshold and a minimum confidence threshold (Strong Rules).

- **Item:** article in the basket.
- **Itemset:** a group of items purchased together in a single transaction.

CHAPTER 6

TESTING

6.1 DEFINITION OF TESTING

- Software Testing is evaluation of the software against requirements gathered from users and system specifications. Testing is conducted at the phase level in software development life cycle or at module level in program code. Software testing comprises of Validation and Verification.
- Software Testing is a procedure to verify whether the actual results are same as of expected results. Software Testing is performed to provide assurance that the software system does not contain any defects.
- To perform software testing we create test cases and test data. Test case is a collection of actions which are applied on our software product to check specific feature or functionality of it. Collection of test cases is called as a test unit.
- Test data is the input provided to the modules which are present in our software product. Test data represents the data which affects execution of the particular module. Sometimes, test data is used for positive testing, that means it is used to check that a provided set of input for a given function generated expected result or not. Sometimes, test data is used for negative testing, that means test data is used to test the capability of our software modules to handle unexpected input.
- Thus, Testing is a process of executing a program with the aim of finding error. To make our software perform well it should be error free. If testing is done successfully it will remove all the errors from the software.

Principles of Testing

1. All the test should meet the customer requirements
2. To make our software testing should be performed by third party
3. Exhaustive testing is not possible. As we need the optimal amount of testing based on the risk assessment of the application.
4. All the test to be conducted should be planned before implementing it

5. It follows pareto rule(80/20 rule) which states that 80% of errors comes from 20% of program components.
6. Start testing with small parts and extend it to large parts.

6.2 TYPES OF TESTS

Following are the types of tests:

- Unit testing- Individual units are tested separately.
- Integration testing- Different units are integrated and tested together.
- System testing- In this software is tested such that it works fine for different operating system. It is covered under the black box testing technique. In this we just focus on required input and output without focusing on internal working.
- Smoke testing- This test is done to make sure that software under testing is ready or stable for further testing.It is called smoke test as testing initial pass is done to check if it did not catch the fire or smoked in the initial switch on.
- Regression testing- Every time new module is added leads to changes in program. This type of testing make sure that whole component works properly even after adding components to the complete program.
- Alpha Testing- This is a type of validation testing.It is a type of *acceptance testing* which is done before the product is released to customers. It is typically done by QA people.
- Beta Testing- The beta test is conducted at one or more customer sites by the end-user of the software. This version is released for the limited number of users for testing in real time environment.
- Black Box testing- It is used for validation. In this, we ignore internal working mechanism and focus on what the output is.
- White Box testing- It is used for verification. In this we focus on internal mechanism i.e. how the output is achieved.

6.3 TYPES OF TESTS CONSIDERED

- **Unit testing** - In computer programming, unit testing is a software testing method by which individual units of source code, sets of one or more computer program modules together with associated control data, usage procedures, and operating procedures, are tested to determine whether they are fit for use. Every time a module was prepared, proper and formal unit testing was done in order to ensure accurate functioning of the module.
- **Integration testing** - Upon completion of unit testing, the units or modules are to be integrated which gives rise to integration testing. The purpose of integration testing is to verify the functional, performance, and reliability between the modules that are integrated. While performing integration testing, several bugs were encountered due to merge conflicts occurring while compilation of the files in unit testing, but after debugging, the entire project was built with a fluid approach

6.4 TEST CASE SCENARIOS CONSIDERED

- Login test scenario.
- Signup(Register) test scenario.
- After login Scanning.
- Test to store things in cart and bill sections
- Test recommendation module.

6.5 INFERENCE DRAWN FROM TEST

All modules are tested individually as well as after integration. These tests explain the entire functionality of our project.

CHAPTER 7

RESULT ANALYSIS

7.1 MODULE(S) UNDER CONSIDERATION

A) Login Module - Keeps track of all the users that are logged in to the system and all the items bought by them and the items present in their cart.

B) Registration Module – Keeps track of all the users that are registered to the system and all the items bought by them and the items present in their cart.

C) Profile Module- The profile module shows all the profile details of the logged in customer, address,name,start date and end date of their membership & contact details etc.

D)Scanner Module – Customer can scan each product and them to their cart

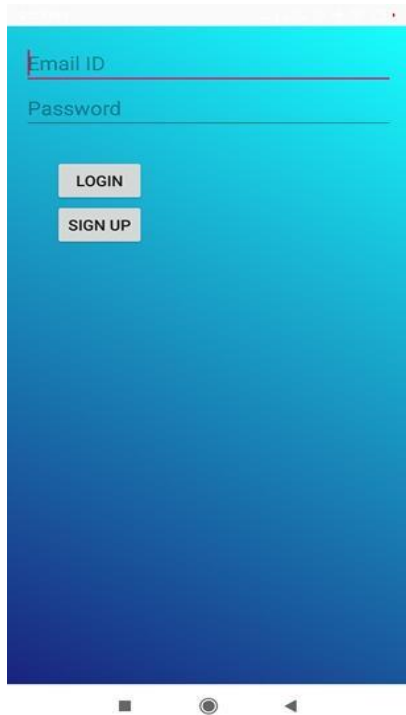
E) Recommendation Module – The app recommends the next item to be bought based on the previous data by applying algorithms.

F) Navigation Module - In this module, Products are searched based on the product name or the category they belong to. It will also navigate the user towards different section.

G) Bill Module – All the items present in the cart are updated in the app and the cost is calculated in parallel.

7.2 SCREENSHOTS OF UI INTERFACE OF VARIOUS MODULES

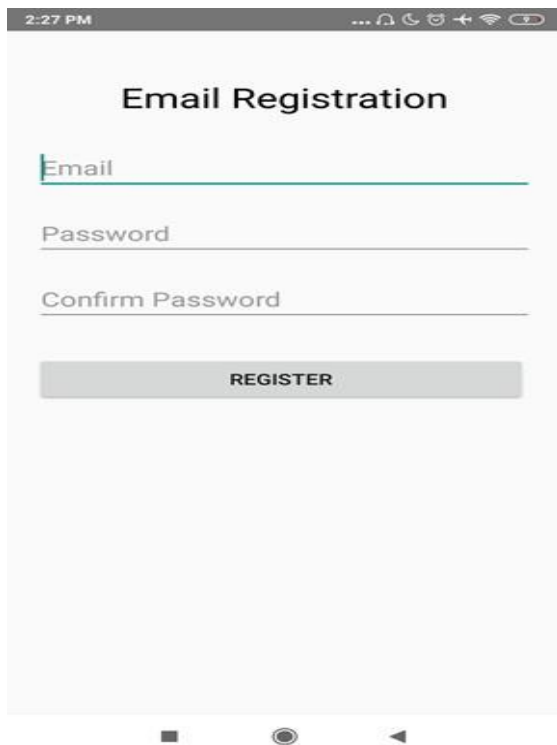
A) Login



7.2.A screenshot of login screen of app.

This is login screen of our app. This is customer login, once the customer is registered in app, he/she can access the app and use it for shopping.

B) Register



The screenshot shows a mobile application interface for email registration. At the top, the status bar displays the time as 2:27 PM and various system icons. The app's title bar is dark grey. The main content area has a light grey background and is titled "Email Registration" in bold black text. Below the title, there are three input fields: "Email" (with a blue underline), "Password" (with a red underline), and "Confirm Password" (with a red underline). A grey "REGISTER" button is positioned below the input fields. The bottom of the screen shows the standard Android navigation bar with back, home, and recent apps icons.

7.2.B Screenshot of Registration screen

This is registration screen of our app. This is customer registration, once the customer wants to register in app , he/she can access the app after registering and logging in and use it for shopping.

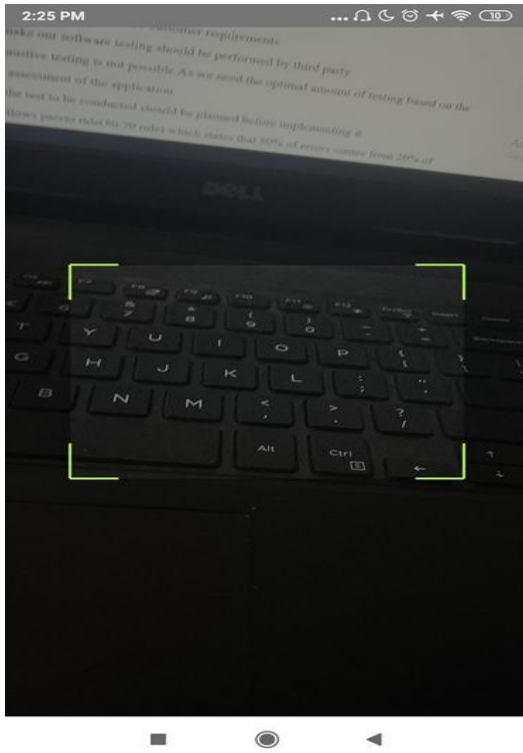
C) Profile



7.2.C Screenshot of profile screen

This is Customer's profile section, all the details his/her name, address, contact, email and start and end date of their membership is displayed over here. One can change password in this section.

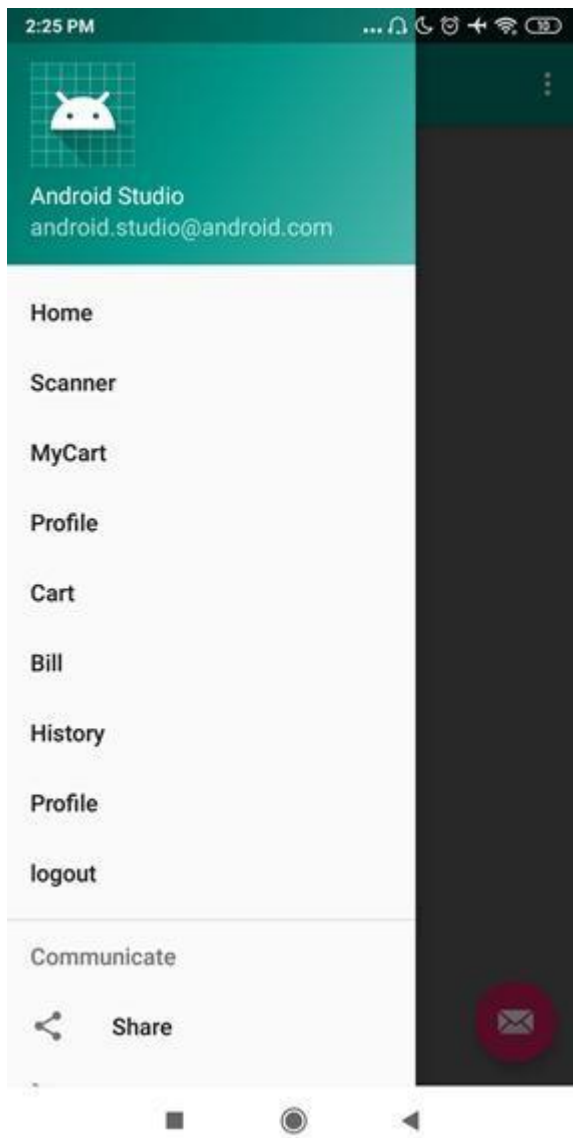
D) Scanner



7.2.D Screenshot of Barcode scanner

The barcode scanner is used for scanning the barcode of the items. once the item is scanned it is added to cart and bill section of app in particular person profile.

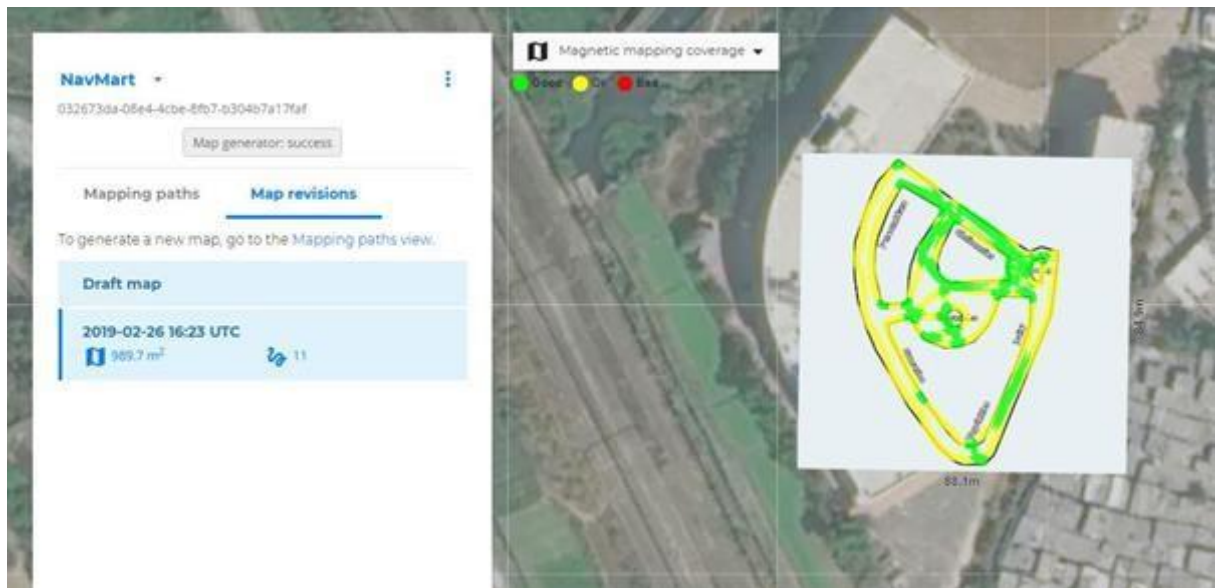
E) Category Module



7.7.E screenshot of categories i.e facilities in app

All the facilitates which a person can get via app is listed here.

F) Location Module



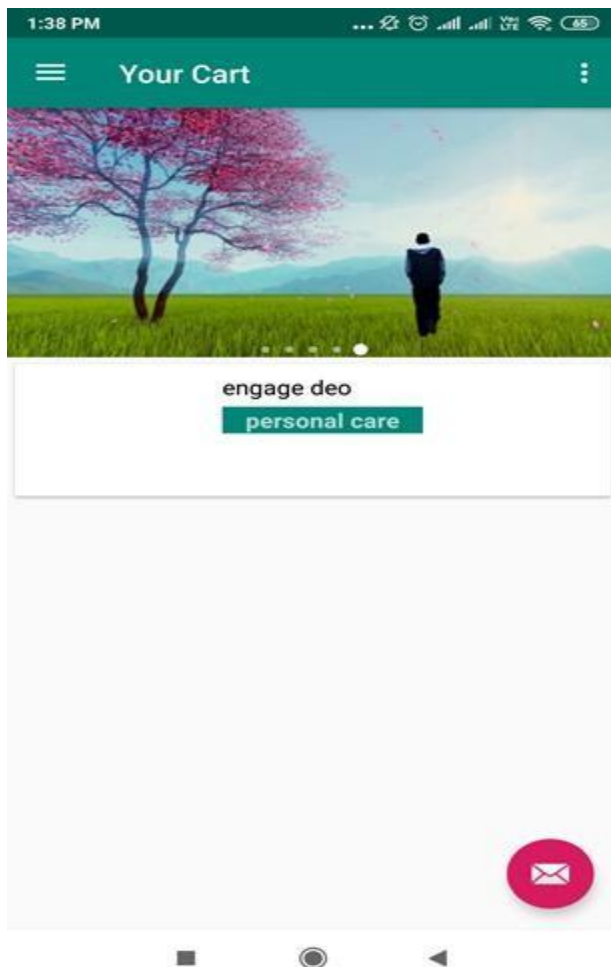
7.2.F.1 location (map)



7.2.F.2 MAP WITH POINTS

Map of the floor area which navigates the customer to a particular section is shown along with the network points stated in red yellow and green is displayed.

G) Bill Module



7.2.G.1 bill mode

The scanned item is putted in the bill section.

CHAPTER 8

CONCLUSION

8.1 LIMITATIONS

- Needs strong Internet connectivity as it is based on API.
- It cannot be used on a large scale.
- Products are recommended to the users based on their likings.
- The cart is less secure with this implementation as one can put the items without scanning.
- One cannot remove the items from the cart after scanning as one cannot delete the added items from bill and cart section.

8.2 CONCLUSION

The main aim of the project was to make it easy for the users to shop as per their requirements. They can search items by their name, location in the mail, on the basis of categories and similarities offered by the store. The users can review their previously shopped list in the history tab. They can search items on the basis of their current location. They can look for recommendations given to them. They can directly scan the item and put it into their shopping carts, once the item is scanned it is stored in database and it is shown to cart and billing section of the cart. Once the user is done with the shopping one can directly pay the bill via online payment. This was done by using Market based analysis Apriori algorithm. We have designed a application that provides all these features. Users can avail these features and accordingly choose an appropriate products.

8.3 FUTURE SCOPE

- Development of a app-application so that people can use it easily.
- Provide the feature of easy shopping so that one can save time.
- Provide the feature of online direct billing without going to crowdy counter queues
- Provide security to the cart.

9. REFERENCES

1. Behera, Laxmidhar, and Indrani Kar. *Intelligent Systems and control principles and applications*. Oxford University Press, Inc., 2010.[1]
2. Yu, Wanjun, et al. "Notice of Retraction The research of improved apriori algorithm for mining association rules." *2008 11th IEEE International Conference on Communication Technology*. IEEE, 2008.
3. Shen, Shaojie, Nathan Michael, and Vijay Kumar. "Autonomous multi-floor indoor navigation with a computationally constrained MAV." *2011 IEEE International Conference on Robotics and Automation*. IEEE, 2011.

10.APPENDIX

10.1 PROJECT REVIEW SHEET 1

Inhouse / Industry : _____

Mini Project Evaluation Sheet 2018 - 19 GROUP NO.: 2 Class: D12 ABB'C

Title of Project: Intelligent Car.

Group Members: Jyoti Rana, Abhinav Velidi, Nisha Purnani, Aney Pimpale

Engineering Concepts & Knowledge	Interpretation of Problem & Analysis	Design / Prototype	Interpretation of Data & Dataset	Modern Tool Usage	Social Benefit, Safety Consideration	Environment Friendly	Ethics	Team work	Presentation Skills	Applied Engg & Mgmt principles	Life - long learning	Professional Skills	Impressive Appearance	Total Marks (50)
(5)	(5)	(5)	(3)	(5)	(2)	(2)	(2)	(2)	(3)	(3)	(3)	(5)	(5)	(50)
4	4	4	3	4	2	2	2	2	3	3	3	4	4	44
Review of Project Stage I														
Comments: _____														

Name & Signature Reviewer1: Nisha Purnani

Engineering Concepts & Knowledge	Interpretation of Problem & Analysis	Design / Prototype	Interpretation of Data & Dataset	Modern Tool Usage	Social Benefit, Safety Consideration	Environment Friendly	Ethics	Team work	Presentation Skills	Applied Engg & Mgmt principles	Life - long learning	Professional Skills	Impressive Appearance	Total Marks (50)
(5)	(5)	(5)	(3)	(5)	(2)	(2)	(2)	(2)	(3)	(3)	(3)	(5)	(5)	(50)
4	4	4	3	4	2	2	2	2	3	3	3	4	4	44
Review of Project Stage I														
Comments: _____														

Name & Signature Reviewer2: Nisha Purnani

Date: 12th FEB 2019

10.2 PROJECT REVIEW SHEET 2

Industry: _____

Project: Intelligent Car.

Members: Jyoti Rana (50), Nisha Purohita (49), Abhinav Verma (46), Anurag Purohita (47)

Mini Project Evaluation Sheet 2018 - 19 GROUP NO.: 2 Class: D12 A/B/C

Engineering Concepts & Knowledge	Interpretation of Problem & Analysis	Design / Prototype	Interpretation of Data & Dataset	Modern Tool Usage	Societal Benefit, Safety Consideration	Environment Friendly	Ethics	Team work	Presentation Skills	Applied Engg & Mgmt principles	Life-long learning	Professional Skills	Innovative Approach	Total Marks
(5)	(5)	(5)	(3)	(5)	(2)	(2)	(2)	(2)	(3)	(3)	(3)	(5)	(5)	(50)
4	4	4	3	4	2	2	2	2	3	2	3	4	4	43

UI needs to be implemented.

Name & Signature: _____

Reviewer: _____

Total Marks: 43.