IBM – NALAIYA THIRAN PROJECT

SMART FASHION RECOMMENDER APPLICATION

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ABSTRACT

Recommendation systems based on machine learning are very important both customers and sellers in our daily life. Many recommendation systems need user's previous shopping activities and digital footprints to make best recommendation purpose for next item shopping. In this study, we develop a cloth recommendation system with using only single photo of user with scalable embedded system. This study lead to important results and give new opportunities for clothing companies and advertisements. In this study, we show that how our system recommends a cloth options without user's previous shopping act data with embedded system and machine learning. In order to recommend a cloth, we develop two inception based convolutional neural networks as prediction part and one feed forward neural network as recommender. In this study, we reach to 98% accuracy on color prediction, 86% accuracy on gender and cloth's pattern predictions and 75% accuracy on clothing recommendation.

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1. INTRODUCTION

PROJECT OVERVIEW

The Fashion industry is one of the larger industries around the world. One of the things that have remained constant throughout human civilization is humans covering their bodies with a piece of cloth. Initially, this cloth was worn as protection from the harsh climates of those ages. Later on, as we humans learned to fend for ourselves from the unforgiving climates, the cloth started to serve a different purpose. Fashion these days showcases the individuality of the person. There are many things that can be said about a person based on their fashion sense.

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 basedon 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

Chatbot design, consumer trust and privacy: Chung, Ko, Joung, & Kim stated that since consumers might see chatbots with negative eyes if there are privacy concerns, consumer trust is another factor that can be explored further. Aspects such as transparent advice and problem-solving could be investigated in future research, addressing the role that design plays in this context and if other factors (e.g. social elements, cultural values, self-identity) influence consumer's trust on chatbots.

Multi-user chatting: Merrilees and Miller observed that traditional shopping with a companion influences the consumer experience. Alone consumers tend to be more price sensitive. Future studies may explore the way fashion consumers seek for advice from chatbots that could be experimented with by adjusting social factors (e.g. including a friend in the conversation), evaluating the impact of these factors on user acceptance levels.

Design bots: Colombi, Kim, & Wyatt suggested that fashion chatbots may be made to behave as a fashion designer, providing a platform to support co-creation of value. Conversational platforms can provide insights for brands to recognize consumer value, which means that future research in this area can also enhance the consumer experience.

Consumer autonomy and identity in chatbot consumer experience: Ameen, Hosany, & Tarhini suggested that consumer autonomy is related to the perceived sense of control that consumers have over the interaction with chatbots and it can be attached to motivational factors. Future studies might address the role that consumer autonomy and identity play in consumer trust and acceptance, for example, by measuring chatbots design approaches that can trigger these states.

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.

REFERENCES:

1. GloablInfoResearch: Global Fast Fashion Apparel Market 2021 by Key Countries, Companies, Type and Application. GloablInfoResearch, HongKong, 2021.
2. Hou, M., Wu, L., Chen, E., Li, Z., Zheng, V. W., & Liu, Q.:Explainable fashion recommendation: A semantic attribute region guided approach. In Proceedings of the 28th Twenty-Eighth International Joint Conference on Artificial Intelligence, 2019; pp. 4681-4688.
3. Wang, H., Wang, N., & Yeung, D. Y.: Collaborative Deep Learning for Recommender Systems. In Proceedings of the 21th CM SIGKDD International Conference on Knowledge Discovery and Data Mining, New York, 2015; pp. 1235- 1244.
4. McAuley, J., Targett, C., Shi, Q., & Van Den Hengel, A.: Image-based Recommendations on Styles and Substitutes. In Proceedings of the 38th International ACM SIGIR Conference on Research and Development in Information Retrieval, 2015; pp. 43-52. 2015.

2.2 PROBLEM STATEMENT DEFINITION

The personal information collected by recommenders raises the risk of unwanted exposure ofthat 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.

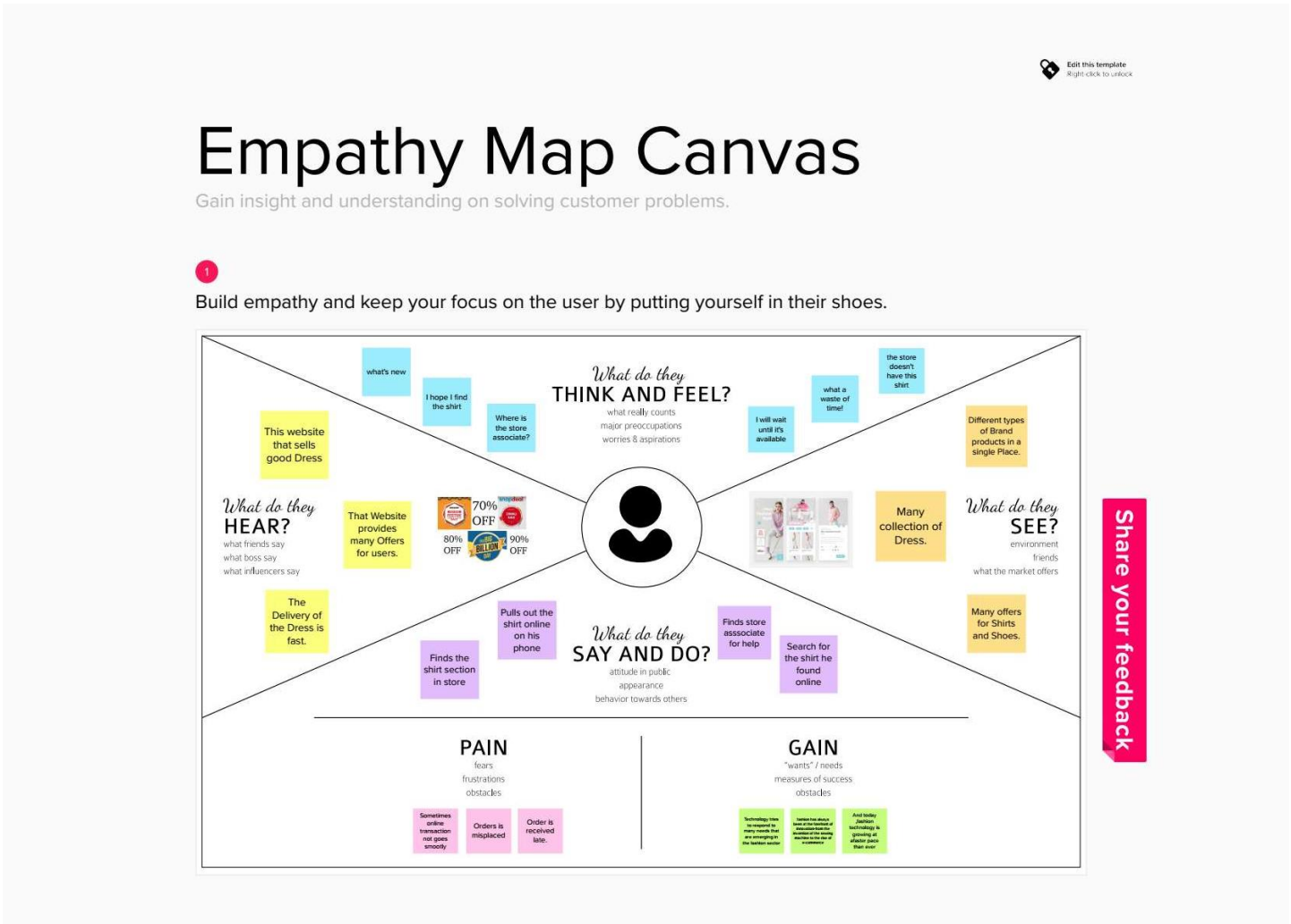
- The problem of the work is to design static web applications deployments withcustomer deployment
- Lack of interaction between application and user
- User need to navigate across multiple pages to choose right product
- Confusion in choosing product
- Lack of sales
- Complex User Interface.
- Lack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

3. IDEATION & PROPOSED SOLUTION

3.1 EMPATHY MAP CANVAS:

An empathy map is a simple, easy-to-digest visual that captures knowledge about a user's behaviours 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.

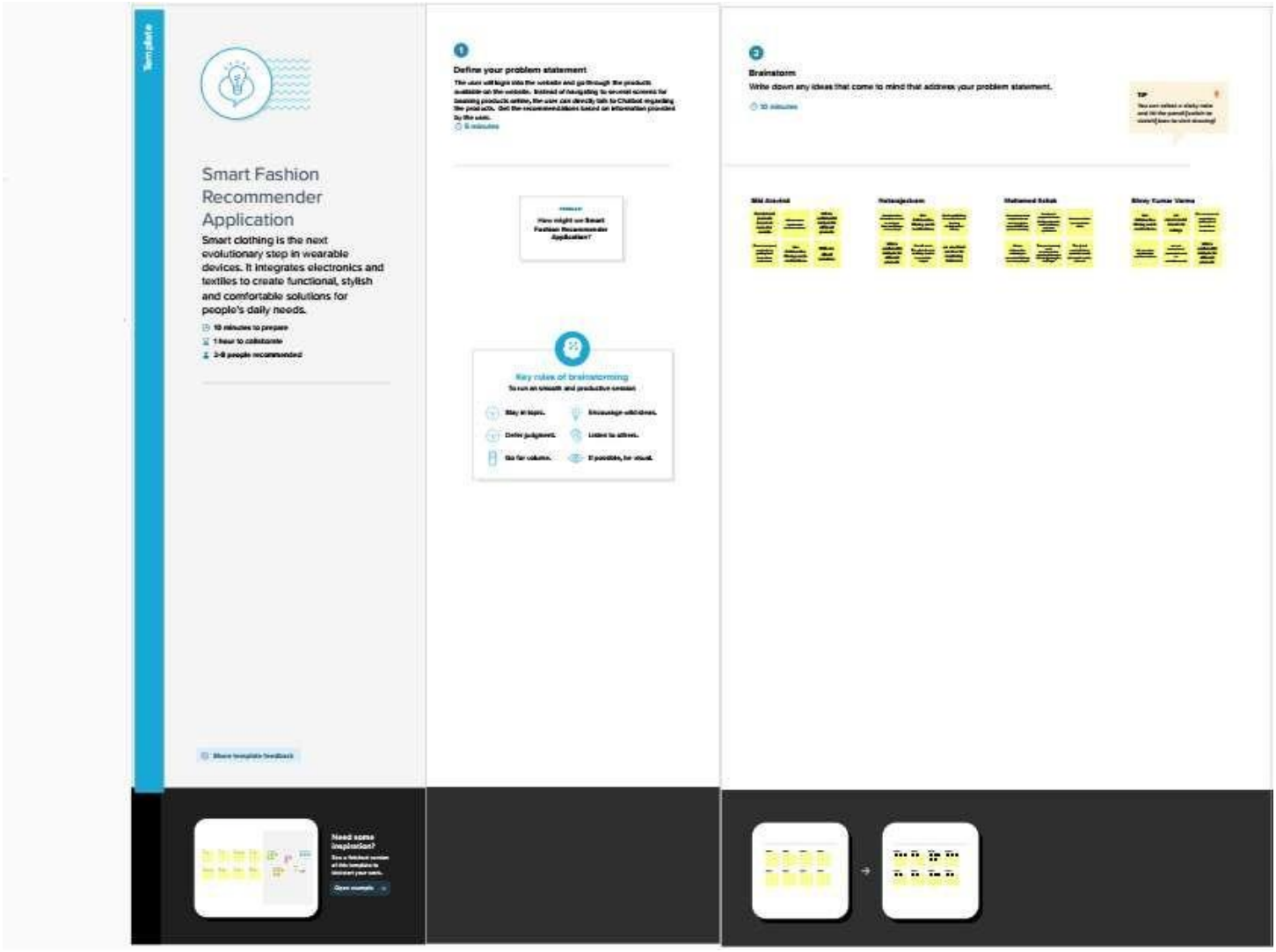
SMART FASHION RECOMMENDER APPLICATION



3.2 IDEATION & BRAINSTROMING:

A group problem-solving technique that involves the spontaneous contribution of ideas fromall members of the group.

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



Group ideas

Take turns sharing your ideas while clustering similar or related notes as you go. In the last 10 minutes, give each cluster a sentence-like label. If a cluster is bigger than six sticky notes, try and see if you and break it up into smaller sub-groups.

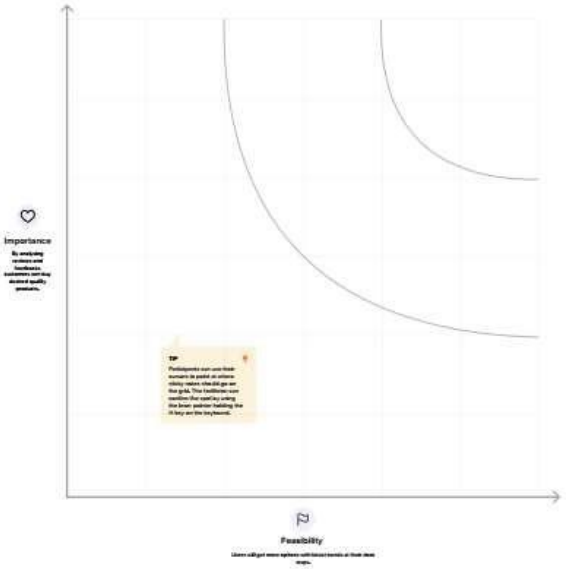
20 minutes

Regarding this project Natarajasivam and Mohamed Ezhaik have similar kind of ideas about using the global smart clothing market

Prioritize

Your team should all be on the same page about what's important moving forward. Place your ideas on this grid to determine which ideas are important and which are feasible.

20 minutes



After you collaborate

You can export the mural as an image or pdf to share with members of your company who might find it helpful.

Quick add-ons

Share the mural
Share a view link to the mural with stakeholders to keep them in the loop about the outcomes of the session.

Export the mural
Export a copy of the mural as a PNG or PDF to attach to emails, include in slides, or save in your drive.

Keep moving forward

Strategy blueprint
Define the components of a new idea or strategy.

Open the template →

Customer experience journey map
Understand customer needs, motivations, and obstacles for an experience.

Open the template →

Strengths, weaknesses, opportunities & threats
Identify strengths, weaknesses, opportunities, and threats (SWOT) to develop a plan.

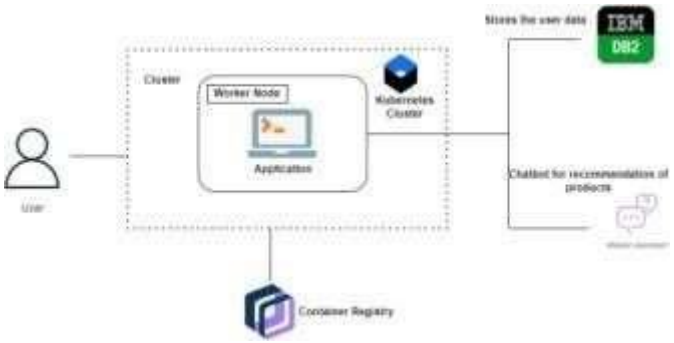
Open the template →

Share template feedback

3.3 PROPOSED SOLUTION:

SMART FASHION RECOMMENDER APPLICATION

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. • Directly do online shopping based on customer

		choice without any search. • It can also save a lot of time.
5.	**Business model** **(Revenue 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

4. REQUIREMENT ANALYSIS

4.1 FUNCTIONAL REQUIREMENTS:

SMART FASHION RECOMMENDER APPLICATION

Following are the functional requirements of the proposed solution.

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	Sign up	Register by using mobile number/ Register by using email id.
FR-2	User Verification	Verify via Email Verify via OTP
FR-3	Login	Login by using username / password
FR-4	Profile Updation	Update the profile details like Name,Gender, Age ,Address & mobile number ,etc,.
FR-5	Chatbot	Chatbot is useful to search products , view offers,discounts and stock availability. It is also used to solve queries and issues.
FR-6	Ordering the product	After confirming the product , buy the product via Cash on Delivery or online transactions.
FR-7	Tracking the ordered Product	After ordering the product , track the delivery via link received to your registered mobile number through SMS or registered email id.
FR-8	Logout	After receiving the product ,user can logout the account when he/she needs

4.2 NON-FUNCTIONAL REQUIREMENTS:

SMART FASHION RECOMMENDER APPLICATION

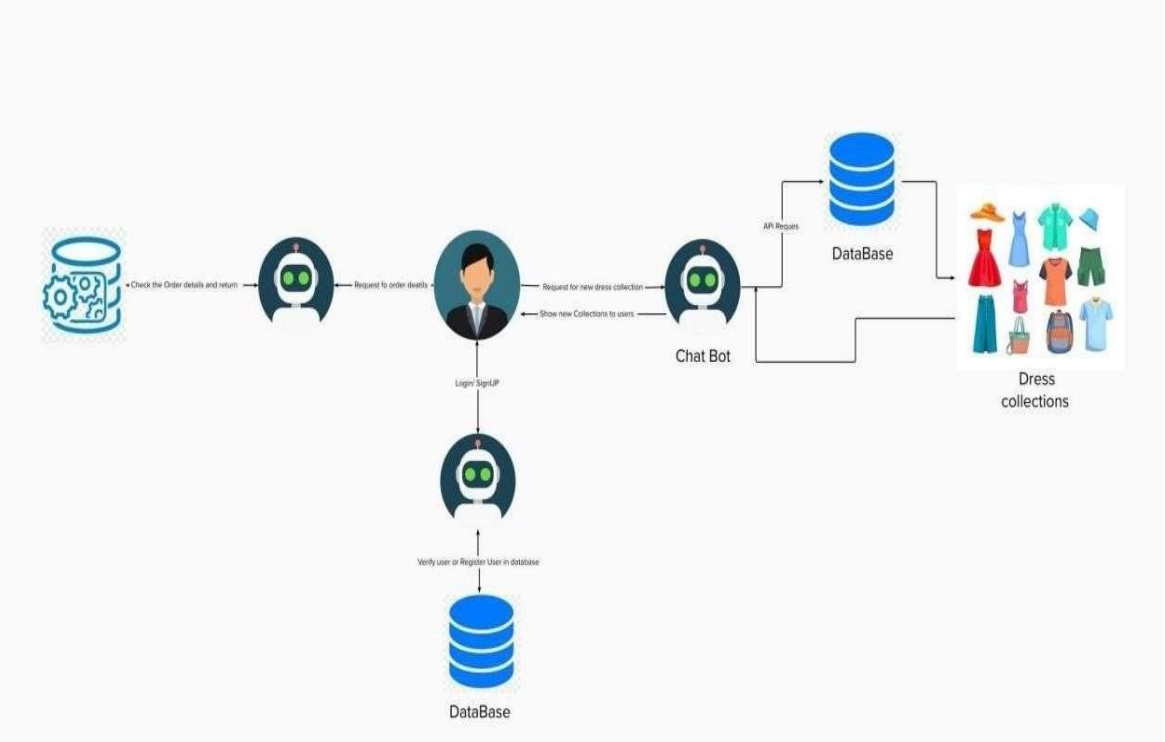
Following are the non-functional requirements of the proposed solution.

FR No.	Non-Functional Requirement	Description
NFR-1	**Usability**	The application will be designed in such a way that any user can easily navigate through it and user can easily view , order and track the product until delivery.(Easy and Compact design.)
NFR-2	**Security**	Using of SSL (Secure Socket Layer) certificate (Python Flask to Cloud connect) will provide security to the project. The user details will be kept as more secure.
NFR-3	**Reliability**	To make sure the application doesn't go down due to network traffic and the details entered in this application is kept as highly confidential, so it is highly reliable.
NFR-4	**Performance**	It focus on loading the application as quickly as possible irrespective of the number of users/integrator traffic.
NFR-5	**Availability**	This application will be available to all users (network connectivity is necessary) at any given point of time. Users can access the chatbot for raising any queries/ questions.
NFR-6	**Scalability**	Chatbot can be very useful during festival season to know about offers and discounts. It will be helpful whenever we make online shopping.

5. PROJECT DESIGN

5.1 DATA FLOW DIAGRAMS:

A Data Flow Diagram (DFD) is a traditional visual representation of the information flows within a system. A neat and clear DFD can depict the right amount of the system requirement graphically. It shows how data enters and leaves the system, what changes the information, and where data is stored.



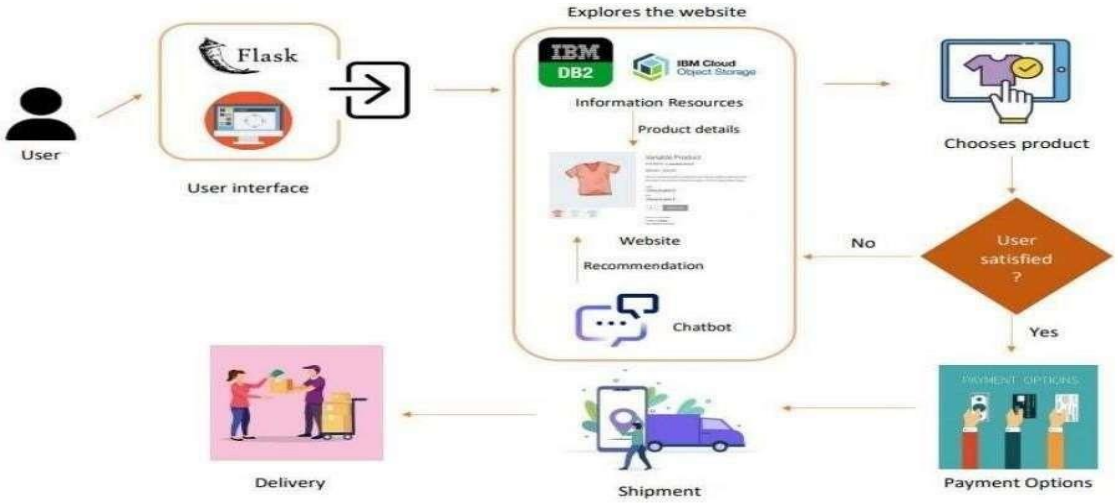
5.2 SOLUTION & TECHNICAL ARCHITECTURE:

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. Inthis 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.



5.3 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:

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
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:

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story points	Priority	Team Members
Sprint-1	Setting up App environment	USN-1	As a user, I can register in ICTA Academy and create IBM cloud account.	2	High	Ramya P Shanthini S
Sprint-1		USN-2	As a user, I will create a flask project	1	Low	Paranikumar B Karthika T
Sprint-1		USN-3	As a user, I will install IBM Cloud CLI	2	Medium	Ramya P Karthika T
Sprint-2	Setting up App environment	USN-4	As a user, I can install Docker CLI	1	Low	Paranikumar B Shanthini S
Sprint-2		USN-5	As a user, I will Create an account in sendgrid	2	Medium	Ramya P Paranikumar B
Sprint-3	Implementing web application	USN-6	As a user, I Create UI to interact with the application	1	High	Karthika T Ramya P
Sprint-3		USN-7	As a user, I Create IBM DB2 and connect with Python	3	High	Shanthini S
Sprint-3	Integrating Sendgrid Service	USN-8	As a user, I will integrating sendgrid with python code	2	High	Ramya P
Sprint-3	Developing a chatbot	USN-9	As a user, I have to build a chatbot and Integrate to application	1	Medium	Shanthini S
Sprint-4	Development of App in IBM Cloud	USN-10	As a user, I will Containerize the App	1	Low	Karthika T
Sprint-4		USN-11	As a user, I will upload image to IBM Container registry	2	Medium	Paranikumar B
Sprint-4		USN-12	As a user, I will deploy App in Kebernetes cluster	3	High	Ramya P
Sprint-4	User panel		As a user • Register, Login, Email, Verification • Manual Search • Order placement, Order Details	3	High	Ramya P Karthika T Shanthini S Paranikumar B

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

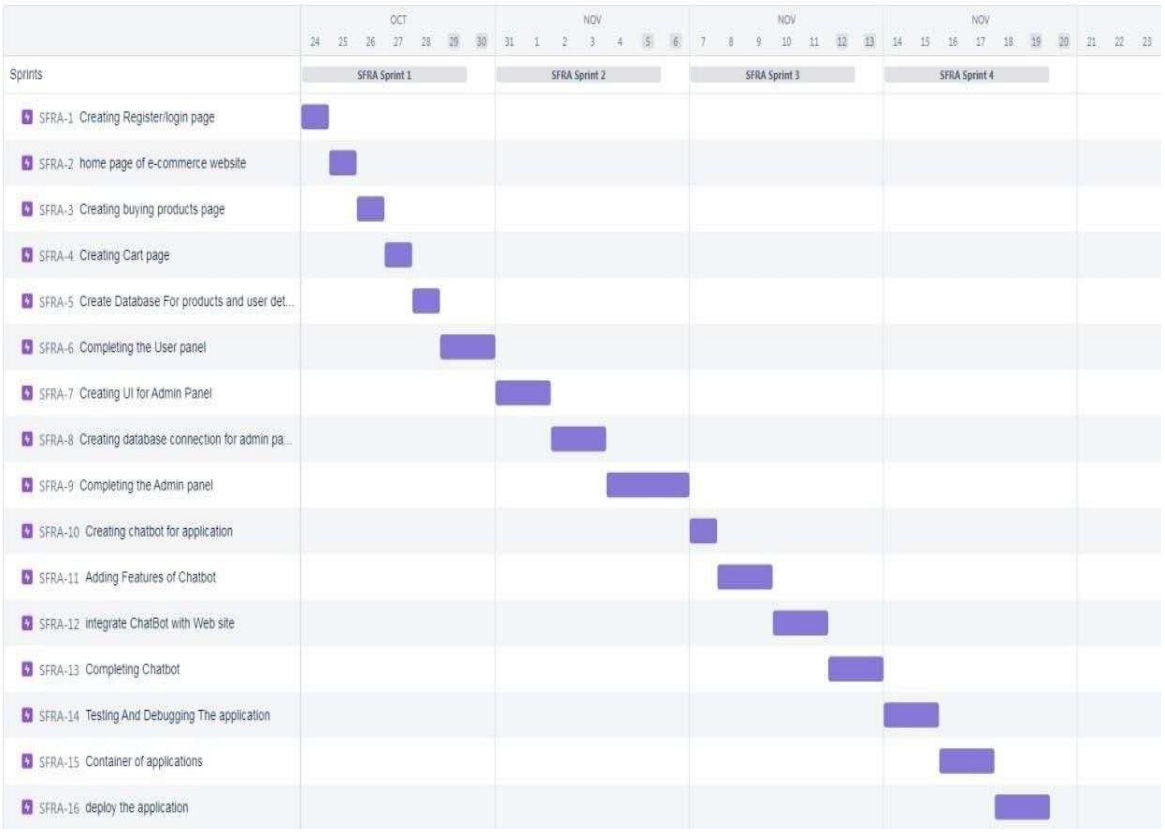
Velocity:

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:

Burndown Chart:



7. CODING & SOLUTIONING

FEATURE 1:

7.1 homepage.html

```
<html>
    <head>
        <title> MOST WANTED FASHION </title>

    </head>
    <style>
        *{
    margin: 0;
    padding: 0;
    font-family: "Times New Roman", Times, serif;

}
.main{
    width: 100%;
    background-color: #131315;
    background-position: center;
    background-size: cover;
    height: 200%;
    font-family: "Times New Roman", Times, serif;


}

.navbar{
    width: 100%;
    height: 75px;
    margin: auto;
}

.icon{
    width: 1000px;
    float: left;
    height: 70px;

}

.logo{
    color:#ebde24;
    font-size: 35px;
    font-family: 'Copperplate Gothic';

    padding-left: 20px;
    float: left;
    padding-top: 10px;
}

.menu{
    width: 400px;
```

```
    float: left;
    height: 70px;
}

ul{
   float: left;
   display: flex;
   justify-content: center;
   align-items: center;
}

ul li{
    list-style: none;
    margin-left: 62px;
    margin-top: 27px;
    font-size: 15px;
}

ul li a{
    text-decoration: none;
    color: #FFFFFF;

    font-weight: bold;
    transition: 0.4s ease-in-out;
}

ul li a:hover{
    color: #ebde24;

}

.search{
    width: 330px;
    float: left;
    margin-left: 470px;

}

.srch{

    width: 200px;
    height: 40px;
    background: transparent;
    border: 1px solid #ebde24
    color: #FFFFFF;
    border-right: none;
    font-size: 16px;
    float: left;
      padding: 10px;
      border-bottom-left-radius: 5px;
```

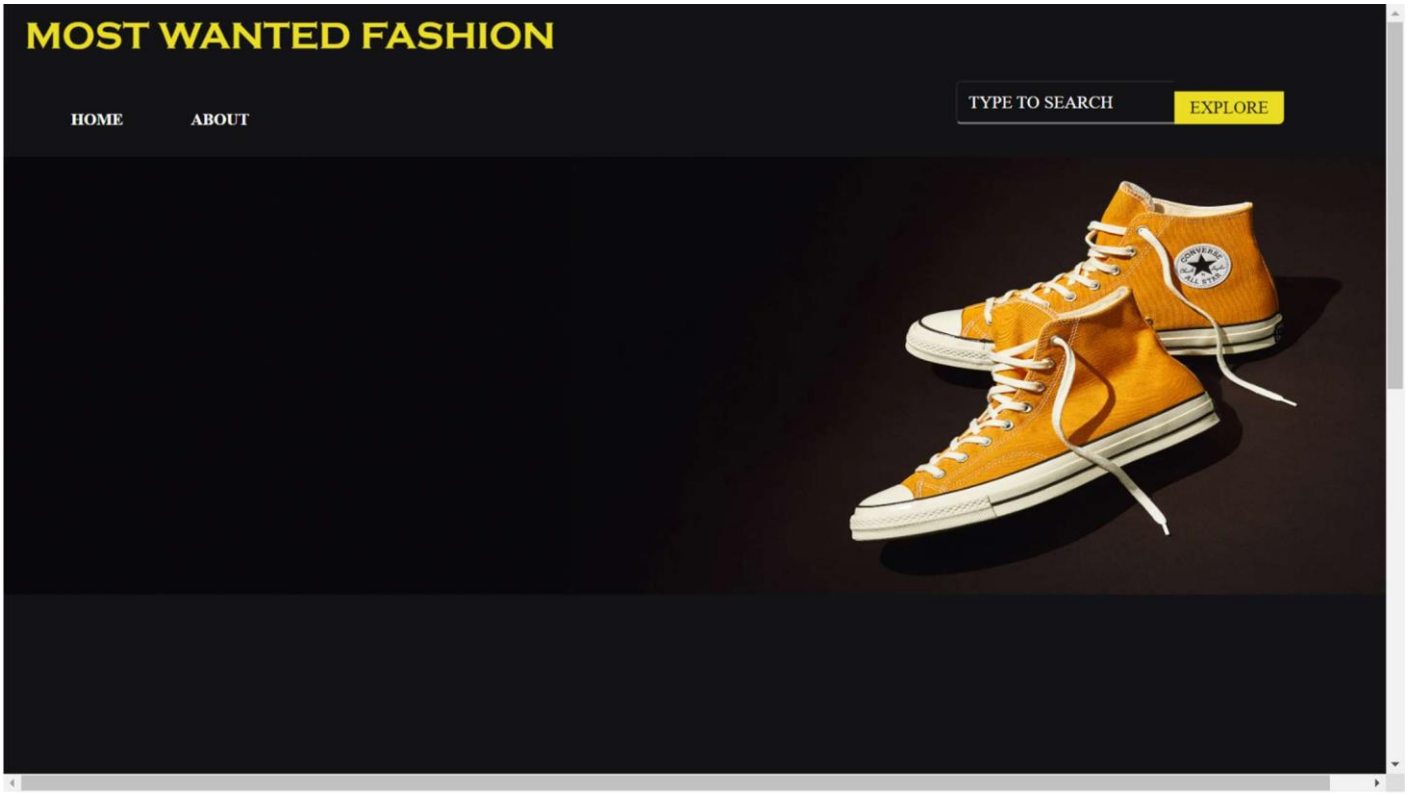
```
    border-top-left-radius: 5px;
}

.btn{
    width: 100px;
    height: 30px;
    background:#ebde24 ;
    border: 2px solid #ebde24;
    margin-top: 10px;
    color: #151414;
    font-size: 16px;
    border-bottom-right-radius: 5px;
    border-bottom-right-radius: 5px;
}

.btn:focus{
    outline: none;
}

.srch:focus{
    outline: none;
}

.content{
    width: 1200px;
    height: auto;
    margin: auto;
    color: #800080;
    position: relative;
}

.content.par{
    padding-left: 20px;
    padding-bottom: 25px;

    letter-spacing: 1.2px;
    line-height: 30px;
}

.content h1{

    font-size: 50px;
    padding-left: 20px;
    margin-top: 9%;
    letter-spacing: 2px;
}

.content .cn{
    width: 160px;
    height: 40px;
```

```
    background: rgb(98, 246, 152);
    border: none;
    margin-bottom: 10px;
    margin-left: 20px;
    font-size: 18px;
    border-radius: 10px;
    cursor: pointer;
    transition:  .4s ease;
}

.content .cn a{
    text-decoration: none;
    color: #FBE7A1;
    transition:  .3s ease;
}

.cn:hover{
    background-color: #FBE7A1;
}

.content span{
    color:rgb(98, 246, 152);
    font-size: 60px;
}

.form{
    width: 250px;
    height: 380px;
    background: linear-gradient(to top,hsla(89, 43%, 51%, 0.3));
    position: absolute;
    top: -20px;
    left: 870px;
    border-radius: 10px;
    padding: 25px;
}

.form h2{
    width: 220px;

    text-align: center;
    color:rgb(98, 246, 152);
    font-size: 22px;

    border-radius: 10px;
    margin: 2px;
    padding: 8px;
}

.form input{
    width: 240px;
```

```
    height: 35px;
    background: rgba(0, 255, 0, 0.5);
}

.form input{
    width: 240px;
    height: 35px;
    background: rgba(0, 255, 0, 0.5);
    border-bottom: 1px solid rgb(98, 246, 152);
    border-top: none;
    border-right: none;
    border-left: none;
    color: #fff;
    font-size: 15px;
    letter-spacing: 1px;
    margin-top: 30px;

}

.form input:focus{
    outline: none;
}

::placeholder{
    color: #fff;

}

.btnn{
    width: 240px;
    height: 40px;
    background: rgb(98, 246, 152);
    border: none;
    margin-top: 30px;
    font-size: 18px;
    border-radius: 10px;
    cursor: pointer;
    color: #fff;
    transition: 0.4s ease;
}

.btnn:hover{
    background: #fff;
    color: rgb(98, 246, 152);
}

.btnn a{
    text-decoration: none;
    color: #000;
    font-weight: bold;
```

```
}

.form .link{

    font-size: 17px;
    padding-top: 20px;
    text-align: center;
}

.form .link a{
    text-decoration: none;
    color: rgb(98, 246, 152);
}

.liw{
    padding-top: 15px;
    padding-bottom: 10px;
    text-align: center;
}

img{
     width:1300px;
     color: yellow;

     height: 400px;
     float:left ;

}
    </style>
    <body>

        <div class="main">
            <div class="navbar">
                <div class="icon">
                    <h2 class="logo">MOST WANTED FASHION</h2>
                </div>

                <div class="menu">
                    <ul>
                        <li><a href="#">HOME</a></li>
                        <li><a href="#">ABOUT</a></li>

                    </ul>
                </div>

                <div class="search">
                    <input class="srch" type="search" name="" placeholder="TYPE TO SEARCH">
                    <a href="#"><button class="btn">EXPLORE</button></a>
                </div>
```

```
            <img src="https://haikyuu09.s3.us-east.cloud-object-
storage.appdomain.cloud/Home%20Page.webp">

            </div>


        </div>

    </body>
</html>
```



FEATURE 2:

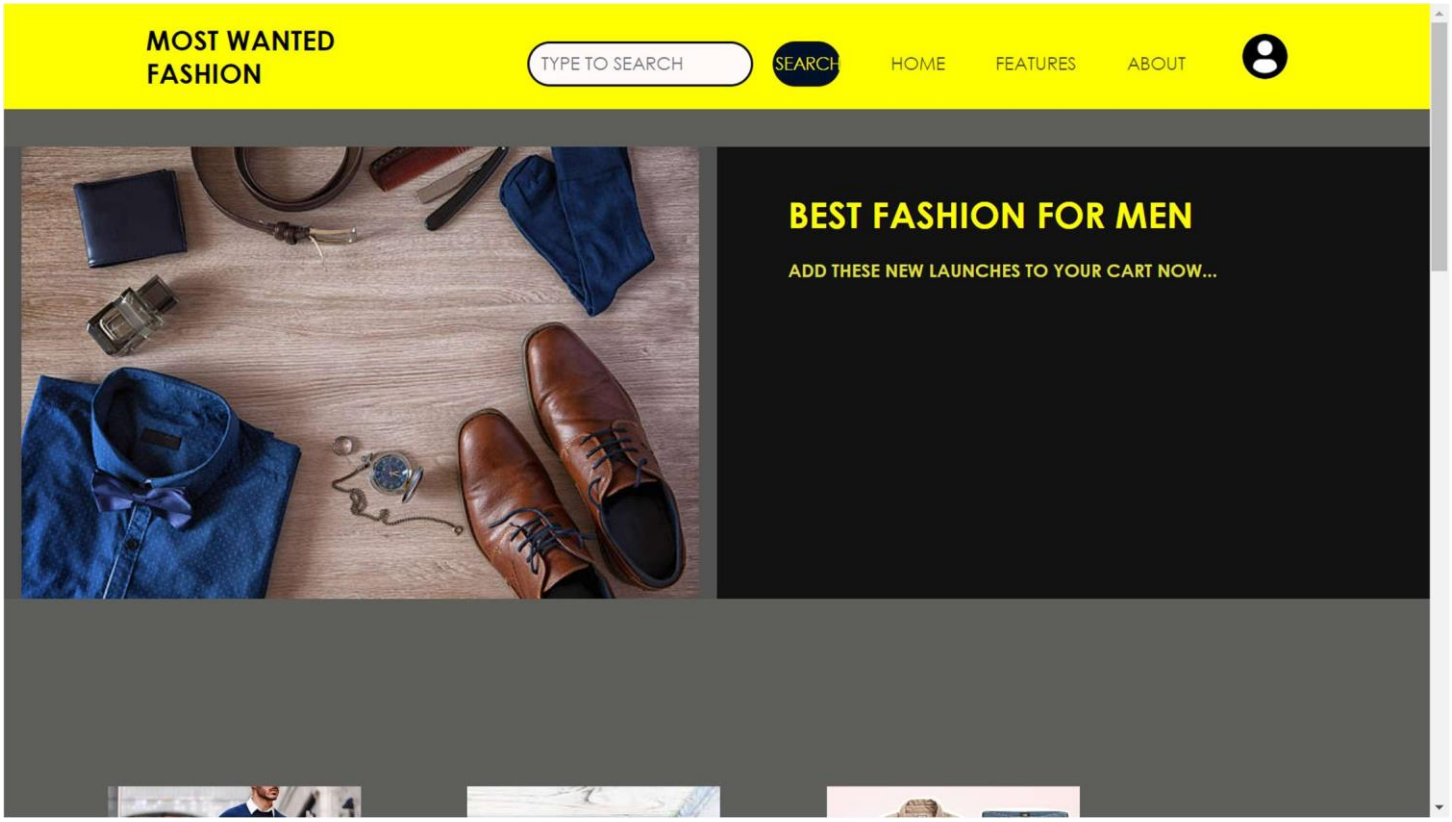
3.1 finalhome.html:

```
<html>

    <head>
        <meta name="viewpoint" content="width=device-width, initial-scale=1.0">
        <title>MOST WANTED FASHION</title>
        <link rel="stylesheet" href="https://storagedemo-madzh.s3.jp-tok.cloud-object-storage.appdomain.cloud/MadmukFinalhomecss.css">

    </head>

    <body style="background-color:rgb(95, 95, 90);">


            <nav style="background-color: yellow;">
               <h2 style="color: rgb(0, 0, 0);">MOST WANTED FASHION</h2> </a>
                <ul>
                    <li><input class="srch" type="search" name="" placeholder="TYPE TO SEARCH">
                    <a href="#"><button class="btn" style="color: yellow;">SEARCH</button></a></li>
                    <li><a href="#">HOME</a></li>
                    <li><a href="#">FEATURES</a></li>
                    <li><a href="#">ABOUT</a></li>

                </ul>
                <img src="https://storagedemo-madzh.s3.jp-tok.cloud-object-storage.appdomain.cloud/images/profile.jpeg" class="user-pic" onclick="toggleMenu()">

                <div class="sub-menu-wrap" id="subMenu">
                    <div class="sub-menu">
                        <div class="user-info">
                            <img src="https://storagedemo-madzh.s3.jp-tok.cloud-object-storage.appdomain.cloud/images/profile.jpeg">
                            <h2>NAME</h2>
                        </div>
                        <hr>

                        <a href="#" class="sub-menu-link">
                            <img src="https://storagedemo-madzh.s3.jp-tok.cloud-object-storage.appdomain.cloud/images/profile.jpeg">
                            <p>EDIT PROFILE</p>

                        </a>

                        <a href="#" class="sub-menu-link">
```

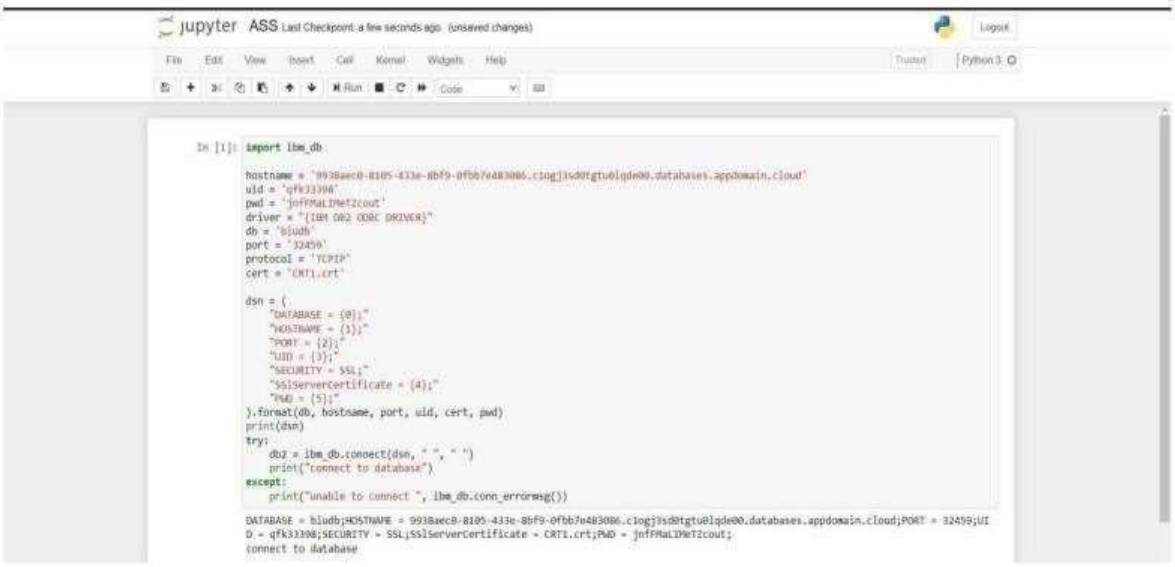
```
                            <img src="https://storagedemo-madzh.s3.jp-tok.cloud-object-storage.appdomain.cloud/images/settings.jpeg">
                            <p>SETTING  & PRIVACY</p>

                        </a>

                        <a href="#" class="sub-menu-link">
                            <img src="https://storagedemo-madzh.s3.jp-tok.cloud-object-storage.appdomain.cloud/images/help.jpeg">
                            <p>HELP</p>

                        </a>

                        <a href="/Login" class="sub-menu-link">
                            <img src="https://cdn-icons-png.flaticon.com/512/56/56805.png">
                            <p>LOGOUT</p>

                        </a>
                    </div>
                </div>

            </nav>

            <div class="Banner">
                <div class="Bannerimg1"> <img img class="image" src="https://haikyuu09.s3.us-east.cloud-object-storage.appdomain.cloud/pic%202.jpg"></div>
                  <div class="Adcontent">

                      <h1 style="color: yellow;"><br>BEST FASHION FOR MEN</br></h1>
                      <h4 style="color:#dbdb40;"><br>ADD THESE NEW LAUNCHES TO YOUR CART NOW...</br></h4>
                  </div>
              </div>

            <div class="row">
                <div class="column"> <div class="depimg"><img class="image" src="https://haikyuu09.s3.us-east.cloud-object-storage.appdomain.cloud/pic%201.jpg"> </div> <div class="Bottom" style="color: yellow ; background-color: black;">T-SHIRTS & POLOS</div> </div>

                <div class="column"> <div class="depimg"><img class="image" src="https://haikyuu09.s3.us-east.cloud-object-storage.appdomain.cloud/pic%203.jpg"> </div> <div class="Bottom" style="color: yellow ; background-color: black;">CASUAL SHIRTS</div>  </div>

                <div class="column"> <div class="depimg"><img class="image" src="https://haikyuu09.s3.us-east.cloud-object-
```

```
storage.appdomain.cloud/pic%205.jpg"> </div> <div class="Bottom" style="color:
yellow ; background-color: black;">SPORTS WEAR</div>  </div>

            </div>

        <div class="Banner">
          <div class="Bannerimg1"> <img img class="image"
src="https://haikyuu09.s3.us-east.cloud-object-
storage.appdomain.cloud/images.jpg"></div>
            <div class="Adcontent">

                <h1 style="color: yellow;"><br>BEST FASHION FOR WOMEN</br></h1>
                <h4 style="color:yellow;"><br>ADD THESE NEW LAUNCHES TO YOUR CART
NOW...</br></h4>
            </div>
        </div>

        <div class="rowstart">
            <div class="columnst"> <div class="depimg"><img class="image"
src="https://cdn0.weddingwire.in/article/2617/original/1280/jpg/107162-wedding-
dresses-for-girls-6.jpeg"> </div> <div class="Bottom" style="color: yellow ;
background-color: black;">WEDDING & FESTIVE</div> </div>

            <div class="columnst"> <div class="depimg"><img class="image"
src="https://previews.123rf.com/images/vadymvdrobot/vadymvdrobot1801/vadymvdrobot18
0102335/94122785-full-length-image-of-smiling-asian-woman-in-business-clothes-and-
eyeglasses-holding-smartphone-while.jpg"> </div> <div class="Bottom" style="color:
yellow ; background-color: black;">BACK TO DESK</div> </div>

            <div class="columnst"> <div class="depimg"><img class="image"
src="https://i.pinimg.com/474x/29/00/fa/2900fa4d1599631766420338e531b2b2.jpg">
</div> <div class="Bottom" style="color: yellow ; background-color: black;">VACAY
MOOD</div> </div>

            </div>


    <script>
        let subMenu = document.getElementById("subMenu");
        function toggleMenu(){
            subMenu.classList.toggle("open-menu");
        }
    </script>

    </body>
    <footer>
      <div class="footer" style="color: yellow ; background-color: black;">
<H1>HAPPY SHOPPING</H1></div>

    </footer>
```

```
419. </html>
```

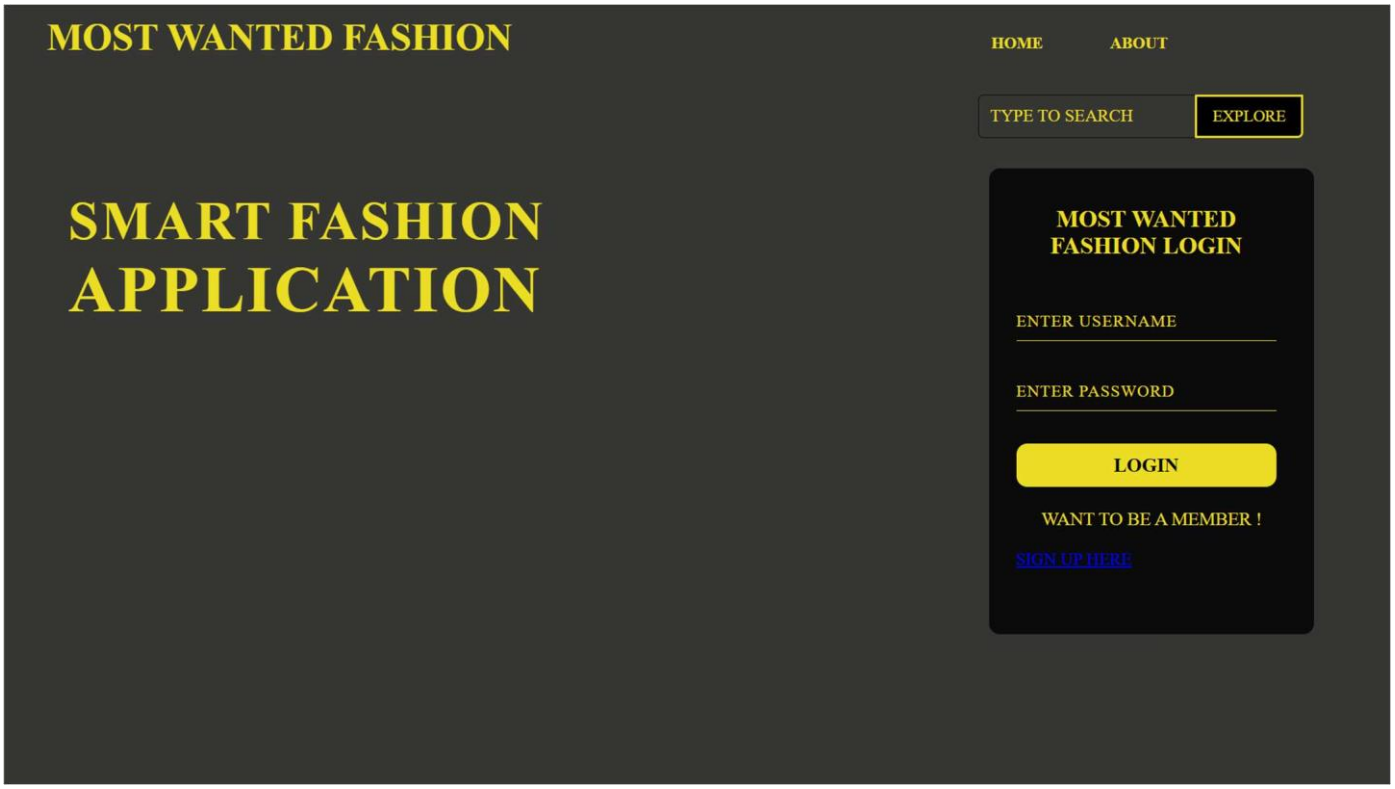

MOST WANTED
FASHION
TYPE TO SEARCH
SEARCH
HOME
FEATURES
ABOUT
BEST FASHION FOR MEN
ADD THESE NEW LAUNCHES TO YOUR CART NOW...

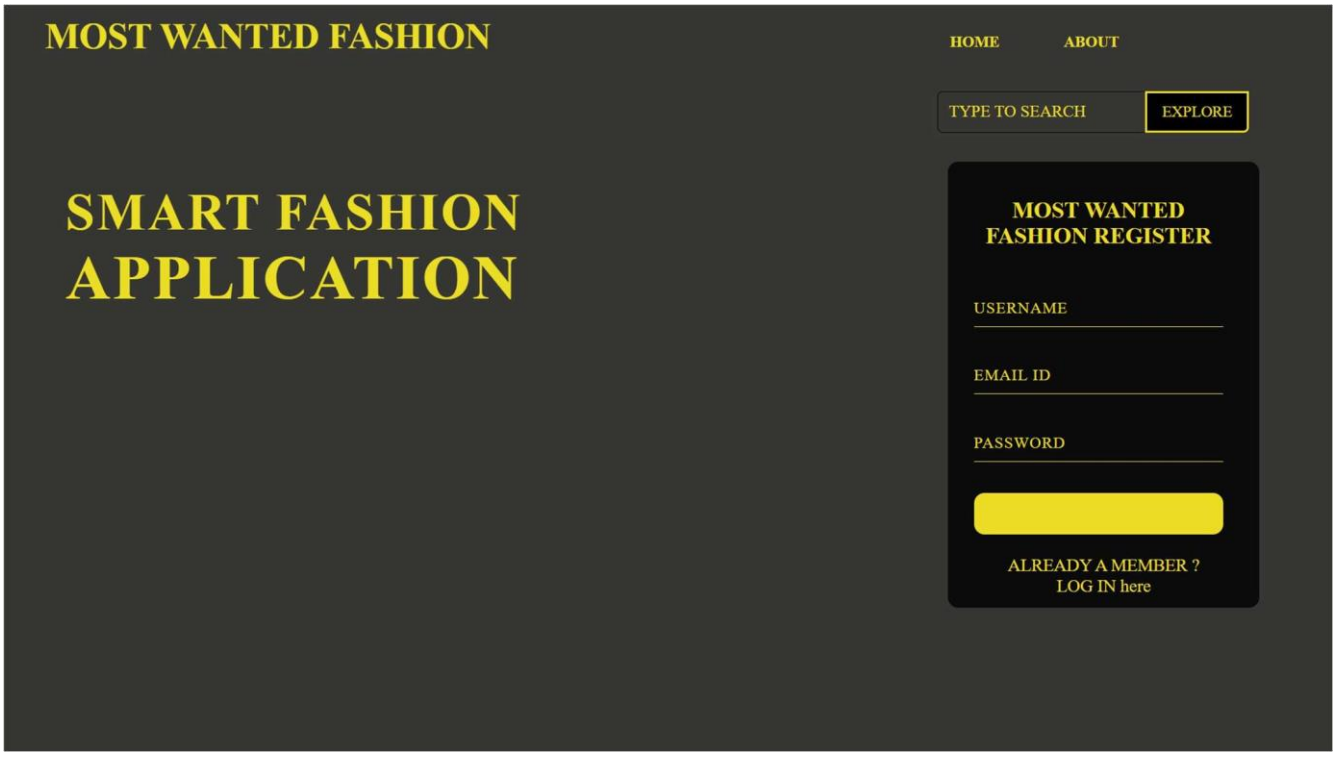
3.1 DATABASE SCHEMA:



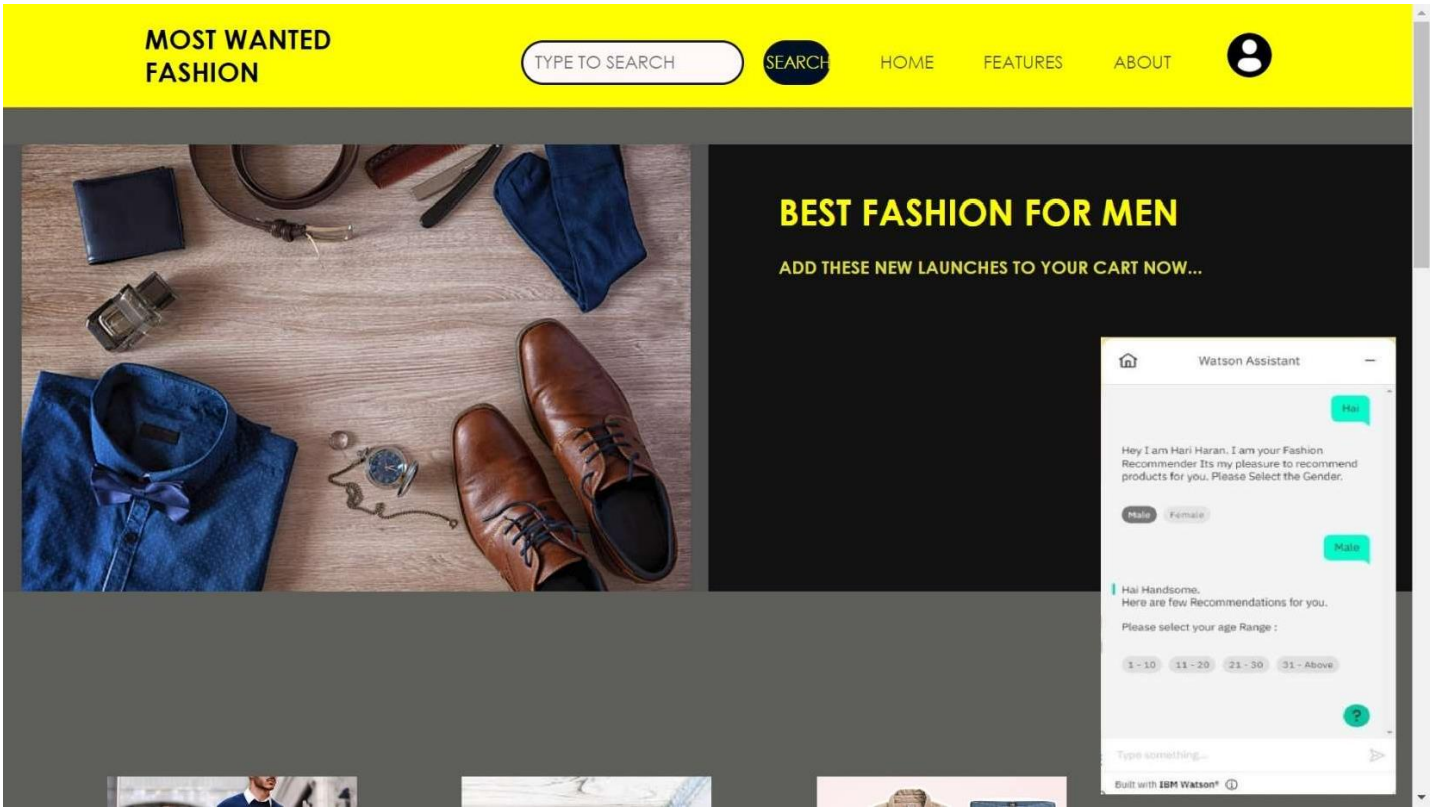
4. TESTING

8.1 TEST CASES





8.2 USER ACCEPTANCE TESTNG



5. RESULTS

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 to evaluate 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 lower RMSE value indicates higher performance by the recommendation model. RMSE, as mentioned by, can be as represented as follows:

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

where, N_p is the total number of predictions, p_{ui} is the predicted rating that a user u will select an 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 as represented 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, where a 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:

$$F1\ score = 2 \times \frac{Precision * Recall}{Precision + Recall} \quad (4)$$

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.

6. ADVANTAGES & DISADVANTAGES

ADVANTAGES:

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

DISADVANTAGES:

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

7. 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 completelyon 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.

8. 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 followbrand-specific personalization campaigns and hence it will ensure highly curate 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.

9. APPENDIX

SOURCE CODE:

login.html:

```
<html>
 <head>

<meta name="viewpoint" content="width=device-width, initial-scale=1.0">
<title>MOST WANTED FASHION</title>

<link rel="stylesheet" href="https://storagedemo-madzh.s3.jp-tok.cloud-object
storage.appdomain.cloud/Regcss.css">

 </head>

 <body>
 <div class="main">
<div class="navbar">
  <div class="menu">
  <ul>
 </ul>
</div>
</div>
<div class="content">
    <h1> SMART FASHION <br><span>APPLICATION</span></h1>
    <div class="form">
          <h2>MOST WANTED FASHION LOGIN</h2>
          <form action="/Login" method="post">
          <input type="text"     name="username"     placeholder="ENTER USERNAME">
          <input type="password" name="password" placeholder="ENTER PASSWORD">
          <button  type="SUBMIT" class="btnn"><a href="#">LOGIN</a></button>
<p class="link">DON'T HAVE AN ACCOUNT<br>
          <a href="/Register">SIGN UP </a> HERE </a></p>
           </form>
                </div>
   </div>
 </div>
</body>
</html>
```

INTEGRATING APPLICATION WITH CHATBOT USING WATSON ASSISTANT

CODE :

```
<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>
```

GITHUB

GITHUB LINK:

https://github.com/IBM-EPBL/IBM-Project-53975-1661586012

DEMO VIDEO LINK:

https://1drv.ms/v/s!Av3mbTmqylcNgxPsRDxxqRfhuQ5o?e=BLQKSI