SMART FASHION RECOMMENDER APPLICATION

A PROJECT REPORT

Submitted by

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for the course

HX8001-Professional Readiness for Innovation, Employability and Entrepreneurship

in

BACHELOR OF ENGINEERING

ELECTRONICS AND COMMUNICATION ENGINEERING

DMI COLLEGE OF ENGINEERING

ANNA UNIVERSITY: CHENNAI 600 025

NOVEMBER 2022

ANNA UNIVERSITY: CHENNAI 600 025

BONAFIDE CERTIFICATE

Certified that this project report **"SMART FASHION RECOMMENDER APPLICATION"** is the bonafide work of **"MADHAN D S, JEEVA M, LALITH KUMAR M, EKAMBER L, VIJAYA KUMAR R"** who carried out the project under my supervision.

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ABSTRACT

Recommendation of outfit helps the people in taking the right decision while purchasing and also increases the sales. The analysis of the accuracy of the classified dataset using various data mining techniques and algorithms is the key concept of this paper. The accuracy when the algorithms are applied on the balanced dataset, imbalanced dataset, dataset with attribute reduction and without attribute reduction is compared. To perform the attribute reduction, we are using Subset Eval, consistency Subset Eval and chi squared Attribute Eval. The algorithms that are used to classify the dataset are Random Forest, Naive Bayes, zero, Multilayer Perception, RBF Network and AdaboostM1. The main challenge is that the virtual dataset is imbalanced through which we got poor results with less accuracies. This dataset is balanced using SMOTE analysis to obtain higher accuracies and also attribute reduction is performed to compare the accuracies obtained. In comparison with the existing method, the maximum accuracy rate produced by the Poonkuzhali Sugumaran and Vinodh Kumar Sukumaran [1] was 98% using hybrid classifier ID3 and AdaBoost algorithms. In the proposed method, the dataset when balanced by SMOTE analysis and classified by Random Forest algorithm, it results in 99.86% of accuracy in recommending the outfit. Keywords: AdaboostM1, ANN, Data Mining, Multilayer perception, Naive Bayes, Random Forest, RBF Network,

Keywords: AdaboostM1, ANN, Data Mining, Multilayer perception, Naive Bayes, Random Forest, RBF Network, SMOTE, Zero.

Abbreviations: ANN, Artificial Neural Network, RBF, Radial Basis Function; SMOTE, Synthetic Minority Oversampling Technique; UCI, University of California Irvine.

TABLE OF CONTENT

1. INTRODUCTION

1.1 PROJECT OVERVIEW

Recent technological advancements have enabled consumers to track current fashion trends around the globe, which influence their choices. The fashion choices of consumers depend on many factors, such as demographics, geographic location, individual preferences, interpersonal influences, age, gender, season, and culture. Moreover, previous fashion recommendation research shows that fashion preferences vary not only from country to country but also from city to city. The combination of fashion preferences and the abovementioned factors associated with clothing choices could transmit the image features for a better understanding of consumers' preferences.

1.2 PURPOSE

There is currently no existing system that is capable of recommending clothes based on the occasion. Different occasions call for different clothing. Moreover, a lot of fashion is based on the color combinations of outfits. A person with no or little fashion sense will have a hard time to decide on clothes that leave a lasting impression. The proposed Fashion Recommendation System is intended to be used by individual users in order to store images of the clothes that they own in what is called a digital wardrobe and also to get recommendations by the system on what clothes to wear for a given occasion. The main aim of the project is to recommend the most appropriate clothes for a given occasion based on the clothes existing in the user's wardrobe to relieve the user of the burden of making decisions about what clothing to wear. Such a system should be capable of helping someone who has no fashion sense to wear clothes that leave a good impression on others. The system should be such that it is easily accessible and easy to take advantage of the various features that it provides. One of the features should be the ability to store images that the user uploads into a wardrobe. A wardrobe is a

very useful entity that the user can use to view and manage the images of clothes that they have uploaded. This feature can also be used by the recommendation algorithm to recommend the clothes. Another feature is the classification of the type and color of the clothing that is uploaded by the user. The system should be capable of handling the 4 basic clothing types: Shirt, T-Shirt, Pants and Shoes.

2. LITERATURE SURVEY

2.1. EXISTING PROBLEM

In existing system only simple web application and their rating has been implemented in existing system. An ecommerce product recommendation engine is a piece of technology that displays recommended products to shoppers throughout your store. It uses machine learning to get smarter and show increasingly relevant products to shoppers based on their interests and previous browsing behavior

In existing model is content based filtering scheme has been employed in existing model **The content-based filtering method** analyzes customer data on the likes and dislikes of each user (cookies allow tracking over multiple visits), then makes recommendations based on the browsing history of that user. The idea behind content-based filtering is that if you enjoy a certain item, you'll likely also enjoy a similar item. An example of a content- based filtering system would be if you were listening to Pandora and consistently 'liked' downtempo jazz music.

The collaborative-filtering method incorporates data from users who have purchased similar products, then combines that information to make decisions about recommendations. The advantage to this filtering method is that it is capable of making complex recommendations on items such as music or movies without having to 'understand' what the item is. This method of filtering operates under the assumption that users will prefer recommendations that are based on purchases they made in the past. Here's an example: If customer A likes a specific line of products that customer B also likes (assuming they have similar interests), then collaborate-filtering would assume that customer A would like other products that customer B purchased and vice versa.

A hybrid method combines the content-based and collaborative-based methods to incorporate group decisions but focuses the output based on the attributes of a specific visitor. An example of a hybrid filtering system would be

how Spotify curates its personalized ‘Discover Weekly’ playlists. If you’ve ever listened to a personalized Spotify playlist, it’s shocking how accurately they’re able to recommend songs based on what you like. The secret behind how they pull this off is through a complex hybrid filtering system that aggregates data on your listening habits as well as similar users’ listening habits, to create a playlist of unique songs that align with your personal taste.

2.2 REFERENCES:

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2.3 PROBLEM STATEMENT DEFINITION

The personal information collected by recommenders raises the risk of unwanted exposure of that information. Also, malicious users can bias or sabotage the recommendations that are provided to other users. In recent years, the textile and fashion industries have witnessed an enormous amount of growth in fast fashion. On e-commerce platforms, where numerous choices are available, an efficient recommendation system is required to sort, order, and efficiently convey relevant product content or information to users.

- The problem of the work is to design static web applications deployments with customer deployment
- Lack of interaction between application and user
- User need to navigate across multiple pages to choose right product
- Confusion in choosing product
- Lack of sales
- Complex User Interface.
- Lack of proper guidance.

FIG 2.3.1:PROBLEM STATEMENT DEFINITION

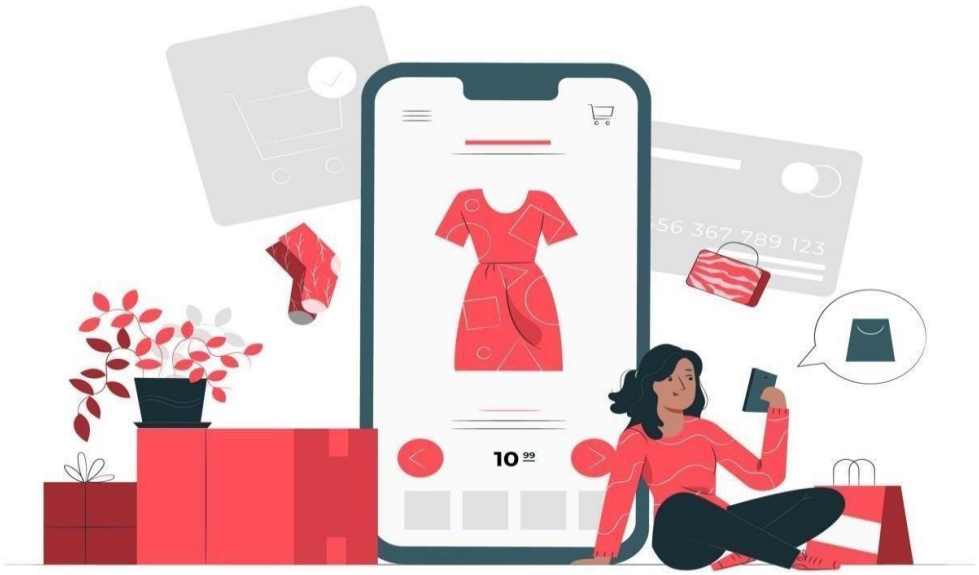


FIG 2.3.2: PROBLEM STATEMENT DEFINITION

3.IDEATION & PROPOSED SOLUTION

An innovative solution through which you can directly do your online shopping based on your choice without any search. It can be done by using the chatbot.

In this project you will be working on two modules:

1. Admin
2. User

ADMIN:

The role of the admin is to check out the database about the stock and have a track of all the things that the users are purchasing.

USER:

The user will login into the website and go through the products available on the website. Instead of navigating to several screens for booking products online, the user can directly talk to Chatbot regarding the products. Get the recommendations based on information provided by the user.

FEATURES OF CHATBOT:

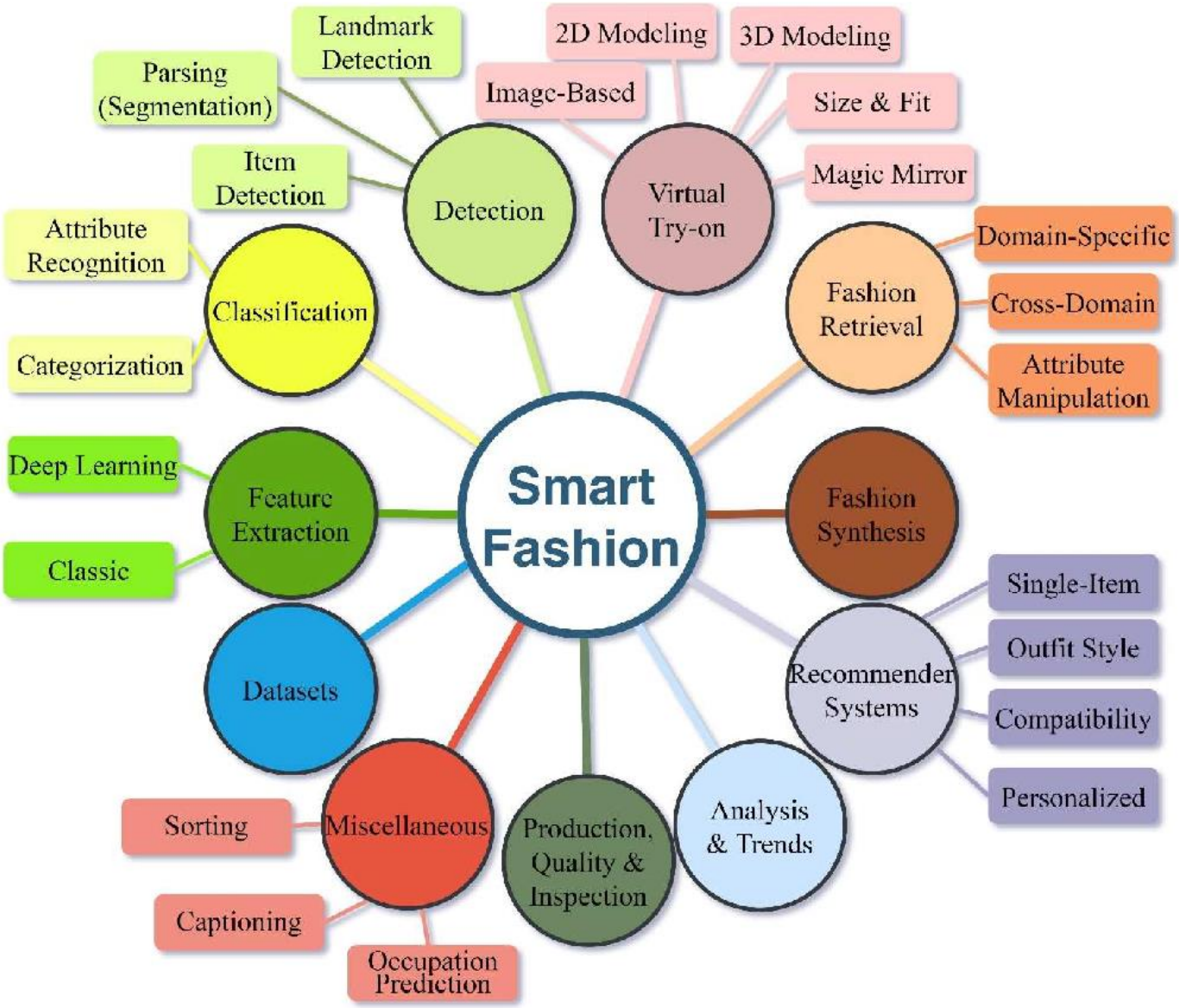
- Provide basic product information.
- Update customer/order details.
- Add/change/remove plans.
- Switch options or preferences.
- Turn things on/off (e.g. roaming, caller ID)
- Get a quote for insurance or shipping (after gathering information in a conversational way)

3.1 EMPATHY MAP CANVAS

An empathy map is a simple, easy-to-digest visual that captures knowledge about a user's behaviors and attitudes. It is a useful tool to helps teams better understand their users. Creating an effective solution requires understanding the true problem and the person who is experiencing it. The exercise of creating the map helps participants consider things from the user's perspective along with his or her goals and challenges. An empathy map is a collaborative tool teams can use to gain a deeper insight into their customers.

SMART FASHION RECOMMENDER APPLICATION

FIG3.1.1: IDEATION & PROPOSED SOLUTION

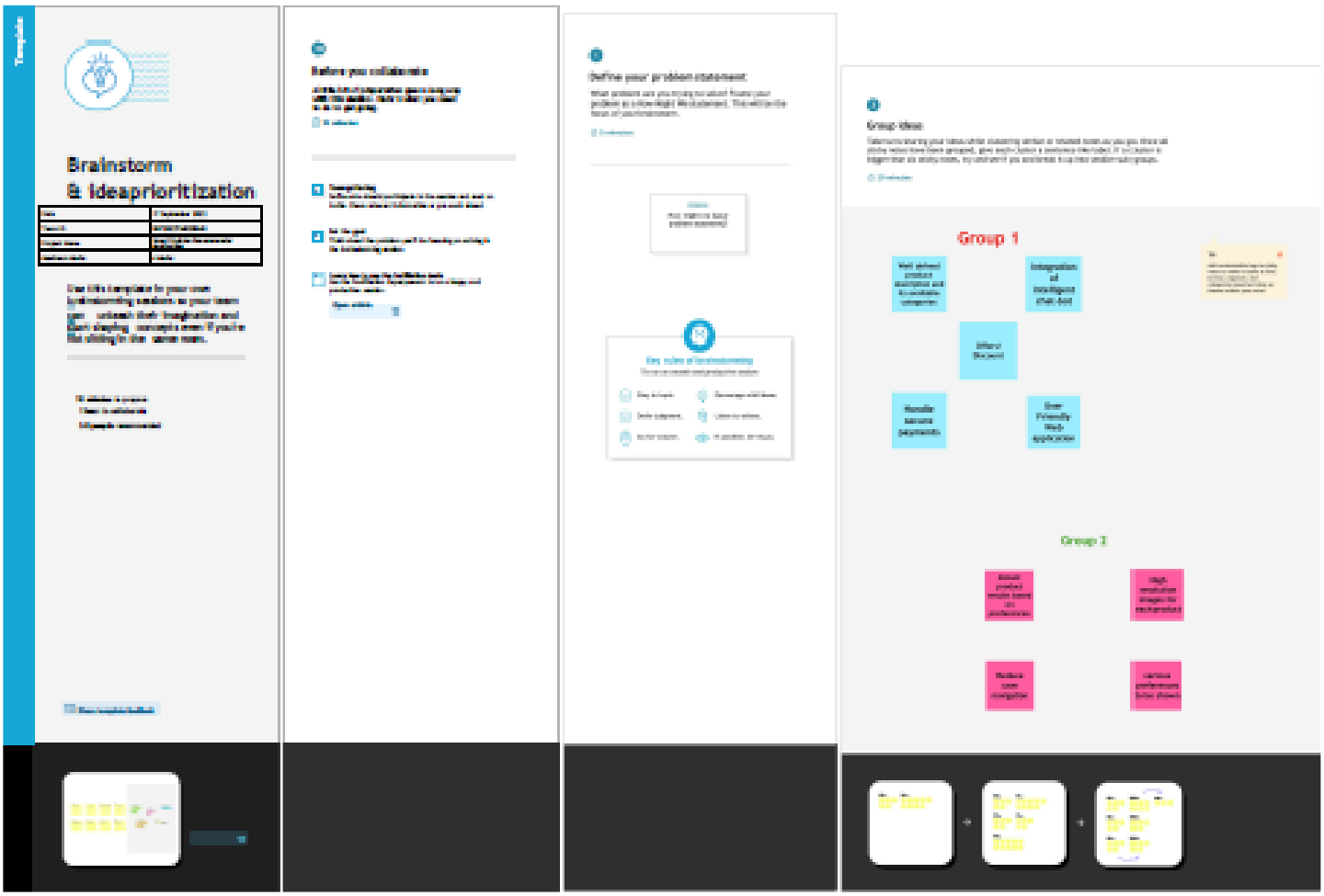


3.2. IDEATION & BRAINSTROMING

A team together solves problem with technique that involves the spontaneous contribution of ideas

The mulling over of ideas by one or more individuals in an attempt to devise or find a solution to a problem

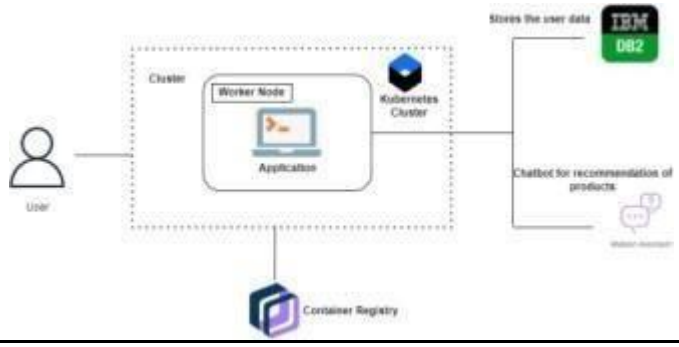
FIG 3.2.1: IDEATION & BRAINSTROMING



3.3 PROPOSED SOLUTION

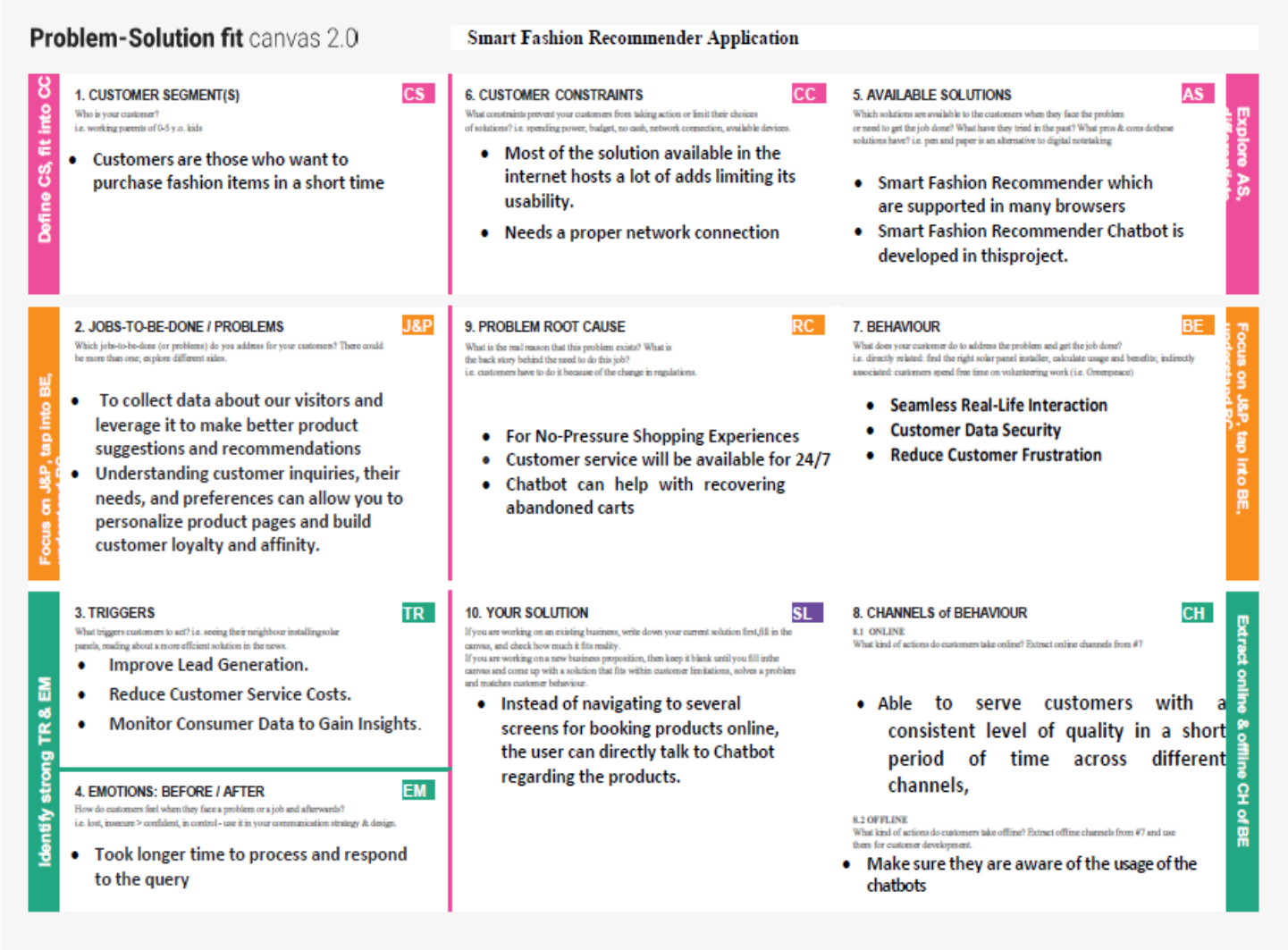
TABLE 3.3.1: PROPOSED SOLUTION

S.NO	PARAMETER	DESCRIPTION
1.	**Problem statement (problem to be solved)**	•In E-commerce websites, users need to search for products and navigate across screens to view the product and order product. •A new innovative solution came up through which can directly make online shopping based on the choice of the user without any search. •It can be done by using the chatbot which can be achieved by a smart fashion recommender application.
2.	**Idea/ solution description**	• The smart fashion recommender application leverages the use of a chatbot to interact with the users, gather information about their preferences, and recommend suitable products to the users. • User can be able to mention their preferences by interacting with chatbot. • The user must receive a notification on order confirmation/failure. • The chatbot must gather feedback from the user at the end of order confirmation
3.	**Novelty/ Uniqueness**	• Chatbot asks and learns from user preference which recommends appropriate products to the user without making them search through various filters which reduces time and thus increases sales. • Instead of searching manually a chatbot will help to find the right product effectively, with this feature user can save time and it is an easy process, chat keep sending a notification about new collections

4.	**Social impact/Customer Satisfaction**	•Feedback from the user at the end of the session or after placing an order is one of the most important factors in deriving customer satisfaction and providing better services. •The model can recommend products that are more suitable to the customer. •It can also save a lot of time •Directly do online shopping based on Customer choice without any search.
5.	**Business Model**	•Due to market dynamics and customer preferences, there is a large vocabulary of distinct fashion products, as well as high turnover. •This leads to sparse purchase data, which challenges the usage of traditional recommender systems. • Better experience and Feasibility. 
6.	**Scalability of the solution**	•The solution can be made scalable by using micro service architecture provided that each server is responsible for certain functionality of the application. •Storing user preferences along with the product in the browser cookie will enable it to provide a response instantly and allows for fetching related products. •The scalability can be increased by increasing the number of products and also the accuracy of the product suggestions

3.4. PROBLEM SOLUTION FIT

FIG 3.4.1: PROBLEM SOLUTION FIT



4.REQUIREMENT ANALYSIS

4.1 FUNCTIONAL REQUIREMENT

TABLE 4.1.1: FUNCTIONAL REQUIREMENT

Following are the functional requirements of the proposed solution.

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Registration	Registration through Form
FR-2	User Interaction	Interact through the Chat Bot
FR-3	Buying Products	Through the chat Bot Recommendation
FR-4	Track Products	Ask the Chat Bot to Track my Orders
FR-5	Return Products	Through the chat Bot
FR_6	New Collections	Recommended from chat Bot

4.2 NON-FUNCTIONAL REQUIREMENTS

TABLE 4.2.1: NON-FUNCTIONAL REQUIREMENTS

Following are the non-functional requirements of the proposed solution.

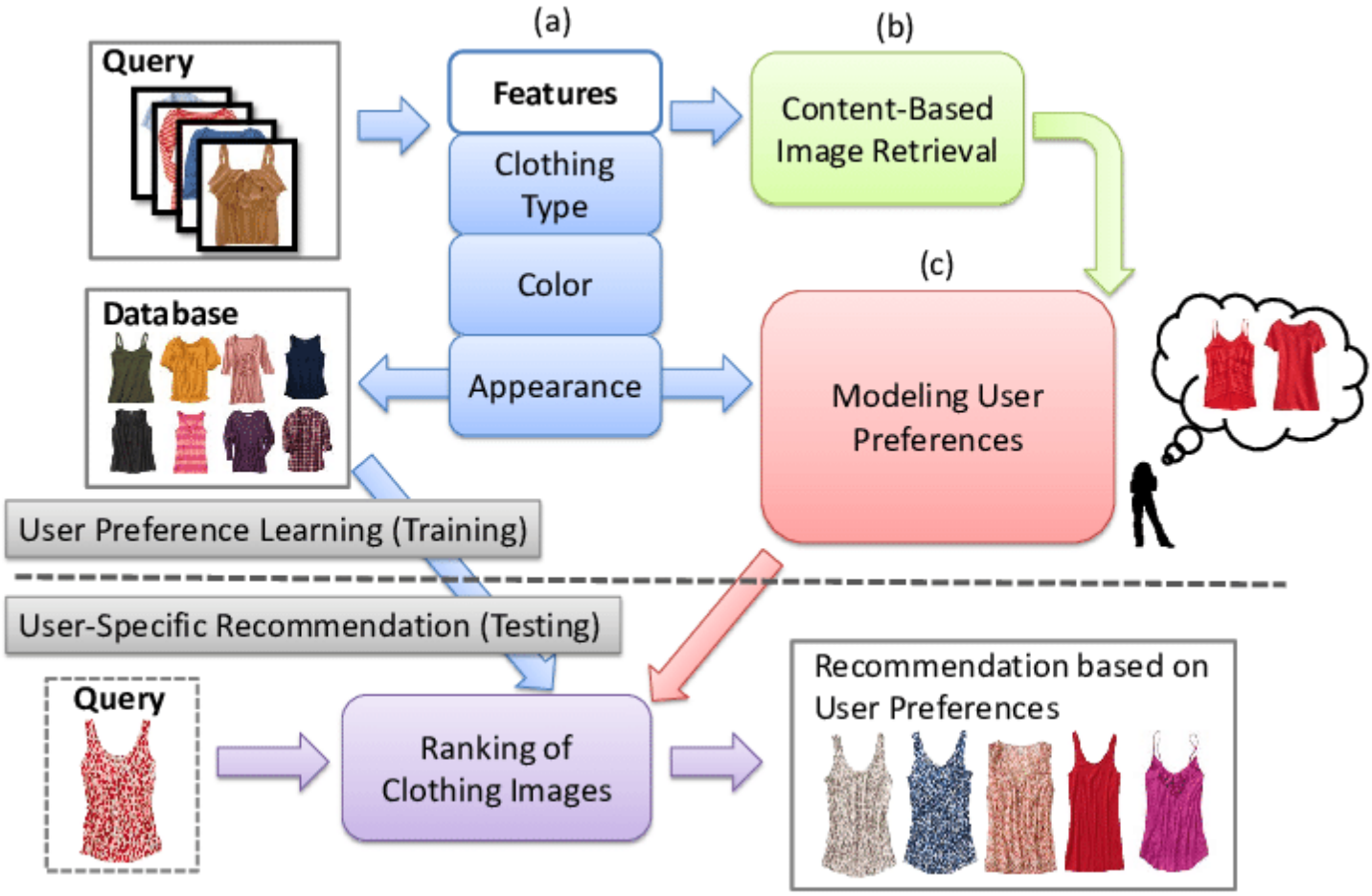
FR No.	Non-Functional Requirement	Description
NFR-1	**Usability**	Using Android or IOS or windows applications.
NFR-2	**Security**	The user data is stored securely in IBM cloud.
NFR-3	**Reliability**	The Quality of the services are trusted.
NFR-4	**Performance**	Its Provide smooth user experience.
NFR-5	**Availability**	The services are available for 24/7.
NFR-6	**Scalability**	Its easy to scalable size of users and products.

5.PROJECT DESIGN

5.1 DATA FLOW DIAGRAM

A data flow diagram shows the way information flows through a process or system. It includes **data inputs and outputs, data stores, and the various subprocesses the data moves through**. DFDs are built using standardized symbols and notation to describe various entities and their relationships.

FIG 5.1.1: DATA FLOW DIAGRAM



5.2. SOLUTION & TECHNICAL ARCHITECTURE:

We have developed a new innovative solution through which you can directly do your online shopping based on your choice without any search. It can be done by using the

chatbot. In this project you will be working on two modules:

- Admin
- User

Instead of searching for products in the search bar and navigating to individual products to find required preferences, this project leverages the use of chatbots to gather all required preferences and recommend products to the user. The solution is implemented in such a way as to improve the interactivity between customers and applications. The chatbot sends messages periodically to notify offers and preferences. For security concerns, this application uses a token to authenticate and authorize users securely. The token has encoded user id and role. Based on the encoded information, access to the resources is restricted to specific users.

FIG 5.2.1: SOLUTION & TECHNICAL ARCHITECTURE

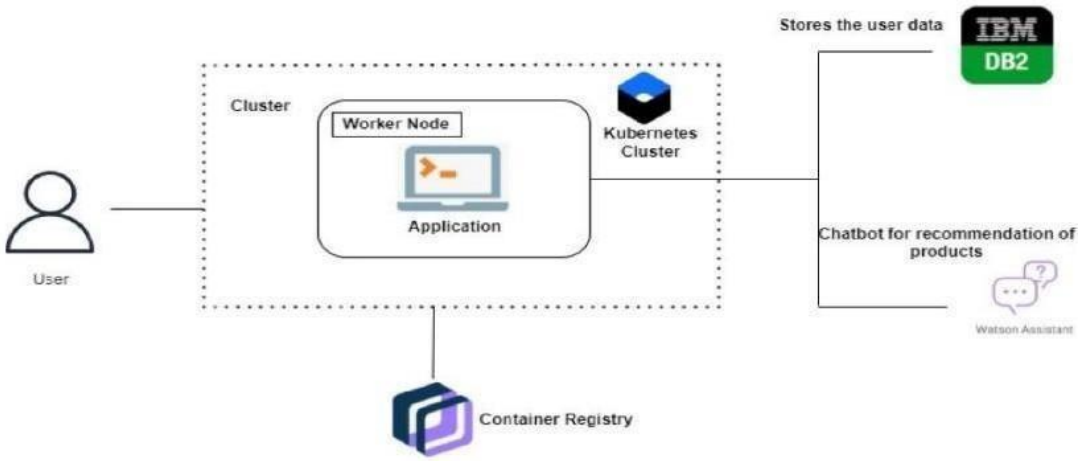


FIG 5.2.2: SOLUTION & TECHNICAL ARCHITECTURE

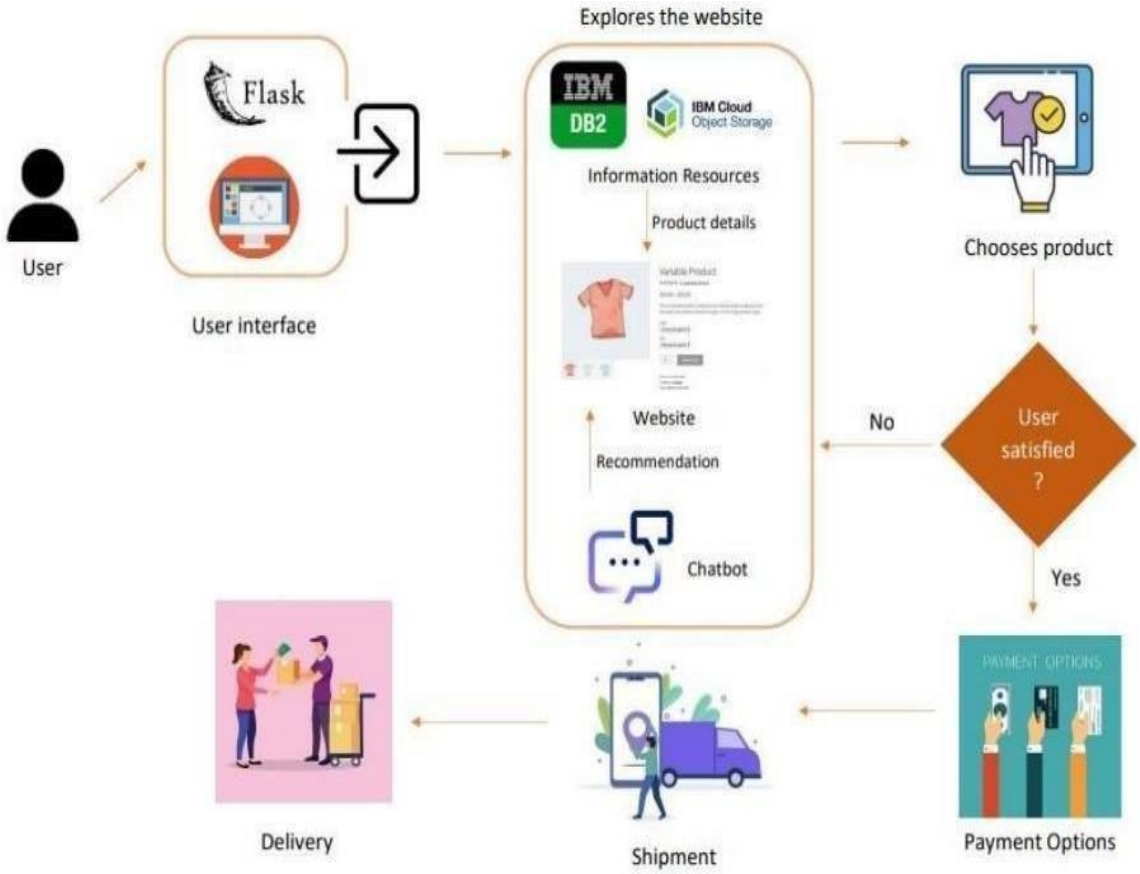


FIG 5.2.3: SOLUTION & TECHNICAL ARCHITECTURE

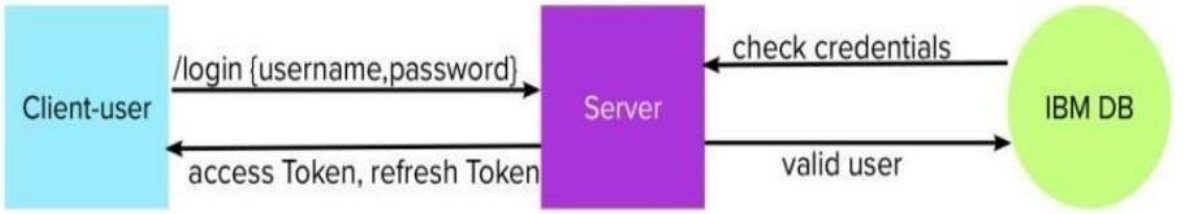


FIG 5.2.4: SOLUTION & TECHNICAL ARCHITECTURE

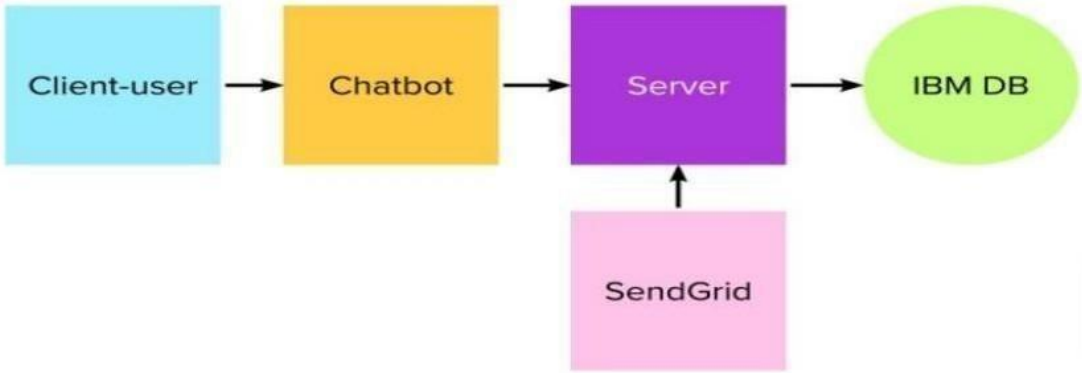
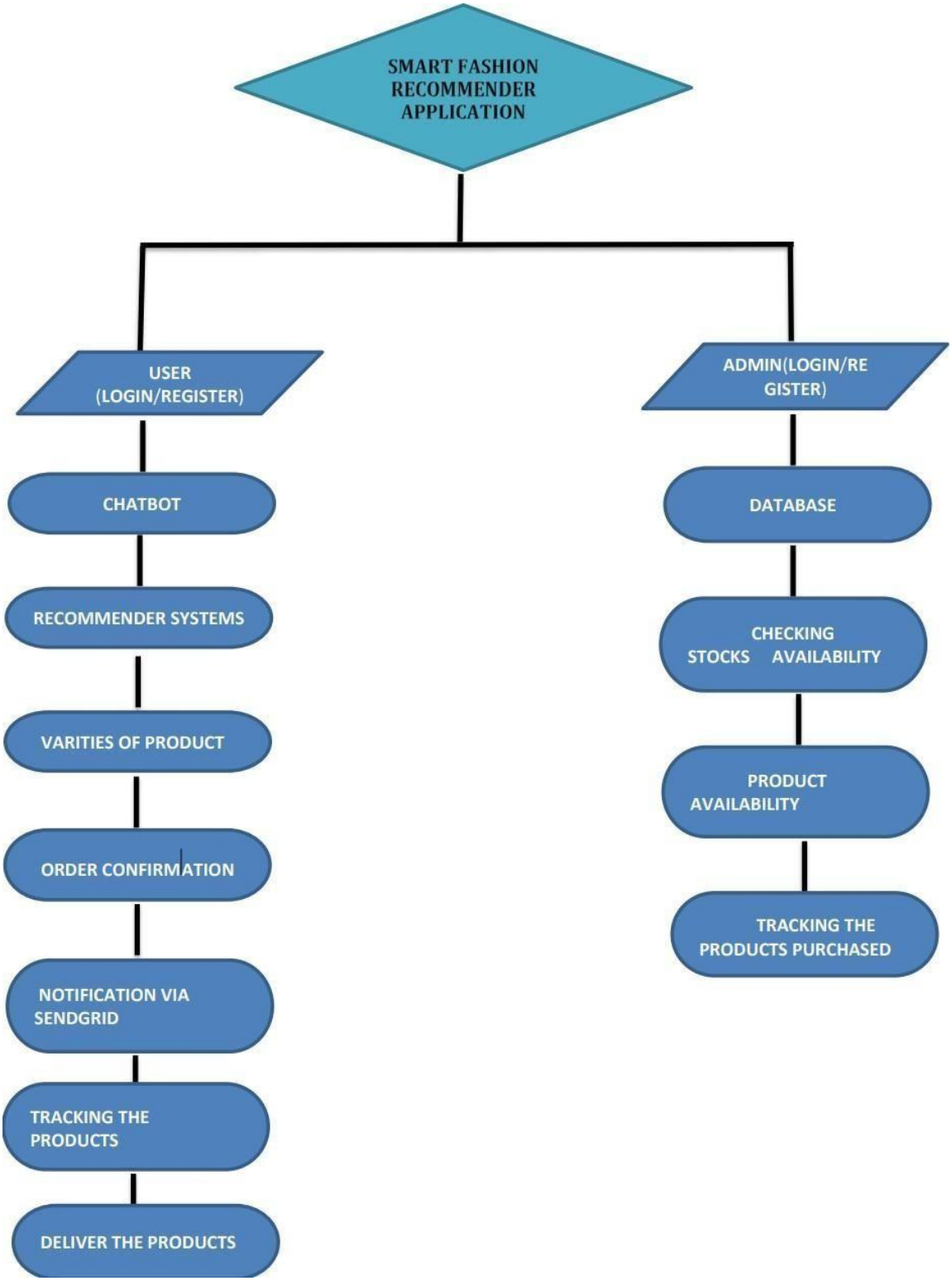


FIG 5.2.5: SOLUTION & TECHNICAL ARCHITECTURE



5.3 USER STORIES

TABLE 5.3.1: USER STORIES

Use the below template to list all the user stories for the product.

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Customer (Mobile user)	Registration	USN-1	As a user, I can register for the application by entering my email, password, and confirming my password.	I can access my account / dashboard	High	Sprint-1
		USN-2	As a user, I will receive confirmation email once I have registered for the application	I can receive confirmation email & click confirm	High	Sprint-1
		USN-3	As a user, I can register for the application through Facebook	I can register & access the dashboard with Facebook Login	Low	Sprint-2
		USN-4	As a user, I can register for the application through Gmail		Medium	Sprint-1
	Login	USN-5	As a user, I can log into the application by entering email & password	I can access my data by login	High	Sprint-1
	Dashboard	USN-6	As a user , I can view the dashboard and by products		High	Sprit -2
Customer (Web user)	Registration / Login	USN-7	As a user, I can register for the application by entering my email, password, and confirming my password.	I can access my account / dashboard		Sprint -1
Customer Care Executive	Contact with Customers	USN-8	As a Customer customers care executive, I solve the customer Requirements and feedback	I can receive calls from customers	High	Sprint-1
Administrator	Check stock and Price , orders	USN_9	As a Administrator , I can Check the database And stock details and buying and selling prices	I am the administrator of the company	High	Sprint -2

6.PROJECT PLANNING & SCHEDULE

6.1 SPRINT PLANNING & ESTIMATION

TABLE 6.1.1: SPRINT PLANNING & ESTIMATION

Milestones	Activities	Description
Project Development Phase	Delivery of Sprint – 1,2,3,4	To develop the code and submit the developed code by testing it
Setting up App environment	Create IBM Cloud account	Signup for an IBM Cloud account
	Create flask project	Getting started with Flask to create project
	Install IBM Cloud CLI	Install IBM Command LineInterface
	Docker CLI Installation	Installing Docker CLI on laptop
	Create an account in send grid	Create an account in sendgrid. Use the service as email integration to our application for sending emails
Implementing web Application	Create UI to interact with Application	Create UI • Registration page • Login page • View products page • Add products page
	Create IBM DB2 & connect with python	Create IBM DB2 service in IBM Cloud and connect with python code with DB
Integrating sendgrid service	Sendgrid integration with python	To send emails form the application we need to integrate the Sendgrid service
Developing a chatbot	Building a chatbot and Integrate to application	Build the chatbot and Integrate it to the flask application
Deployment of App in IBMCloud	Containerize the App	Create a docker image of your application and push it to the IBM container registry
	Upload image to IBM container registry	Upload the image to IBM container registry
	Deploy in kubernetes cluster	Once the image is uploaded to IBM Container registry deploy the image to IBM Kubernetes cluster

TABLE 6.1.2: SPRINT PLANNING & ESTIMATION

Milestones	Activities	Description
Ideation Phase	Literature Survey	Literature survey on the selected project & information gathering
	Empathy Map	Prepare Empathy map to capture the user Panis & Gains, prepare list of problem statement
	Ideation	Organizing the brainstorming session and priorities the top 3 ideas based on feasibility & Importance
Project Design Phase I	Proposed Solution	Prepare proposed solution document which includes novelty, feasibility of ideas, business model, social impact, Scalability of solution
	Problem Solution Fit	Prepare problem solution fit document
	Solution Architecture	Prepare solution architecture document
Project Design Phase II	Customer Journey	Prepare customer journey map to understand the user interactions & experience with the application
	Functional requirement	Prepare functional & non functional requirement document
	Data Flow Diagram	Prepare Data Flow Diagramand user stories
	Technology architecture	Draw the technology architecture diagram
Project Planning Phase	Milestones & Activity list	Prepare milestones and activity list of the project
	Sprint Delivery Plan	Prepare sprint delivery plan

6.2 SPRINT DELIVERY SCHEDULE

TABLE 6.2.1: SPRINT DELIVERY SCHEDULE

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	User Panel	USN-1	The user will login into the website and go through the products available on the website	20	High	Suji Priya R Selvanayaki G Vinothini M Shailesh B
Sprint-2	Admin panel	USN-2	The role of the admin is to check out the database about the stock and have a trackof all the things that the users are purchasing.	20	High	Suji Priya R Selvanayaki G Vinothini M Shailesh B
Sprint-3	Chat Bot	USN-3	The user can directly talk to Chatbot regarding the products. Get the recommendations based on informationprovided by the user.	20	High	Suji Priya R Selvanayaki G Vinothini M Shailesh B
Sprint-4	final delivery	USN-4	Container of applications using docker kubernets and deployment the application.Create the documentation and final submit the application	20	High	Suji Priya R Selvanayaki G Vinothini M Shailesh B

TABLE 6.2.2: SPRINT DELIVERY SCHEDU

Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date(Planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date(Actual)
Sprint-1	20	6 Days	24 Oct 2022	29 Oct 2022	20	29 Oct 2022
Sprint-2	20	6 Days	31 Oct 2022	05 Nov 2022	20	05 Nov 2022
Sprint-3	20	6 Days	07 Nov 2022	12 Nov 2022	20	12 Nov 2022
Sprint-4	20	6 Days	14 Nov 2022	19 Nov 2022	20	19 Nov 2022

Velocity:

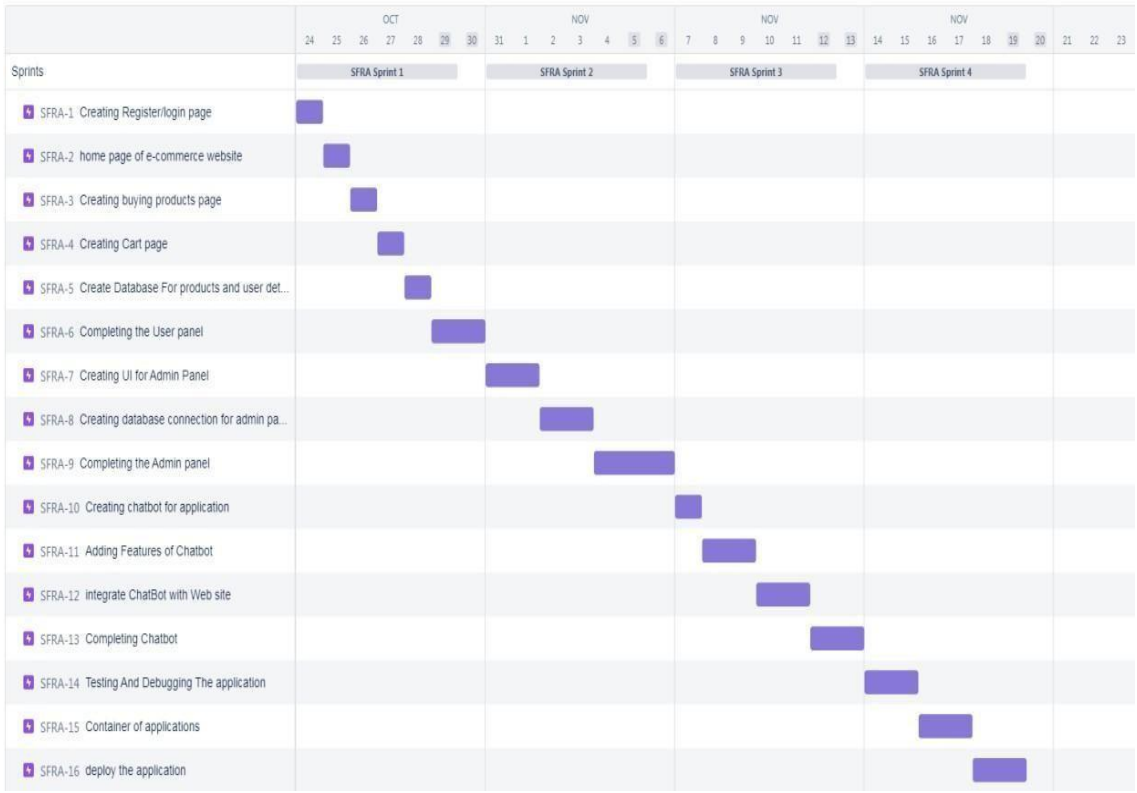
Imagine we have a 10-day sprint duration, and the velocity of the team is 20 (points per sprint). Let's calculate the team's average velocity (AV) per iteration unit (story points per day)

$$AV = \frac{sprint\ duration}{velocity} = \frac{20}{10} = 2$$

6.3 REPORTS FROM JIRA

TABLE 6.3.1: REPORTS FROM JIRA

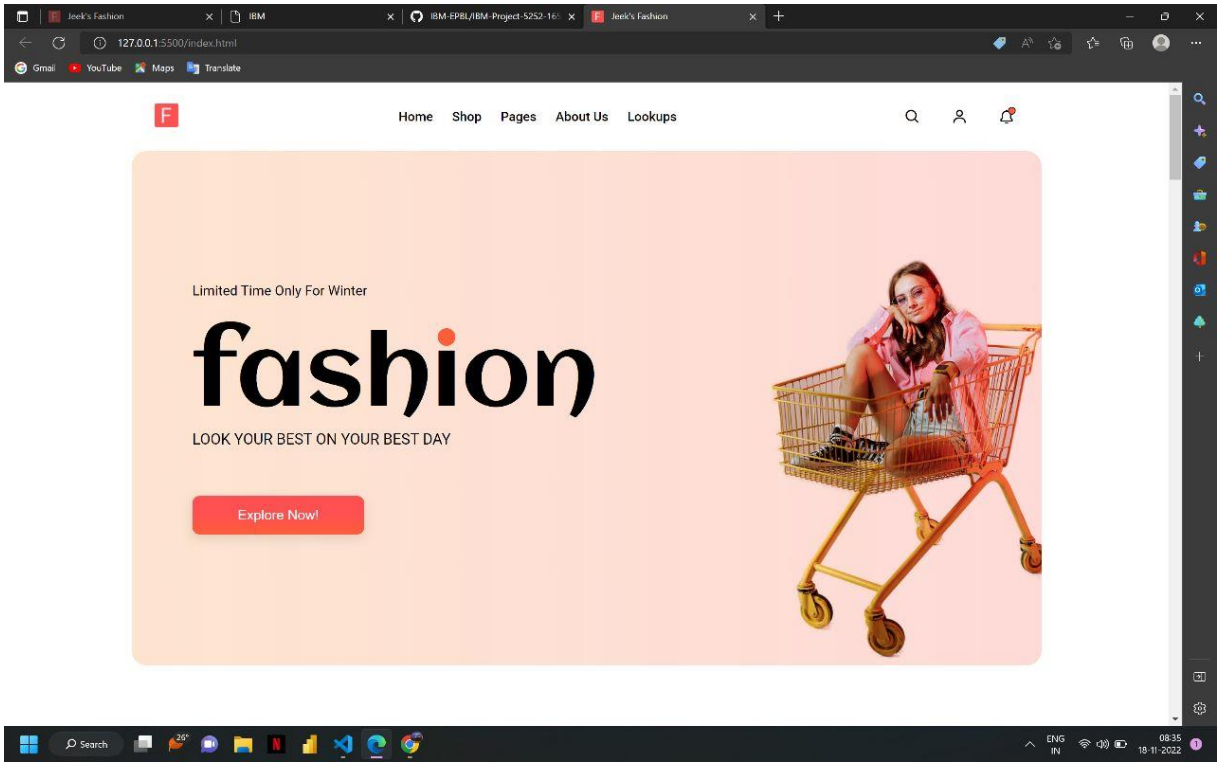
Burndown Chart:



7.CODING & SOLUTIONING

7.1 FEATURE 1

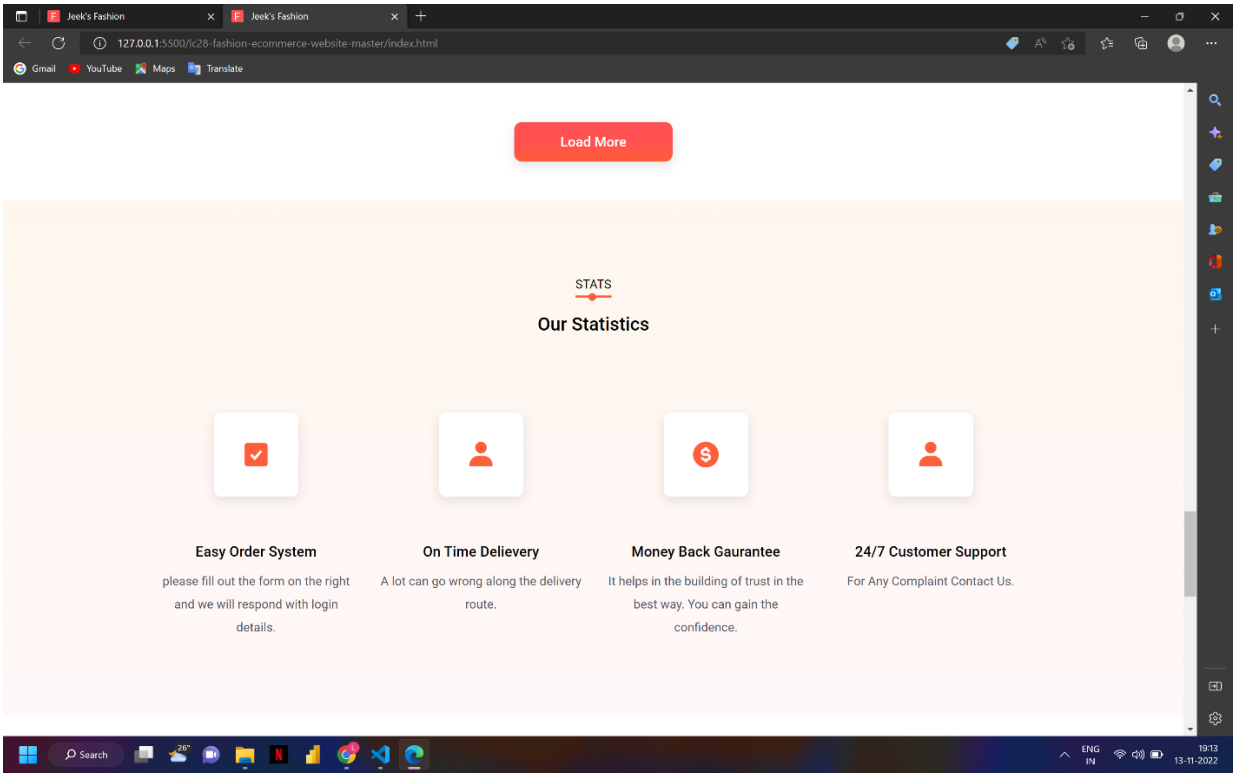
FIG 7.1.1: HOMEPAGE.HTML



7.1.2: AUTOMATIC CASHBACK

```
<!-- ====== Boxicons ====== -->
    <link
      href="https://unpkg.com/boxicons@2.0.9/css/boxicons.min.css"
      rel="stylesheet"
    />
    <!-- ====== Swiper CSS ====== -->
    <link
      rel="stylesheet"
      href="https://unpkg.com/swiper/swiper-bundle.min.css"
    />
    <!-- ====== Custom CSS ====== -->
    <link rel="stylesheet" href="css/styles.css" />
    <title>Jeek's Fashion</title>
  </head>
  <body>
    <!-- ====== Header ====== -->
    <header class="header">
      <!-- ====== Navigation ====== -->
      <nav class="navbar">
        <div class="row container d-flex">
          <div class="logo">
            <img src="./images/favicon-32x32.png" alt="" />
```

FIG 7.1.2: AUTOMATIC CASHBACK



7.2 FEATURE 2

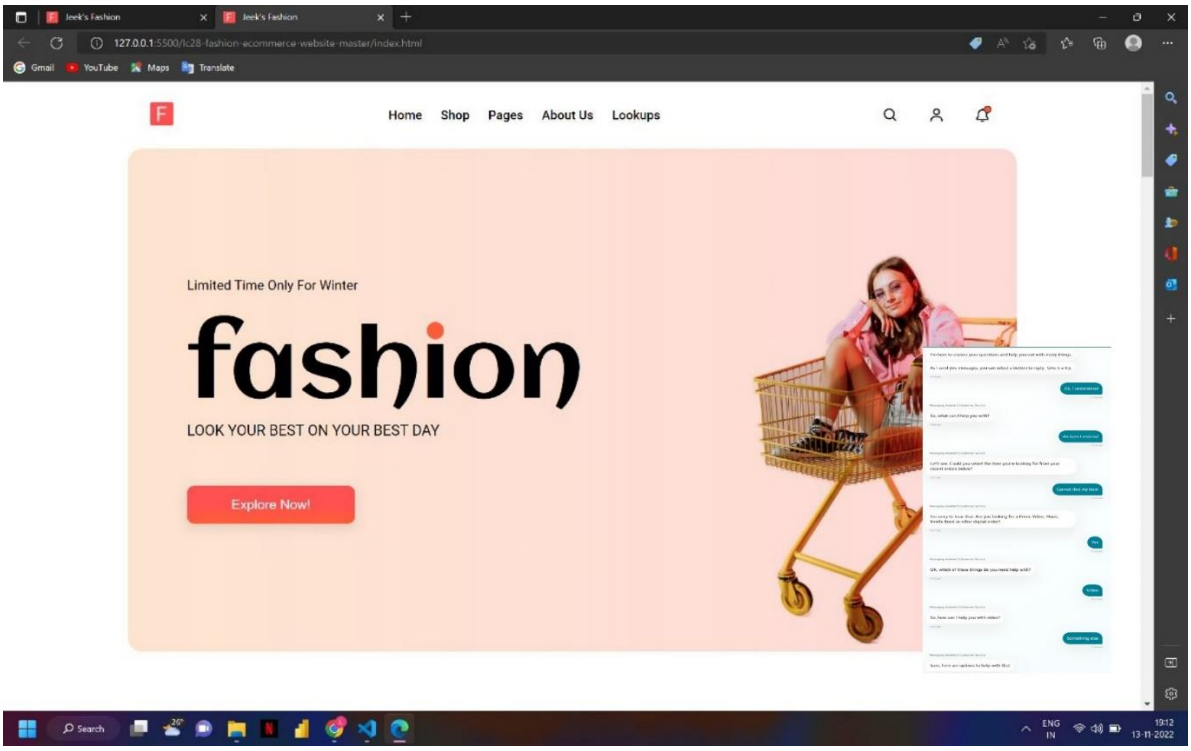
7.2 INTEGRATING CHATBOT WITH HTML PAGE

```
<script>
 window.watsonAssistantChatOptions
integrationID: "614a4315-ff80-4187-
    8fe4-2fd9b506b723", //
    The ID of this
    integration.region: "au-
    syd", // The region your
    integration is hosted in.
    serviceInstanceID: "9670dcf8-
    789f-4609-8d7a-6e25c412a9ec"

    // The ID of your service instance.
    onLoad: function(instance) {
    instance.render(); }
  };
  setTimeout(function(){
    const t=document.createElement('script');
    t.src="https://web-
  chat.global.assistant.watson.appdomain.cloud/versions/" +
  (window.watsonAssistantChatOptions.clientVersion || 'latest') +
  "/WatsonAssistantChatEntry.js";
```

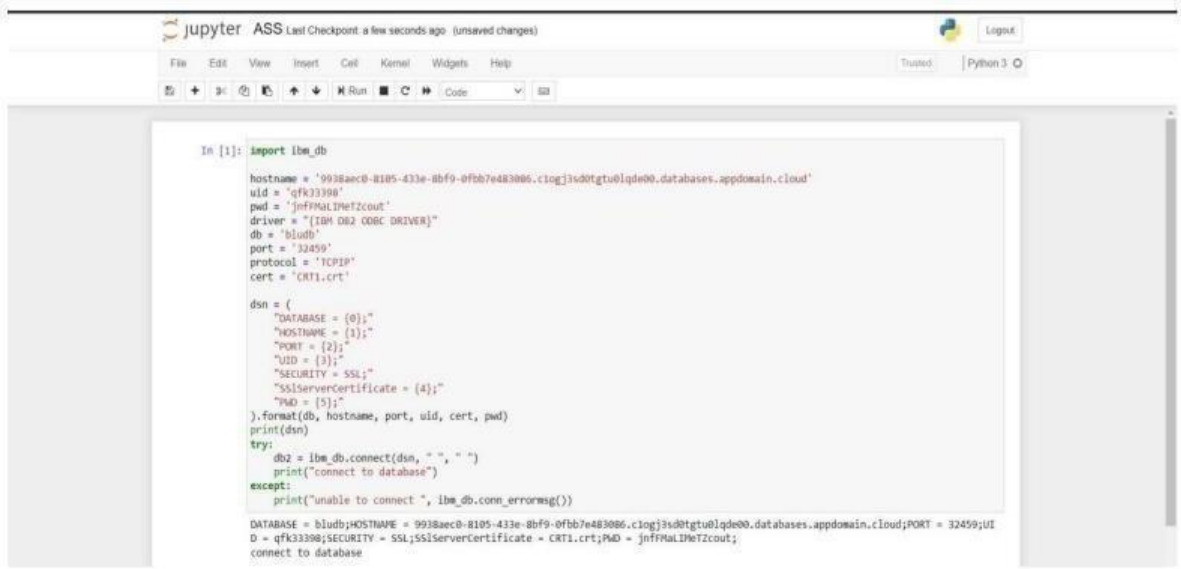
```
        document.head.appendChild(t);
    });
</script>
```

FIG: 7.2.1 FEATURE 2



7.3 DATABASE SCHEMA

FIG 7.3.1 DATABASE SCHEMA



8.TESTING

8.1 TEST CASES

FIG 8.1.1: TEST CASES

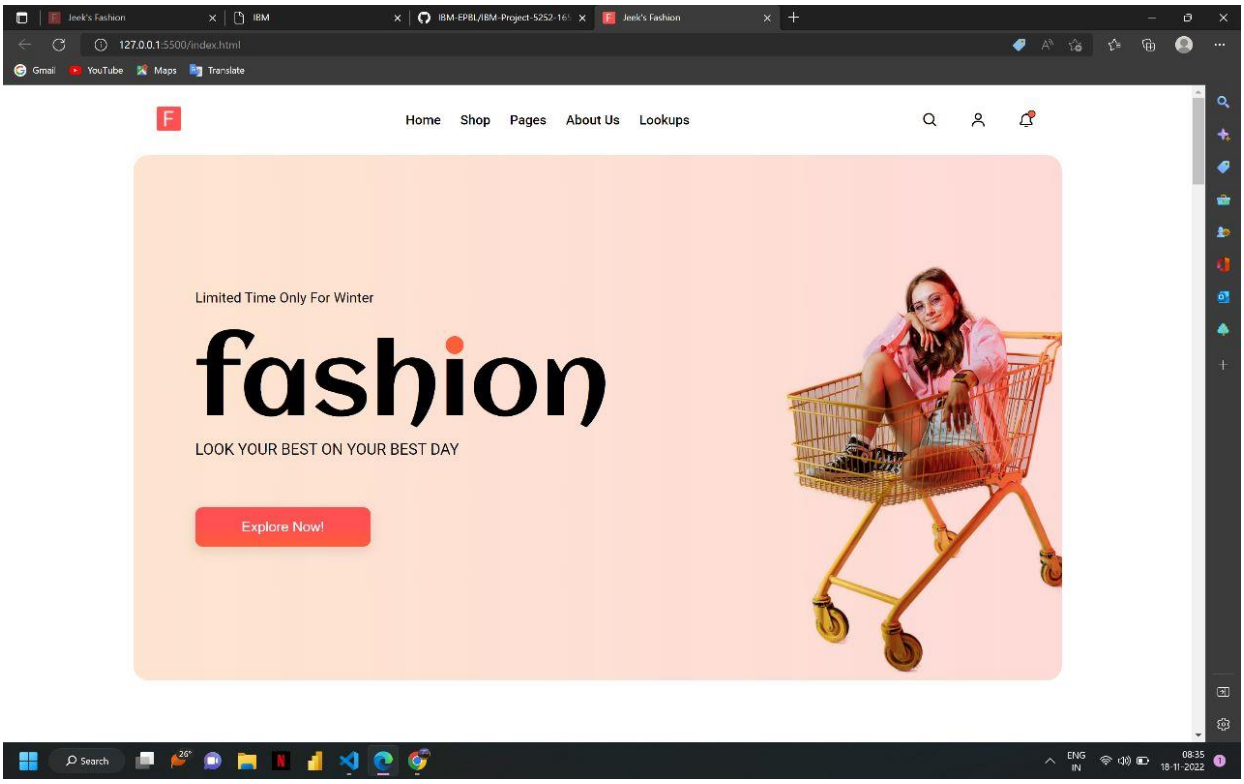
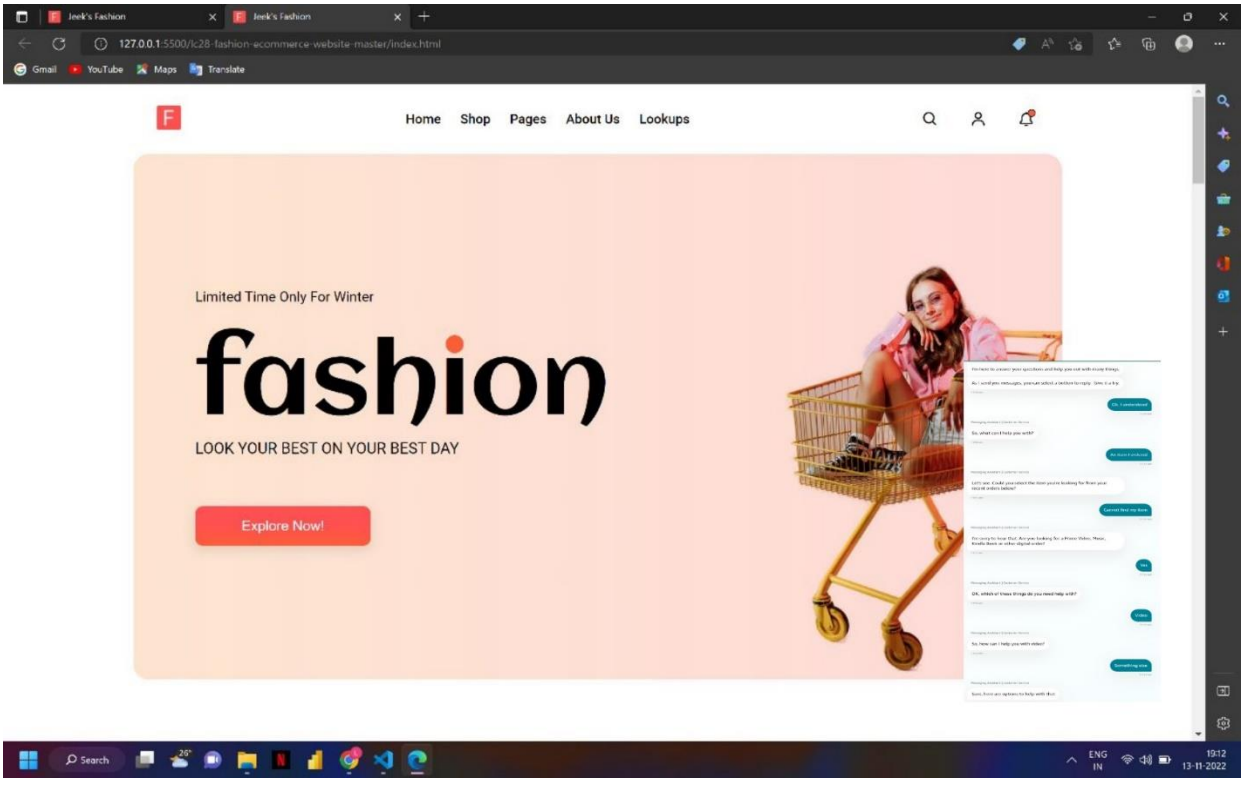


FIG 8.1.2: TEST CASES



9.RESULTS

9.1 PERFORMANCE METRICS

The performance of a recommendation algorithm is evaluated by using some specific metrics
that indicate the accuracy of the system. The type of metric used depends on the type of filtering
technique. Root Mean Square Error (RMSE), Receiver Operating Characteristics (ROC), Area
Under Cover (AUC), Precision, Recall and F1 score is generally used toevaluate the performance or accuracy of the recommendation algorithms.

Root-mean square error (RMSE). RMSE is widely used in evaluating and comparing the performance of a recommendation system model compared to other models. A low error RMSE value indicates higher performance by the algorithm as

$$RMSE = \sqrt{\frac{1}{N_p}\sum_{u,i}(p_{ui} - r_{ui})^2} \quad (1)$$

where, N_p is the total number of predictions, p_{ui} is the predicted rating that a user u will selectan item i and

r_{ui} is the real rating.

Precision. Precision can be defined as the fraction of correct recommendations or predictions

(known as True Positive) to the total number of recommendations provided, which

can be asrepresented as follows:

$$Precision = \frac{True\ Positive\ (TP)}{True\ Positive\ (TP) + False\ Positive\ (FP)} \quad (2)$$

It is also defined as the ratio of the number of relevant recommended items to the

number of recommended items expressed as percentages.

Recall. Recall can be defined as the fraction of correct recommendations or predictions (known as True Positive) to the total number of correct relevant recommendations provided, which can be as represented as follows:

$$Recall = \frac{True\ Positive\ (TP)}{True\ Positive\ (TP) + False\ Negative\ (FN)} \quad (3)$$

It is also defined as the ratio of the number of relevant recommended items to the total number of relevant items expressed as percentages.

F1 Score. F1 score is an indicator of the accuracy of the model and ranges from 0 to 1, wherea value close to 1 represents higher recommendation or prediction accuracy. It represents precision and recall as a single metric and can be as represented as follows:

Coverage. Coverage is used to measure the percentage of items which are recommended by the algorithm among all of the items.

Accuracy. Accuracy can be defined as the ratio of the number of total correct recommendations to the total recommendations provided, which can be as represented as follows

$$Accuracy = \frac{TP + FN}{TP + FN + TN + FP} \quad (5)$$

Intersection over union (IOU). It represents the accuracy of an object detector used on a specific dataset

$$IoU = \frac{TP}{TP + FN + FP} \quad (6)$$

ROC. ROC curve is used to conduct a comprehensive assessment of the algorithm's performance.

AUC. AUC measures the performance of recommendation and its baselines as

well as the quality of the ranking based on pairwise comparisons.

Rank aware top-N metrics. The rank aware top-N recommendation metric finds some of the interesting

and unknown items that are presumed to be most attractive to a user. Mean reciprocal rank (MRR), mean average precision (MAP) and normalized discounted cumulative gain (NDCG) are three most popular rank aware metrics.

MRR. MRR is calculated as a mean of the reciprocal of the position or rank of first relevant

$$MRR = \frac{1}{N_u} \sum_{u \in N_u} \frac{1}{L_u^n [k] \in R_u} \quad (7)$$

Recommendation MRR as mentioned by can be expressed as follows:

where u, N_u and R_u indicate specific user, total number of users and the set of items rated by the user, respectively. L indicates list of ranking length (n) for user (u) and k represents the position of the item found in the he lists L.

MAP: MAP is calculated by determining the mean of average precision at the points where relevant

$$MAP = \frac{1}{N_u |R_u|} \sum_{k=1}^{n} \mathbb{1} (L_u^n [k] \in R_u) P_u @k \quad (8)$$

products or items are found. MAP as mentioned by can be expressed as follows. where P_u represents precision in selecting relevant item for the user.

NDCG: NDCG is calculated by determining the graded relevance and positional information of the recommended items, which can be expressed as follows.

$$NDCG_u = \frac{\sum_{k=1}^{n} G(u, n, k) D(k)}{\sum_{k=1}^{n} G^* (u, n, k) D(k)} \quad (9)$$

where D (k) is a discounting function, G (u, n, k) is the gain obtained.

10.ADVANTAGES & DISADVANTAGES

10.1ADVANTAGES

- Smart fashion recommender application is the user friendly.
- With the help of chatbot user cand find the products very easily.
- This application used to discover the product based on the user’s choice , very easily and quickly.
- It have ability to reduce transaction costs for consumers, and increase revenue for retailers.

10.2 DISADVANTAGES

- It needs active internet connection.
- Privacy concerns.
- Too many choices.
- Cold-start problem.

11.CONCLUSION

The Fashion Recommendation System is mainly used to recommend the best possible outfit combinations to a user who has no fashion sense based on their wardrobe. It may not always provide the best possible outfit to wear for an occasion as the system is dependent completely on the clothes present in the user's wardrobe. Also another reason is that fashion is highly dependent on the time period. However the system does a great job in inculcating a fashion sense among the users and can provide the best recommendations based on the user's wardrobe. Since the system is implemented as a website, it is very easy for the end users to access as well as use. The scope of this system can be expanded by including the ability to detect the various design and patterns on clothing, and to increase the number of occasions.

Recommendation systems have the potential to explore new opportunities for retailers by enabling them to provide customized recommendations to consumers based on information retrieved from the Internet.

Many researches were done on recommending the outfit with various algorithms but there is lack in providing the best method to continue this process of recommending and hence we used different algorithms to classify the dataset by applying some techniques on it and compared all the accuracies to provide the best method. The highest accuracy is found when the dataset is balanced using SMOTE analysis and then classified using Random Forest algorithm which is 99.86%. On an average, the Random Forest algorithm and the chi squared Attribute Eval have the highest accuracy rate. Hence, it is recommended to use the Random Forest algorithm to classify this dataset and chi squared Attribute Eval for the attribute reduction according to our research. Also this research highly recommends to make the dataset balanced before classifying it. This research might help in selecting the algorithms and other techniques while performing

12.FUTURE SCOPE

In the future, to implement this recommendation system to be extended to include male and non-binary fashion items including apparel, footwear, accessories etc. This work can further be enhanced to predict fashion items based on the skin colour and weather conditions.

Future research should concentrate on including time series analysis and accurate categorization of product images based on the variation in colour, trend and clothing style in order to develop an effective recommendation system. The proposed model will follow brand- specific personalization campaigns and hence it will ensure highly curated and tailored. offerings for users. Hence, this research will be highly beneficial for researchers interested in using augmented and virtual reality features to develop recommendation systems.

For different markets, it could split in short-term and long-term recommendations in the future research. Current discussions and reviews are all based on short-term recommendations toward apparel retailing markets. It delivers real-time recommendations straight to the online shoppers as shopping advice and suggestions. Apart from online shopping, recommendations could also be utilized in design and manufacture by providing long term recommendations, such as predicting new trends through years and seasons.

13.APPENDIX

13.1 SOURCE CODE

```
<!DOCTYPE html>
<html lang="en">
  <head>
    <meta charset="UTF-8" />
    <meta http-equiv="X-UA-Compatible" content="IE=edge" />
    <meta name="viewport" content="width=device-width, initial-scale=1.0"
/>
    <!-- ====== Favicon ====== -->
    <link
      rel="shortcut icon"
      href="images/favicon-32x32.png"
      type="image/png"
    />
    <!-- ====== Boxicons ====== -->
    <link
      href="https://unpkg.com/boxicons@2.0.9/css/boxicons.min.css"
      rel="stylesheet"
    />
    <!-- ====== Swiper CSS ====== -->
    <link
      rel="stylesheet"
      href="https://unpkg.com/swiper/swiper-bundle.min.css"
    />
    <!-- ====== Custom CSS ====== -->
    <link rel="stylesheet" href="css/styles.css" />
    <title>Jeek's Fashion</title>
  </head>
  <body>
    <!-- ====== Header ====== -->
    <header class="header">
      <!-- ====== Navigation ====== -->
      <nav class="navbar">
        <div class="row container d-flex">
          <div class="logo">
            <img src="./images/favicon-32x32.png" alt="" />
          </div>

          <div class="nav-list d-flex">
            <a href="">Home</a>
            <a href="">Shop</a>
            <a href="">Pages</a>
            <a href="">About Us</a>
            <a href="">Lookups</a>
            <div class="close">
              <i class="bx bx-x"></i>
```

```
            </div>
            <a class="user-link">Login</a>
          </div>

          <div class="icons d-flex">
            <div class="icon d-flex"><i class="bx bx-search"></i></div>
            <div class="icon user-icon d-flex">
              <i class="bx bx-user"></i>
            </div>
            <div class="icon d-flex">
              <i class="bx bx-bell"></i>
              <span></span>
            </div>
          </div>

          <!-- Hamburger -->
          <div class="hamburger">
            <i class="bx bx-menu-alt-right"></i>
          </div>
        </div>
      </nav>

      <!-- ====== Hero Area ====== -->
      <div class="hero">
        <div class="row container d-flex">
          <div class="col">
            <span class="subtitle">Limited Time Only For Winter</span>
            <h1>fash<span class="i">i</span>on</h1>
            <p>LOOK YOUR BEST ON YOUR BEST DAY</p>

            <button class="btn">Explore Now!</button>
          </div>
          <img src="./images/woman-in-cart.png" alt="" />
        </div>
      </div>
    </header>
    <!-- ====== Collection ====== -->
    <section class="section collection">
      <div class="title">
        <span>COLLECTION</span>
        <h2>Our Top Collection</h2>
      </div>
      <div class="filters d-flex">
        <div data-filter="Jewellery">Jewellery</div>
        <div data-filter="Accessories">Accessories</div>
        <div data-filter="Dresses">Dresses</div>
        <div data-filter="Footwear">Footwear</div>
      </div>

      <div class="products container">
        <div class="swiper mySwiper">
```

```
            <div class="swiper-wrapper" id="products">
              <div class="swiper-slide">
                <!-- <div class="product">
                  <div class="top d-flex">
                    <img src="./images/product-1.png" alt="" />
                    <div class="icon d-flex">
                      <i class="bx bxs-heart"></i>
                    </div>
                  </div>
                  <div class="bottom">
                    <h4>Nike Air Men’s Hoodie - Imported Hoodie Red</h4>
                    <div class="d-flex">
                      <div class="price">$150</div>
                      <div class="rating">
                        <i class="bx bxs-star"></i>
                        <i class="bx bxs-star"></i>
                        <i class="bx bxs-star"></i>
                        <i class="bx bxs-star"></i>
                        <i class="bx bxs-star"></i>
                      </div>
                    </div>
                  </div>
                </div> -->
              </div>
            </div>
          </div>
          <div class="pagination">
            <div class="custom-pagination"></div>
          </div>
        </div>
      </section>

      <!-- ====== New Arrival ====== -->
      <section class="section new-arrival">
        <div class="title">
          <span>NEW ARRIVAL</span>
          <h2>Latest Collection</h2>
        </div>

        <div class="row container">
          <div class="col col-1">
            <img src="./images/poster-1.png" alt="" />
            <h3>
              2022 Trends <br />
              Women’s Smart Skirt
            </h3>
          </div>
          <div class="col col-2">
            <img src="./images/./poster-2.png" alt="" />
            <h3>
              2022 Trends <br />
```

```
              Women’s Smart Skirt
            </h3>
          </div>
          <div class="col col-3">
            <img src="./images/poster-3.png" alt="" />
            <h3>
              2022 Trends <br />
              Women’s Smart Shirt <br />
              <span>Discover More:</span>
            </h3>
          </div>
        </div>
      </section>

      <!-- ====== Categories ====== -->
      <section class="section categories">
        <div class="title">
          <span>CATEGORIES</span>
          <h2>2022 Latest Collection</h2>
        </div>

        <div class="products container">
          <!-- <div class="product">
            <div class="top d-flex">
              <img src="./images/product-1.png" alt="" />
              <div class="icon d-flex">
                <i class="bx bxs-heart"></i>
              </div>
            </div>
            <div class="bottom">
              <div class="d-flex">
                <h4>Nike Air Men’s Hoodie - Imported Hoodie Red</h4>
                <a href="" class="btn cart-btn">Add to Cart</a>
              </div>
              <div class="d-flex">
                <div class="price">$150</div>
                <div class="rating">
                  <i class="bx bxs-star"></i>
                  <i class="bx bxs-star"></i>
                  <i class="bx bxs-star"></i>
                  <i class="bx bxs-star"></i>
                  <i class="bx bxs-star"></i>
                </div>
              </div>
            </div>
          </div> -->
        </div>

        <div class="button d-flex">
          <a class="btn loadmore">Load More</a>
        </div>
```

```
        </section>

        <!-- ====== Statistics ====== -->
        <section class="section statistics">
          <div class="title">
            <span>STATS</span>
            <h2>Our Statistics</h2>
          </div>

          <div class="row container">
            <div class="col">
              <div class="icon">
                <i class="bx bxs-check-square"></i>
              </div>
              <h3>Easy Order System</h3>
              <p>please fill out the form on the right and we will respond with
    login details.</p>
            </div>
            <div class="col">
              <div class="icon">
                <i class="bx bxs-user"></i>
              </div>
              <h3>On Time Delievery</h3>
              <p>A lot can go wrong along the delivery route.</p>
            </div>
            <div class="col">
              <div class="icon">
                <i class="bx bxs-dollar-circle"></i>
              </div>
              <h3>Money Back Gaurantee</h3>
              <p>It helps in the building of trust in the best way. You can
    gain the confidence.</p>
            </div>
            <div class="col">
              <div class="icon">
                <i class="bx bxs-user"></i>
              </div>
              <h3>24/7 Customer Support</h3>
              <p>For Any Complaint Contact Us.</p>
            </div>
          </div>
        </section>

        <!-- ====== Blogs ====== -->
        <section class="section blog">
          <div class="title">
            <span>BLOGS</span>
            <h2>Latest News</h2>
          </div>

          <div class="row container">
```

```
            <div class="col">
              <div class="top">
                <img src="./images/blog-1.png" alt="" />
              </div>
              <div class="bottom">
                <h3>Trendy</h3>
                <h4>
                  I'm not the kind of person who tries to be cool.
                </h4>
                <span>09 December 2022</span>
              </div>
            </div>
            <div class="col">
              <div class="top">
                <img src="./images/blog-2.png" alt="" />
              </div>
              <div class="bottom">
                <h3>Trendy</h3>
                <h4>
                  Whether you try too hard to fit in or you try too hard to
    stand out.
                </h4>
                <span>09 December 2022</span>
              </div>
            </div>
            <div class="col">
              <div class="top">
                <img src="./images/blog-3.png" alt="" />
              </div>
              <div class="bottom">
                <h3>Trendy</h3>
                <h4>
                  Trendy is the last stage before tacky.
                </h4>
                <span>09 December 2022</span>
              </div>
            </div>
          </div>
        </section>

        <!-- ====== Footer ====== -->
        <footer class="footer">
          <div class="row container">
            <div class="col">
              <div class="logo d-flex">
                <img src="./images/favicon-32x32.png" alt="logo" />
              </div>
              <p>
                Best OutFit For<br />
                Best People's.
              </p>
```

```
            <div class="icons d-flex">
              <div class="icon d-flex">
                <i class="bx bxl-facebook"></i>
              </div>
              <div class="icon d-flex"><i class="bx bxl-twitter"></i></div>
              <div class="icon d-flex"><i class="bx bxl-instagram"></i></div>
              <div class="icon d-flex"><i class="bx bxl-youtube"></i></div>
            </div>
            <p class="color">
              Copyrights 2022 <br />
              @07jeevaaa
            </p>
          </div>
          <div class="col">
            <div>
              <h4>Product</h4>
              <a href="">Download</a>
              <a href="">Pricing</a>
              <a href="">Locations</a>
              <a href="">Server</a>
              <a href="">Countries</a>
              <a href="">Blog</a>
            </div>
            <div>
              <h4>Category</h4>
              <a href="">Men</a>
              <a href="">Women</a>
              <a href="">Kids</a>
              <a href="">Best Seller</a>
              <a href="">New Arrivals</a>
            </div>
            <div>
              <h4>My Account</h4>
              <a href="">My Account</a>
              <a href="">Discount</a>
              <a href="">Returns</a>
              <a href="">Order History</a>
              <a href="">Order Tracking</a>
            </div>
            <div>
              <h4>Contact Us</h4>
              <div class="d-flex">
                <div class="icon"><i class="bx bxs-map"></i></div>
                <span>123 Street Chennai, TamilNadu, India</span>
              </div>
              <div class="d-flex">
                <div class="icon"><i class="bx bxs-envelope"></i></div>
                <span>Jeek's@CostumerService.com</span>
              </div>
              <div class="d-flex">
                <div class="icon"><i class="bx bxs-phone"></i></div>
```

```
                <span>+91 8939177948</span>
              </div>
            </div>
          </div>
        </div>
      </footer>

      <!-- ====== Login and Signup Form ====== -->
      <div class="user-form">
        <div class="close-form d-flex"><i class="bx bx-x"></i></div>
        <div class="form-wrapper container">
          <div class="user login">
            <div class="img-box">
              <img src="./images/login.svg" alt="" />
            </div>
            <div class="form-box">
              <div class="top">
                <p>
                  Not a member?
                  <span data-id="#ff0066">Register now</span>
                </p>
              </div>
              <form action="">
                <div class="form-control">
                  <h2>Hello Again!</h2>
                  <p>Welcome back you've been missed.</p>
                  <input type="text" placeholder="Enter Username" />
                  <div>
                    <input type="password" placeholder="Password" />
                    <div class="icon form-icon">
                      <!-- <img src="./images/eye.svg" alt="" /> -->
                    </div>
                  </div>
                  <span>Recovery Password</span>
                  <input type="Submit" value="Login" />
                </div>
                <div class="form-control">
                  <p>Or continue with</p>
                  <div class="icons">
                    <div class="icon">
                      <img src="./images/search.svg" alt="" />
                    </div>
                    <div class="icon">
                      <img src="./images/apple.svg" alt="" />
                    </div>
                    <div class="icon">
                      <img src="./images/facebook.svg" alt="" />
                    </div>
                    <div class="icon">
                      <img src="./images/github.svg" alt="" />
                    </div>
```

```
            </div>
          </div>
        </form>
      </div>
    </div>

    <!-- Register -->
    <div class="user signup">
      <div class="form-box">
        <div class="top">
          <p>
            Already a member?
            <span data-id="#1a1aff">Login now</span>
          </p>
        </div>
        <form action="">
          <div class="form-control">
            <h2>Welcome Jeek's!</h2>
            <p>It's good to have you.</p>
            <input type="email" placeholder="Enter Email" />
            <div>
              <input type="password" placeholder="Password" />
              <div class="icon form-icon">
                <img src="./images/eye.svg" alt="" />
              </div>
            </div>
            <div>
              <input type="password" placeholder="Confirm Password" />
              <div class="icon form-icon">
                <img src="./images/eye.svg" alt="" />
              </div>
            </div>
            <input type="Submit" value="Register" />
          </div>
          <div class="form-control">
            <p>Or continue with</p>
            <div class="icons">
              <div class="icon">
                <img src="./images/search.svg" alt="" />
              </div>
              <div class="icon">
                <img src="./images/apple.svg" alt="" />
              </div>
              <div class="icon">
                <img src="./images/facebook.svg" alt="" />
              </div>
              <div class="icon">
                <img src="./images/github.svg" alt="" />
              </div>
            </div>
          </div>
```

```
                </form>
              </div>
              <div class="img-box">
                <img src="./images/trial.svg" alt="" />
              </div>
            </div>
          </div>
        </div>
        <!-- ====== SwiperJs ====== -->
        <script src="https://unpkg.com/swiper/swiper-bundle.min.js"></script>

        <!-- ====== Custom Script ====== -->
        <script src="./js/product.js"></script>
        <script src="./js/main.js"></script>
      </body>
    </html>
```

13.2 GITHUB & PROJECT DEMO LINK

13.2.1 GITHUB LINK

https://github.com/IBM-EPBL/IBM-Project-53846-1661501244

13.2.2. PROJECT DEMO LINK

https://vimeo.com/774791461