AI Fashion Assistant-Vogue Vista

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Keywords: Fashion Recommendation, AI-Based Styling, Wardrobe Management, Outfit Suggestions, Machine Learning in Fashion, Personalized Fashion Assistant.

Abstract: Fashion plays an important role in expressing oneself and picking the right outfit according to personal characteristics can boost a person's confidence and comfort level. AI-Based Fashion Assistant which helps Users to choose their best outfits based on their Skin Tone, Body Type, Personal preferences. By utilizing machine learning algorithms to analyze fashion trends, the system can recall appropriate individual-characteristic-tailored outfits. Furthermore, the project also includes a wardrobe management system that suggests outfits based on the clothes a user already possesses, encouraging sustainable clothing habits. The inclusion of AI-powered suggestions allows this fashion assistant to streamline the decision-making process and save time when choosing outfits. The new system proposed in this paper resolves the issues of daily styling in the fashion domain with data-assisted and user-oriented recommendations thus providing a positive experience of shopping and wardrobe management to the user.

1 INTRODUCTION

In today's digital age, fashion and personal style play an increasingly central role in how individuals present themselves to the world. As society gravitates towards personalization in all aspects of life, fashion is no exception. The desire to express one's unique identity through clothing choices has never been more prevalent. However, curating a wardrobe that reflects personal preferences, aligns with current trends, and suits different occasions is not always a straightforward task. Factors such as time constraints, budget considerations, and an overwhelming number of fashion choices can make it challenging for individuals to build and maintain a versatile wardrobe. This is where the AI Fashion Assistant project comes into play. By leveraging the power of artificial intelligence (AI) and machine learning (ML), this innovative solution aims to provide personalized fashion recommendations and styling assistance. The intelligent assistant is designed to simplify wardrobe management, optimize outfit selection, and enhance the overall user experience in personal styling. As the fashion industry continues to embrace digital transformation, the AI Fashion Assistant stands at the forefront of this evolution, offering a seamless blend of technology and fashion.

2 LITERATURE SURVEY

All the studies reviewed highlight the amazing area fashion recommendation systems have achieved through the fusion of machine learning, deep learning and computer vision methods. These technologies have pioneered a new personalization experience in fashion advice, where systems like Convolutional Neural Networks (CNNs) learn the performance to distinguish clothing types from visual data with high precision. Due to their capability of efficiently recognizing textured, colorful, or complex shapes in images, CNNs have become very potent in classifying fashion categories, thus supporting better recommendations with context-aware detailed knowledge. Moreover, Transfer learning (especially towards pre-trained models from sites like Hugging Face Smith, J., & Taylor, K. (2022)), further elevated the ability to reduce training time with significant amount of classification accuracy.

3 EXISTING SYSTEM

Due to the demand for individual styling and outfit recommendations, there have been various approaches and techniques in the area of AI fashion

C., P., Prabha, N., M., M., G., M., R., S. and K., V.
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DOI: 10.5220/0013913500004919

In *Proceedings of the 1st International Conference on Research and Development in Information, Communication, and Computing Technologies (ICRDICCT'25 2025) - Volume 4*, pages 377-381
ISBN: 978-989-758-777-1

recommendations. (2006) to list some early fashion recommendation systems used rule-based algorithm and simple filtering methods. With the advent of artificial intelligence, techniques of the past have been augmented and improved upon such as image recognition and machine learning models to study clothing attributes and analyze user preferences. The well-known methods include collaborative filtering, content filtering, and hybrid recommendation systems, which are based on the combination of several algorithms. Though, these approaches offer some degree of personalization, they frequently fail due to inherent restrictions inflexible styling recommendations and difficulty to cater individual style. Some of the shortcomings to date fashion recommendation systems are lack of style matching based on the context, color detection accuracy is limited, real-time outfit suggestions based on the user uploaded piece of garments in their wardrobe cannot be provided.

4 PROPOSED SYSTEM

In the proposed system, we employ advanced machine learning and image processing techniques to provide personalized fashion recommendations and automated wardrobe management. Figure 1 shows Block Diagram of Outfit Assistant. The system is designed to enhance the user experience by offering tailored outfit suggestions based on individual preferences and existing wardrobe items, aiming to improve styling choices and streamline wardrobe management. Figure 2 shows Block Diagram of Wardrobe Assistant.

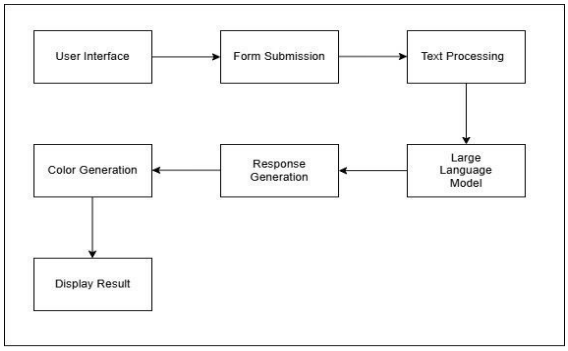

Figure 1: Block Diagram of Outfit Assistant.

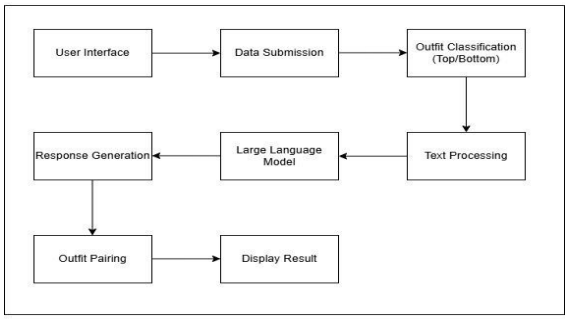

Figure 2: Block Diagram of Wardrobe Assistant.

5 SYSTEM REQUIREMENTS

AI and ML are revolutionizing numerous sectors by improving personalization and automating intricate tasks. In the fashion industry, AI is being utilized with increasing frequency to provide personalized styling suggestions, maximize wardrobe organization, and enhance the overall user experience. AI enables application in the fashion field through data analysis and pattern recognition, allowing it to analyze a user's preferences and recommend a personalized solution that was previously too difficult to manually handle.

AI technology can customize advice, generate personalized fashion outfit suggestions, recommend color combinations, and assist users in wardrobe planning based on their attributes. AI finds its use in retail to improve product recommendations, provide virtual try-ons, and study shopping trends for a better user experience. Using cutting-edge image processing and machine learning algorithms, these apps can manage enormous amounts of visual and textual data, providing exceptionally relevant and precision recommendations. (What we're actually creating is more along the lines of recommendations given to a stylist based on the latest trends in addition to tailoring recommendations based on user inputs including body shape, skin tone, style preferences, etc.) AI and ML are integral to streamlining this flow and other details to provide personalized fashion recommendations. The models that build up the system are AI tools and machine learning models that analyze the user preferences, detect the color and advise the outfits based on an individual's interests. Using these technologies, our system allows users to receive a smooth and highly personalized fashion experience, creating enhanced convenience and confidence for daily styling. Through this, we can see how AI and ML Technology not only boost personalization but also offer scalable solutions to the problems of the fashion industry. Incorporating these

technologies, we propose a system that could revolutionize the process of wardrobe management and styling into an interesting, precise, and simple experience for the user.

6 ALGORITHMS

6.1 Examples of Pretrained Models (Hugging Face)

Algorithm: Deep Learning Models Based on Transformers.
Purpose: Hugging Face models are optimized for complex data, i.e. images and text (mainly transformer architectures). These models are optimized for understanding and classifying based on learned representations of content. To narrow down this error, you will have to train these models on your dataset and consequently, you will have new models that can be used to classify clothing into categories such as top wear, bottom wear etc. This is the classification process that helps the assistant to analyses and categorize a user's wardrobe. The Hugging Face platform offers many pre-trained models that save time and computational requirements when comparing training from scratch to a pre-trained model, allowing the quick and efficient use of a fashion assistant with reduced labeled inputs. Moreover, transformers are capable of capturing both local and global features in images, improving their capacity to recognize clothing items across challenging conditions (e.g., changing light or perspective).

6.2 Gemini 1.5 Model

Algorithm: proprietary AI/ML model (most likely using various deep learning techniques)
Intent: It utilizes the Gemini 1.5 model to provide personalized clothing recommendations based on user data like body shape, skin tone, and style preferences. It is likely to incorporate multiple machine learning techniques such as neural networks to detect complex relations between clothing item's features and a user's preferences. Because the model is flexible enough to use many variables such as gender, occasion and fashion trends it can give extremely targeted recommendations. As an example, it might suggest an outfit based on a user’s body shape that is proportional and enhances someone’s personal style. The retraining process allows the model to better adjust to user feedback and to improve over time. This helps keep the recommendations fresh and tailored to the user's evolving taste over time, or in light of new style trends.

6.3 Image Processing (OpenCV)

Algorithm: Computer Vision Techniques (e.g., Edge Detection, Contour Analysis)
Functionality: The OpenCV (Open Source Computer Vision Library) is an important part of the fashion assistant as this library is used in the assistant to understand about the images and helps extract the useful features for clothing recommendations. These include the image processing algorithms that allow OpenCV to characterize shape, size, and fabric of clothing items. For instance, edge detection techniques assist in determining the contours of an object, enabling the system to differentiate between various types of clothing, like dresses, pants, or shirts. Contour analysis refines this process even further, aiding in the detection of the outlined edges of individual clothing pieces in the versions uploaded, especially beneficial in context with overlapping or cluttered images. Based on color theory or references from past experience, Color Detection can be used to identify colors, this can be a great application of OpenCV as colors are directly related to the garment and one can classify various colors of clothes. The library's real-time processing capabilities make the fashion assistant efficient, delivering instant feedback, crucial for an interactive user experience. This is why real-time tasks like pattern recognition, object detection, and feature extraction are handled well by OpenCV.

6.4 Color Detection (K-means Clustering

Algorithm: K-means (machine learning algorithm)
Purpose: The K-means clustering is an unsupervised machine learning algorithm used for segmenting grouping items in data based on similarity by understanding how K- means clustering works, fashion clothing color detection could be achieved by multiple methods of K- clustering. The K- means clustering algorithm works by clustering pixels in an image with similar colors, allowing it to identify color clusters. This is how a fashion assistant would be able to know what the main colors are in one clothing piece, such as a dress or a shirt. The primary advantage of K-means cluster the tone of using mean values for color detection is its simplicity and efficiency. After the image has been split into color clusters using the algorithm, the assistant will identify which cluster is characteristic of the colors used in the clothing piece.

7 RESULTS

The AI analyses the colors and suggests the best outfit pairings by matching complementary colors. This ensures that users receive personalized styling recommendations and well-coordinated wardrobe suggestions, enhancing their overall fashion experience. Figure 3 shows the Main Web Page.

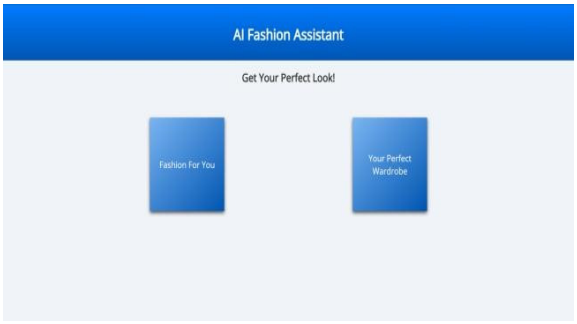

Figure 3: Main Web Page.

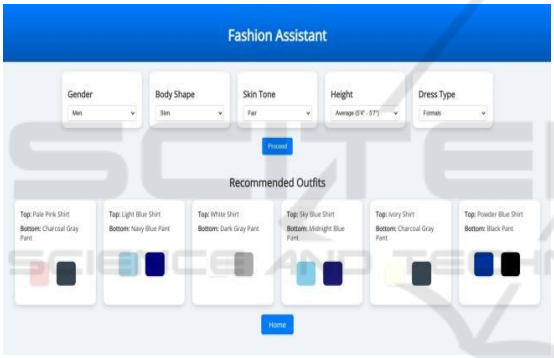

Figure 4: Web Page of Outfit Assistant.

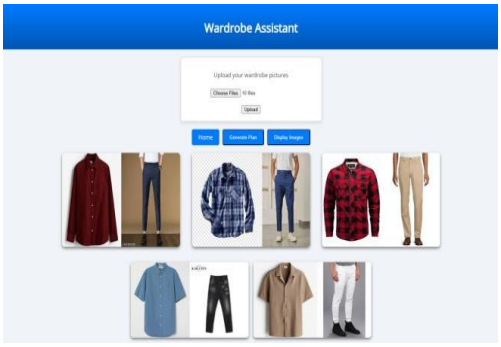

Figure 5: Web Page of Outfit Assistant.

In our AI Fashion Assistant project, the user interacts with three main pages. The first page serves as a navigation hub, providing two buttons: one leading to the Dress Suggestion page and the other to the Wardrobe Suggestion page. On the second page, users can select various features such as gender, dress type, body shape, skin tone, height, and more. Figure 4 shows Web Page of Outfit Assistant. Upon submission, the system processes these inputs and provides color-matching recommendations for outfits. The third page allows users to upload images of clothing items (such as tops and bottoms). Based on the uploaded images. Figure 5 shows Web Page of Outfit Assistant.

8 CONCLUSIONS

The AI Fashion Assistant reads and uses advanced machine learning models and AI tools to offer personalized recipes for fashion. The system provides personalized outfit recommendations by employing technologies such as Hugging Face for image classification, OpenCV for image analysis, and K-means for color detection, thereby considering user preferences, body type, and existing wardrobe pieces. Limitations of fashion recommendation systems are addressed in order to provide personalized styling, accurate colors, and dynamic outfit generation in order to improve user experience. To sum up, our project tries to connect technology with your wardrobe and how to interact with it. Unlike other AI fashion assistants, this one is known for context-aware recommendations, allowing the app to filter by tastes. Additional capabilities such as real-time trend analysis, seasonal wardrobe planning, and social media integration have the potential to be incorporated into the tool in the future, further proving the power of AI to provide tailored and easily accessible style guidance.

ACKNOWLEDGEMENTS

We express our deep sense of gratitude and indebtedness to our institution "SNS COLLEGE OF TECHONOLGY", Coimbatore, which provided us the opportunity to fulfil our cherished goals. We extend our sincere thanks and regards to Dr. Angel Latha Mary, Head of the Department, Artificial Intelligence and Machine Learning, for giving this opportunity to carry out this work in the college. We would most heartily like to thank the almighty, our family members and friends without whom this paper would be impossible.

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