

## E-Commerce Website with Virtual Trial Feature

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### Abstract:

In this paper, we describe the creation and deployment of an effective e-commerce website with state-of-the-art technologies to improve user experience and enable smooth transactions. Deep Neural Networks (DNN) are used by our platform to deliver individualized product recommendations based on the interests of each unique user. In addition, we incorporate computer vision technology to facilitate product classification, image recognition, and image-based search capabilities, making it simple for customers to locate related products. Flask, a lightweight Python framework, is used in the development of the web application to ensure effective processing of HTTP requests and

dynamic content delivery. Additionally, we present a novel functionality that incorporates research papers associated with items, enabling users to get pertinent scholarly literature straight from the platform. Prioritization is also given to security measures, with user data being protected via encryption and secure authentication methods.

**Keyword:** Image processing, E-commerce, Virtual Trial, Computer Vision, Shopping, Deep Neural Network

## Introduction:

Online shopping has developed from a practical choice to a favored way to make purchases in today's digital environment. Traditional e-commerce systems are having a hard time keeping up with consumer expectations, which include simple access to information and more personalized shopping experiences. In order to solve this, we have created a cutting-edge e-commerce website that will completely transform the online purchasing experience. Our platform provides easy-to-use image-based search functions and personalized product suggestions by utilizing Deep Neural Networks (DNN) and Computer Vision technologies. When looking for a new pair of shoes, picture-based product recommendations could appear to you or you could find comparable items with ease. These features not only make purchasing easier, but they also increase user interaction and satisfaction. Our e-commerce platform does more than just make product discovery easier; it also incorporates academic research right into the purchasing experience, giving customers useful information and insights. We prioritize security to safeguard user data and transactions while guaranteeing the effective processing of user requests and dynamic content delivery by utilizing the lightweight Python framework Flask. By seamlessly integrating cutting-edge technologies, our platform seeks to transform the online shopping experience by enabling users to make educated decisions and take pleasure in a personalized, easy-to-use, and safe purchasing experience.

## Literature Survey:

Recently, the integration of virtual try-on features in e-commerce has gained significant attention due to its potential to enhance the online shopping experience. Various technologies such as OpenCV (Computer Vision), Deep Neural Networks and Python have been utilized to develop and implement virtual try-on solutions.

OpenCV, an open-source computer vision and machine learning software library, has been a key technology in enabling virtual try-on capabilities. Its robust features for image and video analysis, including facial recognition and tracking, form the foundation for creating realistic virtual try-on experiences.

Deep learning techniques, particularly deep neural networks, play a pivotal role in the development of virtual try-on solutions. By leveraging convolutional neural networks (CNNs) and other deep learning architectures, e-commerce platforms can accurately map clothing items onto users' bodies in real-time, enabling them to virtually "try on" different products.

Flask, a lightweight WSGI web application framework in Python, has been widely adopted for building the backend

infrastructure of virtual try-on systems. Its simplicity and flexibility make it well-suited for handling user requests, managing product databases, and interfacing with the front-end components of e-commerce websites.

By combining these technologies, e-commerce businesses are able to offer customers an immersive and personalized shopping experience that closely simulates the in-store try-on process.

## Need for a Virtual Trial-on Feature In E-Commerce:

In today's digital age, the virtual try-on feature has become an essential element for e-commerce platforms. By providing customers with the ability to virtually try on products in clothing enhances the overall shopping experience and drive sales.

**Enhanced Customer Experience:** The virtual try-on feature allows customers to visualize how a product will look on them before making a purchase. This not only reduces the likelihood of returns but also builds trust and confidence in the brand.

**Personalization:** With virtual try-on, customers can personalize their shopping experience by virtually trying on different styles, colors, or sizes without having to physically visit a store.

**Reduced Uncertainty:** For items like apparel and accessories, the virtual try-on feature helps in reducing uncertainty about fit and appearance, thereby increasing the likelihood of a successful purchase.

**Competitive Advantage:** As more e-commerce businesses adopt the virtual try-on feature, it has become a competitive necessity to stay ahead in the market and meet evolving customer expectations.

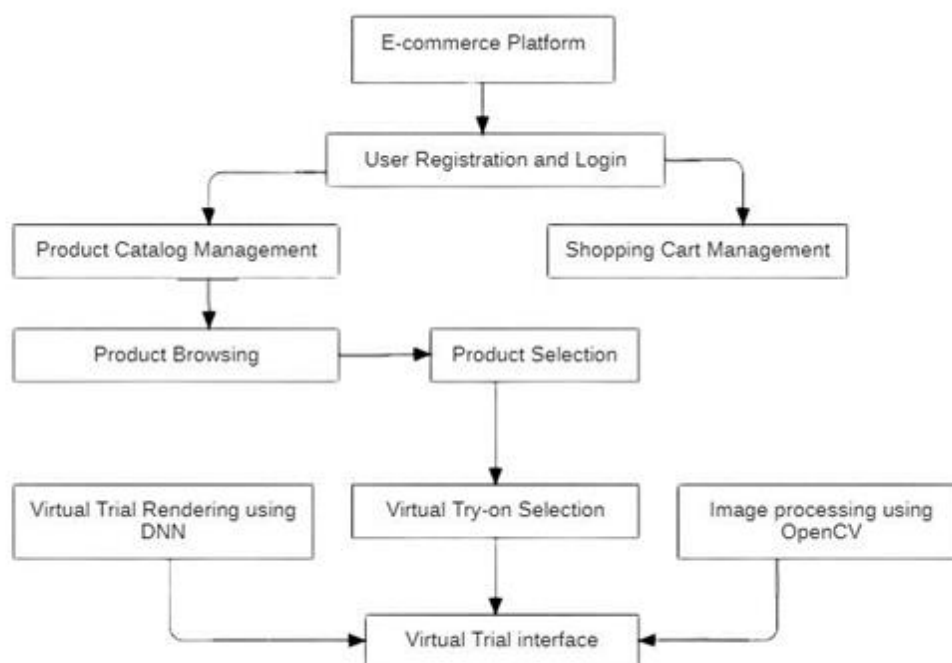
Overall, the inclusion of a virtual try-on feature in e-commerce platforms is not just a luxury but a smart move to modern consumer needs and preferences.

## Issues with current System:

**Sizing Accuracy:** Virtual try-on systems may struggle with accurately representing clothing sizes. This can lead to customers receiving items that do not fit as expected.

**Color Accuracy:** The colors displayed on virtual models may not always match the actual product. This can be disappointing for customers who expect the item to look a certain way based on the virtual try-on.

## Proposed System:



Users typically input images, often in real-time video format, showcasing themselves and the desired items for virtual try-on. These images serve as the foundation for the virtual try-on process. Image processing methods are then utilized to extract pertinent features like body shape, facial landmarks, and clothing items.

Deep neural networks, particularly convolutional neural networks (CNNs), play a significant role in feature extraction from these input images. Pre-trained CNN models such as VGG and ResNet are commonly used, either fine-tuned or employed as feature extractors, to capture crucial characteristics of both the user and the clothing items.

Semantic segmentation is another technique applied to distinguish different components within the input images, such as the user's body, clothing, and background. This segmentation enhances precision in manipulating and overlaying clothing items onto the user's body.

At the core of the system lies an algorithm responsible for realistically overlaying virtual clothing items onto the user's image. This algorithm factors in various elements such as body shape, size, pose, lighting conditions, and the physical attributes of the clothing items.

Some applications employ real-time rendering techniques to offer users immediate feedback during interaction with the virtual try-on system. Achieving interactive frame rates in real-time rendering necessitates efficient algorithms and hardware acceleration.

**Limited Movement:** Virtual try-on systems may not accurately simulate how a garment will move or drape on the body. This can make it difficult for customers to gauge the overall fit and look of the clothing.

## Methodology:

In order to develop a successful Virtual Try feature in e-commerce, a detailed and comprehensive methodology was followed. The following steps were taken to ensure the effectiveness and efficiency of the feature:

**Research and Analysis:** Extensive market research was conducted to understand consumer preferences and behaviors related to virtual try-on features. Analysis was carried out to identify strengths and weaknesses of existing virtual try-on solutions in the market.

**Technology Selection:** Evaluation of various Python technologies was performed to select the most suitable tools for implementing the virtual try feature. Consideration was given such as OpenCV, Deep Neural Networks, Python frameworks, ease of integration with e-commerce platforms and cost-effectiveness.

**User Experience Design:** User interface (UI) and User Experience (UX) design principles were employed to create an intuitive and seamless virtual try-on experience for

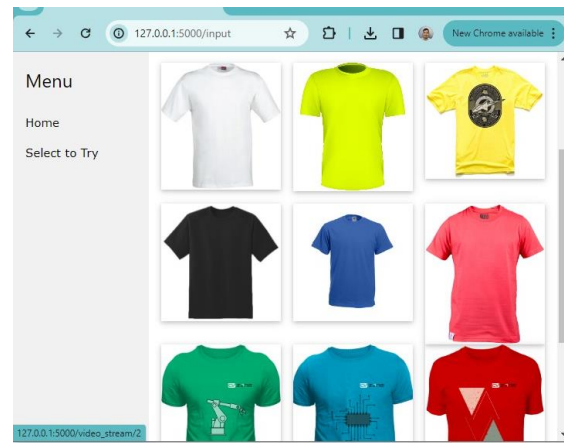
customers. Prototypes were developed and tested with potential users to gather feedback for iterative improvements.

**Integration with E-commerce Platform:** Collaboration with the development team and e-commerce platform providers was essential for seamless integration of the virtual try feature within the existing framework.

**Performance Testing and Optimization:** Rigorous performance testing was carried out to assess the speed, accuracy, and reliability of the virtual try feature under various network conditions. Optimization was performed to enhance the responsiveness and realism of virtual try-on simulations.

By following this detailed methodology, we were able to develop a robust virtual try feature that enhances the overall e-commerce experience for customers while addressing technical, design, and privacy considerations.

### Result:



### Conclusion:

In summary, the e-commerce platform we have developed is a vision of the future of online shopping, utilizing cutting edge technology such as computer vision and deep neural networks to seamlessly customize user experiences and expedite the process of finding products. We enable people with important insights and information, improving their capacity to make well-informed decisions, by incorporating academic research directly into the purchasing experience. Our platform, which offers a seamless and pleasurable purchasing experience, is built on the Flask framework, ensuring efficiency, flexibility, and security. We think our platform sets a new benchmark for online shopping, making it more user-friendly, educational, and entertaining for customers all over the world. We are dedicated to innovation and user pleasure.

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