WWW.IJRPR.COM

International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

AI Virtual Clothes Try-On

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A B S T R A C T :

This work focuses on proposing an AI Virtual Clothes Try-On system to improve online clothing buying processes. The system combines AI technology and AR application with physical fittings to enable users to have a glimpse of what they will look like in the clothes before buying them. By using computer vision and machine learning, the solution takes a scan of a user's body dimensions and then gives an instant visualization of how a particular piece of clothing would fit.

These drawbacks of online clothing purchases can be solved by this application: virtual fitting room, which will indeed be an interesting and unique project.The project also focuses on employing the python programming for development of the AI models which get trained for modifying the texture and size of the clothes in accordance to the size of the user's body. In general, the AI Virtual Clothes Try-On system has a guidance and time-saving role for e-commerce applications and increase customer satisfaction with a minimum return rate.

Keywords: Virtual Try-On, Smart Fashion

Introduction

In the era of digital transformation, retail industry is facing a major revolution that turns to e-commerce, especially in the field of fashion. However, one of the biggest problems that online buyers meet is that they can't try-on clothes before buying it, thus this always leads to concerns about size, fit or style. To solve these inconvenience, we introduce an AI based virtual-try-on solution which integrates high-technology tools like augmented reality and machine learning to show customers what they will look like with desired-clothes in real-life. With the ultimate goal is enhancing user's satisfaction as well as their personal interactive during shopping time, our system also promises to cut down return rates and then make positive effects on interest promotion of both customers and retailers.

Web shopping websites have changed the retail process by providing ease, diversity, and accessibility. But the lack of physical trials results in a degree of uncertainty in terms of product fit, resulting in discontent and high rates of returns. The fashion business is especially hampered by trying to fill the gap between product displays on a screen and what people expect to happen in reality. This project is a Virtual Clothes Try-On System that allows users to see clothes on a custom 3D avatar depending on their chosen size and skin color. Users can explore a digital closet and watch clothes put on the avatar in real-time. The user interaction is done through HTML, CSS, and JavaScript, with Blender used for 3D avatar modeling and animation. This integration of web programming and 3D modeling gives an online shopping experience that looks real and interactive.

Literature Review

Existing systems for AI Virtual Clothes Try-On include platforms like FitMe by Amazon and Zeekit, which use AI and AR technologies to allow users to try on clothes virtually. These platforms overlay clothing onto real-time images or create 3D avatars based on body measurements for more accurate fit prediction. However, challenges remain in achieving perfect personalization, ensuring fit accuracy for diverse body types, and improving real-time performance. These limitations present significant opportunities for further advancements and innovation in the virtual fashion space.

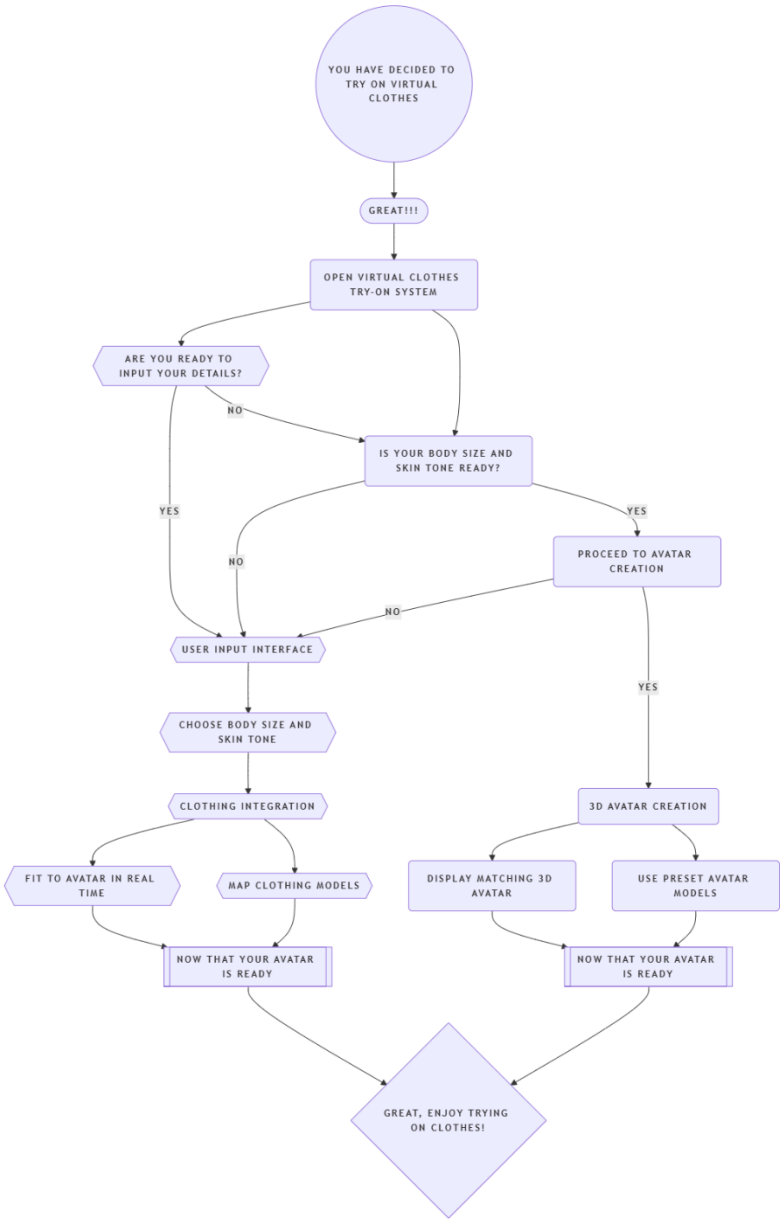
Virtual try-on technologies have proven to be the answer to offer an improved experience in online purchases through visualizing clothing on a virtual model. Early technology employed 2D overlays, which were not real-looking and lacking user-specific aspects. With developing computer vision and 3D modeling, contemporary solutions aim towards creating realistic avatars that replicate user-specific qualities such as body shape, size, and color.

A number of studies have investigated the combination of 3D modeling software like Blender and Unity with web technologies to provide realistic clothing fit and movement simulation. Silva et al. (2020) emphasized the efficiency of 3D avatars in minimizing return rates in e-commerce through enhanced customer confidence. Web-based solutions utilizing JavaScript and WebGL have also provided virtual try-ons with greater accessibility without the need for high-end hardware.

These advances justify the viability of constructing an interactive, browser-based virtual try-on system that combines user personalization with real-time apparel simulation to increase customer satisfaction and interaction.

Methodology

The Virtual Clothes Try-On System is developed adopting a modular framework that integrates web development and 3D modeling:



User Input Interface:

Users choose their body size (e.g., XS to XXL) and skin tone from pre-defined values using a web-based interface constructed using HTML, CSS, and JavaScript.

3D Avatar Creation:

Depending on user inputs, a matching 3D avatar is displayed using Blender. Preset avatar models are prepared for various combinations of sizes and skin tones to provide quick rendering and seamless transitions.

Clothing Integration:

There is a virtual wardrobe having different clothing models developed in Blender. These are mapped and fitted to the chosen avatar in real time.

Frontend-3D Integration:

JavaScript is utilized for loading and working with the avatar and clothing models in the browser. Libraries such as Three.js or the likes can be utilized for rendering web-based 3D models.

User Interaction & Display:

Users can change clothing, rotate the avatar, and zoom in and out for a better view. The interface is designed for usability and responsiveness.

Results

The AI Virtual Clothes Try-On system designed for the website offers a simplified yet effective solution for users to visualize how clothes might appear on them, without requiring photo uploads or camera access. This system focuses on ease of access, speed, and user privacy. The user interface allows customers to select their preferred clothing size from a standard range (XS, S, M, L, XL, XXL) and choose a skin tone from a predefined set such as fair, medium, and dark. Based on these selections, the system dynamically displays an image of a model wearing the selected outfit that closely resembles the user's inputs.

These images are pre-generated and stored in a database or folder structure, named according to the combination of size and skin tone to allow easy retrieval through simple JavaScript or backend logic. This technique eliminates the need for computationally intensive operations or personal data processing, making it suitable for lightweight web platforms. It also enhances the inclusivity of the platform by showing diverse skin tones and sizes. The visual design is straightforward and mobile-friendly, likely built using HTML, CSS, and JavaScript to ensure compatibility across devices. This system lays a strong foundation for future enhancements, such as integrating machine learning models to personalize suggestions or using AR overlays for real-time try-ons, while currently delivering a privacy-focused, visually accurate experience.

Conclusion

The AI Virtual Clothes Try-On system represents a significant step forward in the way consumers interact with fashion and e-commerce platforms. By eliminating the need for users to upload personal photographs, the system emphasizes privacy and simplicity, making it accessible to a wide range of users who may have privacy concerns or limited technical knowledge. Instead, it allows users to choose their preferred clothing size (ranging from XS to XXL) and select their skin tone from a predefined palette, which reflects a strong commitment to inclusivity and diversity. These selections dynamically display model-based try-on visuals that help users envision how a particular outfit might look on someone with a similar body type and complexion.

This innovative solution bridges the gap between physical and online shopping experiences. It offers customers a more engaging and confidence-boosting way to explore fashion items virtually, reducing the uncertainty and dissatisfaction commonly associated with online clothing purchases. Furthermore, it also benefits retailers by minimizing return rates and increasing customer satisfaction, which can lead to stronger brand loyalty and higher conversion rates.

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