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# ABSTRACT

There are many shopping portals in market but people prefer to use the product which is reliable, secure and fast. Developer has some of advanced features to make the portal and app much faster and reliable. The name of the project **is “NeuroCart- NLP based advanced shopping cart”**. NLP (Natural Processing Language) is used in my system which is most commonly used in AI (Artificial Intelligence) systems.

Developer is doing the research for the development for the project. For the development of the proposed system, the developer has done following process of the software development method.

* Literature Review
* Primary Research
* Secondary Research
* Analysis

Developer had done the research on literature review in which advanced preliminary research, domain research and the market research are shown.

Developer had chosen two data gathering technique questionnaire and interview to get the feedback and the information for the project development by the user. In questionnaire, developer had tried to get the feedback from almost 15 general users and in analysis, the developer had analyzed whole question which are been answered by the professional or experienced user; he further added some functionality to the system according to it. After having questionnaire and the interview session, developer had analyzed, enhanced and set up some goal to develop the system.

Developer had done secondary research also. In secondary research, technical research, academic research and the selection of methodology has been shown. In methodology, developer had chosen the Waterfall methodology for the development of the proposed system.

The developer has given the overall conclusion of primary research and secondary research for getting the benefits in development of project.

Below the whole research work are been shown.

Part – I

**Abstract**

Chapter 1: Introduction

Chapter 2: Problem Description

# Chapter 1: INTRODUCTION

## 1.1 Topic and brief intro about the system:

The title of the project is **“NeuroCart- NLP based advanced shopping cart”** which is much advanced than traditional shopping carts.

The days have gone when people need to go to market to do shopping, e-carts give all the required services online like searching product, buying them and get delivered on their fingertip. E-carts like flipkart, amazon are tech-giants, it’s very interesting to know that the whole system is built in megabytes and they provides features of many humans. An e-cart can be developed on many languages like php, java, python. Every language has its own significance in terms of security, speed etc.

The current system is being developed on java because java is much faster and secure. Java is trending language in market since more than 20 years because of its platform dependency and OOPS based coding.

Current e-cart systems don’t have advanced features like voice to product search and image to product search. I as a developer felt that technology can be used to tackle daily life problems, technology makes life faster, better and smarter. Image to product search makes life easier, customer will choose an image and upload to my e-cart (NeuroCart) and the system will try its best to match with other images and show similar products. And voice to product search is one more one of best feature, its built in android application like we do google search, the customer will speak and the system will fetch the voice and show the results. Now we will see some facts about e-carts.

## 1.2 Purpose of the system:

There are 3 functionalities which support the point that such system must be developed.

1. Web+Android Application: I am providing both applications web and android because by doing this all types of customers will be targeted which will boost the health of organization.
2. Voice to product search: This feature is very extraordinary as google also provides same feature to search queries. It will also help blind people to search products via android application.
3. Image to product search: This functionality will help people to match best match related to their search.

So because of these special features this system will rock in market. The stakeholders will be in benefit because of this system.

## 1.3 Target Users

The users can be categorized in 2 types:  
1. Web application users.  
2. Mobile application users.

**1. Web application users:**

We have seen the era of web applications. It all started from a lab when two researchers proposed a concept to share documents over web, they called it html and now a day html is core part of web designing. Yes, it’s not yet dynamic and was never considered to make it dynamic but html5 is much dynamic than ever, dynamic doesn’t mean the interaction of web application with database but in terms of responsive, even a game can be developed using html5. Recently htnl5.1 has been released and soon html6 will come into picture.

But html doesn’t complete our requirements, it only gives us source to design for browser could render our codes and show what actually we are doing. Here we are developing a shopping cart website which includes database part also because database is essential part of any dynamic website. We will store user’s information for he or she could login in future. Users will be able to search product and all the information will be fetched from database like product info, order history, payment information, and user information.

Computer has become essential part of human’s life, the journey of internet started before launch of Internet Explorer, **Maosic** and **Navigator** were launched before **IE (Internet Explorer)**. Times before, browsers will only be used to visit static websites not dynamic websites like today. In these days, mostly websites are dynamic because it allows people to change website’s content without having coding knowledge using **CMS (Content Management System)**. Even by using CMS, a complete website can be built.

So, we can see by above explanations that web application has taken important part in human’s life, people are fond of opening browser and check their social networking sites, they want everything online and virtual and technology has improved in such a way that **Artificial Intelligence** has come in scene. By using **AI (Artificial Intelligence),** the application software has become most advanced in nature.

**2. Mobile Application users:**

Mobile has become essential part of human’s life, every work is performed using mobile. Modern mobiles include calculator, calendar, stopwatch, watch, torch etc, these are basic features which are found in cheapest phones but modern phones are based on **android, apple IOS** and have many applications. A mobile application is developed for every web application because it’s not possible that every time a user will open his laptop and open the browser to visit the site and use web application.

Top mobile platforms like **android, IOS** are champion of today’s mobile market. There has been competition between these two mobile platforms since 5-6 years. On one hand, Android is open source and free whereas IOS is neither open source not free but suppose a mobile company wants to launch his mobile phones with android platform then that company has to sign several agreements with **Google** to launch his mobile phones.

## 1.4 Topic Background

In 2013, Asia-Pacific emerged as the strongest business-to-consumer (B2C) eCommerce region in the world with sales of around 567.3 billion USD, a growth of 45% over 2012, ranking ahead of Europe (482.3 billion USD) and North America (452.4 billion USD). The top three were followed by Latin America, and the Middle East and North Africa (MENA) region, according to Ecommerce Europe. Globally, B2C eCommerce sales increased by 24% over 2012. This reflects the huge untapped potential of eCommerce by retail companies, both in their country of origin and across borders. eCommerce or electronic commerce, deals with the buying and selling of goods and services, or the transmitting of funds or data, over an electronic platform, mainly the internet. These business transactions are categorized into either business-to-business (B2B), business-to-consumer (B2C), consumer-to-consumer (C2C), consumer-to-business (C2B) or the recently evolved business-to-business-to-consumer (B2B2C). eCommerce processes are conducted using applications, such as email, fax, online catalogues and shopping carts, electronic data interchange (EDI), file transfer protocol and web services and e-newsletters to subscribers. eTravel is the most popular form of eCommerce, followed by eTail which essentially means selling of retail goods on the internet conducted by the B2C category.

Since the eCommerce industry is fast rising, changes can be seen over a year. The sector in India has grown by 34% (CAGR) since 2009 to touch 16.4 billion USD in 2014. The sector is expected to be in the range of 22 billion USD in 2015. Currently, eTravel comprises 70% of the total eCommerce market. eTailing, which comprises of online retail and online marketplaces, has become the fastest-growing segment in the larger market having grown at a CAGR of around 56% over 2009-2014. The size of the eTail market is pegged at 6 billion USD in 2015. Books, apparel and accessories and electronics are the largest selling products through eTailing, constituting around 80% of product distribution. The increasing use of smartphones, tablets and internet broadband and 3G has led to developing a strong consumer base likely to increase further. This, combined with a larger number of homegrown eTail companies with their innovative business models has led to a robust eTail market in India rearing to expand at high speed.

## 1.5 Tangible and Intangible assets

Difference between tangible and intangible assets:

|  |  |
| --- | --- |
| Tangible Assets | Intangible assets |
| 1. Tangible assets have a physical existence | 1. They don’t have physical assets. |
| 1. They are deprecated. | 2. They are amortized. |
| 1. Tangible assets are much easier to liquidate due to their physical presence. | 3. Are not easy to liquidate and sell in market. |
| 1. The cost can easily be determined and evaluated. | 4. Costs are harder to determine. |
| 1. Examples: Vehicle, plant & machinery, etc. | 5. Example: Logo, Software and patent. |

The product we are developing is a software application which doesn’t has physical asset neither we can easily determine the price so it will be intangible come under intangible assets. Usually it’s harder to define price for a software product. For example: In 2004, an unnamed financer offered Mark Zuckerberg $10 million to buy facebook which was web application and facebook was not that much advanced at that time. Technologies like ajax, java was not being used in facebook at that time, facebook was just developed as their normal projects. And if we compare the price of that level of system then it would be maximum of 10k Indian rupees which is may be hourly income of Mark Zuckerberg (Founder of Facebook). So we can’t final the price of intangible assets, it all depends on whether that product will be helpful to earn huge money.

## Objective of system

**Project Objectives:**

The objective of this project is to make an advanced shopping cart which will be more successful than other projects and help people to do shopping in more efficient way. By using some advanced features, this product will give tough competition to other e-cart websites. Shopping cart like amazon.com is a multi-national company and still they don’t have such advanced features so I can say that this project much advanced than others.

**Academic Objectives:**

Some of the major learning outcomes in developing the system are mentioned below:

* To learn and apply the Project Management concepts like software development methodologies, work breakdown tools and techniques, etc.
* To lean the concepts of Human Computer Interaction and Usability, SDLC model and needs to be implemented.
* To learn different programming language, their concepts and database for developing the project. New concepts in ASP.NET and C# to be learned.
* J Query - SQL
* Ajax
* Java Script
* XML
* Java
* Web Services

## Functionalities of System

All the features of basic shopping cart features are included in this system and extra advanced features have also been included. The core, enhanced and special features are described below:

**1. Core Features:** The most basic features are login, sign-up, searching, buying and ordering the product. Rest of the features is listed below:

1. Product search using text input.
2. Product categories.
3. Product order and cancellation.
4. Product availability based on city pin code.

**2. Enhanced Features:**

1. Image to image product search (in web-app).
2. Voice to product search (in android-app).
3. Comment analysis using NLP (for admin).
4. Generate the graph based on comments (for admin).
5. Recommend system (item-based and user-based).

**3. Special Features:**

1. Live chat support.

# Chapter-2: Problem Description

## 2.1 Problem Description

There are lots of problems in current systems because of lack of functionalities, the major problems are:

**Voice-to-product search:** The current systems doesn’t have voice-to-product search which can be measured as problem of system. The people need faster process so this functionality should be added.

**Image-to-product search:** The current system doesn’t have this feature, it’s one of very advanced feature provided by Google API, so it’s easy to integrate in apps.

## 2.2 Feasibility Study

Feasibility studies addresses things like where and how the business will operate. It provides in-depth details about the business to determine if and how it can succeed and serve as a valuable tool for developing a winning business plan.

|  |  |  |
| --- | --- | --- |
| **Project Feasibility Report** | | |
| **Opportunity project is intended to address.** | The project intends to address most of the problems identified under problem context. The main opportunity is to make a better system than existing system. | |
| **Project Objective** | The objective of this project is to make an advanced shopping cart which will be more successful than other projects and help people to do shopping in more efficient way. | |
| **Manpower Required** | **Developer** | Prashant Tripathi |
| **Project Manager** | Mr. Ravi Sachdeva |
| **Project Supervisor** | Gurpreet Kaur |
| **Project Advisor** | Rajbeer Kaur |
| **Operational**  **Feasibility** | Operational feasibility is to find out whether the proposed system would solve all the problems of the users and can be used efficiently by users. For this purpose, the developer would be utilizing fact-finding techniques like *interviews* and *questionnaires* in this project and carry out the user acceptance testing at the end of the development. | |
| **Technical Feasibility** | It is the most important feasibility study to be carried out for developing this project. It mainly involves the hardware and the software requirements of the system regarding all the tasks of the system to be done. It has been assumed from the developer side that all the hardware and software resources are available to develop the project and demonstrate it further. | |
| **Economic Feasibility** | The purpose for assessing economic feasibility is mainly to identify the financial benefits and costs associated with the development project. Economic feasibility is referred as cost and benefit analysis for any system. | |
| **Schedule Feasibility** | It is to find out whether the project is running in time and can be completed on time or not. It plays an important role in planning the project. It consist of assess the work to which the time frame and the completion date for all major activities within the project that meets organizational deadlines and constraints for affecting change. | |

## 2.3 Challenges in project

Developing shopping cart as a web or android application is not a big deal but developing both at same time needs so much hard-work and patience. Both web and android app will synchronize data from **MYSQL database** at the same time. So, a web-service will be implemented to make the communication of android app with database server. Lots of new concepts are required to be studied before developing this major project like:

* NLP (Natural Language Processing) which is basically used in Artificial Intelligence.
* Image to image product search will either be used by algorithms or google provides API for this feature. If the developer chooses alogirithm, he will have to study some machine learning algorithms and if google API will be used then he will have to learn how to integrate 3rd party API in software applications.
* While implementing recommendation system (item-based & user-based), the user will have to learn **Negation and positive phrases identification** algorithm.

Part – II

Chapter 3: Literature Review

Chapter 4: Research Methods

Chapter 5: Analysis

# Chapter 3: LITERATURE REVIEW

A literature review is both a summary and explanation of the research undertaken. It also provides purpose, background and justification of the research. It is written as part preparation for a research report. A literature review is a form of writing that aims to review the critical points of current knowledge and or procedural approaches on a particular topic. Literature reviews are secondary sources, and as such, do not report any new or original experimental work.

Research is the key to the success of every creation, especially in IT projects it is essential as there are many white papers, services and products may be available in the selected topic area. This makes an emphasis on the importance of the Literature Review for detailed research.

## 3.1 Advanced Preliminary

The idea to build such system came in mind when developer was using google app and tried to find results using voice search. The developer thought if this feature is added in other applications then it will be very useful to users. So the developer decided to add this feature in shopping cart and made it enhanced.

My second advanced feature image-to-image product search idea came when I was using google image-to-image search, google searches same images what user uploads. So I decided to add this feature in my shopping cart app.

**Conclusion (Advanced Preliminary)**

The basic idea of the project is incidentally found on real time scenario and developer performed research on various sources where it was found that there is a great to implement such type of NLP based shopping cart system.

## 3.2 Secondary Research

First phase of any software development model involves research and analysis method to find specific data regarding any project. Developer has categorized them under specific categories on their user during development of project.

### 3.2.1 Domain Research

Domain research about the topic is very important as it provides the foundation to build any system. It is knowledge of what thing to develop, and how can it be developed and handled here. It is very important for any application development to have a design structure of that system. It proves to be more vital for any product that it has incorporated new or untried features. It is better to have a predefined model for effective time management and smooth flow or work. The advantage of a clear design is that it describes and plans for the application development, helps to realize what all features are possible within the application, and also helps in visualizing the look and feel of the application being developed. Apart from this, it also provides a logical boundary within which the changes or modifications could be made.

Today, advancement in the technology is increasing rapidly, and probably this is reason for the increase in number of computers and its users. The advancement of technology has evolved e-commerce, e-business, e-banking, e-Schools. Important data which includes Client information, payment information, personal files, and bank account details are communicating worldwide through internet. These data are very important and personal to the users so, data security is very important. Otherwise, it can be hacked by hacker that will be a disaster. So, security is also a very important point while developing the system. The system should be tested to make it hack-proof. There should be also firewalls and WAFs which will protect the data.

#### Research (Forensic & Spy Transmission System)

1. **Recommend system (item-based and user-based):**

The system will recommend items to users using algorithms. If a person buys something, the system will automatically recommend him related products.

1. **Comment analysis using NLP**:

The admin will be able to see the user reviews. Admin will not be required to read each and every review. The NLP will generate results based on user’s comments.

1. **Generate the graph based on comments:**

Using algorithms (NLP analysis of comment (Negation and positive phrases identification)). A graph will be generated.

### 3.2.2 Technical Research

This section primarily discusses the research done on choosing the technology, platform and other technical details before selecting the technology upon which the project will be developed. This is one of the most crucial researches that need to be done before the work on the implementation begins. Selecting the correct technology and platform can affect a number of steps in the implementation phase and can even lead to the failure of the project. Improper research done in this area can lead to the following:

* Improper technical research can lead to the selection of a technology in which the developer is not very comfortable leading to delays in the implementation of the designs and could also lead to project failure in some cases.
* The users for whom the application is to be developed might be working on some other platform which is quite different from the technology in which the project is being developed rendering the project useless for them.
* The technology might be new and hence not compatible with many existing servers or communication models.
* The technology might not be very efficient for the current system being developed and can lead to extra tedious work which might lengthen the development time process.

After doing a proper research in the field of various technologies present, **Java** has been chosen as the preferred.

#### Human Computer Interaction and Usability

The Human Computer Interaction and Usability is a subject which is to be studied in order to apply in the system. This subject contains several points which tell us about how to make the system more user friendly and interactive design. Thus one of the most important topic of this project which is really important to be implemented in this system is-

**Design Principles:** The design principles that need to be studies in order to provide are as follows:

*Visibility:* Visibility is one of the most important design principles and what it means is that, as and when the user looks on the system screen he/she may feel the possibility for action.

**Conclusion**: The developer will provide color schemes and positioning of the text in such a way that users of this system can easily find suitable content in both web and android app.

*Feedback:* Feedback is the response to the user of the action performed.

**Conclusion**: The developer will provide appropriate message box, change in color, etc. to provide feedback.

*Constrains:* Constrains are some universally accepted conventions which notify some specific actions.

**Conclusion**: Validations are being included so as to warn the user in case of any error is about to occur.

*Consistency:* Consistency means maintaining similar color schemes, backgrounds, font size and color.

**Conclusion**: The developer will provide consistent color, same background, same font size and color for headings.

Mapping: Mapping naturally takes advantage of physical analogies & cultural standards so that user can understand how the things work.

**Conclusion**: The developer will design the user-friendly interface for all types of user.

*Affordances*: Affordance means expected behavior like cursor of mouse changes into hand symbol on roll-over the link, color of text changes, etc.

**Conclusion**: The developer will provide roll-over link wherever it is necessary.

### 3.2.3 System Architecture Research

“The architecture of a system is a comprehensive framework that describes its form and structure-its components and how they fit together.” Architectural design is a simplistic way to develop modular program structure. Moreover it provides a liaison between program structure and data structure.

Proposed system (Shopping cart) will be based on client/server architecture. IT made the user work easier. Comparative study of Architecture is shown below:

|  |  |  |
| --- | --- | --- |
| **Two-Tier** | **Three-Tier** | **N-Tier** |
| The interface of the system is located on the user’s desktop and the database is lying on some remote machine. After receiving the request, Server executes the command and sends response to the client. | Here, a middle layer is added between the user’s interface on the client side and database environment on the server side. Middle layer, also known as business logic layer help users to perform queuing, application execution and database staging. | It is a distributed object architecture that allows users to write faster, larger, powerful and robust programs. Here multiple data feeds arrive from different sources, processed by multiple databases and multiple clients running specialized applications. |

Table 5: Comparative Study of Client/Server Architecture

#### Three-Tier Architecture

After analyzing the comparative study of different system architectures, the developer has decided to implement Three-tier architecture in the project, as it offers a degree of simplicity when selecting implementation tools by separating the main components of the system into manageable layers i.e. the Presentation layer, the Business Logic layer and the Data layer. Hence, the project should use Three-tier architecture for its development.

**Advantages of using .Net over Java:**

* J2EE is being marketed by an entire industry.
* J2EE is a proven platform, with a few new web services APIs. .NET is a rewrite and introduces risk as with any first-generation technology.
* Only J2EE lets you deploy web services today.
* Existing J2EE code will translate into a J2EE web services system without major rewrites. Not true for Windows DNA code ported to .NET.
* .NET web services are not inter operable with current industry standards. Their BizTalk framework has proprietary SOAP extensions and does not support ebXML.
* J2EE is a more advanced programming model, appropriate for well-trained developers who want to build more advanced object models and take advantage of performance features.
* J2EE lets you take advantage of existing hardware you may have J2EE gives you platform neutrality, including Windows. You also get good (but not free) portability. This isolates you from heterogeneous deployment environments.
* J2EE has a better legacy integration story through the Java Connector Architecture (JCA).
* J2EE lets you use any operating system you prefer, such as Windows, UNIX, or mainframe. Developers can use the environment they are most productive in.
* J2EE lets you use Java, which is better than C# due to market-share and maturity. According to Gartner, there are 2.5 million Java developers. IDC predicts this will grow to 4 million by 2003. 78% universities teach Java, and 50% of universities require Java.

## 3.3 Available Resources

### 3.3.1 Books

* + 1. **Software Engineering: -**
* Jalote, Pankaj (2005). *Software Project Management in Practice*, Sixth Indian Reprint, New Delhi, Pearson Education (Singapore) Pvt. Ltd.
* Pressman, Roger (2005). *Software Engineering,* 6th edition, New Delhi, Mcgraw Hill International Edition.
  + 1. **Programming Languages: -**
* Mac Donald, Matthew (2002). Java The Complete Reference, Tata McGraw-Hill.
* Marco Bellinaso, Kevin Hoffman, Java Website Programming: Problem - Design - Solution, C# Edition, 2002 , Wrox
  + 1. **Database: *-***
* Larson, Brian. *MySQL: The Complete Reference,* 2004, McGraw Hill

### Journals and Articles

* "FUTURE OF E-COMMERCE IN INDIA". FUTURE OF E-COMMERCE IN INDIA (2014): n. pag. Web. 19 Nov. 2016.

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* "DBMS Tutorial". www.tutorialspoint.com. N.p., 2016. Web. 24 Nov. 2016.
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* "Java Tutorial". www.tutorialspoint.com. N.p., 2016. Web. 24 Nov. 2016.
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* "The Java™ Tutorials". Docs.oracle.com. N.p., 2016. Web. 24 Nov. 2016.

## 3.4 Market Research

### 3.4.1 Flipkart

|  |  |
| --- | --- |
|  |  |
| **Explanation** | Flipkart is well known and popular e-commerce websites, it provides both website and app for customers. |
| **Functionalities** | * Product search. * Order and cancellation. * Track order. * Search product by keyword. |
| **Pros** | * It’s fast and secure. * The ‘track order’ provides exact information. * Item recommendation. |
| **Cons** | * It doesn’t have image-to-product search. * It doesn’t have voice-to-product search. |
| **Source** | http://flipkart.com |

Table 6: Similar System (Flipkart)

### 3.4.2 Amazon

|  |  |
| --- | --- |
|  |  |
| **Explanation** | It is similar to flipkart, it is one of biggest e-commerce website in world. Flipkart is only in India but this company is ruling in many countries. |
| **Functionalities** | * Product search. * Order and cancellation. * Track order. * Search product by keyword. |
| **Pros** | * It’s fast and secure. * The ‘track order’ provides exact information. * Item recommendation. * The web application is very light-weight, it doesn’t require fast internet connection to load. * Mobile app is also very light weight. |
| **Cons** | * It doesn’t have image-to-product search. * It doesn’t have voice-to-product search. |
| **Source** | http://www.amazon.in/ |

Table 7: Similar System (Amazon App)

**Conclusion**

The developer found that there are various systems which are developed and are currently running with very high requirements but those are highly costlier than the proposed system

Project which is going to be implemented has cost of algorithm as negligible and impact of features at greater levels.

## Critical Evaluation of Literature Review

The literature review provides the foundation to carry out further research on different aspects dealt by the proposed system. After studying all mentioned materials, developer reached the conclusion that the people are getting more dependent on the internet for different purposes. Users of internet is increasing worldwide, people ranging from student, business man, government, militaries all are using internet for data transfer or other transactions. The developer has done research on many e-commerce website and found that many shopping portals are not using advanced features which will not only help users to find their choice of products as well as it will help to boost the economic growth of industry.

# Chapter 4: RESEARCH METHODS

Research is the systematic investigation and detailed study of materials, sources, etc especially in order to establish new facts and reach conclusions. *(Oxford Dictionary, 2014)*

Research is the most important step in finding out the requirements, views and demands of the users. Research includes gathering of data, information and facts. It can be from books, journals, websites and stakeholders of the system.

This chapter discusses the primary research which has been done about the topic on which the project is being developed. It basically involves the **Primary Research** done before designing the project.



## 4.1 Primary Research

Primary research is conducted based upon the requirements of the application. Primary research involves the collection of data that does not already exist, which is research to collect original data. It was conducted by developer to gather preliminary information from the actual users of the system in order to complete requirement. Developer intends to involve users to decide functionality and usability of the system so that the developed system would be acceptable by its users. There are different data gathering techniques like questionnaires, interviews, personal observation, focus groups, studying existing documentation, etc. But the developer has chosen *Questionnaires* and *Interviews* technique for gathering information from the users.

### 4.1.1 Questionnaire

“A questionnaire is a pre-formulated written series of questions for the purpose of gathering information to which respondents record their answers; usually within rather closely define alternatives”. Questionnaires will be specially designed for users who would use the system which will include people who are interested in securing their data or information without getting it leaked. There are few advantages of Questionnaire:

* Can be used to collect both qualitative as well as quantitative data.
* Can be distributed manually or electronically.
* Can reach a vast number of people regardless of physical location or geographical dispersion.
* Can be distributed quickly and cheaply.
* Can be used when human and financial resources are not available to conduct interviews.

|  |  |
| --- | --- |
| **S. No.** | **Objective of the Questionnaire** |
|  | To verify the nature and seriousness of the identified problems. |
|  | To gather users requirement. |
|  | To get the viewpoints of intended system user. |
|  | For defining scope of the project. |

Table 8: Objective of Questionnaire

#### Justification for selecting Questionnaire

*NeuroCart (Shopping cart)* involves large number of users and it not possible for the developer to interview all the users. Through questionnaire technique, opinion of large number of users can be obtained in a very short span of time. Though there can be low response rate and questionnaires can even be misinterpreted but it can be done on a large number of users at one time takes advantage over it. It helps in collecting specific information about any particular domain. It also requires less cost and time as compared to other data gathering techniques. Therefore, keeping in mind the advantages of questionnaire developer has chosen questionnaire as one of the data gathering methods.

**Writing the Questionnaires**

The developer has prepared the questions carefully so as to ensure proper structuring and logical flow of questions. The developer has avoided the questions which raises the risk of ambiguity. Offensive questions are also avoided so as to get the proper views and output from the users. The questions prepared for the questionnaires have been included below. The justification for each question has been provided along with the question so as to prove the need of asking the question.

|  |
| --- |
| **QUESTIONNAIRE** |
| 1. **How old are you?**   Below 18  18-24 years  25-30 years  above 30 years  ***Justification:*** *This question is being asked so that the developer can know the age of user.*   1. **What's your gender?**   Male  Female  ***Justification:*** *This question is being asked so that the developer can know the gender of user.*   1. **living area?**   Rural  Urban  ***Justification:*** *This question will help the developer in finding the location of users.*   1. **Your occupation?**   Student  Employee  Self- Employee  Housewife  Others  ***Justification:*** *This question will help developer to know the occupation of users.*   1. **level of qualification?**   UNDER MATRICULATION  INTERMEDIATE  UNDER GRADUATE  GRADUATE  POST GRADUATE  ***Justification:*** *This question will help the developer to know qualification level of users.*   1. **Do you use online shopping portal?**   Yes  No  ***Justification:*** *This question is being asked to know whether the users use e-commerce portal or not.*   1. **What kind of application do you use?**   Web-application  Android  Both  ***Justification:*** *This question is being asked to find out what kind of application the users use.*   1. **Are you aware about image-to-product search?**   Yes  No  ***Justification:*** *This question is being asked so that the developer can know whether users are aware about the advanced feature image-to-product-search.*   1. **Are you aware about voice-to-product search?**   Yes  No  ***Justification:*** *This question is being asked so that the developer can know whether users are aware about the advanced feature voice-to-product-search.*   1. **Do you want to have an option "image-to-product" search in website (web-application) ?**   Yes  No  ***Justification:*** *This question will let to know the developer about the requirement of users.*   1. **Do you want to have an option "voice-to-product" search in android-application?** Yes   No  ***Justification:*** *This question will let to know the developer about the requirement of users.*   1. **Do you think that "voice-to-product" search option will help users to find their choice of products easily?**   Yes  No  ***Justification:*** *This question is being asked to find out whether the organization wants easy installation of their system or not.*   1. **How much rating would you like to give both features "voice-to-product" and "image-to-product" search?**   Most-Disagree     Most-Agree  ***Justification:*** *The result of the above query will get developer to know the rating of proposed system.*   1. **Do you think that this product will be able to beat other products like flipkart and amazon?**   Yes  No  Maybe  ***Justification:*** *This question is being asked to find out whether the system will be able to beat other products in market.*   1. **Will this product be able to stand in market and make huge business?**   Yes  No  Maybe  ***Justification:*** *This question will help the developer to know whether the product will stand in market and beat other products.* |

### 4.1.2 Interviews

Interview is conversation between two or more people (the interviewer and the interviewee) where [questions](http://en.wikipedia.org/wiki/Question) are asked by the interviewer to obtain information from the interviewee. A much detail amount of information can be gathered from this technique. The developer wants to use Interview technique in addition to the survey performed. The information thus gathered will help the developer to get a clear understanding of the information already gathered. The developer has decided to conduct the interview with the common user of the FSTS to get more and more feedback for the system. The developer knows that it is important to get the end user’s view while developing a system. The developer has decided to conduct the interview with the person who is presently working in the government departments.

#### Justification for selecting Interviews

*NeuroCart (ShoppingCart)* involves large number of users but to collect the exact and clear understanding about the system, personal interview has been chosen as it is one of the data gathering methods for conducting primary research. Here, the developer can get the answers and feedback in depth and clear. The detailed information about the participant’s experiences and impressions about the system can easily be collected. This system requires a detailed analysis of the functionalities, so this data gathering technique is selected. Developer main motive in conducting interviews is to obtain more and more understanding about the current system and earlier techniques used by the people so as to able to develop the proposed system in a more productive manner for the target users.

**Interview Questions:**

1. **What do you know about online shopping portal?**

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***Justification:*** *This question is being asked to know what the users know about shopping portal.*

1. **What do you know about image-to-product search?**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

***Justification:*** *This question is being asked to know what the users know about image-to-product search.*

1. **What do you know about voice-to-product search?**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

***Justification:*** *This question is being asked to know what the users know about voice-to-product search.*

1. **What do you know about NLP (Natural Language processing) ?**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

***Justification:*** *This question is being asked in order to know whether users know about NLP.*

1. **What do you know about item recommendation system?**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

***Justification:*** *This question is being asked to find out what the users know about item-recommendation system.*

## 4.2 Secondary Research

Under this section, the developer is going to provide the research done through various books, Internet, Journals etc. It was conducted by developer to collect data from existing research like choosing which development *methodology*, *programming language* or *suitable database* is best for this project. The developer has decided to include various functionalities in the system, so choosing a suitable platform is very important for proper implementation. As the system has to use database to store information on which the computations will be done. For this a database is to be selected from a list of databases available that can easily tie us with the language chosen and database operations becomes easy to perform.

### 4.2.1 Software Development Methodology

Planning for any project in advance saves much of the time and energy that would be wasted in doing all the work in a non-systematic manner. A proper software development methodology provides a framework for the project and is needed to be selected before the planning.

This will allow the developer to produce products with greater functionality, fewer defects in lesser time.

Various software development methodologies are available now-a-days but selecting the appropriate one for the system is the most important task to take the development of system in right direction.

The selection of methodology has required lots of research.

The developer has carefully done the research on all the software development methodologies and then on the basis of certain reasons as discussed below “**Spiral Model**” is chosen for the development of the system.

## Spiral Model:

Being a highly sophisticated design, it is meant to reduce the early risks in the project.

As per the process going by, the developers initiate on a smaller level and explore the included risks in it.

Further to this, the developers are intended towards crafting a plan for iterating of the spiral.

The accomplishment of any Spiral Lifecycle model is based on consistent, observant, and conversant management of the project.

**Pros:**

* Risk factors are considerably reduced
* Excellent for large and complex projects
* Allows for additional functionality later
* Suitable for highly risky projects with varied business needs

**Cons:**

* Costly model in software development
* Failure in risk analysis phase may damage the whole project
* Not appropriate for low-risk projects
* Might get continued and never finish

## Conclusion:

We have seen and discussed every common methodology here and we’ve chosen Spiral Model. There are few reasons to choose this methodology like:

* All the risks are reduced at the very beginning.
* As my project is complex so choosing this project would be best option.
* I have given ‘Live chat support’ feature as special feature, it means I may or may not include this feature in this project. So adding a new functionality later in this project would be possible.
* This model is perfect for highly risky project and various business needs so it would better that I choose this methodology.

### 4.2.2 Programming Language Research

To successfully develop a project or system, technical and programming skills are both equally important. The academic research determines the design of the system, while the technical and programming research will determine the usability of the system. The processes behind every action performed by the user are to be deal with specific algorithms or functions.

Java is a simple and yet powerful object oriented programming language and it is in many respects similar to C++. Java originated at Sun Microsystems, Inc. in 1991. It was conceived by James Gosling, Patrick Naughton, Chris Warth, Ed Frank, and Mike Sheridan at Sun Microsystems, Inc. It was developed to provide a platform-independent programming language. This site gives you an Introduction to Java Programming accompanied with many java examples. It’s a complete course in java programming for beginners to advanced java..

**Features of Java:**

#### PLATFORM INDEPENDENT:

Unlike many other programming languages including C and C++ when Java is compiled, it is not compiled into platform specific machine, rather into platform independent byte code. This byte code is distributed over the web and interpreted by virtual Machine (JVM) on whichever platform it is being run.

#### JAVA VIRTUAL MACHINE

What is the Java Virtual Machine? What is its role?

Java was designed with a concept of ‘write once and run everywhere’. Java Virtual Machine plays the central role in this concept. The JVM is the environment in which Java programs execute. It is a software that is implemented on top of real hardware and operating system. When the source code (.java files) is compiled, it is translated into byte codes and then placed into (.class) files. The JVM executes these bytecodes. So Java byte codes can be thought of as the machine language of the JVM. A JVM can either interpret the bytecode one instruction at a time or the bytecode can be compiled further for the real microprocessor using what is called a just-in-time compiler. The JVM must be implemented on a particular platform before compiled programs can run on that platform.

#### OBJECT ORIENTED PROGRAMMING

Object Oriented Programming is a method of implementation in which programs are organized as cooperative collection of objects, each of which represents an instance of a class, and whose classes are all members of a hierarchy of classes united via inheritance relationships.

#### OOP Concepts

Four principles of Object Oriented Programming are

* Abstraction
* Encapsulation
* Inheritance
* Polymorphism
* Abstraction

**Abstraction:** Abstraction denotes the essential characteristics of an object that distinguish it from all other kinds of objects and thus provide crisply defined conceptual boundaries, relative to the perspective of the viewer.

**Encapsulation:** Encapsulation is the process of compartmentalizing the elements of an abstraction that constitute its structure and behavior; encapsulation serves to separate the contractual interface of an abstraction and its implementation.

\* Hides the implementation details of a class.

\* Forces the user to use an interface to access data

\* Makes the code more maintainable.

**Inheritance:** Inheritance is the process by which one object acquires the properties of another object.

**Polymorphism:** Polymorphism is the existence of the classes or methods in different forms or single name denoting different implementations.

**Java has powerful features. The following are some of them:-**

Since Java is an object oriented programming language it has following features:

* Reusability of Code
* Emphasis on data rather than procedure
* Data is hidden and cannot be accessed by external functions
* Objects can communicate with each other through functions
* New data and functions can be easily added
* Simple
* Reusability of Code
* Portable (Platform Independent)
* Distributed
* Robust
* Secure
* High Performance
* Dynamic
* Threaded
* Interpreted

**JAVA IS DISTRIBUTED:**

With extensive set of routines to handle TCP/IP protocols like HTTP and FTP java can open and access the objects across net via URLs.

**JAVA IS MULTITHREADED:**

One of the powerful aspects of the Java language is that it allows multiple threads of execution to run concurrently within the same program A single Java program can have many different threads executing independently and continuously. Multiple Java applets can run on the browser at the same time sharing the CPU time.

**JAVA IS SECURE:**

Java was designed to allow secure execution of code across network. To make Java secure many of the features of C and C++ were eliminated. Java does not use Pointers. Java programs cannot access arbitrary addresses in memory.

**GARBAGE COLLECTION:**

Automatic garbage collection is another great feature of Java with which it prevents inadvertent corruption of memory. Similar to C++, Java has a new operator to allocate memory on the heap for a new object. But it does not use delete operator to free the memory as it is done in C++ to free the memory if the object is no longer needed. It is done automatically with garbage collector.

**JAVA APPLICATIONS:**

Java has evolved from a simple language providing interactive dynamic content for web pages to a predominant enterprise-enabled programming language suitable for developing significant and critical applications. Today, it is used for many types of applications including Web based applications, financial applications, Gaming applications, embedded systems, Distributed enterprise applications, mobile applications, Image processors, desktop applications and many more.

### 4.2.3 Database Management System

Developer has researched on many different databases and after critically analyzing each database, developer has selected **MySql** database for the system.

Justification for choosing Microsoft SQL Server 2008 database

MySql is the world's most widely used open source relational database management system (RDBMS) that runs as a server providing multi-user access to a number of databases. The developer is using this database because:

1. **Large Database & Space Management Control**: MySql supports the largest database of hundreds of Giga Bytes in size. To make efficient use of expensive devices, it allows full control of space usage.
2. **Many Concurrent Database Performances:** It supports large no of concurrent users executing a variety of database applications operation on the same data. It minimizes data connection & guarantees data concurrency.
3. **High Transaction Processing Performance:** MySql maintains the processing features with a high degree of overall system performance. Database users don’t suffer from slow processing performance.
4. **High Availability:** MySql works 24 hours a day with no downtime or limited database throughput. Normal system operation such as database backup & partial system failure doesn’t interrupt database use.

## 4.3 Academic Research

In early research it was clear that web based would be needed so for developing web based application, **Java** would be needed for it.

**Justification for choosing Java as the development platform:**

1. Good experience in C++, and Java just uses the concepts of C++.
2. Eclipse and Netbeans are rapid application development tool which enables faster application development with better features.
3. Java code executes faster than other langauges code hence speed up the application’s performance.
4. Java handles unsigned data types too.
5. Java compilers exist for just about every platform imaginable, including Mac, Linux, Windows, Solaris, etc. And java gives bytecode which can be run on any machine.
6. Eclipse and Netbeans is a rapid application development tool which enables faster application development with better features.
7. One can create reusable, enterprise-class code using full object-oriented constructs.

**Features of Java:**

* Simple
* Object-Oriented
* Platform independent
* Secured
* Robust
* Architecture neutral
* Portable
* Dynamic
* Interpreted
* High Performance
* Multithreaded
* Distributed
* Simple

**Object-Oriented Feature:**

Object means a real word entity such as pen, chair, table etc. Object-Oriented Programming is a methodology or paradigm to design a program using classes and objects. It simplifies the software development and maintenance by providing some concepts:

* Object
* Class
* Inheritance
* Polymorphism
* Abstraction
* Encapsulation

**Object:** Any entity that has state and behavior is known as an object. For example: chair, pen, table, keyboard, bike etc. It can be physical and logical.

**Class:** Collection of objects is called class. It is a logical entity

# Chapter 5: Analysis

## 5.1 Analysis

The main objective of the analysis phase is to analyze the various researches done by the developer. This chapter includes the detailed discussion and analysis done in the previous chapters called primary and secondary research and Literature review which is conducted by the developer. A successful research will lead to a better analysis and design documentation and system development. The developer had conducted vast research that is documented and shown in Chapter 4. Final part of analysis provides summary and conclusion of secondary research. This section will be helping the developer in designing the business modeling and implementing the entire system.

Most of the analysis on the research work has already been done in Chapter 4 with the research itself and it comes under the session, conclusion, in each research work. Some extra analysis details that have not been mentioned in previous chapter are provided here.

### 5.1.1 Primary Research Analysis - Questionnaire

Many of the people are still not satisfied with the current e-commerce systems like amazon and flipkart. In questionnaire, general questions were asked and the researcher found that the proposed system will be able to beat other systems which are available in market. The users will be able to search their products easily by using image-to-product search and voice-to-product search. This system will also be helpful for admins, they will be able to see graph based on positive or negative comments. This system also includes item-based and user-based recommendation system which is very helpful to find related products.

### 5.1.2 Primary Research Analysis - Interviews

In interview questions, basically technical short questions are asked. The researcher will be able to see whether the users know about given functionalities. In interview direct questions are being asked and users give clear and concise answers, by using which researchers will be able to observer whether the functionalities which are being used are going to boom in market or not.

## Analysis of Questionnaire Questions

|  |
| --- |
| **1. How old are you?**  Below 18  18-24 years  25-30 years  above 30 years |
|  |
|  |
| ***Analysis:*** *By the graph given above, it’s* very clear that 60% people are of 18-24, 20-20% are of 25-30 and above 30 years old. |

|  |
| --- |
| * 1. **What's your gender?**   Male  Female |
|  |
|  |
| ***Analysis:*** *By the graph given above, it’s* very clear that 100% of people were male. |

|  |
| --- |
| * 1. **living area?**   Rural  Urban |
|  |
|  |
| ***Analysis:*** *By the graph given above, it’s* very clear that 75% were from urban whereas 25% were from rural area. |

|  |
| --- |
| * 1. **Your occupation?**   Student  Employee  Self- Employee  Housewife  Others |
|  |
|  |
| ***Analysis:*** *By the graph given above, it’s* very clear that 40% were employee and 60% student. |

|  |
| --- |
| * 1. **level of qualification?**   UNDER MATRICULATION  INTERMEDIATE  UNDER GRADUATE  GRADUATE  POST GRADUATE |
|  |
|  |
| ***Analysis:*** *By the graph given above, it’s* very clear that 40% were graduate, 40% under graduate and 20% intermediate. |

|  |
| --- |
| * 1. **Do you use online shopping portal?**   Yes  No |
|  |
|  |
| ***Analysis:*** *By the graph given above, it’s* very clear that 100% people use online shopping portal. |

|  |
| --- |
| * 1. **What kind of application do you use?**   Web-application  Android  Both |
|  |
|  |
| ***Analysis:*** *By the graph given above, it’s* very clear that 60% people use both web and android app, 20% use web and other 20% use android. |

|  |
| --- |
| * 1. **Are you aware about image-to-product search?**   Yes  No |
|  |
|  |
| ***Analysis:*** *By the graph given above, it’s* very clear that 60% people are aware about image-to-product search and 40% are not. |

|  |
| --- |
| * 1. **Are you aware about voice-to-product search?**   Yes  No |
|  |
|  |
| ***Analysis:*** *By the graph given above, it’s* very clear that 80% people are aware about voice-to-product search and 20% are not. |

|  |
| --- |
| * 1. **Do you want to have an option "image-to-product" search in website (web-application) ?**   Yes  No |
|  |
|  |
| ***Analysis:*** *By the graph given above, it’s* very clear that 100% people want image-to-product search. |

|  |
| --- |
| * 1. **Do you want to have an option "voice-to-product" search in website (web-application) ?**   Yes  No |
|  |
|  |
| ***Analysis:*** *By the graph given above, it’s* very clear that 100% people want voice-to-product search. |

|  |
| --- |
| * 1. **Do you think that "voice-to-product" search option will help users to find their choice of products easily?**   Yes  No |
|  |
|  |
| ***Analysis:*** *By the graph given above, it’s* very clear that 80% people agree that voice-to-product search will be successful. |

|  |
| --- |
| * 1. **How much rating would you like to give both features "voice-to-product" and "image-to-product" search?**   Most-Disagree     Most-Agree |
|  |
|  |
| ***Analysis:*** *By the graph given above, it’s* very clear that 60% people give it 3 rating and 40% gave 2 rating. |

|  |
| --- |
| * 1. **Do you think that this product will be able to beat other products like flipkart and amazon?**   Yes  No  Maybe |
|  |
|  |
| ***Analysis:*** *By the graph given above, it’s* very clear that 60% people agree that it may beat other products, 20% disagree and 20% are not confirm. |

|  |
| --- |
| * 1. **Will this product be able to stand in market and make huge business?**   Yes  No  Maybe |
|  |
|  |
| ***Analysis:*** *By the graph given above, it’s* very clear that 60% people agree that it will make huge business. |

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