IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.53
Volume 4, Issue 1, October 2024

A Survey on Virtual Personal Stylist

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Abstract: *hen the individuality and the availability of gadgets are combined, it becomes possible to create a Virtual Personal Stylist in the world where people need inventions in fashion, which can change their styles without spending plenty of time and traveling far away. That new solution utilizes artificial intelligence, machine learning, as well as user-centered approach to deliver proper styling suggestions regarding the user's individuality, body shape, and fashion trends in the present. Maintaining a virtual wardrobe and providing outfit recommendations as well as help with shopping the Virtual Personal Stylist doesn't just enable consumers to build their own style, but it also helps them do it with ease. It is for these reasons that this abstract discusses the attributes of this technology, and the advantages of practicing the application of this technology for fashion businesses purposes in the fashion industry. Wherever this digital solution is implemented, we show how, thanks to case analyses and users' feedback, it improves styling experiences strictly as well as disrupts retail conventional models for making clothing affordable and, at the same time, tailored.*

Keywords: AI Styling, Fashion Technology; Digital Wardrobe; Body Type Solutions; Trend Analysis

I. INTRODUCTION

In the modern world of technology, a personal sense of style is not just an extension of one's character, but rather an important mode of communication. Nevertheless, due to the nature of fashion, one must learn many complexities, including which dresses fit and suit whom. Move over the Virtual Personal Stylist, a groundbreaking service aimed at revolutionizing the way people shop online. Thanks to modern algorithms and anthropometry, this system provides clothes to users who are fully ready to wear them the same way, as per their shape and disposition.Easily, a major drawback of this service is its absence of a non-physical fitting room. This shallow level interactive feature helps the clients imagine how various dresses would suit them without actually putting on those clothes. The feature of augmented reality allows the digital trial room to recreate a highly interactive environment in which users can try various clothes on themselves without putting them on in an actual sense, trying out options of patterns, color, and size at home. Thus, the Virtual Personal Stylist not only eases the process of shopping but also allows people to express their uniqueness more with fashionable choices. This section considers the fusion of technology into fashion and clarifies how the Virtual Perso

II. TYPES OF DETECTION ALGORITHMS

To build a Virtual Personal Stylist that recommends dresses based on shape and size, and includes a digital trial room, several algorithms and technologies can be employed:To build a Virtual Personal Stylist that recommends dresses based on shape and size, and includes a digital trial room, several algorithms and technologies can be employed:

2.1 Recommendation Algorithms

- Collaborative Filtering: This algorithm recommends dresses by looking at the trends in purchasing patterns of similar users, therefore coming up with better recommendations based on these patterns.
- Content-Based Filtering: It suggests items similar to those the user has liked in the past using proactively decided attributes such as style, color and fabric.
- Hybrid Models: Adding the precision in the recommendation by using both collaborative and the content-based methods.

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2.2 Evaluation of Body Shape and Body Size

- Machine Learning Classification: Users are divided into different categories of body shape/size by an algorithm (Decision Trees or Support Vector Machines etc.,) depending on some input parameters (measurements/ preferences etc.).
- Regression Models: In order to design sizes which could fit well in relation to the sizes entered by the users or which could fit in terms of size history.

2.3 Image Processing and Augmented Reality.

- Computer Vision Algorithms: Other methods such as Convolutional Neural Networks (CNNs) are applied for picture identification and manipulation meaning that the platform can determine whether the pictures uploaded by the user fit or not.
- 3D Modeling: Techniques use algorithms to render good representations of the clothes and the user avatars, and thus give a correct view in the trial room.
- Augmented Reality (AR): Systems like ARKit or ARCore help in the placement of virtual outfits on top of a user's picture so that one can interact in real-time.

2.4 User Experience Personalization

- Natural Language Processing (NLP): More so in comprehending the user reviews, feedbacks, and preference given in natural language for improving the existing recommendation engine.
- Sentiment Analysis: Gaining insight of users' perception of different styles to be able to improve on the style recommendation that will be provided in the future.

2.5 Data Analytics

- A/B Testing: Appendix C – Primary goal: To determine which algorithms and features appear to work best to allow UX developers to determine which aspects of the system most or least effectively meet performance criteria for the target users.
- Predictive Analytics: To record seasonal trends and long-term behaviour in order to better plan inventory and styles to be brought in.

2.6 Integration and Backend Technologies

- API Integrations: To extract information from fashion retailers and integrate such data into the inventory list in real-time depending on the users' preferences.
- Database Management Systems: For storage of such data and preferences of users as well as attributes of other garments and items of clothing.

These are very useful algorithms and technologies integrated together to make a smooth and user friendly shopping experience for the dresses which are designed for the users based on their body shape and fashion sense.

III. RELATED WORK

3.1 AI Driven Personalized Fashion Stylist by Om Udavant, Nidhi Agrawal & Preeti Bhatia

This paper proposes a fashion recommender system that takes into consideration all aspects that are unique to every user including their size, color choice and kind of clothes that they like. It is the Collaborative Filtering and Content-Based Filtering kind of algorithms that are applied in the core system and regarded as the primary filtering algorithms of the recommendation systems.

Collaborative Filtering assist the system to recommend items that are similar to those liked by other user with similar profile. The data acquired by the system includes past user's experiences like click through rate or purchases and cloths which had been considered favorites by other users with similar taste.

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Content-Based Filtering involves the identification of the characteristics of the clothing items then the comparison of these characteristics to what the user has in his or her profile. For instance, if a user keeps on choosing formal wears of certain colors or type of fabric then the system suggests similar items of the same color or fabric respectively.

The system is enriched by a Machine Learning (ML) model that learns the users' feedback for real-time futures trends, to adapt the recommendations. also used here that

Augmented Reality (AR), so users can try-on clothes virtually, moreover, users see how clothes will look like on them in real time.

The paper focuses on the Real-Time Trend Analysis where by the use of NLP the program will track fashion trends from social media platforms and fashion bloggers to ensure that the recommendations are up-to-date. The scalability of the system is supported by a cloud-based database, allowing seamless updates and real-time data processing [oai_citation:Uncited Source 4 : Paper of PDF format is available at [online] [accessed 4 May 2018] Available from: http://ssrn.com/abstract=3093221 or doi: 10.2139/ssrn.3093221 file name : 4,Paper.pdf

3.2 Ashish Vartak, et. Al., ' 'Virtual Stylist Using IoT "

This paper aims at discovering how IoT integrated with AI technologies can be employed to develop a virtual stylist tool a tool that would make shopping for fashion online more interactive. The paper focuses on the design of the Virtual Try-On which has been created from Image Processing and Computer Vision.

Clothing Detection and Segmentation: In terms of object segmentation in images, the system uses Convolutional Neural Networks (CNNs). They are also used in the identification of particular features of the clothes such as fabric material, color among others.

Style Matching Algorithm: Once the user is identified and their preferences as well as their body measurements are captured the Style Matching Algorithm can be utilized to suggest appropriate clothing items. This algorithm helps in recommending outfit related to user's past choices, their body shape, and the current fashion trends.

Real-time Image Processing is done by OpenCV that allows users to upload their photos, and see how they will look wearing specific outfits without having to actually put them on. The integration of IoT allows the system to collect real-time data on the user's environment, such as location and weather, which can further personalize clothing recommendations [oai_citation:3 [paper2.pdf](file-service://file-vkOzBe362IyTUqwGLTwB0 Tnz).

3.3 A paper by Vishal R. et al : "Virtual Dressing Room System Using Deep Neural Networks".

From the following sub-topics, this paper presents a virtual dressing room system that incorporates DNNs, more specifically the GANs to achieve a realistic virtual try-on.

Pose Estimation and Human Parsing: The system begins with detecting the human body by Pose Estimation techniques that find out the significant points of the body such as joints and limbs to represent the figure of the user. This is taken a step further through >Human Parsing

<through which the user is separated from the background and the body parts of the user are segmented (such as the torso, arms, etc.).

Cloth Wrapping Module: With the help of GANs, the system can translate clothing images onto the figure of the user. The Geometric Matching Module thus has the job of aligning the design of the clothes with the virtual persona of the real buyer.

Try-On Module: The Virtual Try-On Module applies an Encoder-Decoder Neural Network to blurs the clothing overlay onto the figure of the user. This eliminates problems such as hair and hands going through the clothings which makes the try-on more realistic.

It also looks at how various Semantic Segmentation methods aid in the identification and preservation of limbs (for instance, arms) during the wearing of the virtual clothes to ensure that they are well Overlaid onto the user's body. This system significantly enhances the online shopping experience by reducing the need for physical trials and increasing engagement [oai_citation:2,An example of a paper that discusses the importance of second-generation biofuels while touching on the second and third generation is the Paper3. pdf.

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3.4 "AI-Based Fashion Stylist Recommendation System," Sakshi Shete, Msandos Ndwandwe, Prasad Dhakad, and Ayushi Sojitra.

This paper discusses a fashion stylist system which incorporates the use of artificial intelligence in order to recommend articles of clothing. It has been programmed to cater to the numerous interactions that its users will have with the system and also has the ability to be adjusted depending on the fashion trends in the current generation.

Convolutional Neural Networks (CNNs): These are used for image recognition and processing especially in the recognition of the various apparels. The CNNs used extract features including, texture, color and style to match to these of the user.

Collaborative and Content-Based Filtering: Like the previous paper, this system employs Collaborative Filtering for recommending clothe on the basis of other users' preferences and Content-Based Filtering for recommending other items similar to the user's previous choices.

Augmented Reality (AR) Integration: Virtual try-ons are performed using AR; this means that the users are able to see how the particular type of the clothing item would fit him / her. This feature is more advantageous when it comes to assisting the users to make proper decisions on clothes without having to wear them.

Deep Learning Models: The recommendation engine of the system stands tuned to Deep Learning whereby the recommendations updated themselves depending on the feedback from the users. Lists can also be changed in real-time as the users scroll through items or make purchases, when applied to the system.

Trend Analysis Algorithm: This feature scans fashion trends in real-time via Natural Language Processing (NLP) algorithms, as referred to in formulating strategies. By analyzing data from fashion blogs, social media, and other sources, the system stays up-to-date with the latest trends, ensuring its recommendations are always relevant [oai_citation:1,paper1.pdf

These papers compiled together explain how AI, deep learning, and AR can revolutionalise the fashion industry through algorithms such as CNNs, GANs, the collaborative filtering technique, as well as the pose estimation technique that all contribute to making virtual stylist systems more personalised and interaction

Fig.1. Shown flowchart of steps of proposed algorithm.

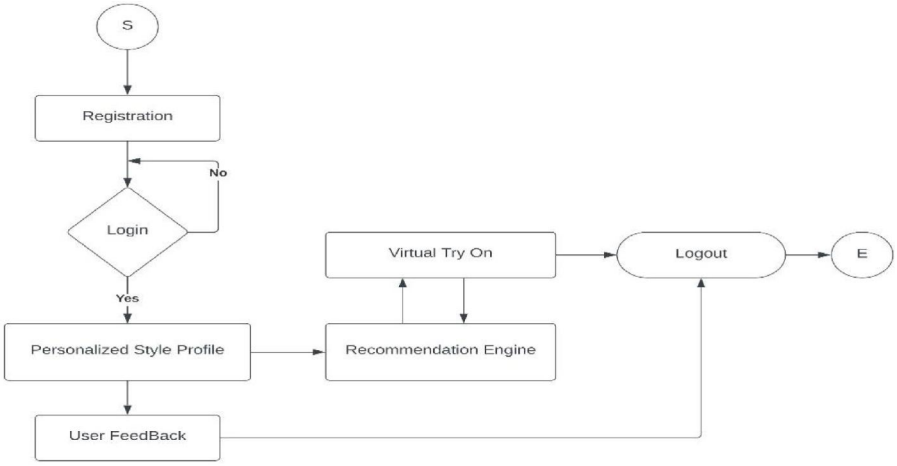

Fig 1:- Flow Chart or the Activity Diagram

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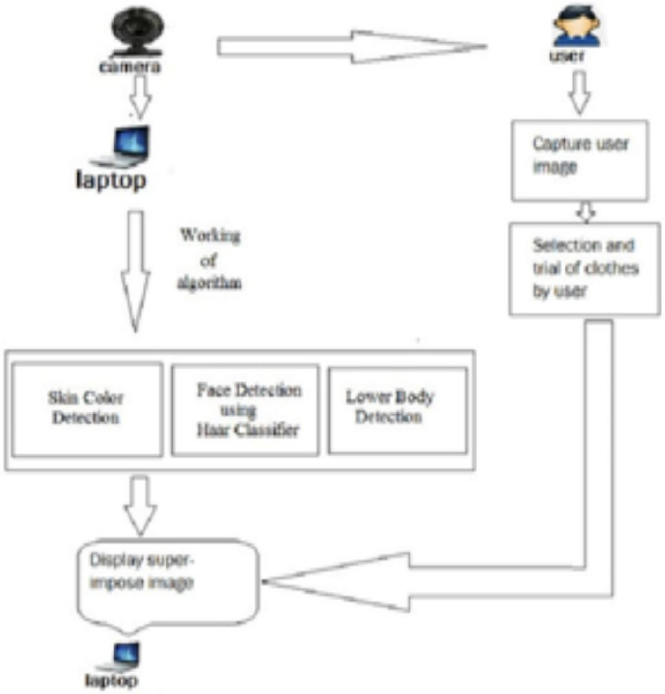
Fig.2. Shown the architecture of proposed system



Architecture of Virtual Dressing Room

Table 1.Literature Survey on Virtual Personal Stlist

No	Title	Algorithm	Dataset	Result
[1]	AI Driven Personalized Fashion Stylist	Collaborative Filtering Machine Learning Augmented Reality	Custom dataset Body shape dataset Clothing dataset	The system successfully delivers personalized fashion recommendations and virtual tryons, enhancing the online shopping experience.
[2]	Virtual Stylist Using IoT	Convolutional neural network Style matching Algorithm Open CV(Image processing)	Body measurement image of clothes	The virtual stylist system effectively allows users to try on clothes virtually, reducing product returns and improving user satisfaction.
[3]	Virtual Dressing Room System Using Deep Neural Networks	Human parsing Pose estimation Machine learning Generative Adversal Networks	clothing dataset human body pose custom collected	The system enables realistic virtual try-ons using GANs, improving online shopping convenience by eliminating the need for physical try-ons.
[4]	AI-Based Fashion Stylist Recommendation System	Collaborative Filtering Content based Filter Natural language processing	Fashion items past purchases	The AI-based system provides personalized, real-time fashion recommendations with virtual try-ons, increasing user engagement and satisfaction.

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