



A Personalized Style Guide

Guide Name: - Ms. Trupti Ghate

Mr. GEETANSHU PATIL, Ms. AASTHA PATI, Ms. SHITAL KANOJIA, Mr. ADITYA HIREKHAN, Mr. ADITYA RAMTEKE

Abstract: ML-based Outfit Suggestion System to help fashion enthusiasts choose outfits that flatter their body type and shape. The system uses deep learning, computer vision, and natural language processing to analyze databases of clothing materials and body shape attributes, providing personalized clothing recommendations. Artificial Intelligence and Machine Learning (AIML) technologies present viable solutions to address industry-specific challenges, including those within the fashion sector. Many consumers Struggle with uncertainty when purchasing clothes online,

lacking clarity on suitability and style preferences. Consequently, there is a growing demand for customizable recommendation systems tailored to individual needs and preferences, enhancing both user satisfaction and e-commerce efficiency.

Keywords: Machine Learning ML, Outfit Suggestion System, fashion, clothing recommendations), customizable recommendation.

I. Introduction

Fashion serves as a means for individuals to express their identity and social status, a tradition ingrained in human culture. With every person being unique in size, shape, and color, the choice of attire becomes pivotal, influencing one's impression and presentation. As the world witnesses a surge in the integration of computer vision in the fashion industry, particularly in clothing recommendations, a notable gap remains in understanding the correlation between body shape and fashion choices. This gap persists due to the scarcity of datasets encompassing both clothing category and comprehensive body shape annotations.

Artificial Intelligence and Machine Learning (AIML) technologies present viable solutions to address industry-specific challenges, including those within the fashion sector. Many consumers Struggle with uncertainty when purchasing clothes online, lacking clarity on suitability and style preferences. Consequently, there is a growing demand for customizable recommendation systems tailored to individual needs and preferences, enhancing both user satisfaction and e-commerce efficiency.

With 2% of the GDP, the fashion industry has a considerable impact on the world economy. Fashion companies now frequently use virtual fitting rooms to improve customer satisfaction and attitudes toward online shopping. Today's internet platforms, however, are unable to give customers a tangible grasp of the products. The most frequent online purchase is clothes, but consumers have trouble finding outfits that match their size and skin tone, which results in a return rate that is 60% higher than in other e-commerce industries. Fashion businesses are placing a high priority on virtual try-on technology to solve this problem by enhancing product visibility and offering sensory feedback for online shopping. Consumers can use this technology to virtually try on sizes, styles, and colours by utilizing images on a computer or smartphone screen. Consumers can evaluate products and reduce associated hazards.

Try-on technology has the potential to revolutionize the fashion industry when used wisely. Fashion companies must consider factors like consumer characteristics, technological challenges, national cultural values, and social influence when introducing new technology. Understanding these factors can improve user experience and

satisfaction, and societal ramifications. By understanding how different cultural values impact the adoption of try-on technology, businesses can customize aspects to meet customer needs and preferences.

In response to this demand, our research endeavors to develop an improved recommendation system leveraging pre-trained models to cater to varying body types. The objectives of our study include accurately measuring body silhouette, predicting suitable apparel based on body type through image classification, and evaluating the efficacy of pre-trained and traditional models. user confidence by offering personalized outfit suggestions that prioritize comfort and style, recognizing the impact of fashion on self-esteem. It streamlines decision-making by offering tailored recommendations based on individual preferences and body type. The project also encourages personal style as a unique form of self-expression, encouraging users to explore and refine their fashion identity. It also responds to evolving consumer needs by providing up-to-date recommendations aligned with the latest trends and cultural influences.

II. Literature Survey

[1] The literature on fashion recommendation systems encompasses various approaches leveraging machine learning and deep learning techniques.

[2] Focuses on explainable fashion recommendation using semantic attribute region guidance.

[3] Explore clothing style recommendations tailored to personal body shapes.

[4] Propose collaborative deep learning for recommender systems. Other studies.

[5] Delve into complexion-based outfit color recommendation and intelligent clothing selection systems, respectively.

[6] On powering virtual try-on through auxiliary human segmentation learning.

[7] On outfit recommender systems. Additionally. [8] Discuss real-time virtual try-on using image warping techniques, while Limaksornkul present a statistical-based apparel recommendation system named Smart Closet Our research embarked on a meticulous and comprehensive methodology aimed at developing and implementing an MLbased outfit suggestion system tailored to individual preferences. The initial stage involved dataset creation, a process of extensive research and data collection from various sources, including online fashion platforms, blogs, social media outlets, and fashion magazines. This exhaustive dataset compilation involved gathering a diverse range of images depicting different clothing items, accessories, and fashion ensembles, thereby laying the groundwork for subsequent analysis and model training.

III. Research Methodology

Address the gap in the online fashion retail market where customers often struggle with selecting outfits that fit well and flatter their body shape without the ability to try them on physically. Use machine learning models (e.g., decision trees, k-means clustering) trained on a dataset of body measurements and corresponding body shapes. Alternatively, implement a rule-based system using predefined measurement thresholds.

This implements an image classification model using TensorFlow and Keras. The model is designed to classify images into two classes: "human" and "non-human." The neural network architecture consists of convolutional (Conv2D) and pooling (MaxPooling2D) layers, followed by fully connected (Dense) layers. The model is compiled using the binary crossentropy loss function and the Adam optimizer. The Intel OneDNN helped in reducing the time for training, and the optimized TensorFlow for Intel Hardwares helped us in reducing the time for training. To facilitate real-world deployment, we seamlessly integrated our trained model with the Flask framework, a lightweight and flexible web application framework for Python. This integration enabled us to develop a user-friendly web interface, allowing users to access personalized outfit recommendations in real-time and interact with the system effortlessly.

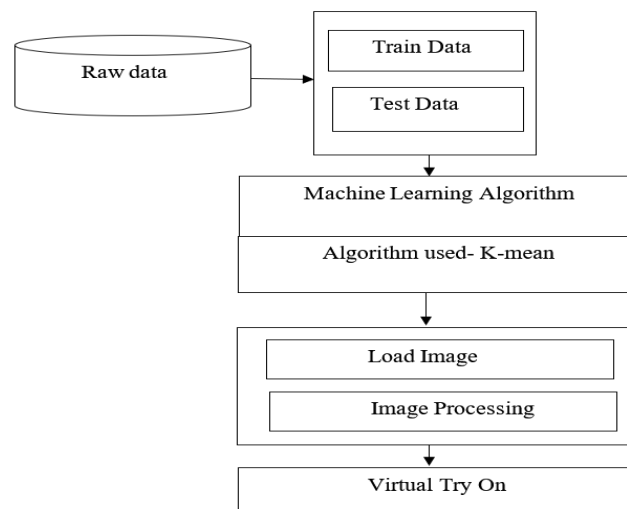


Fig 1. System Diagram

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VI. Conclusion

In conclusion, the creation of the ML-Based Outfit Suggestion System marks a significant advancement in revolutionizing the fashion industry and addressing the challenges individuals encounter in curating a fashionable wardrobe. This project harnesses state-of-the-art technologies like deep learning, computer vision, and natural language processing to introduce a novel and personalized solution. The system's advantages are apparent in its capacity to deliver highly customized fashion recommendations, simplify wardrobe management, and boost user confidence by considering individual body shapes and style preferences. By integrating advanced technologies such as augmented reality for virtual try-ons and machine learning for trend analysis, the system emerges as a leader in fashion recommendation innovation.

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