

IBM - NALAIYA THIRAN PROJECT

SMART FASHION RECOMMENDER APPLICATION

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ABSTRACT

In recent times, the cloth and fashion diligence have witnessed an enormous quantum of growth in fast fashion. One-commerce platforms, where multitudinous choices are available, an effective recommendation system is needed to sort, order, and efficiently convey applicable product content or information to druggies. Image-grounded fashion recommendation systems(FRSs) have attracted a huge quantum of attention from fast fashion retailers as they give a substantiated shopping experience to consumers. With technological advancements, this branch of artificial intelligence exhibits a tremendous quantum of eventuality in image processing, parsing, brackets, and segmentation. Despite its huge eventuality, the number of academic papers on this content is limited. The available studies don't give a rigorous review of fashion recommendation systems and the corresponding filtering ways. To the stylish of the authors ' knowledge, this is the first scholarly composition to review the state- of- the- art fashion recommendation systems and the corresponding filtering ways. In addition, this review also explores colorful implicit models that could be enforced to develop fashion recommendation systems in the future. This paper will help experimenters, academics, and interpreters who are interested in machine literacy, computer vision, and fashion merchandising to understand the characteristics of the different fashion recommendation systems.

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1. INTRODUCTION

Clothing is a kind of symbol that represents people's internal comprehension through their external appearance. It conveys information about their choices, faith, personality, profession, social status, and station towards life. Thus, apparel is believed to be a verbal way of communicating and a major part of people's external appearance. Recent technological advancements have enabled consumers to track current fashion trends around the globe, which impacts their choices. The fashion choices of consumers depend on numerous factors, such as demographics, geographic position, individual preferences, interpersonal influences, age, gender, season, and culture. Also, former fashion recommendation exploration shows that fashion preferences vary not only from country to country but also from megacity to megacity. The combination of fashion preferences and the over mentioned factors associated with apparel choices could transmit the image features for a better understanding of consumer's preferences.

Therefore assaying consumers choices and recommendations is precious to fashion controversy and retailers. Also, consumer apparel choices and product preference data have come available on the Internet in the form of textbook or opinions and images or filmland. Since these images contain information about people from each around the world. Both online and offline fashion retailers are using these platforms to reach billions of druggies who are active on the Internet. Thus, e-commerce has become the predominant channel for shopping in recent times. The capability of recommendation systems to give individualized recommendations and respond snappily to the consumer's choices has contributed significantly to the expansion of e-commerce deals.

According to different studies e-commerce retailers, similar as Amazon, eBay, and Shop style, and social networking spots, such as Pinterest, Snapchat, Instagram, Facebook, Chictopia, and Look book, are now regarded as the most popular media for fashion advice and recommendations. exploration of textual content, similar as posts and commentary, emotion and information prolixity, and images has attracted the attention of Ultramodern- day experimenters, as it can help to prognosticate fashion trends and grease the development of effective recommendation systems. An effective recommendation system is a pivotal tool for successfully conducting an e-commerce business. Fashion recommendation systems(FRSs) generally give specific recommendations to the consumer based on their browsing and former purchase history. Social- network- grounded FRSs consider the stoner's social circle, fashion product attributes, image parsing, fashion trends, and thickness in fashion styles as important factors since they impact upon the Stoner's purchasing opinions.

FRSs have the capability to reduce sale costs for consumers and increase profit for retailers. With the exception of a single study from 2016 that focuses only on vesture recommendation systems, no current exploration presents recent advances in exploration on fashion recommendation systems. Thus, the purpose of this paper is to present an integrative review of the exploration related to fashion recommendation systems.

2. History and Overview of Recommendation System

The era of recommendation systems originally started in the 1990s based on the widespread research progress in Collective Intelligence. During this period, recommendations were generally provided to consumers based on their rating structure. The first consumer-focused recommendation system was developed and commercialized by Goldberg, Nichols, Oki and Terry in 1992. Tapestry, an electronic messaging system was developed to allow users only to rate messages as either a good or bad product and service. However, now there are plenty of methods to obtain information about the consumer's liking for a product through the Internet. These data can be retrieved in the forms of voting, tagging, reviewing and the number of likes or dislikes the user provides. It may also include reviews written in blogs, videos uploaded on YouTube or messages about a product. Regardless of communication and presentation, medium preferences are expressed in the form of numerical values.

2.1. Recommendation System

Recommendation system (RS) is referred to as a decision-making approach for users under a multidimensional information environment. RS has also been defined as an e-commerce tool, which helps consumers search based on knowledge that is related to a consumer's choices and preferences. RS also assists in augmenting social processes by using the recommendations of other users when there is no abundant personal information or knowledge of the alternatives. RS handles the complication of information overload that consumers usually encounter by offering customized service, exclusive content, and personalized recommendations. There are multiple phases involved in the recommendation system that develop the foundation of any state-of-the-art recommendation system. These are defined as the information collection phase, the learning phase, and the recommendation phase. It shows that information collection is the initial stage of RS, which is followed by the learning phase and the recommendation phase. The recommendation provided in the last phase can be generated based on information

gathered during the information collection phase.

2.1.1. Information Collection Phase

The foundation of the recommendation system relies on three types of input similar as

unequivocal feedback, implicit feedback, and cold-blooded feedback. unequivocal feedback needs to be of high quality as it encompasses druggies' unequivocal input regarding their interest in or choice of a product. The delicacy of the vaticination or recommendation relies on stoner conditions. Thus, if the druggies don't give enough information, it limits the delicacy of the system.

Despite this demand, unequivocal feedback is still considered a pivotal information input process as it provides further dependable data and builds translucency into the recommendation procedure(). Implicit feedback is also important in understanding druggies' preferences, which are inferred laterally through observation of stoners. Although this system doesn't bear the same trouble from the druggies, it's frequently seen as less accurate. mongrel feedback is considered a combination of unequivocal and implicit feedback. It can be fulfilled by exercising the implicit feedback data as a check on the unequivocal feedback standing or by furnishing druggies with the occasion to give feedback only if they choose to explicitly express their interest.

2.1.2. Learning Phase

A learning algorithm is applied in this phase to filter and exploit the users' features based on the feedback collected in the information collection phase. The learning algorithms used in this phase are helpful for drawing out the appropriate patterns relevant for application during the recommendation stage.

2.1.3. Recommendation Phase

The recommendation phase recommends the types of items that a user or consumer may prefer. Recommendations can be provided either directly based on the dataset collected during the information collection phase (which might be memory- or model-based) or through the browsing history of users observed by the system. Recommendations can also be provided by combining the learned information with the rating matrix to recommend learning resources. Researchers reported improved recommendation accuracy using hybrid models in comparison with product content-based or other user preference-based collaborative models.

2.1.4 Problem Statement

Personalized product recommendations are the alternative way of navigating through the online shop. More people find products they need. Even if they didn't think of them. The project is a Website application for fashion recommendation using machine learning with a built-in recommendation engine which suggests similar products to the given product.

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 help 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.



3.2 IDEATION & BRAINSTORMING :

A group problem-solving technique that involves the spontaneous contribution of ideas from all members of the group. The mulling over of ideas by one or more individuals in an attempt to devise or find a solution to a problem.

3.3 Proposed Solution

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	<ul style="list-style-type: none">• User need to navigate across many many pages to reach correct product• Lack of interaction between application and users• Insufficiency of proper guidance
2.	Idea / Solution description	<ul style="list-style-type: none">• Customers make online shopping based on their choice• Collect customers feedback immediately• It lower the human error• Providing proper guidance in acquiring application
3.	Novelty / Uniqueness	<ul style="list-style-type: none">• Chat bot asks users preference and recommend appropriate products to the users without using filters• Reduce time in chossing coorrect products
4.	Social Impact / Customer Satisfaction	<ul style="list-style-type: none">• Feedback given by the user after receivijg order is most important factor• It helps for obtaining customer satisfication
5.	Business Model (Revenue Model)	<ul style="list-style-type: none">• Customer buy products through chat-bots and generate revenue• Develope application with high performance and interactive user interface
6.	Scalability of the Solution	<ul style="list-style-type: none">• Application can be easily scalable by increasing the items and products list based on customer preferences

3.4 PROBLEM SOLUTION FIT



4.REQUIREMENT ANALYSIS

4.1 FUNCTIONAL REQUIREMENTS :

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Registration	Registration can be done through gmail or mobile number
FR-2	User Confirmation	User can login using gmail and password
FR-3	Live chat -chatbot	Users recommendation can be done based on their choice by chatbot
FR-4	Delivery confirmation	Product shipment confirmation through email and phone number
FR-5	Shopping Cart	Add to cart button,My cart , Remove from cart
FR-6	Checkout	Pay with mobile wallet, credit card payment

4.2 NON-FUNCTIONAL REQUIREMENTS :

FR No.	Non-Functional Requirement	Description
NFR-1	Usability	<ul style="list-style-type: none">● Offers provided by the application should on the first page● A user friendly interface with chatbot to make usability efficient
NFR-2	Security	<ul style="list-style-type: none">● Application gather personal information to complete a order which includes banking details,address and email , etc
NFR-3	Reliability	<ul style="list-style-type: none">● Ability to handle both expected and unexpected errors● Perform critical tasks which may include gathering and securing customer data
NFR-4	Performance	<ul style="list-style-type: none">● This application can able to handle various requests and generate appropriate responses
NFR-5	Availability	<ul style="list-style-type: none">● Users can access without any restrictions● Administrator needs to check the availability of the stock

NFR-6	Scalability	<ul style="list-style-type: none">● Consists of enough network resources, ensure deliveries out on time and avoid downtime
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5.PROJECT DESIGN

5.1 DATA FLOW DIAGRAMS :

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

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 through email and password	I can register & access my account and dashboard	High	Sprint-1
		USN-2	As a user, I'll receive confirmation email once I have registered for the application	I can receive confirmation email and 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 and make purchases	High	Sprint-1
	Dashboard					
Customer (Web user)	Registration	USN-1	As a user, I can register for the application by entering my email, password and confirming my password	I can register & access my account and dashboard	High	Sprint-1
		USN-2	As a user, I'll receive confirmation email once I have registered for the application	I can receive confirmation email and 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
		USN-5	As a user, I can log into the application by entering email & password	I can access and make purchases	High	Sprint-1
Administrator	Login	USN-1	I enter my mail and password on approval	I can approve products and purchases	High	Sprint-1 Administrator

Functional Requirements:

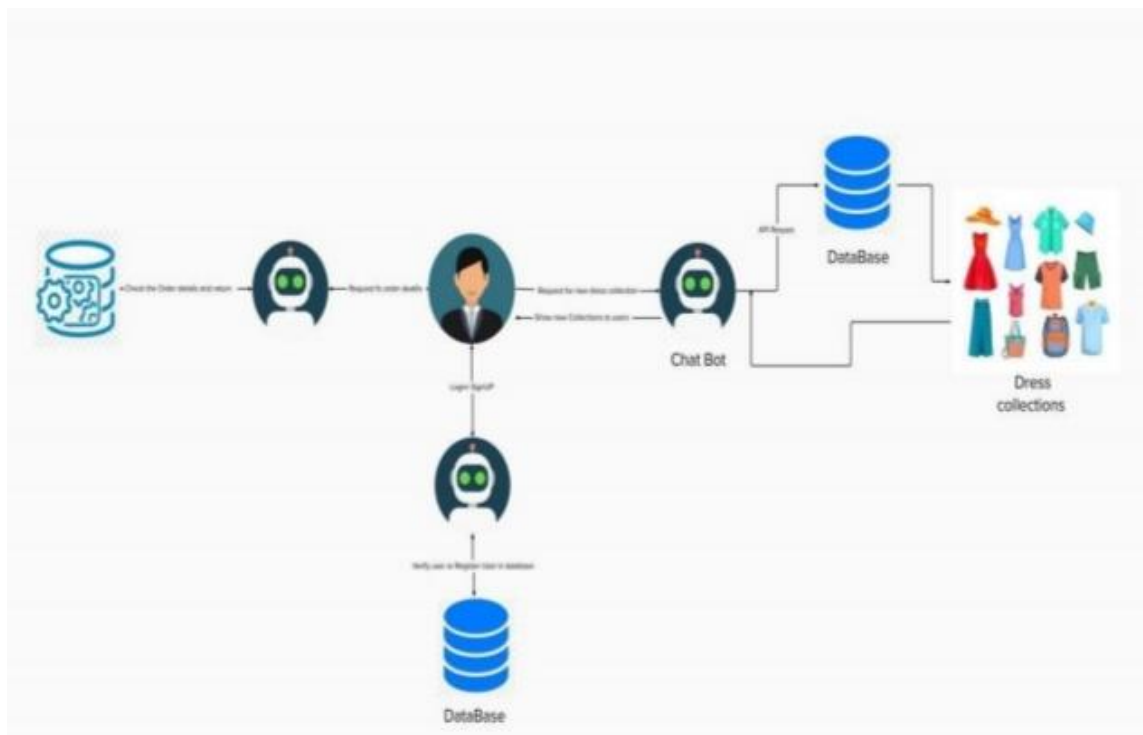
FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Registration	<ul style="list-style-type: none"> User must register by giving their username. Next the user must set a secure password satisfying the criteria.
FR-2	User Confirmation	Confirmation mail will be sent to the mail id which the user has given at the time of registration.
FR-3	User Verification	<ul style="list-style-type: none"> After confirming the mail, OTP will be sent to the user's registered mobile number. The user must enter the same at the time of sign up.

Non-functional Requirements:

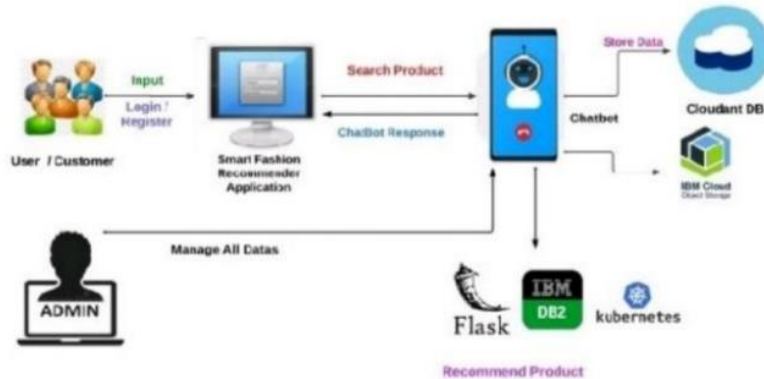
FR No.	Non-Functional Requirement	Description
NFR-1	Usability	Can be used by the users who are searching the best price for reselling their cars.
NFR-2	Security	All the users data will be completely secured and there will be no threats for user's privacy.
NFR-3	Reliability	Data is completely secured, also best prices for the cars can be predicted considering the users feelings.
NFR-4	Performance	Our model predicts using linear regression, which has the high success rate. Also huge datasets are used for testing and training the model. So the performance of our model will stand high.
NFR-5	Availability	Our model will be available for the users, who owns a car and is trying to resell it.
NFR-6	Scalability	Since our predictor considers multiple parameters before prediction, it can stand as a unique one which predicts the best price and hence it is a scalable one which can easily adapt.

5.PROJECT DESIGN

5.1 DATA FLOW DIAGRAMS :



5.2 SOLUTION & TECHNICAL ARCHITECTURE :



5.3 USER STORIES :

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

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 through email and password	I can register & access my account and dashboard	High	Sprint-1
		USN-2	As a user, I'll receive confirmation email once I have registered for the application	I can receive confirmation email and 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 and make purchases	High	Sprint-1
	Dashboard					
Customer (Web user)	Registration	USN-1	As a user, I can register for the application by entering my email, password and confirming my password	I can register & access my account and dashboard	High	Sprint-1
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		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
		USN-5	As a user, I can log into the application by entering email & password	I can access and make purchases	High	Sprint-1
Administrator	Login	USN-1	I enter my mail and password on approval	I can approve products and purchases	High	Sprint-1 Administrator

6. Project Planning and Scheduling

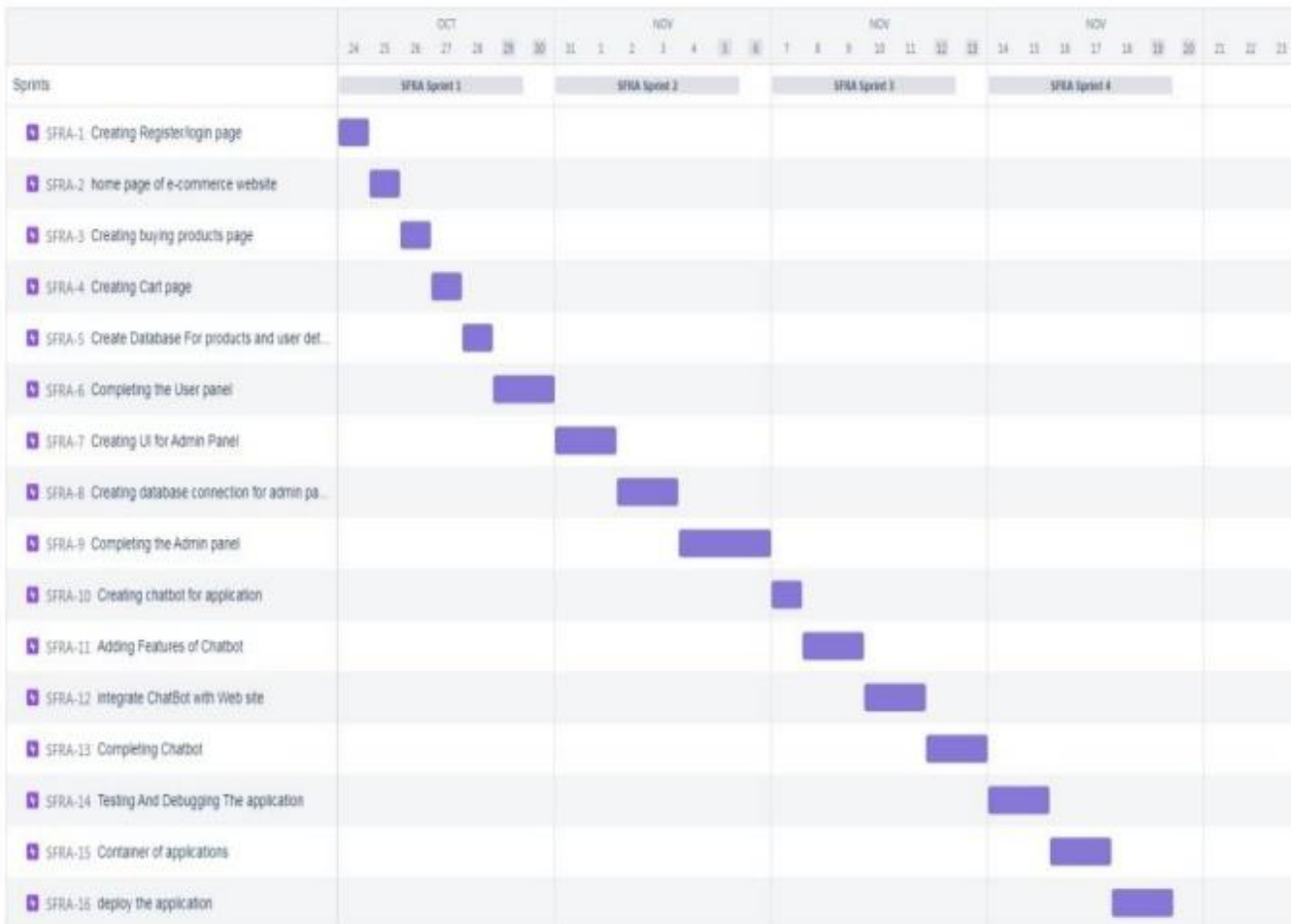
6.1. Sprint Planning and Estimation

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority
Sprint-1	Pre Processing Data	USN-1	Collect Dataset	1	Low
Sprint-1		USN-2	Import required Libraries and Cleaning	2	Medium
Sprint-2	Model Building	USN-1	Splitting data into dependent and Independent Variable.	1	Low
Sprint-2		USN-2	Apply algorithms and findings best.	5	High
Sprint-3	Testing the Model	USN-1	Train Machine Learning Model	1	Medium
Sprint-3		USN-2	Test the Model	2	Medium
Sprint-4	Application Building	USN-1	Build HTML Page and <u>python</u> Flask Application	5	High
Sprint-4		USN-2	Integrate Flask	5	High

6.2 Sprint Delivery Schedule

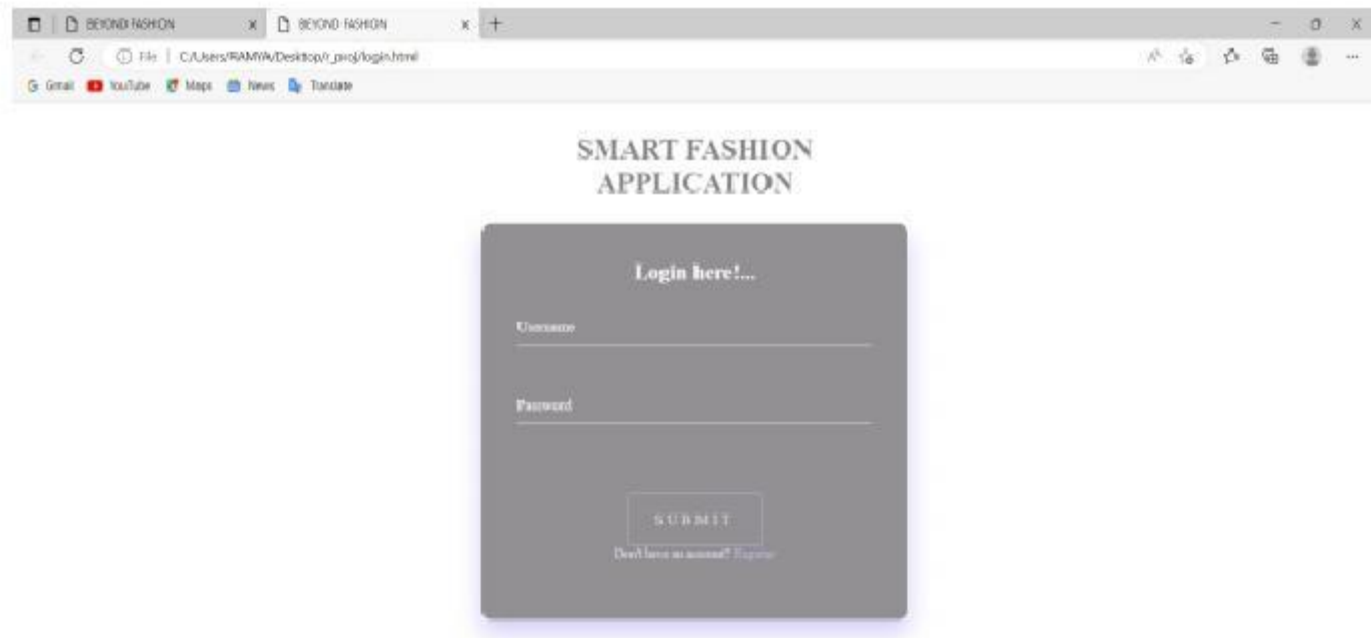
Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date (Actual)
Sprint-1	20	6 Days	24 Oct 2022	29 Oct 2022	20	29 Oct 2022
Sprint-2	20	6 Days	31 Oct 2022	05 Nov 2022	20	05 Nov 2022
Sprint-3	20	6 Days	07 Nov 2022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

6.3 REPORTS FROM JIRA

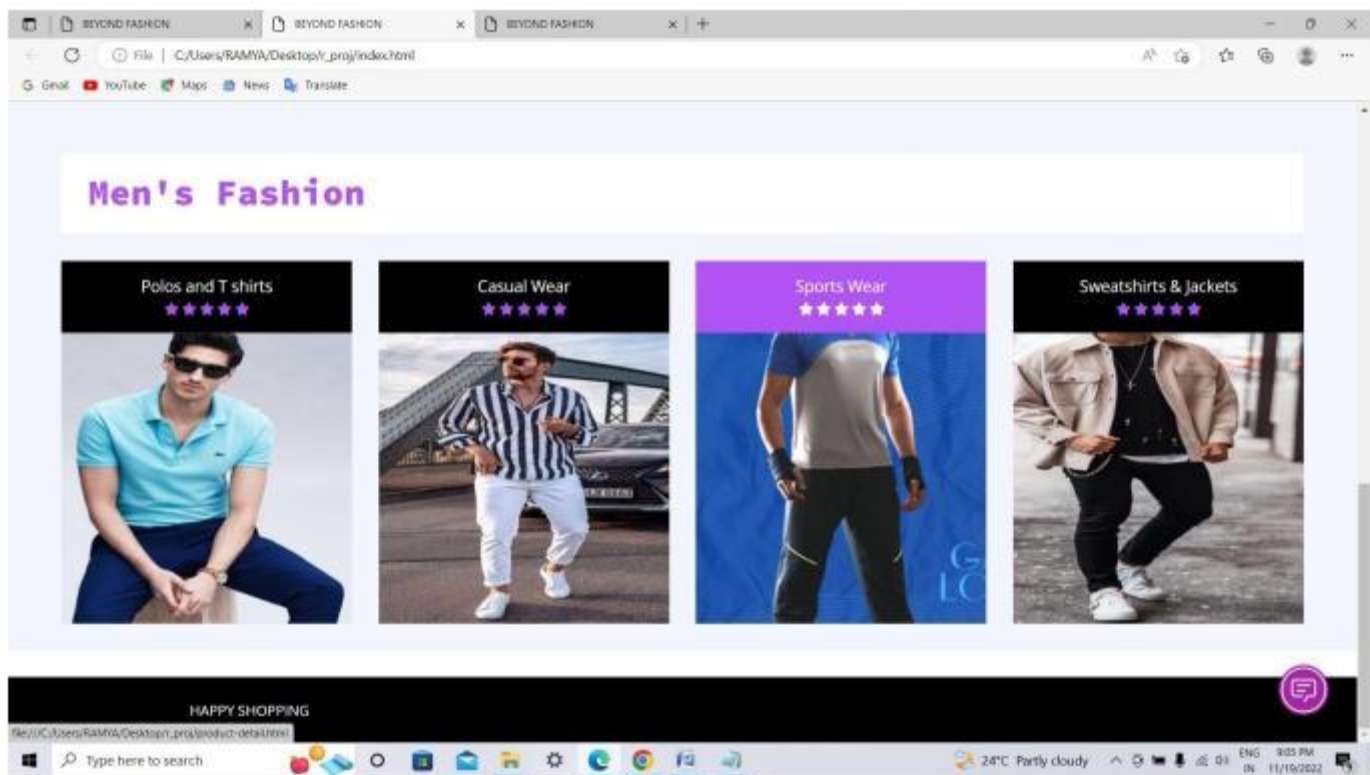
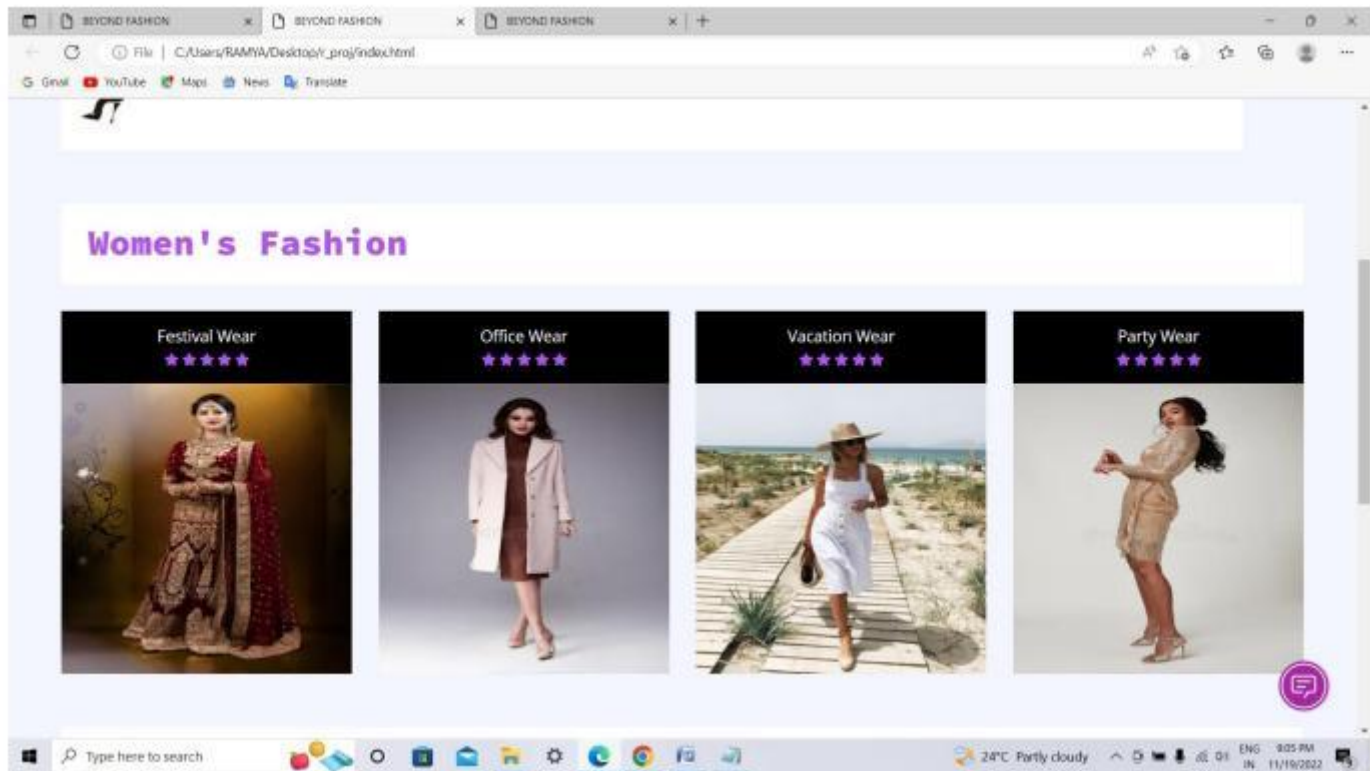


7.TESTING

7.1 TEST CASES



7.2 USER ACCEPTENCE TESTING



8.CONCLUSION

We introduced the trajectory of studies in fashion recommender systems from the very beginning. The main categories have been defined. We clarified what makes developing fashion recommender systems a necessity for the fashion domain, in this contemporary society, as a competitive advantage leveraging the power of data within employing machine learning methods and AI solutions for different purposes, including marketing, decision making, cross-selling, etc. Representing what makes the fashion domain distinguished from other recommender system domains, we conceptualized the sources of complexity in the fashion domain by illustrating how interconnected these concepts are, as a framework that any fashion recommender system can be defined and understood through it. Focusing on image-based fashion recommender systems, we identified four main tasks in fashion recommender systems, bringing their characteristics to the fore, including cloth-item retrievals, Complementary item recommendation, Outfit recommendation, and Capsule wardrobes. The studies which have been conducted in each category also have been introduced. In addition, we provide the evolution trajectory of image-based fashion recommender systems, which consists of three main eras, in addition to considerations of the most recent advancements in computer vision and deep learning-based methods.

9.APPENDIX

9.1 GITHUB LINK

GITHUB LINK :

<https://github.com/IBM-EPBL/IBM-PROJECT-6181-1658824268>

9.2 PROJECT DEMO LINK

VIDEO LINK :

<https://youtu.be/4AfC2FSnHOQ>

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