

# **SMART FASHION RECOMMENDER SYSTEM**

## **A REPORT**

**IV YEAR / VII SEM**

**TEAM ID : PNT2022TMID07200**

*Submitted by*

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**BACHELOR OF ENGINEERING**

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**DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING**



**JERUSALEM COLLEGE OF ENGINEERING**

**(An Autonomous Institution, Affiliated to Anna University, Chennai)**

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# INTRODUCTION

Clothing is a kind of symbol that represents people's internal perceptions through their outer appearance. It conveys information about their choices, faith, personality, profession, social status, and attitude towards life.

Therefore, clothing is believed to be a nonverbal way of communicating and a major part of people's outer appearance. 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. Additionally, consumers' clothing choices and product preference data have become available on the Internet in the form of text or opinions and images or pictures. Since these images contain information about people from all around the world, both online and offline fashion retailers are using these platforms to reach billions of users who are active on the Internet. Therefore, e-commerce has become the predominant channel for shopping in recent years. The ability of recommendation systems to provide personalized recommendations and respond quickly to the consumer's choices has contributed significantly to the expansion of e-commerce sales.

According to different studies, e-commerce retailers, such as Amazon, eBay, and social networking sites, such as Pinterest, Snapchat, Instagram, Facebook are now regarded as the most popular media for fashion advice and recommendations. Research on textual content, such as posts and comments emotion and information diffusion, and images has attracted the attention of modern-day researchers, as it can help to predict fashion trends and facilitate the development of effective recommendation systems.

## 1.1 PROJECT OVERVIEW

An online Fashion recommender system is a process in which people (specific customers) are being provided with the option of purchasing goods and services directly from the seller, all in a real-time environment. Online Fashion recommender is an application of the internet as electronic commerce. From the business perspective, customers usually find the products more attractive, on websites, as they get all the details available there.

People in large number are doing online shopping today, and it is not only because it is convenient as one can shop from home, but also because there is an ample number of varieties available, with a high competition of prices, and also it is easy to navigate for searching regarding any particular item.

## **1.2 PURPOSE**

Systems are often used to solve different complex problems in this scenario, such as social fashion-based recommendations (outfits inspired by influencers), product recommendations, or size and fit recommendations.

The impact of social networks and the influence that fashion influencers have on the choices people make for shopping is undeniable. For instance, many people use Instagram to learn about fashion trends from top influencers, which helps them to buy similar or even exact outfits from the tagged brands in the post. When traced, customers' social behavior can be a very useful guide for online shopping websites, providing insights on the styles the customers are really interested in, and hence aiding the online shops in offering better recommendations and facilitating customers quest for outfits.

## 2. LITERATURE SURVEY

S.NO	TITLE OF THE JOURNAL	AUTHOR NAME	JOURNAL NAME	YEAR	DESCRIPTION
1.	Extraction of visual features for recommendation of products via deep learning.	Andreeva E., Ignatov D.I., Grachev A., and Savchenko A.V.	International Conference on Analysis of Images, Social Networks and Texts.	2018	In this paper (The first author is the 1st place winner of the Open HSE Student Research Paper Competition (NIRS) in 2017, Computer Science nomination, with the topic "Extraction of Visual Features for Recommendation of Products", as alumni of 2017 "Data Science" master program at Computer Science Faculty, HSE, Moscow), we describe a special recommender approach based on features extracted from the clothes' images. The method of feature extraction relies on pre-trained deep neural network that follows transfer learning on the dataset. Recommendations are generated by the neural network as well.
2.	Understanding and personalising clothing recommendation for women.	de Barros Costa, E., Rocha, H.J.B., Silva, E.T., Lima, N.C., and Cavalcanti, J.	World Conference on Information Systems and Technologies	2017	In this paper, we introduce an approach for clothing personalized recommendation system that is able to recommend clothing items to women, according to their fashion styles and body types. Thus, our recommendation approach includes three main modules: one for automatically identifying the fashion style, the other for detecting body type, and the third is responsible for recommending clothing categories with models linked to clothing images. Thus, it allows the women to select appropriate clothing options, considering clothing categories that include: dresses, coats, tops, sweaters, jackets.
3.	M.Image-based fashion product	Tuinhof H., Pirker C., and Haltmeier	International Conference on Machine Learning,	2018	We develop a two-stage deep learning framework that recommends fashion images based on other input images of similar style. For that

	recommendation with deep learning.		Optimization, and Data Science		purpose, a neural network classifier is used as a data-driven, visually-aware feature extractor. The latter then serves as input for similarity-based recommendations using a ranking algorithm. Our approach is tested on the publicly available Fashion dataset. Initialization strategies using transfer learning from larger product databases are presented. Combined with more traditional content-based recommendation systems, our framework can help to increase robustness and performance, for example, by better matching a particular customer style.
4.	A novel fashion clothing advising framework	Yang Z., Su Z., Yang Y., and Lin G	International Conference on Digital Home	2018	In this paper, we combine visual features of clothing images, user's implicit feedback and the price factor to construct a recommendation model based on Siamese network and Bayesian personalized ranking to recommend clothing satisfying user's preference and consumption level. Then on the basis of recommending clothing, we use Generative Adversarial Networks to generate new clothing images and use them to form a compatible collocation to provide fashion suggestions out of datasets.
5.	Neural fashion experts	Liu J., Song X., Chen Z., and Ma J	Neurocomputing	2019	The rich fashion data provide us an opportunity for the clothing matching, especially the complementary fashion item matching. In this work, we propose a multiple autoencoder neural network based on the Bayesian Personalized Ranking, dubbed BPR-MAE. Seamlessly exploring the multi-modalities (i.e., the visual and textual modalities) of fashion items, this framework is able to not only comprehensively model the compatibility between fashion items (e.g., tops and bottoms, bottoms and shoes) but also fulfill the

					complementary fashion item matching among multiple fashion items. Experimental results on the real-world dataset FashionVC+ demonstrate the effectiveness of BPR-MAE, based on which we provide certain deep insights that can benefit the future research.
6.	Fashion recommendations through cross-media information retrieval	Zhou W., Mok P.Y., Zhou Y., Zhou Y., Shen J., Qu Q., andChau K.P	Journal of Visual Communication and Image Representation	2019	Fashion recommendation has attracted much attention given its ready applications to e-commerce. Traditional methods usually recommend clothing products to users on the basis of their textual descriptions. Product images, although covering a large resource of information, are often ignored in the recommendation processes. In this study, we propose a novel fashion product recommendation method based on both text and image mining techniques. Our model facilitates two kinds of fashion recommendation, namely, similar product and mix-and-match, by leveraging text-based product attributes and image features. To suggest similar products, we construct a new similarity measure to compare the image colour and texture descriptors.
7.	Scene-based complementary product recommendation.	Kang W.C., Kim E., Leskovec J., Rosenberg C., andMcAuley, J.	IEEE/CVF Conference on Computer Vision and Pattern Recognition	2019	Modeling fashion compatibility is challenging due to its complexity and subjectivity. Existing work focuses on predicting compatibility between product images (e.g. an image containing a t-shirt and an image containing a pair of jeans). However, these approaches ignore real-world 'scene' images (e.g. selfies); such images are hard to deal with due to their complexity, clutter, variations in lighting and pose (etc.) but on the other hand could potentially provide key context (e.g. the user's body type, or the season) for making more accurate recommendations. In this work, we propose a new task called 'Complete the Look', which seeks to recommend visually compatible products based on scene images. We design an approach to extract training data for this task, and propose a novel way to learn the scene-product

					compatibility from fashion or interior design images.
8.	Enhancing fashion recommendation with visual compatibility relationship.	Yin R., Li K., Lu J., and Zhang G.	The World Wide Web Conference	2019	With the increasing of online shopping services, fashion recommendation plays an important role in daily online shopping scenes. A lot of recommender systems have been developed with visual information. However, few works take into account compatibility relationship when they are generating recommendations. The challenge is that fashion concept is often subtle and subjective for different customers. In this paper, we propose a fashion compatibility knowledge learning method that incorporates visual compatibility relationships as well as style information.
9.	Learning fashion compatibility with bidirectional lstms	Han X., Wu Z., Jiang Y.G., and Davis L.S.	ACM international conference on Multimedia	2017	The ubiquity of online fashion shopping demands effective recommendation services for customers. In this paper, we study two types of fashion recommendation: (i) suggesting an item that matches existing components in a set to form a stylish outfit (a collection of fashion items), and (ii) generating an outfit with multimodal (images/text) specifications from a user. To this end, we propose to jointly learn a visual-semantic embedding and the compatibility relationships among fashion items in an end-to-end fashion. More specifically, we consider a fashion outfit to be a sequence (usually from top to bottom and then accessories) and each item in the outfit as a time step
10.	Scenery-based fashion recommendation with cross-domain generative	Jo S.Y., Jang S.H., Cho H.E., and Jeong J.W	IEEE International Conference on Big Data and Smart Computing	2019	To build an effective fashion recommendation system is a still challenging issue due to its high complexity. Previous research works generally have focused on how to provide fashion items visually similar to the user's current fashion taste. However, a scenery (natural landscape) around users is also an important affective factor in

	adversarial networks				recommending fashions. This paper presents a novel system to recommend fashion designs that fit target sceneries. To address this, the exemplar photos regarding the target landscape are first collected from the database.
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## 2.1 EXISTING SYSTEM

**Lack of consistency between brands:** There is a large number of approved sizing systems around the globe for various clothes, such as dresses, tops, skirts, pants and brands. Moreover, there are different size systems such as numeric (38-39-40), standard (S, M, L), fractions (41 1/3, 42.5), convention sizes (36-38, 40-42), country conventions (EU, FR, IT, UK), where inconsistencies and different ways of converting a local size system to another (as brands do not always comply with the same conversion logic) make the task challenging.

**Subjectivity:** The exact size is a very subjective feature; users who have purchased items with the same style and shape may make future purchases with different sizes; how an item fits on your body depends on or can be influenced by several factors, making an objective recommendation difficult. Moreover, customers may be driven by emotional aspects; even a piece of accurate size advice can come with a high emotional cost when the advised size differs from the customer's expectation.

**Data sparsity:** Users are able to buy only a small part of the items of an e-commerce website and on the other hand articles have a limited stock, which can in turn hinder the task of recommender systems working with user-item fit feedback.

## 2.2 REFERENCE

- <https://www.w3schools.com/>
- <https://stackoverflow.com/>
- <https://arxiv.org/pdf/2202.02757.pdf>
- <https://link.springer.com/book/10.1007/978-3-030-55218-3#:~:text=Recommender%20Systems%20are%20often%20used,or%20size%20and%20fit%20recommenda%20tions.>
- [https://www.w3schools.com/html/html\\_favicon.asp](https://www.w3schools.com/html/html_favicon.asp)
- [www.github.com](http://www.github.com).



## 2.3 PROBLEM STATEMENT DEFINITION

The textile and apparel industries have grown tremendously over the last years. Customers no longer have to visit many stores, stand in long queues, or try on garments in dressing rooms as millions of products are now available in online catalogs. However, given the plethora of options available, an effective recommendation system is necessary to properly sort, order, and communicate relevant product material or information to users. Effective fashion RS can have a noticeable impact on billions of customers' shopping experiences and increase sales and revenues on the provider-side.

The goal of this survey is to provide a review of recommender systems that operate in the specific vertical domain of garment and fashion products. We have identified the most pressing challenges in fashion RS research and created a taxonomy that categorizes the literature according to the objective they are trying to accomplish (e.g., item or outfit recommendation, size recommendation, explain ability, among others) and type of side-information (users, items, context). We have also identified the most important evaluation goals and perspectives (outfit generation, outfit recommendation, pairing recommendation).

## 3.IDEATION & PROPOSED SOLUTION

### 3.1 EMPATHY MAP CANVAS



### 3.2 IDEATION & BRAINSTORMING

#### Brainstorm & Idea Prioritization Template:

Brainstorming provides a free and open environment that encourages everyone within a team to participate in the creative thinking process that leads to problem solving. Prioritizing volume over value, outof-the-box ideas are welcome and built upon, and all participants are encouraged to collaborate, helping each other develop a rich number of creative solutions.

Use this template in your own brainstorming sessions so your team can unleash their imagination and start shaping concepts even if you're not sitting in the same room.

Reference: <https://www.mural.co/templates/empathy-map-canvas>

1

Smart Fashion Recommender Application  
solving the users problems in purchase Online shopping

5 minutes

PROBLEM

How might we (your problem statement)?

Key rules of brainstorming

To run an smooth and productive session

Stay in topic

Encourage wild ideas

Defer judgment

Listen to others

Go for volume

If possible, be visual

2

Brainstorm

Write down any ideas that come to mind that address your problem statement.

10 minutes

Parameshwaran.V.K

Dayanithi.S

Manoj Adhithyan.A

Mohan Raj.M

Trending Designs clothes

Shop with Assistant

Discounts & Offers

Cash on Delivery

Save Time

All size of clothes

24/7 Shopping

Home Delivery

Easy Price Comparison

Easy to send gifts

Online Tracking

Online Tracking

Reviews of Products

Shopping via the internet saves time

No need to travel

Free shipping

3

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

Importance

Feasibility

Cash on Delivery

Easy to send gifts

Reviews of Products

Shopping via the internet saves time

No need to travel

Free shipping

Shop with Assistant

Home Delivery

24/7 Shopping

Parameshwaran V.K - 421319104021

Manoj Adhithyan A - 421319104016

Dayanithi S - 421319104003

Mohan Raj M - 421319104018

### 3.3 PROPOSED SOLUTION

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	> Copycats & product counterfeiting
2.	Idea / Solution description	> You can also trademark important words or designs, which makes it easier to pursue legal action against those who try to copy you.
3.	Novelty / Uniqueness	> A unique fashion brand should speak to a niche in the fashion industry with its own voice and creativity.
4.	Social Impact / Customer Satisfaction	> Customer satisfaction is defined as a measurement that determines how happy customers are with a company's products, services, and capabilities.
5.	Business Model (Revenue Model)	> Optimize Your eCommerce Storefront. A clothing business without an online presence is missing out on key opportunities.
6.	Scalability of the Solution	> Scalability is an aspect or rather a functional quality of a system, software or solution.

### 3.4 PROPOSED SOLUTION FIT

<b>1.CUSTOMER SEGMENT</b>  ➤ Teenagers and young adults.	<b>4.CUSTOMER CONSTRAINTS</b>  ○ Limited stock ○ Over price	<b>7.AVAILABLE SOLUTIONS</b>  ○ Customer can request return within a week. ○ They also request refund on payment issue.
<b>2.JOBS TO BE DONE</b>  ➤ If any problems faced by customer please get into our sight.	<b>5.PROBLEM ROOT CAUSE</b>  ➤ Internet issue while purchasing or some technical issue.	<b>8.BEHAVIOUR</b>  ➤ Customer just explore and pick which is favourite to their own, don't consider others opinion.
<b>3.EMOTIONS: BEFORE / AFTER</b>  ○ <b>Before</b> : Lost, insecure ○ <b>After</b> : Confident, in control	<b>6.SOLUTION</b>  ➤ Kindly check that your network connection is stable while paying or purchasing.	<b>9.CHANNELS OF BEHAVIOUR</b>  ○ <b>ONLINE</b> : Using chat option customer can access our service ○ <b>OFFLINE</b> : By make a call to the given toll-free customer care number.

## 4. REQUIREMENT ANALYSIS

### 4.1 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 Login	Login Using Username and Password Login Using Email id and password
FR-3	Review or Rating	User can review a product and can give a rating for it.
FR-4	Assistant	By Using assistant make the work easier.
FR-5	Logout	Logout from the webpage after exploring

## 4.2 NON-FUNCTIONAL REQUIREMENT

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

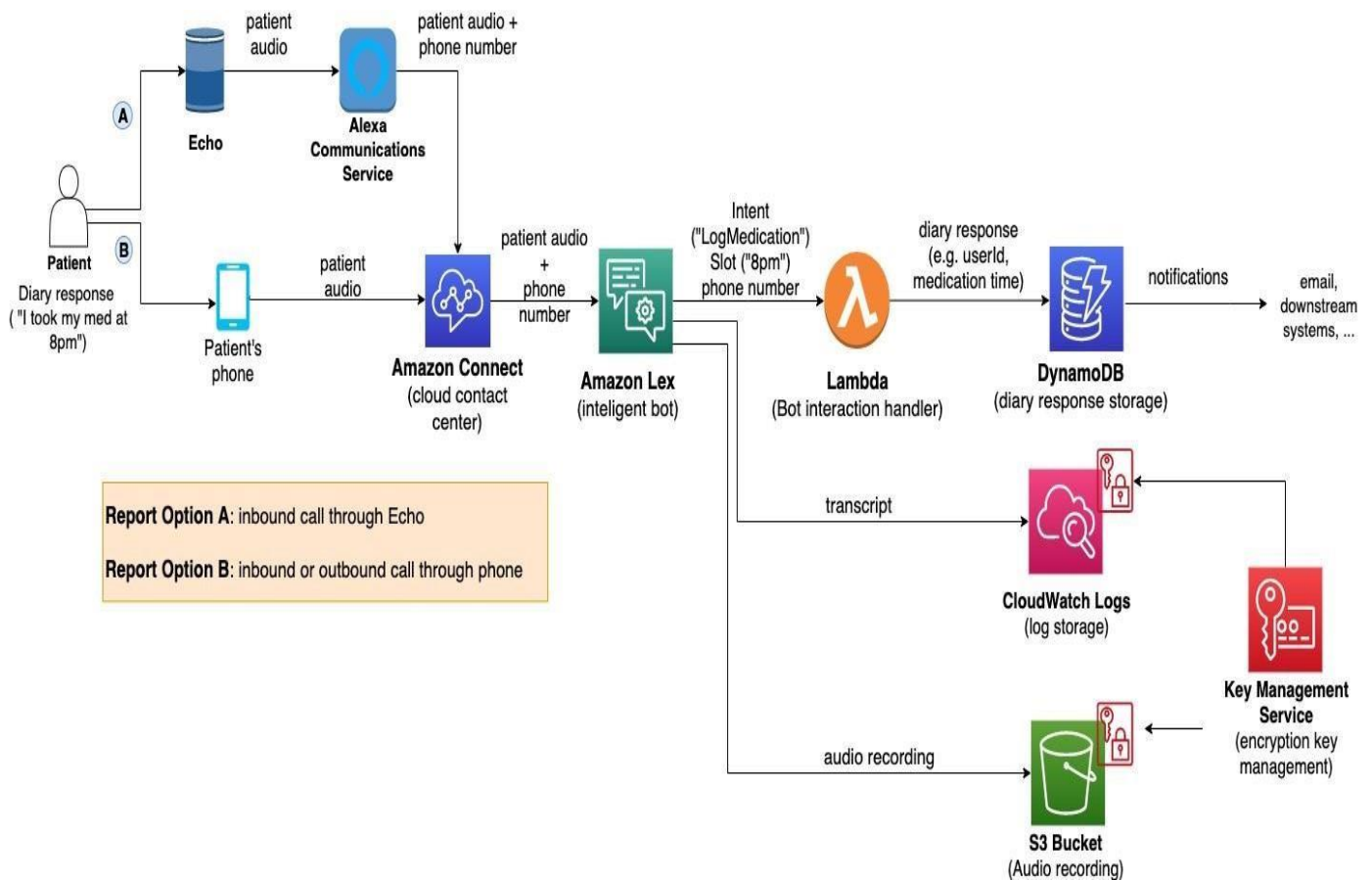
FR No.	Non-Functional Requirement	Description
NFR-1	<b>Usability</b>	The webpage should be useful for most of people those who visited it.
NFR-2	<b>Security</b>	The data should be stored in safe place which is given by the users.
NFR-3	<b>Reliability</b>	The service should be given at the same quality to all the user of the website.
NFR-4	<b>Performance</b>	The performance of the website should clean and it should contain clean UI to retain customer.

## 5 PROJECT DESIGN

### 5.1 DATA FLOW DIAGRAM

Solution architecture is a complex process – with many sub-processes – that bridges the gap between business problems and technology solutions. Its goals are to:

- Find the best tech solution to solve existing business problems.
- Describe the structure, characteristics, behavior, and other aspects of the software to project stakeholders.
- Define features, development phases, and solution requirements.
- Provide specifications according to which the solution is defined, managed, and delivered.



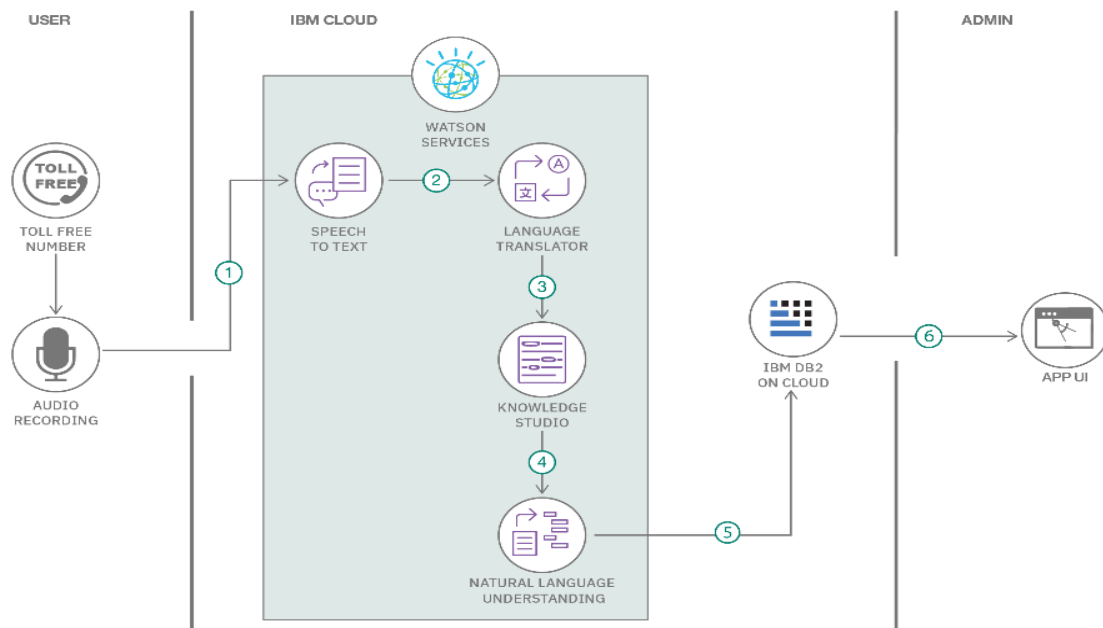


## 5.2 SOLUTION & TECHNICAL ARCHITECTURE

### Technical Architecture:

The Deliverable shall include the architectural diagram as below and the information as per the table1 & table 2

#### Example: Order processing during pandemics for offline mode



#### Guidelines:

1. Include all the processes  
(As an application logic / Technology Block)
2. Provide infrastructural demarcation  
(Local / Cloud)
3. Indicate external interfaces (third party API's etc.)
4. Indicate Data Storage components / services
5. Indicate interface to machine learning models (if applicable)

### 5.3 USER STORIES

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Customer (Web user)	Registration	USN-1	As a user, I can register for the application by entering my email, password, and confirming my password.		High	Sprint-1
	Login	USN-2	As a user, I can log into the application by entering email or User name & password which I had registered	I can access my account / dashboard	High	Sprint-1
	Dashboard	USN-3	As a user, I can explore the web page to find the latest fashion and details about those products	I am able to like or dislike the new ideas that showcased	Medium	Sprint-2
	Assistant	USN-4	As a user, I can use the personal assistant offered by the website to make my job easier	It is completely an extra choice	Low	Sprint 3
Customer Care Executive	Request	USN-5	If any problem occurred or any doubts you can contact Customer care executive		High	Sprint 4

## 6. PROJECT PLANNING & SCHEDULING

### 6.1 SPRINT PLANNING & ESTIMATION

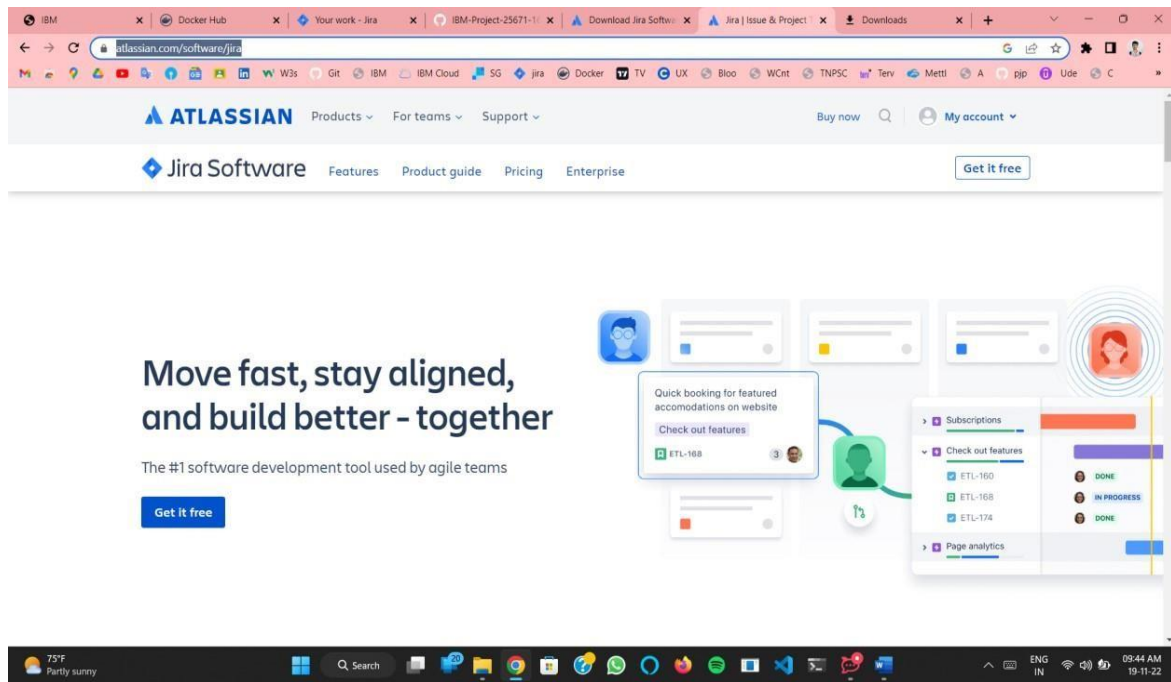
Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint 1	Registration	USN-1	As a user, I can register for the application by entering my email, password, and confirming my password.	2	High	Velmani J, Mukesh M Muralidharan M, Anand K
Sprint 1	Login	USN-2	As a user, I can log into the application by entering email or User name & password which I had registered	1	High	Velmani J, Mukesh M Muralidharan M, Anand K
Sprint 2	Dashboard	USN-3	As a user, I can explore the web page to find the latest fashion and details about those products	2	High	Velmani J, Mukesh M Muralidharan M, Anand K
Sprint 3	Assistant	USN-4	As a user, I can use the personal assistant offered by the website to make my job easier	2	High	Velmani J, Mukesh M Muralidharan M, Anand K
Sprint 4	Uploading as image in Docker and Containerize app in IBM	USN-5	Making the app file as image in Docker and Using Kubernetes Containerize the app into IBM.	1	High	Velmani J, Mukesh M Muralidharan M, Anand K

## 6.2 SPRINT DELIVERY SCHEDULE

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	1	29 Oct 2022
Sprint-2	20	10 Days	31 Oct 2022	10 Nov 2022	3	10 Nov 2022
Sprint-3	20	5 Days	11 Nov 2022	15 Nov 2022	2	15 Nov 2022
Sprint-4	20	5 Days	15 Nov 2022	19 Nov 2022	2	19 Nov 2022

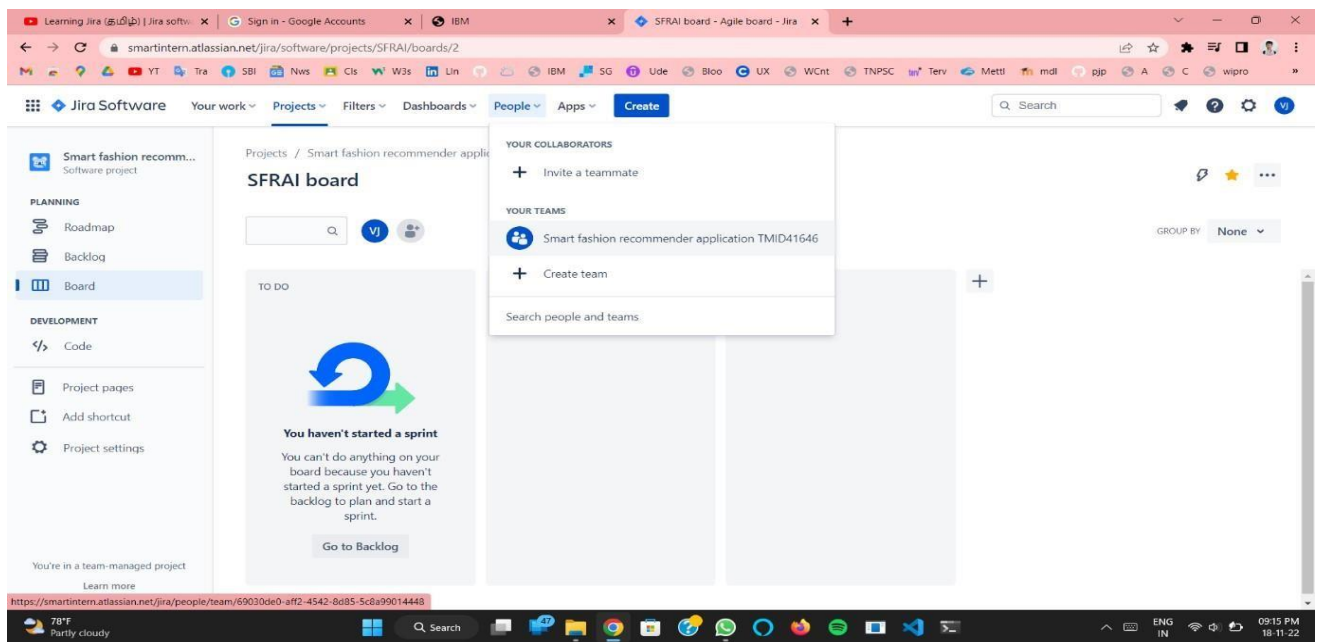
## 6.3 REPORTS FROM JIRA

1. Navigate to <https://www.atlassian.com/software/jira>

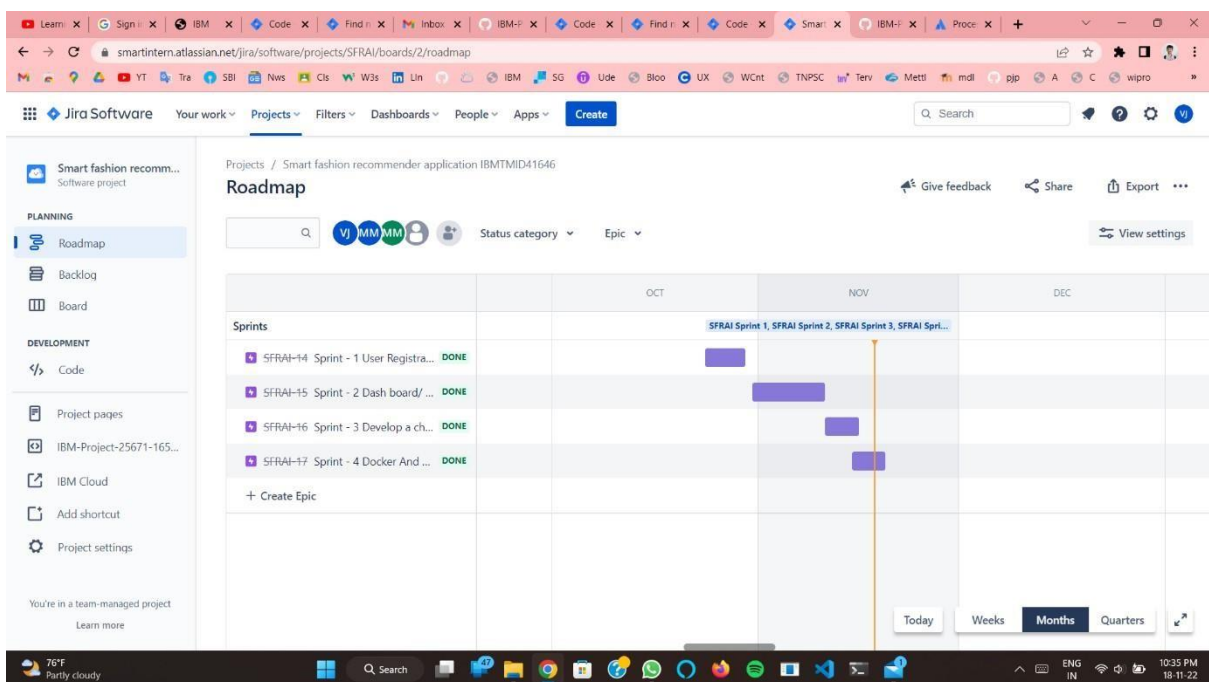


1. Click on get started free. And follow the account creation procedures.
2. Once you done search for SMARTINTERNZ domain add your team members to the Group
3. And get started for Creating a sprint and task assigning activities

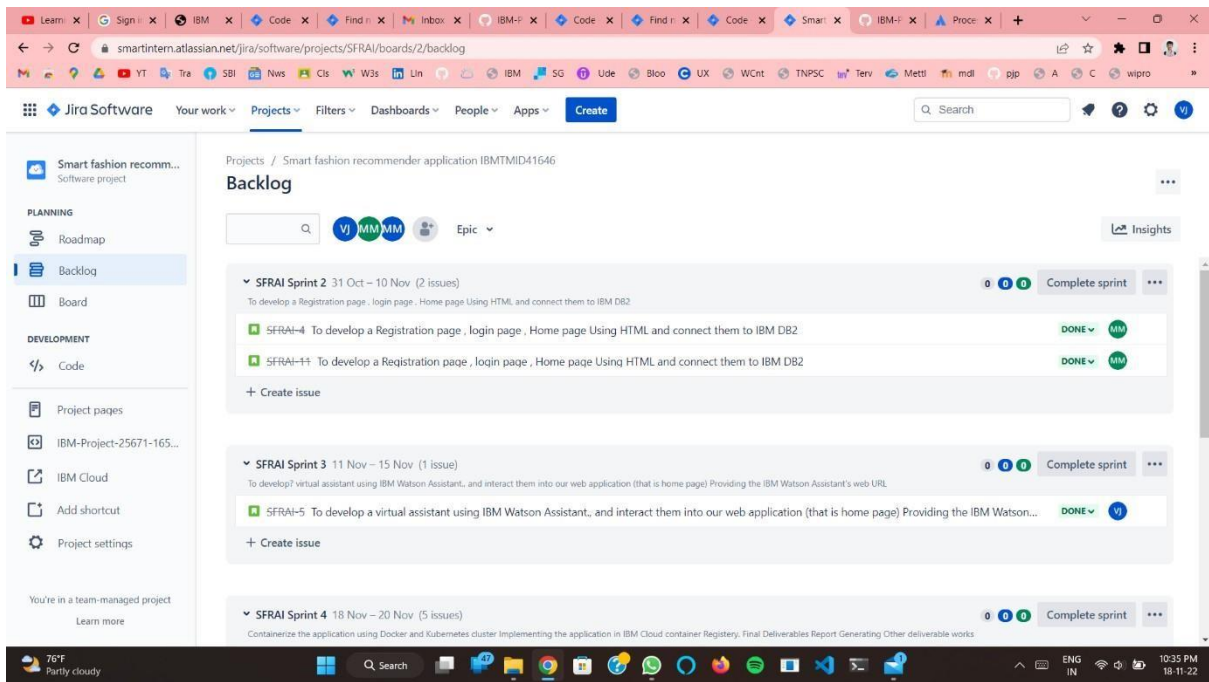
Our Project, Work and Dashboard pages as follows:



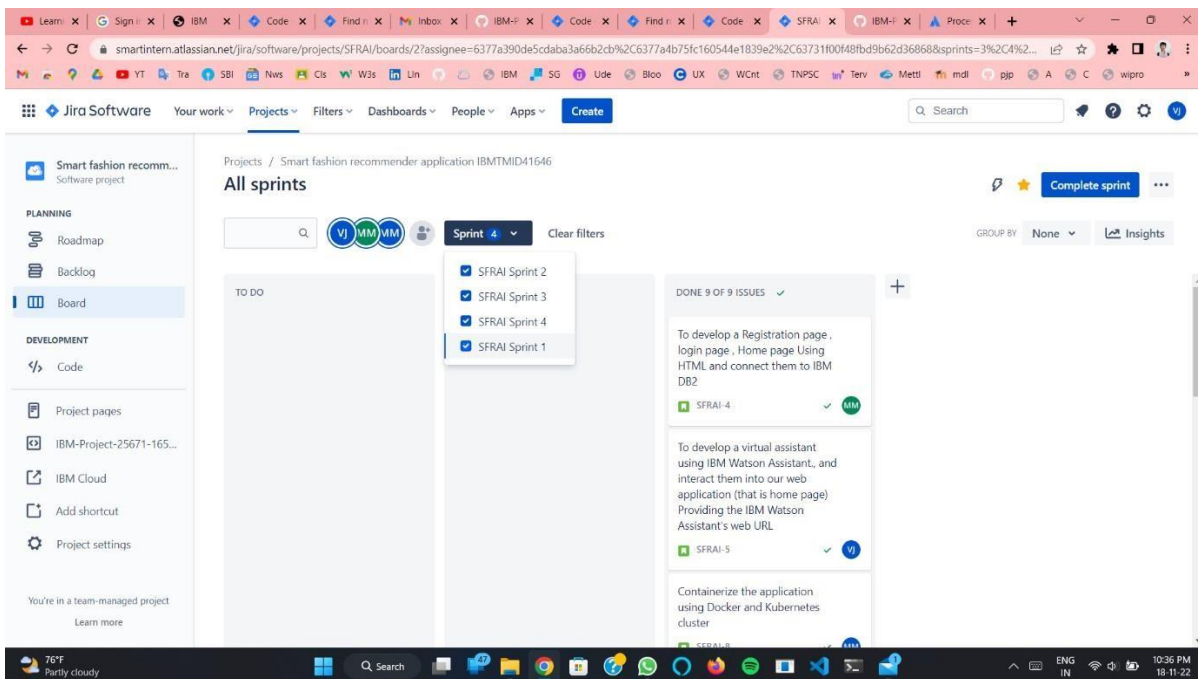
## Our Project Details Page:



## Sprint Progress Page:



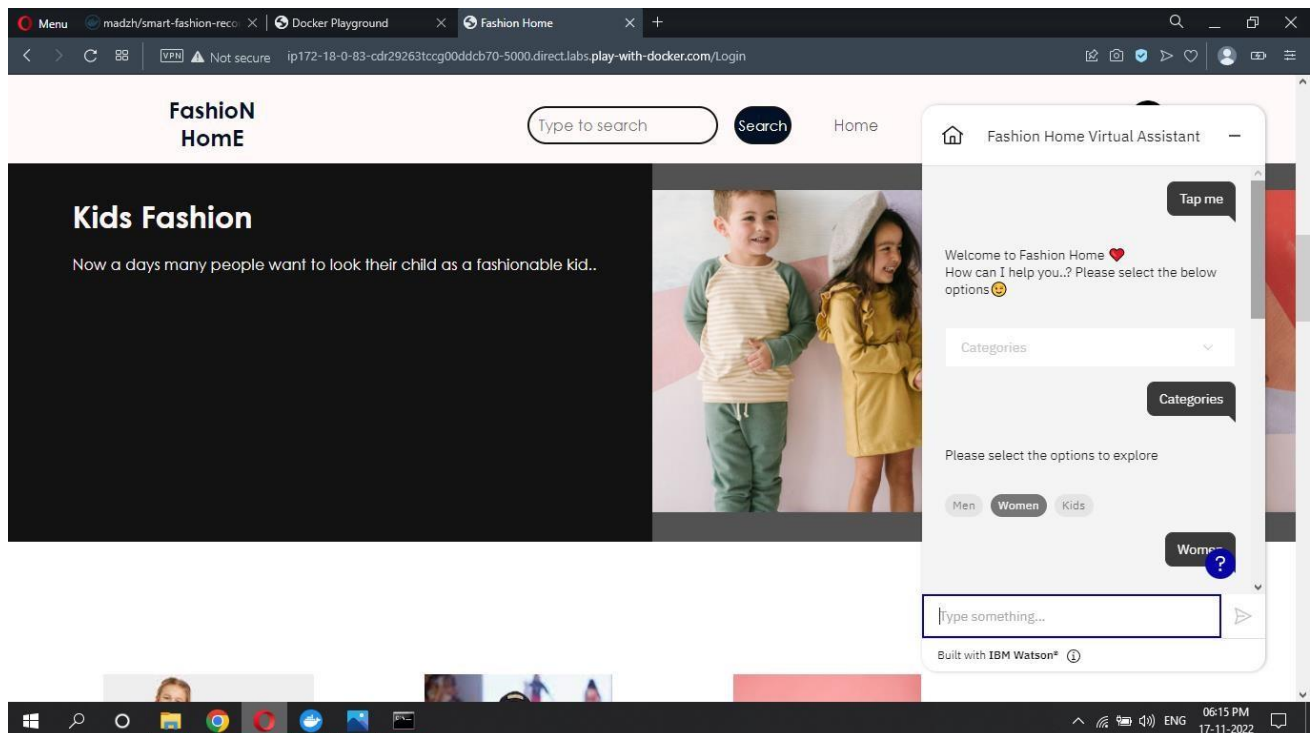
Sprint Done page :



## 7. CODING & SOLUTIONING

### 7.1 FEATURE 1

IBM Watson Assistant uses artificial intelligence that understands customers in context to provide fast, consistent, and accurate answers across any application, device, or channel. Remove the frustration of long wait times, tedious searches, and unhelpful chatbots with the leader in trustworthy AI.



### 7.2 FEATURE 2

#### Clean User Interface

The user interface (UI) is the point of human-computer interaction and communication in a device. This can include display screens, keyboards, a mouse and the appearance of a desktop. It is also the way through which a user interacts with an application or a website.

The growing dependence of many businesses on web applications and mobile applications has led many companies to place increased priority on UI in an effort to improve the user's overall experience.



## 7.3 DATABASE SCHEME (if Applicable)

Db2 is a family of data management products, including database servers, developed by IBM. It initially supported the relational model, but was extended to support object–relational features and nonrelational structures like JSON and XML. The brand name was originally styled as DB/2,[2] then DB2 until 2017 and finally changed to its present form.

The screenshot displays the IBM Db2 on Cloud web interface. The top navigation bar includes 'Load Data', 'Load History', 'Tables', 'Views', 'Indexes', 'Aliases', 'MQTs', 'Sequences', and 'Application objects'. The 'Tables' tab is active, showing a list of tables with columns 'Name', 'Schema', and 'Properties'. The 'USERS' table is selected, and its definition is shown on the right. The table definition includes columns: USERNAME (VARCHAR, 32, Y, 0), EMAIL (VARCHAR, 32, Y, 0), and PASSWORD (VARCHAR, 32, Y, 0). A 'View data' button is visible at the bottom of the table definition panel.

Name	Data type	Nullable	Length	Scale
USERNAME	VARCHAR	Y	32	0
EMAIL	VARCHAR	Y	32	0
PASSWORD	VARCHAR	Y	32	0

## **8. TESTING**

### **8.1 TEST CASES**

#### **Case 1**

Verify user able to see the UI elements Steps:

1. The user visits our website through the link
2. They can understand our user-friendly UI in our website

#### **Case 2**

Verify user able to register their account in our website Steps:

1. User needs to register their account with their credentials
2. Then the user who able to login their account

#### **Case 3**

Verify user able to login to application or not Steps:

1. To explore our home page user needs to login with their correct credentials
2. If the user enters with their correct credentials, then the user can explore our website.

#### **Case 4**

Verify user able to access the chat (IBM Watson Assistant)?

Steps:

1. After a successful login user can able to access the Chatbot for accessing a resource which are available in our website.
2. In the Chatbot user can explore our product details and customer support for their need

#### **Case 5**

Verify user can able to explore and search Steps:

1. If the user wants to search about our products, they can use the search box which is the top right corner of our website.
2. User can able to explore our products and other categories in our website.

## 8.2 USER ACCEPTANCE TESTING

### 1. Purpose of Document

The purpose of this document is to briefly explain the test coverage and open issues of the [ProductName] project at the time of the release to User Acceptance Testing (UAT).

### 2. Defect Analysis

This report shows the number of resolved or closed bugs at each severity level, and how they were resolved.

Resolution	Severity 1	Severity 2	Severity 3	Severity 4	Subtotal
By Design	7	2	3	3	15
Duplicate	0	0	3	0	3
External	1	0	0	1	2
Fixed	12	2	4	7	25
Not Reproduced	0	0	1	0	1
Skipped	0	0	1	1	2
Won't Fix	1	2	2	1	6
Totals	20	6	14	13	54

### 3. Test Case Analysis

This report shows the number of test cases that have passed, failed, and untested

Section	Total Cases	Not Tested	Fail	Pass
Print Engine	5	0	0	5
Client Application	37	0	0	37
Security	2	0	0	2
Outsource Shipping	3	0	0	3
Exception Reporting	7	0	0	7
Final Report Output	2	0	0	2
Version Control	3	0	0	3

## 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 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, can be as represented as follows:

#### 1.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:

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

#### 2.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:

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

#### 3.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:

#### 4.Coverage

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

#### 5.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:

#### **6.Intersection over union (IoU)**

It represents the accuracy of an object detector used on a specific dataset.

## **10. ADVANTAGE & DISADVANTAGE**

### **ADAVANTAGE**

- Products recommended based on the evaluation of experienced users.
- IT does not need any information from other users, which makes this technique more feasible and less time consuming.
- This technique can be applied to one of the multiple users' generators. This method can allow users to discover new interests despite the absence of content in the user's profile.
- User can easily to search the product and can use our chat bot.

### **DISADVANTAGE**

- As it is CBF domain-dependent, rigorous domain knowledge is required to make precise recommendations.
- The model only recommends products based on an existing database of previous users' interest, which restricts its expansion.
- Not applicable for new users, similar to content-based methods.
- Difficult to include side features for query/items.

## **11. CONCLUSION**

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. They help consumers to instantly find the products and services that closely match with their choices. Moreover, different state-of-the-art algorithms have been developed to recommend products based on users' interactions with their social groups. Therefore, research on embedding social media images within fashion recommendation systems has gained huge popularity in recent times. This paper presented a review of the fashion recommendation systems, algorithmic models and filtering techniques based on the academic articles related to this topic. The technical aspects, strengths and weaknesses of the filtering techniques have been discussed elaborately, which will help future researchers gain an in-depth understanding of fashion recommender systems. However, the proposed prototypes should be tested in commercial applications to understand their feasibility and accuracy in the retail market, because inaccurate recommendations can produce a negative impact on a customer. Moreover, future research should concentrate on including time series analysis and accurate categorization of product images based on the variation in color, 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 .



## **12.FUTURE SCOPE**

Fashion designing has become very popular in India in the last few years and many people are now considering it as a career choice. With economic prosperity, the average income of Indians has increased. Hence, people have better lifestyles compared to the past and they can afford spend more on their attire. As a result, there is an increased demand for professionals who can design and create new garments, dresses and attires to cater to the people from different walks of life.

A career in fashion application designing is considered as financially rewarding and has become very popular with people with creative mindset. It is normally looked at as a field full of glamor, though the field is full of very intense competition and huge number of challenges as well. However, there is a wide scope of fashion designing students enjoy a lot of choices once they complete their fashion designing professional studies.

- The fashion designers in the 21st century have multiple number of options including research, designing, cloth production and textile designing, etc.
- There is also a huge scope of fashion designing in Canada, USA, UK and countries in the European Union.
- They are free to join garment manufacturing companies, fashion houses, export units etc. after the completion of their studies.
- The scope of fashion technology is not only limited to garments. It covers many other aspects such as accessories, footwear, etc.

## 13.APPENDIX

### Login Form:

```
<html>
  <head>
    <meta name="viewpoint" content="width=device-width, initial-scale=1.0">
    <title>Login</title>
    <link rel="stylesheet" href="https://storagedemo-madzh.s3.jp-tok.cloud-
objectstorage.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>LOGIN</h2>
          <form action="/Login" method="post">
            <input type="text" name="username"
placeholder="Enter Username Here">
            <input type="password" name="password"
placeholder="Enter Password here">
            <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>
    </body>
  </html>
```

## Python Code for Flask:

```
from flask import Flask, render_template, request, redirect, url_for,
session import ibm_db import re
app =
Flask(__name__
_)

app.secret_k
ey = 'a'
conn=ibm_db.connect("DATABASE=bludb;HOSTNAME=9938aec0-8105-
433e-8bf9-
0fbb7e483086.c1ogj3sd0tgtu0lqde00.databases.appdomain.cloud;PORT=32459;Security=SSL;
SSLServe
rCertificate=DigiCertGlobalRootCA.crt;UID=dpk79343;PWD=29Jm7EbzOubtoerk",'','')
@app.route('/')
def
home
r():
    return
render_template('Login.html')

@app.route('/Login',methods=['GET',
'POST']) def login():    global
userid    msg = ''

    if
request.method == 'POST'
:
        username = request.form['username']    password
= request.form['password']    sql = "SELECT * FROM
users WHERE username =? AND password=?"    stmt =
ibm_db.prepare(conn, sql)
ibm_db.bind_param(stmt,1,username)
ibm_db.bind_param(stmt,2,password)
ibm_db.execute(stmt)    account =
ibm_db.fetch_assoc(stmt)    print (account)    if
account:

        session['loggedin'] = True
session['id'] = account['USERNAME']
userid= account['USERNAME']
        session['username'] =
account['USERNAME']    msg = 'Logged in
successfully !'

        msg = 'Logged in successfully
!'    return render_template('Finalhome.html',
msg = msg)    else:
msg = 'Incorrect username / password !'
```

```
return render_template('Login.html', msg = msg)
```

```
@app.route('/Register', methods
=['GET', 'POST']) def registet():
    msg = ''    if request.method ==
'POST' :

        username = request.form['username']
    email = request.form['email']
    password = request.form['password']
    sql = "SELECT * FROM users WHERE username
=?"        stmt = ibm_db.prepare(conn,
sql)
    ibm_db.bind_param(stmt,1,username)
    ibm_db.execute(stmt)        account =
    ibm_db.fetch_assoc(stmt)
    print(account)        if account:
        msg = 'Account already exists !'
    elif not re.match(r'[^@]+@[^@]+\.[^@]+',
email):
        msg = 'Invalid email address !'
    elif not re.match(r'[A-Za-z0-9]+',
username):
        msg = 'name must contain only characters and
numbers !'        else:
        insert_sql = "INSERT INTO  users VALUES
(?, ?, ?)"        prep_stmt =
    ibm_db.prepare(conn, insert_sql)
    ibm_db.bind_param(prepare_stmt, 1, username)
    ibm_db.bind_param(prepare_stmt, 2, email)
    ibm_db.bind_param(prepare_stmt, 3, password)
    ibm_db.execute(prepare_stmt)        msg = 'You
have successfully registered !'        elif
request.method == 'POST':
        msg = 'Please fill out the form
!'        return
    render_template('Reg.html', msg = msg)
@app.route('/
Homepage')
def dash():
    return render_template('Finalhome.html')
```

```

@app.route('/display') def
display():

print(session["username"],session['
id'])

cursor = mysql.connection.cursor()      cursor.execute('SELECT * FROM
job WHERE userid = % s', (session['id'],))      account =
cursor.fetchone()      print("accountdisplay",account)      return
render_template('display.html',account = account)
@app.route('/Logout')
def
logou
t():
    session.pop('loggedin',
None)      session.pop('id',
None)
session.pop('username', None)
return
render_template('Login.html')
if __name__ ==
'__main__':
app.run(host='0.0.
0.0')

```

**GitHub Project Repository link: <https://github.com/IBM-EPBL/IBM-Project-24643-1659946527>**