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# **Software Requirements Specification**

**for**

## **FreeCom**

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# Table of Contents

<b>Table of Contents .....</b>	<b>iii</b>
<b>1. Introduction.....</b>	<b>1</b>
1.1 Purpose.....	1
1.2 Document Conventions.....	1
1.3 Intended Audience and Reading Suggestions .....	2
1.4 Product Scope .....	2
1.5 References.....	2
<b>2. Overall Description .....</b>	<b>4</b>
2.1 Product Perspective.....	4
2.2 Product Functions .....	5
2.3 User Classes and Characteristics .....	5
2.4 Operating Environment.....	5
2.5 Design and Implementation Constraints .....	6
2.6 User Documentation .....	6
2.7 Assumptions and Dependencies .....	6
<b>3. External Interface Requirements .....</b>	<b>7</b>
3.1 User Interfaces .....	7
3.2 Hardware Interfaces .....	10
3.3 Software Interfaces .....	10
3.4 Communications Interfaces .....	10
<b>4. System Features .....</b>	<b>11</b>
4.1 System Feature 1 .....	11
4.2 System Feature 2.....	11
4.3 System Feature 3 .....	11
4.4 System Feature 4.....	12
4.2 System Feature 5.....	12
4.2 System Feature 6.....	12
<b>5. Other Nonfunctional Requirements.....</b>	<b>13</b>
5.1 Performance Requirements .....	13
5.2 Safety Requirements .....	13
5.3 Security Requirements .....	13
5.4 Software Quality Attributes .....	13
5.5 Business Rules .....	14
<b>6. Other Requirements .....</b>	<b>15</b>
<b>Appendix A: Glossary.....</b>	<b>15</b>
<b>Appendix B: Analysis Models.....</b>	<b>15</b>
<b>Appendix C: To Be Determined List.....</b>	<b>21</b>

# **1. Introduction**

## **1.1 Purpose**

“FreeCom” acts as a platform or medium between the consumers and the sellers. It allows consumers to see the lists of prices in a tabular format from Flipkart and Snapdeal, it helps consumers to make an informed decision about which to choose to save money.

The main purpose of a comparison website for products is for online purchasers to evaluate features and prices before the users commit to buying.

QR Codes help you gauge the impact of print media marketing efforts by letting you track their scanning activity. For example, how many people have scanned it, when did they scan it, and where did they scan it?

The purpose of QR code-based Authentication is to help users/customers check whether they have bought an authenticated product or not.

The purpose of product analysis is to provide manufacturers with the deliverables necessary to understand and perfect the product. The analysis ensures that the product is market ready, reaches the intended target market, and achieves the desired results.

## **1.2 Document Conventions**

- Entire document should be justified.
- Convention for main title:
  - Font Face: Times New Roman.
  - Font Style: Bold.
  - Font Size: 18.
- Convention for sub title:
  - Font Face: Times New Roman.
  - Font Style: Bold.
  - Font Size: 14.
- Convention for body:

- Font Face: Times New Roman.
- Font Style: Normal.
- Font Size: 12.

### **1.3 Intended Audience and Reading Suggestions**

- Customers.
- Users.
- Developers.
- Company.

### **1.4 Product Scope**

The scope of the study for this "FreeCom" project will be all internet users and it is narrowed down to those who are using the internet for business-related purposes, especially in India. Statista.com has provided a statistic for Indian online shopping based on the number of internet buyers. In 2020, there were approximately 150 million online shoppers annually, compared to about 135 million online shoppers in 2019 in India. This increase can be attributed to the growth of the e-commerce industry in India and to the coronavirus (COVID-19) pandemic, which led to a change in the shopping behavior of consumers. In 2021, the number of online shoppers is expected to increase further.

With the internet, a price comparison website is accessible anytime and anywhere. The observation made by the author has resulted that people usually going online when they are on the way back from work, especially those who are using public transport. Therefore, visiting "FreeCom" can be one of their choices to fill up their free time. They also can share the link of the promotion through the social website such as Facebook and Twitter which has the most Indian internet users according to the research made by gs.statcounter.com (<https://gs.statcounter.com/social-media-stats/all/india>).

Meanwhile, for the sellers/retailers, the target will be focusing more on the business that operating at the shop lot. Based on the interview done by the author with some of the owners of the shops, they admit that it will be useful for them if there is a service for them to advertise their products on the web for free because they don't have much time and insufficient skills to maintain website/blog on their own.

### **1.5 References**

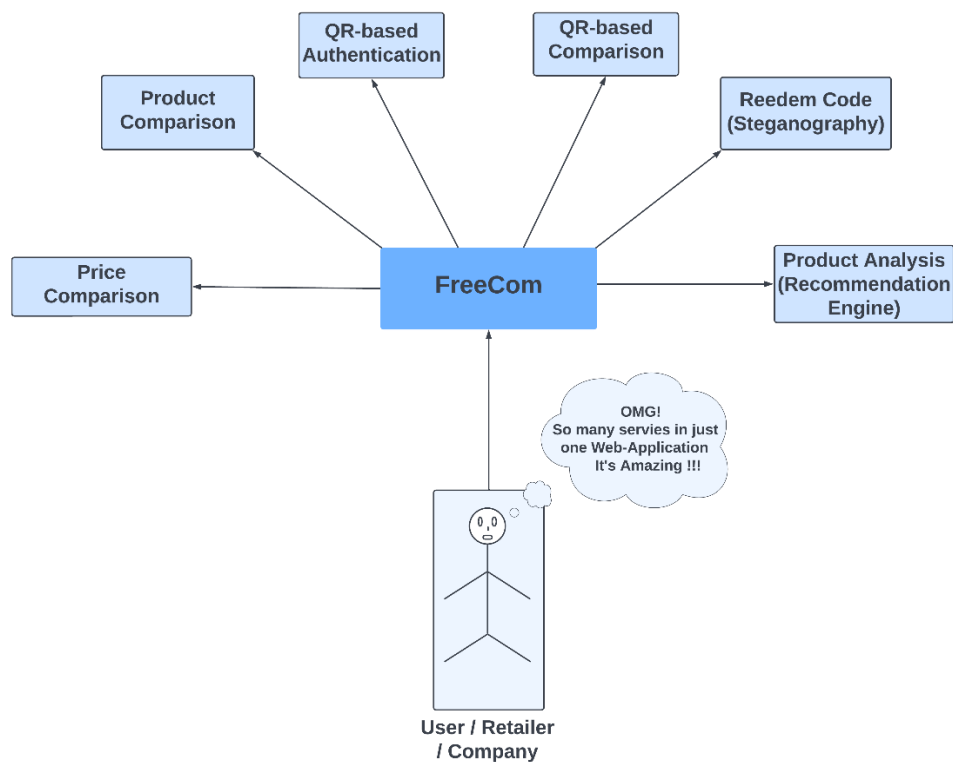
- "Number of annual shoppers, India 2018-2020" [India: number of annual online shoppers 2021 | Statista](#)

- “Most of the Indian internet users” <https://gs.statcounter.com/social-media-stats/all/india>
- <https://www.studocu.com/in/document/vishwakarma-university/electronics-and-communication/srs-template-ieee/26330591>

## 2. Overall Description

### 2.1 Product Perspective

“FreeCom” acts as a tool to assist consumers in making informed decisions before purchasing a product by providing a list of prices offered by different retailers/supermarkets. Users will use this website as their reference to check on the price of electronic products sold and see if there is any promotion going on. It is also able to help sellers promote new products by sending emails to the subscribers about them. Users will use this website to check out the difference between the electronic devices that seem to have almost the same price but may have different specifications.



**Figure Number - 1**

It is designed to compare the prices and specifications of electronic goods from a range of providers, which will help consumers make decisions to choose products that will save them money online. It will also provide a mechanism to verify the authenticity of the product through the use of a QR code reader. It will also provide a QR code comparison mechanism that will help the consumer when comparing items in retail stores. For marketing purposes, companies often use creative art, images, or logos that have hidden discounts or offers that will be sent to the consumer's email address when they purchase goods from their site. This technique can be implemented using Steganography. There is one product analysis part.

## **2.2 Product Functions**

1. Price Comparison: A customer will enter the product name and our site will compare the prices of the same product from different e-commerce sites and show the cheapest products as a result in a tabular format.
2. Product Comparison: A customer will enter the product name and our site will compare any two electronic devices on the basis of their specifications and show that comparison to the customer.
3. QR-based authentication: The customer will scan the QR code with the help of our site, which will check the authenticity of the product.
4. QR-based comparison: A customer will scan a QR code on any two electronic devices, and our site will compare those products based on their specifications.
5. Redeem the Code (Steganography): The customer will upload the encrypted image with the discount/offer code hidden in it, and our site will decrypt the image to redeem the code (if any) and show it to the user.
6. Product Analysis (Recommendation Engine): Customers will be able to see various ranked products on the basis of their popularity using a weighted rating formula (used by IMDB).

## **2.3 User Classes and Characteristics**

Types of Users: -

1. Normal User.
2. Retailer.
3. Company.

They will all need only a system with internet connection and webcam to use our service

## **2.4 Operating Environment**

The product will be operating in any environment i.e., Windows, Linux and Mac. “FreeCom” is a web application and shall operate in all famous browsers, i.e., Microsoft Internet Explorer, Google Chrome and Mozilla Firefox. The only requirement to use this online product would be the internet connection.

The hardware configuration includes Hard Disk: 100GB, Monitor: 15-inch Color monitor, Keyboard: 122 keys. The basic input devices required are keyboard, mouse and output devices are monitor etc.

## **2.5 Design and Implementation Constraints**

“FreeCom” will be available as a webapplication. It will be hosted online. It is designed to compare the prices and specifications of electronic goods from a range of providers, which will help consumers make decisions to choose products that will save them money online. It will also provide a mechanism to verify the authenticity of the product through the use of a QR code reader. It will also provide a QR code comparison mechanism that will help the consumer when comparing items in retail stores. For marketing purposes, companies often use creative art, images, or logos that have hidden discounts or offers that will be sent to the consumer’s email address when they purchase goods from their site. This technique can be implemented using Steganography. There is one product analysis part which will help consumers get to know about the top trending products according to the Amazon dataset.

## **2.6 User Documentation**

The product will include user manual. The user manual will include product overview, complete configuration of the used software (such as Flask), technical details and contact information which will include email address. There will be no online help for the product at this moment. The product will be compatible with any updated browser.

## **2.7 Assumptions and Dependencies**

The assumptions are:

- 1.) The coding should be error free.
- 2.) The system should be user friendly so that it is easy to use for the users.
- 3.) The system should provide search facility and support quick transactions.
- 4.) The FreeCom is running twenty-four hours a day.
- 5.) Users may access from any computer that has internet browsing capabilities and an internet connection.

The dependencies are:

- 1.) The specific hardware and software due to which the product will be run.
- 2.) On the basis of listing requirements and specification the project will be develop and run.
- 3.) The end users (admin) should have proper understanding to the product.
- 4.) The system has a dependency on a website to scrap data with the help of bots.

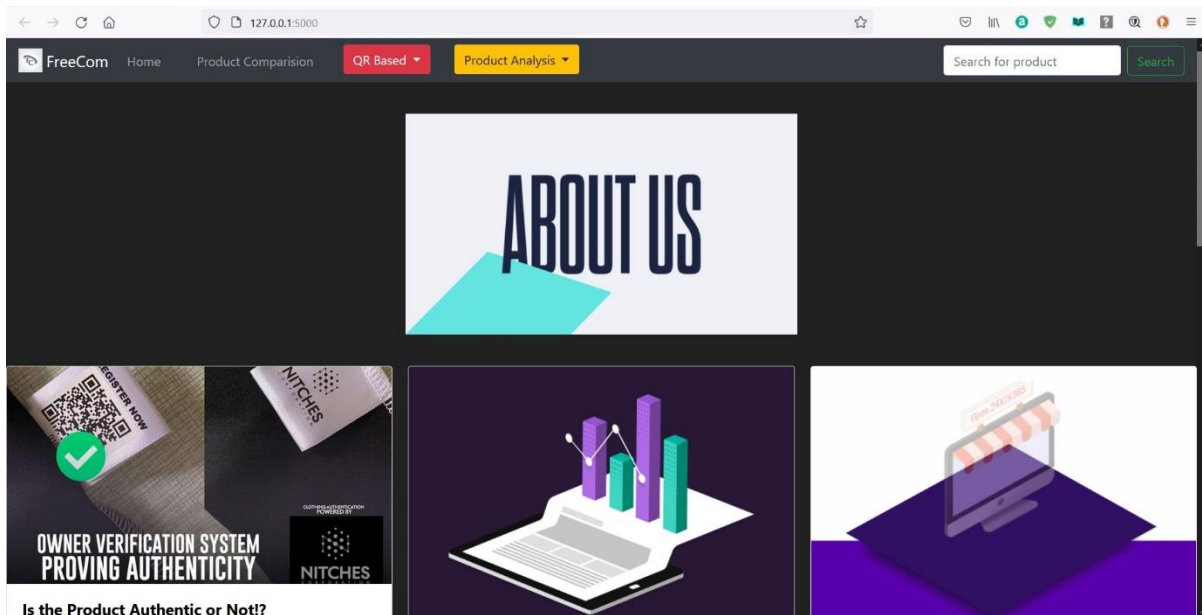


## 3. External Interface Requirements

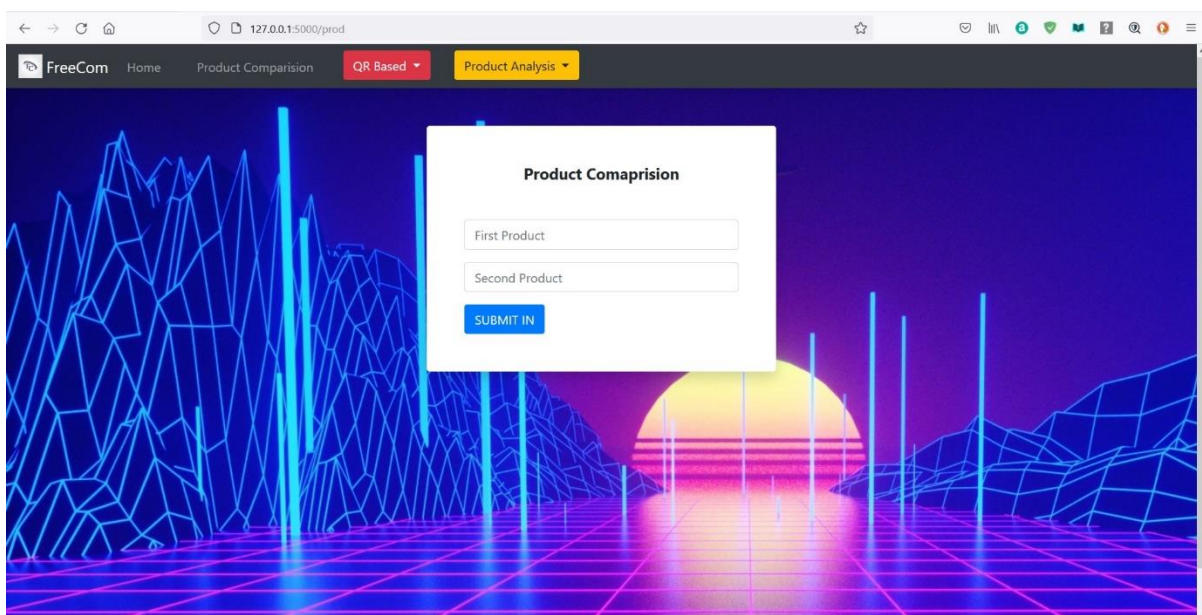
### 3.1 User Interfaces

Screenshots of UI of various modules available in the system:

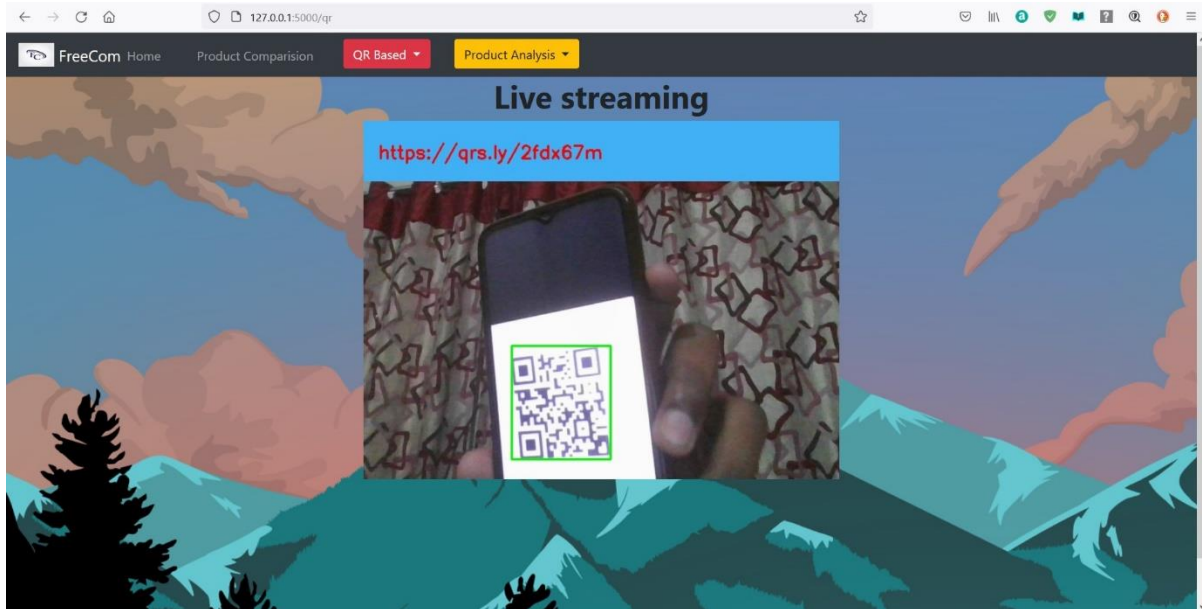
#### 1. Price Comparison and Home Page



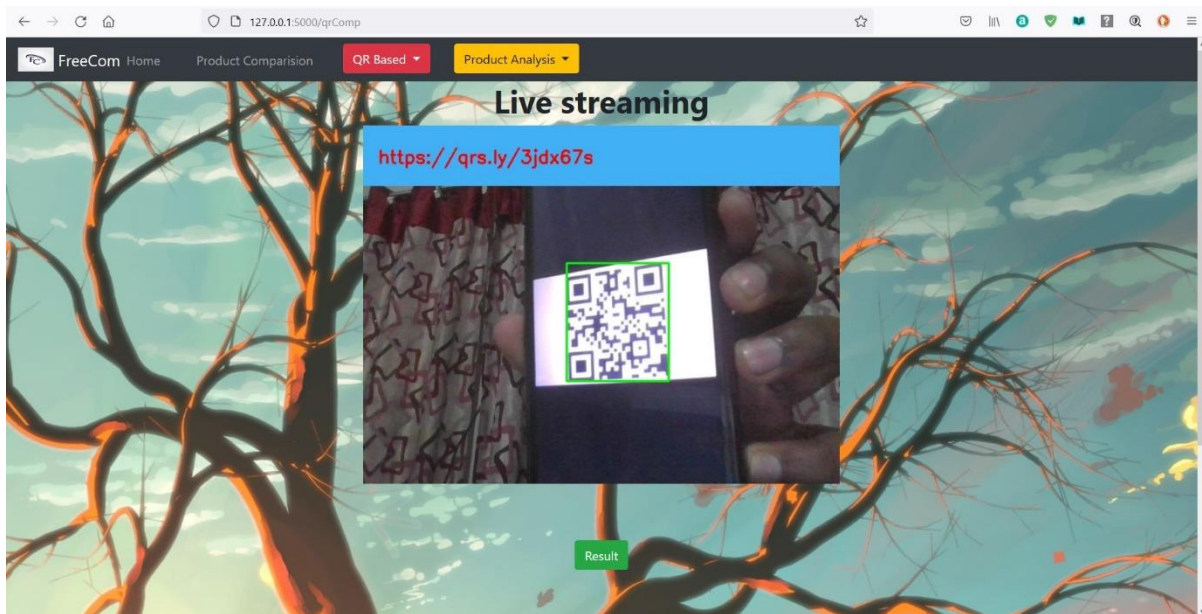
#### 2. Product Comparison



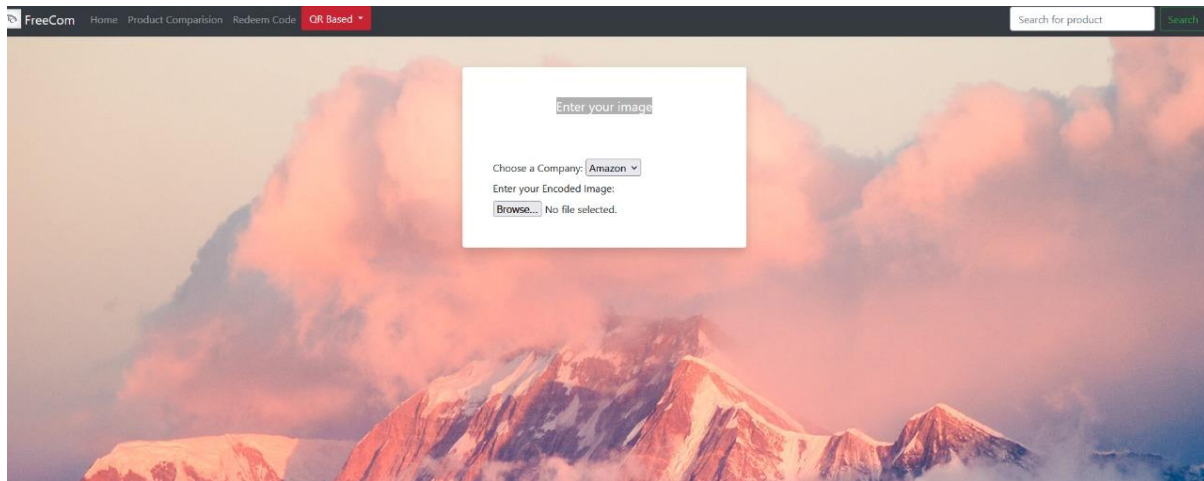
### 3. QR Based Authentication



### 4. QR Based Comparison



## 5. Redeem Code (Steganography)



## 6. Product Analysis (Recommendation Engine)

← → ↻ 🏠 127.0.0.1:5000/Reco ☆ 🛒 📶 📶 📶 🔍 ⚙️

FreeCom Home Product Comparison QR Based Product Analysis

### Popularity Based Recommendation Engine:

Top	Image	Product Info	Score	Link To Site
# 1		Mediabridge ULTRA Series HDMI Cable (6 Feet) - High-Speed Supports Ethernet, 3D and Audio Return [Newest Standard]	4.586157803527432	<a href="#">Link to Buy</a>
# 2		Garmin Portable Friction Mount	4.538879887998	<a href="#">Link to Buy</a>
# 3		BlueRigger High Speed HDMI Cable with Ethernet - Supports 3D, 4K 60Hz, Audio Return - Latest Version (6.6 Feet / 2 Meters)	4.433980715140866	<a href="#">Link to Buy</a>
# 4		eneloop SEC-CSPACER4PK C Size Spacers for use with AA Battery Cells	4.382755214177979	<a href="#">Link to Buy</a>
# 5		SanDisk Extreme 4GB UHS-I SDHC Memory Card (SDSDX-004G-X46)	4.3697763827047975	<a href="#">Link to Buy</a>

## 3.2 Hardware Interfaces

OS: Windows 7 & above.

Processor: Intel(R) Dual Core or higher.

RAM: 2.00 GB or greater.

Disk space: At least 100 GB.

## 3.3 Software Interfaces

1. Jupiter Notebook and VS Code for IDE.
2. Flask framework for creating web applications.
3. HTML, CSS, JavaScript, and Bootstrap V4 for web designing.
4. Anaconda for Python + useful packages.

## 3.4 Communications Interfaces

Since we are using Flask Framework, the communication between each respective module were handled by **Request** and **Response** libraries with Synchronous calls.

These Libraries also helps in getting input values form the user/client and sending response back to it from System/server.

We used Third part API for scraping Amazon, since it's not possible to manually configure a self-developed scraping bot every time amazon updates its privacy policies.

We use self-developed bot to scrape various other ecommerce websites like Flipkart, Snapdeal etc. using Scrappy, Selenium and bs4 libraries. For connecting to internet, we used libraries like **Web browser** and **Requests**.

## **4. System Features**

### **4.1 System Feature 1**

- Price Comparison:

Customer will enter the product name and our site will compare price of the same product from different e-commerce sites and show the cheapest products as the result in a tabular format.

- The system must allow user to enter the product name.
- The system must show the result to user in tabular format.
- The system must show respective link to buy the product for each item in the table.

### **4.2 System Feature 2**

- Product Comparison:

Customer will enter the product name and our site will compare any two electronic devices on the basis of their specifications and show that comparison to the customer.

- The system must allow user to enter the first product name.
- The system must allow user to enter the second product name.
- The system must show the comparison result to user in tabular format.

### **4.3 System Feature 3**

- QR based authentication:

Customer will scan the QR code by the help of our site, which will redirect the Customer to the companies/brands authenticity mechanism for the product validity.

- The system must scan the QR code provided by the user.
- The system must decode the QR code.
- The system must open the link contained in code in a new tab for user to access.

## **4.4 System Feature 4**

- QR based comparison:

Customer will scan QR code any two electronic devices and our site will compare those products based on their specifications.

- The system must scan two QR code provided by the user for the comparison.
- The system must show the comparison result to user in tabular format.

## **4.5 System Feature 5**

- Redeem Code (Steganography)

Customer will upload the encrypted image with the discount/offer code hidden in it and our site will decrypt the image to redeem the code and show it to the user.

- The system must allow user to upload the image.
- The system must decrypt the image and show the hidden code (if any) to the user.
- The system must be able to check authenticity of the code hidden in the image.

## **4.6 System Feature 6**

- Product Analysis (Recommendation Engine):

Customer will be able to see various ranked various products on the basis of their popularity using weighted rating formula (used by Imdb).

- The system must accept the dataset provided to it by the admin.
- The system must prevent any redundancy regarding the dataset.
- The system must show the ranked trending products with their image, information, score and link to buy.

## **5. Other Nonfunctional Requirements**

### **5.1 Performance Requirements**

- The application should load and be usable within 3 seconds.
- The application should update the interface on interaction within 2 seconds.
- The database should be normalized to prevent redundant data and improve performance.
- The database should be distributed to prevent outages.

### **5.2 Safety Requirements**

- Databases should use sharding to be redundant to prevent loss of data.
- Backups of the databases should be done hourly and be kept for one week.

### **5.3 Security Requirements**

- Any keys used for the API should be stored securely.
- Only the API should be able to connect to the databases.
- Databases should be behind a firewall.

### **5.4 Software Quality Attributes**

- Availability: Because this application is critical to business communication, we will have a goal of four nines (99.99%) availability.
- Correctness: The application should never allow anyone to read messages or discussions not intended for that person.
- Maintainability: The application should use continuous integration so that features and bug fixes can be deployed quickly without downtime.
- Usability: The interface should be easy to learn without a tutorial and allow users to accomplish their goals without errors.

## **5.5 Business Rules**

It is a rule that defines or constrains some aspect of business and always resolves to either true or false. Business rules are intended to assert business structure or to control or influence the behavior of the business rules describe the operations, definitions and constraints that apply to an organization. Business rules can apply to people, processes, corporate behavior and computing systems in an organization, and are put in place to help the organization achieve its goals.

Non-business software also has business logic. For example, a rule that states that "when a user does xyz, the application should validate something" can be classified as a business rule.

Module wise our Business Rules are:

- Price Comparison: A customer will enter the product name and our site will compare the prices of the same product from different e-commerce sites and show the cheapest products as a result in a tabular format.
- Product Comparison: A customer will enter the product name and our site will compare any two electronic devices on the basis of their specifications and show that comparison to the customer.
- QR-based authentication: The customer will scan the QR code with the help of our site, which will check the authenticity of the product.
- QR-based comparison: A customer will scan a QR code on any two electronic devices, and our site will compare those products based on their specifications.
- Redeem the Code (Steganography): The customer will upload the encrypted image with the discount/offer code hidden in it, and our site will decrypt the image to redeem the code (if any) and show it to the user.
- Product Analysis (Recommendation Engine): Customers will be able to see various ranked products on the basis of their popularity using a weighted rating formula (used by IMDB).



## **6. Other Requirements**

Some other miscellaneous (Legal and Technical) requirements for our system can be:

- Permission from various e-commerce websites to scrape their data.
- Dedicated API for scraping data from the websites.
- Companies are placing QR code on their products for scanning.
- Companies make their products description available.
- Companies provide authorization to redeem code on their encode images.
- Retailers subscribing to our services for increasing their productivity and decreasing unnecessary headcount.

## **Appendix A: Glossary**

- IMDB - Internet Movie Database.
- QR - Quick Response.
- UI - User Interface.
- GUI - Graphical User Interface.
- API - Application Programming Interface.
- OS – Operating System.
- IDE – Integrated Development Environment.
- HTML – Hyper Text Markup Language.
- CSS – Cascading Style Sheets.
- V4 – Version 4.
- RAM – Random Access Memory.

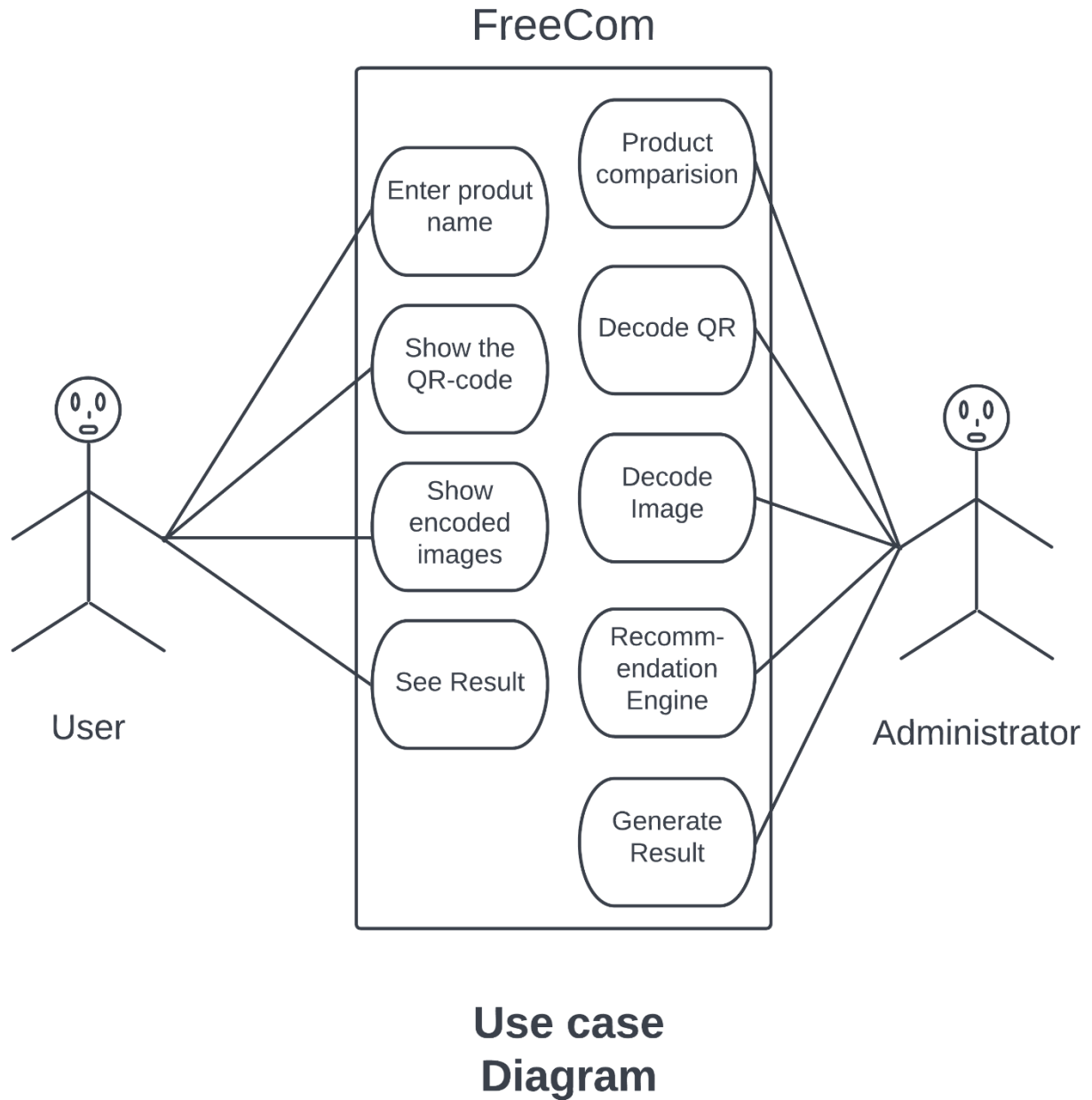
- CV – Computer Vision.
- IPO – Input Process Output.
- VS Code – Visual Studio Code.
- GB – Giga Byte.

## **Appendix B: Analysis Models**

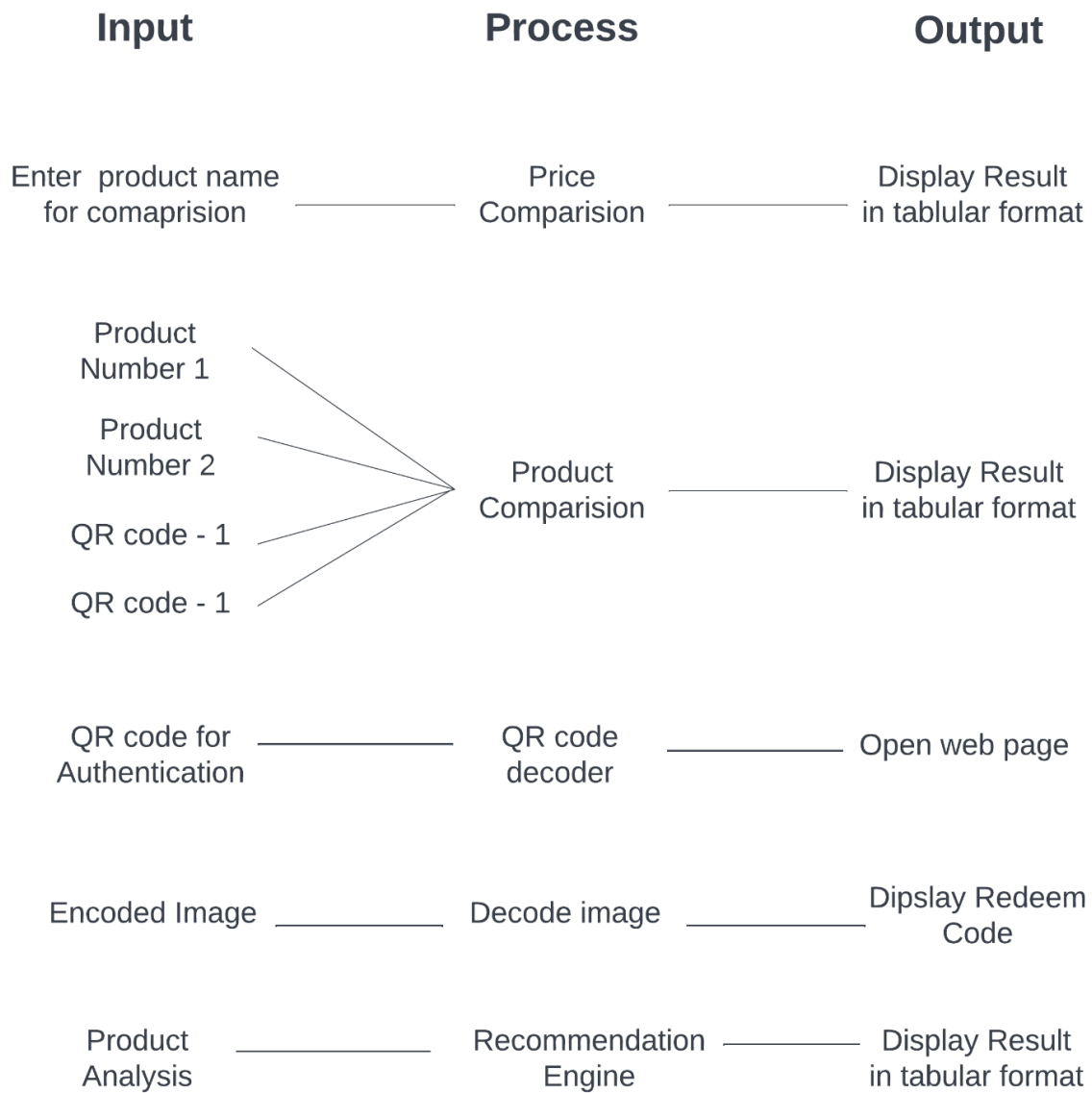
Analysis Model is a technical representation of the system. It acts as a link between system description and design model. In Analysis Modelling, information, behavior, and functions of the system are defined and translated into the architecture, component, and interface level design in the design modeling.

- It must establish a way of creating software design.
- It must describe the requirements of the customer.
- It must define a set of requirements that can be validated, once the software is built.

## 1.) Use Case Diagram

**Figure Number - 2**

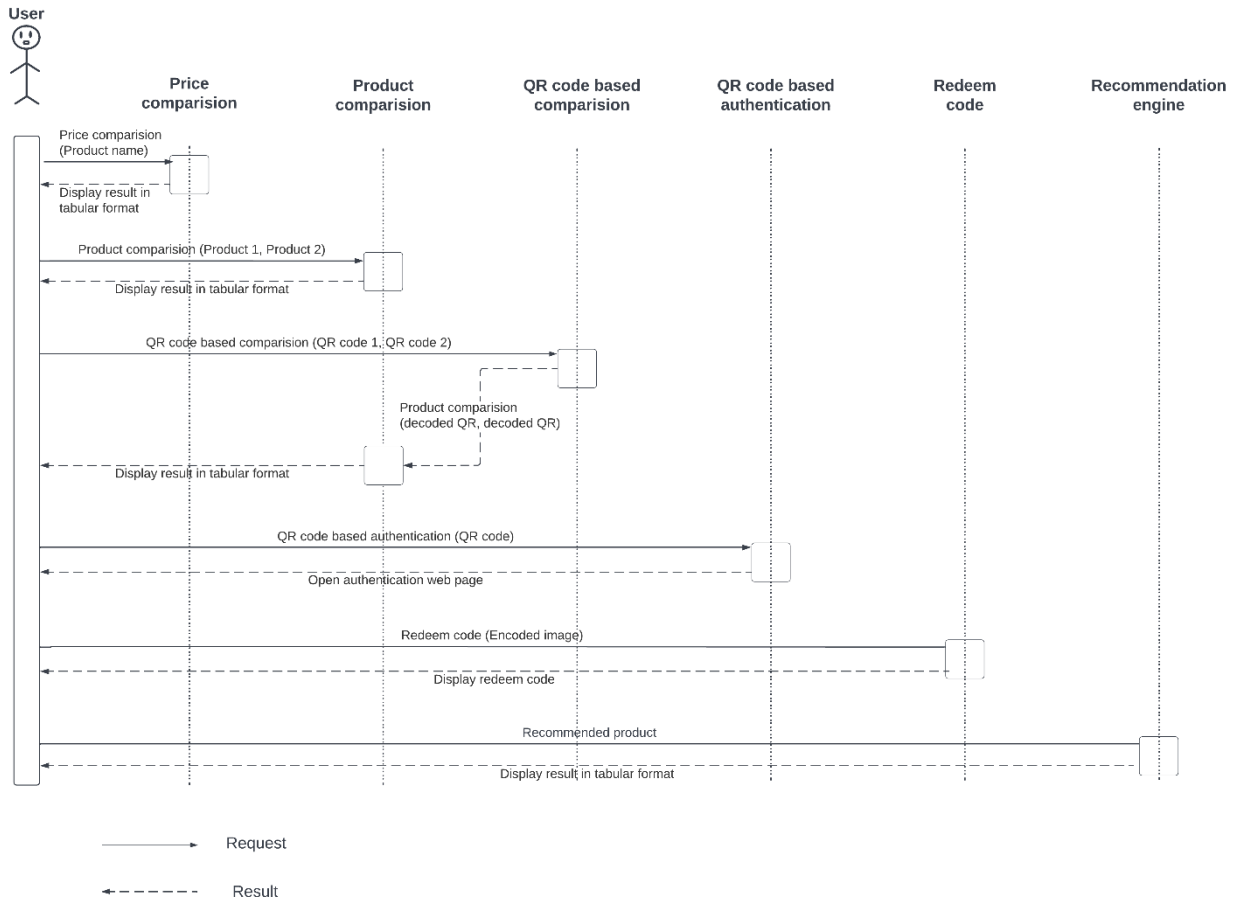
## 2.) Input Process Output (IPO) Diagram



## Input Propcess Output Diagram

Figure Number -3

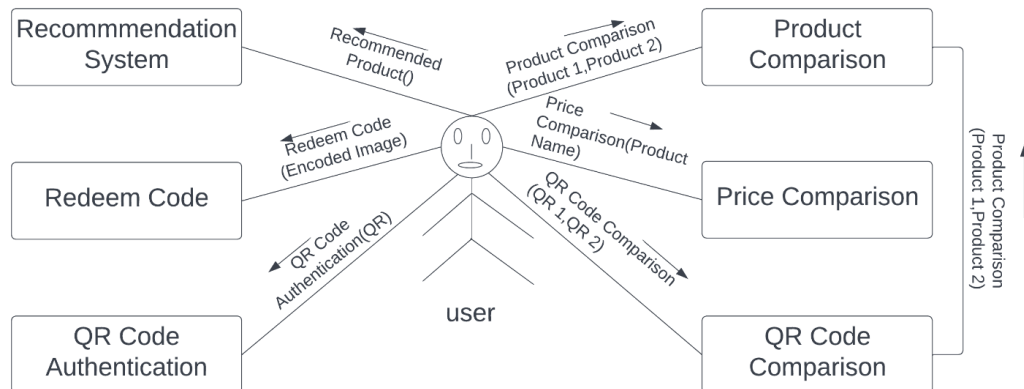
## 3.) Sequence Diagram



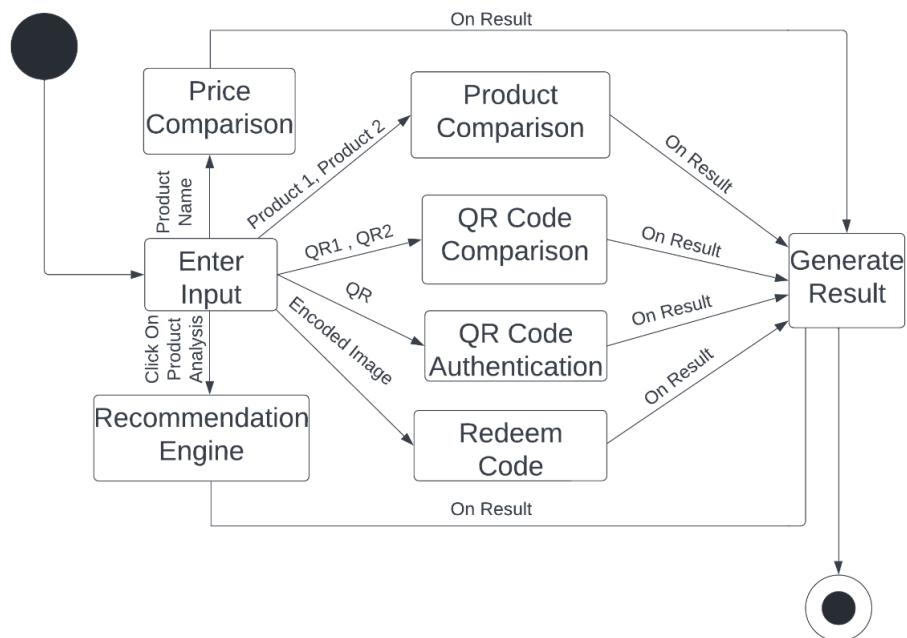
Sequence diagram

Figure Number - 4

## 4.) Collaboration Diagram

**Collaboration Diagram****Figure Number - 5**

## 5.) State Diagram

**State Diagram****Figure Number - 6**

## 6.) Activity Diagram

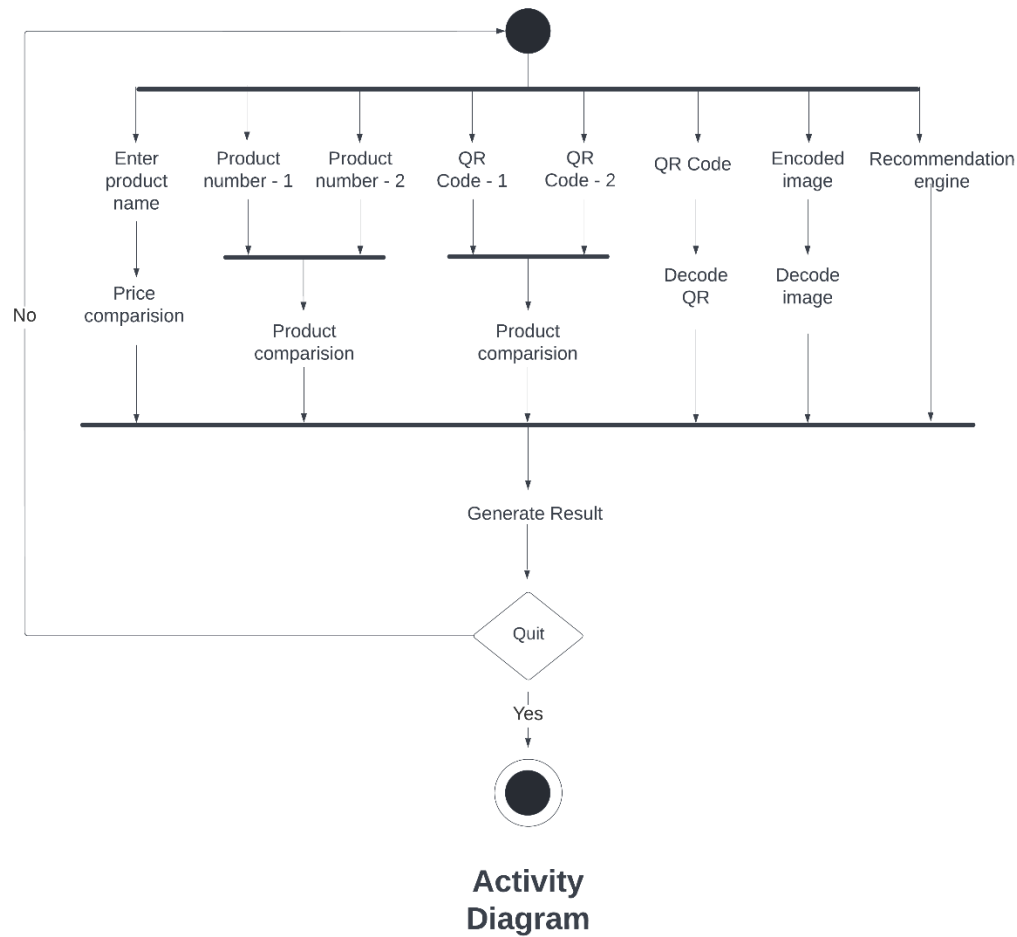


Figure Number – 7

**Appendix C: To Be Determined List**

- [https://www.researchgate.net/publication/335580087\\_The\\_Application\\_of\\_Artificial\\_Intelligence\\_in\\_Electronic\\_Commerce](https://www.researchgate.net/publication/335580087_The_Application_of_Artificial_Intelligence_in_Electronic_Commerce)
- <https://www.cloudways.com/blog/price-comparison-websites/>
- <https://influencermarketinghub.com/best-price-comparison-sites/>
- <https://gs.statcounter.com/social-media-stats/all/india>