SOFTWARE REQUIREMENT SPECIFICATION

For

Virtual Try-On

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Submitted By

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Revision History

Date	Change	Reason for Changes	Mentor Signature
16/01/2023	Start collecting several research paper regarding our project	So that we have deep knowledge of our project.	
10/02/2023	Discussing the various approaches that can be used in the project.	To increase the knowledge about different algorithms.	
15/03/2023	Progress Report of first implemented code.	For improving prototype and increasing accuracy.	
11/04/2023	Discussed about the accuracy metrics and more clothing items add-ons in the project.	For increasing accuracy and uses of the prototype.	
20/04/2023	Discussed about the GUI implementation for the project.	For improving the user experiences.	

Introduction

Virtual try-ons have revolutionized the way people shop for clothes, accessories, and footwear. The technology behind virtual try-ons has advanced significantly in recent years, and it's now possible to experience a realistic, true-to-life simulation of how a product would look on you.

In our virtual try-on project, we aim to provide a seamless and intuitive shopping experience for customers by incorporating cutting-edge technology and user-centered design. Our virtual try-on system will allow customers to easily try on a wide range of products, from clothing to footwear and accessories, using just a smartphone or computer webcam. With a simple, user-friendly interface and accurate product representation, our virtual try-on system will provide customers with the confidence to make informed purchase decisions.

Our project is designed to address the common challenges faced by online shoppers, such as sizing, fit, and colour accuracy. With our virtual try-on system, customers will be able to see exactly how a product fits, without the need for physical fitting rooms or trying on multiple sizes. Additionally, the use of augmented reality technology will allow customers to see the product in the context of their own environment, helping them visualize how the product will look in real life.

We believe that virtual try-ons are the future of online shopping, and our project will provide customers with a more engaging, interactive, and enjoyable shopping experience.

1.1. Purpose of Project

The purpose of a virtual try-on project is to provide customers with a more convenient and engaging way to try on clothes and accessories before making a purchase. By using advanced technologies such as 3D scanning, fabric physics simulation, and machine learning, virtual try-on projects aim to create an immersive and realistic virtual try-on experience. This can help customers make more informed purchase decisions, reduce the likelihood of returns, and enhance customer satisfaction. Additionally, virtual try-on projects can help retailers and brands reduce costs associated with traditional fitting rooms and improve their overall e-commerce experience. Overall, the purpose of a virtual try-on project is to bridge the gap between physical and online shopping, providing customers with a more seamless and enjoyable shopping experience.

1.2. Target Beneficiary

Fashion Industry: The target beneficiaries for a virtual try-on project in the fashion industry could be online shoppers. Virtual try-on technology can provide a more engaging and immersive shopping experience, allowing customers to try on clothes and see how they look before making a purchase.

Beauty Industry: Virtual try-on technology can also be used in the beauty industry to help customers test makeup products before buying them. Target beneficiaries could be people looking to try out different makeup looks without having to physically apply the products themselves.

Eyewear Industry: Virtual try-on technology can help customers try on glasses and see how they look before making a purchase. Target beneficiaries could be people with vision problems who need to buy glasses, but prefer to do so online.

Home Decor Industry: A virtual try-on project in the home decor industry could target homeowners who are looking to redecorate their homes. The technology can allow them to visualize how furniture and decor items would look in their homes before making a purchase.

Automotive Industry: Virtual try-on technology can also be used in the automotive industry to help customers see how different car models would look in different colors and configurations. Target beneficiaries could be car enthusiasts who are interested in customizing their cars.

1.3. Project Scope

The project scope for a virtual try-on project typically involves developing and implementing a software application that allows users to visualize and try on products virtually. This includes integrating 3D modelling, computer vision, and augmented reality technologies to create a realistic and interactive experience for the user. The scope may also include building a database of products, developing a user-friendly interface, and ensuring compatibility across various devices and platforms. Additionally, the project may involve collaborating with industry partners to obtain product data and feedback to improve the overall functionality and user experience of the virtual try-on system.

1.4. References

- https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=8719115
- https://arxiv.org/ftp/arxiv/papers/1810/1810.10148.pdf
- https://openaccess.thecvf.com/content_cvpr_2018/papers/Han_VITON_An_ImageBased_CVPR_2018_paper.pdf
- https://github.com/omagarwal2002/Virtual-Try-On_Minor-2

2. Project Description

A virtual try-on project is a software application that allows users to visualize and try on products virtually before making a purchase. This technology is used across various industries, including fashion, beauty, home decor, and automotive, to provide customers with an immersive and interactive shopping experience.

The virtual try-on system is typically built using a combination of 3D modeling, computer vision, and augmented reality technologies. It involves creating a database of products that can be visualized and manipulated in a realistic and interactive way by the user. This may include features such as the ability to adjust colors, textures, and sizing, and to view products from different angles.

The project typically involves collaboration with industry partners to obtain product data and feedback to improve the overall functionality and user experience of the virtual try-on system. Additionally, the project may involve designing and implementing a user-friendly interface, ensuring compatibility across various devices and platforms, and integrating other technologies such as AI and machine learning.

The goal of a virtual try-on project is to provide customers with a more engaging and convenient shopping experience, leading to increased sales and reduced returns. By allowing customers to visualize and try on products virtually, the system can help customers make more informed purchasing decisions, leading to greater customer satisfaction and loyalty.

2.1. Reference Algorithm

Object Detection: Object detection algorithms can be used to detect the user's body in the captured images.

Image Segmentation: Image segmentation algorithms can be used to extract the user's body region from the background in the captured images.

Feature Extraction: Feature extraction algorithms can be used to extract relevant features of the user's feet, such as the length, width, and curvature.

3D Modeling: 3D modeling algorithms can be used to create a 3D model of the user's feet from the captured images.

Augmented Reality: Augmented Reality (AR) algorithms can be used to render 3D models of the selected shoes onto the user's body.

Deep Learning: Deep Learning algorithms can be used to improve the accuracy of the virtual try-on system. For example, Convolutional Neural Networks (CNNs) can be used for object detection and image segmentation, while Recurrent Neural Networks (RNNs) can be used for generating personalized shoe recommendations based on user data.

2.2. Data Structure

In this project the data structures used are one dimensional and multidimensional numpy arrays because NumPy arrays are faster and more compact than Python lists. An array consumes less memory and is convenient to use. NumPy uses much less memory to store data and it provides a mechanism of specifying the data types. This allows the code to be optimized even further.

2.3. SWOT

Strength:

- Current need of the market
- Useful in managing other AI application

Weakness:

•Fault intolerant.

•Accuracy may depend on the accent of the user.

Opportunity:

•A new boost for the fashion industry.

•Boon for product-based companies

Threat:

•Some research is ongoing to achieve this objective more efficiently.

2.4. Project Features

- The software program described on this SRS may be used to try different clothing items virtually.
- This project can be used in numerous industries like Fashion and Apparel industry, Beauty and Cosmetic industry, Eyewear industry, Fitness industry and Furniture and Home Décor industry.

2.5. User Classes and Characteristics

Customers: Customers are the primary user class for a virtual try-on project. They are individuals who are interested in trying on and visualizing products before making a purchase. This user class may include individuals of all ages and backgrounds, who are shopping online or in-store.

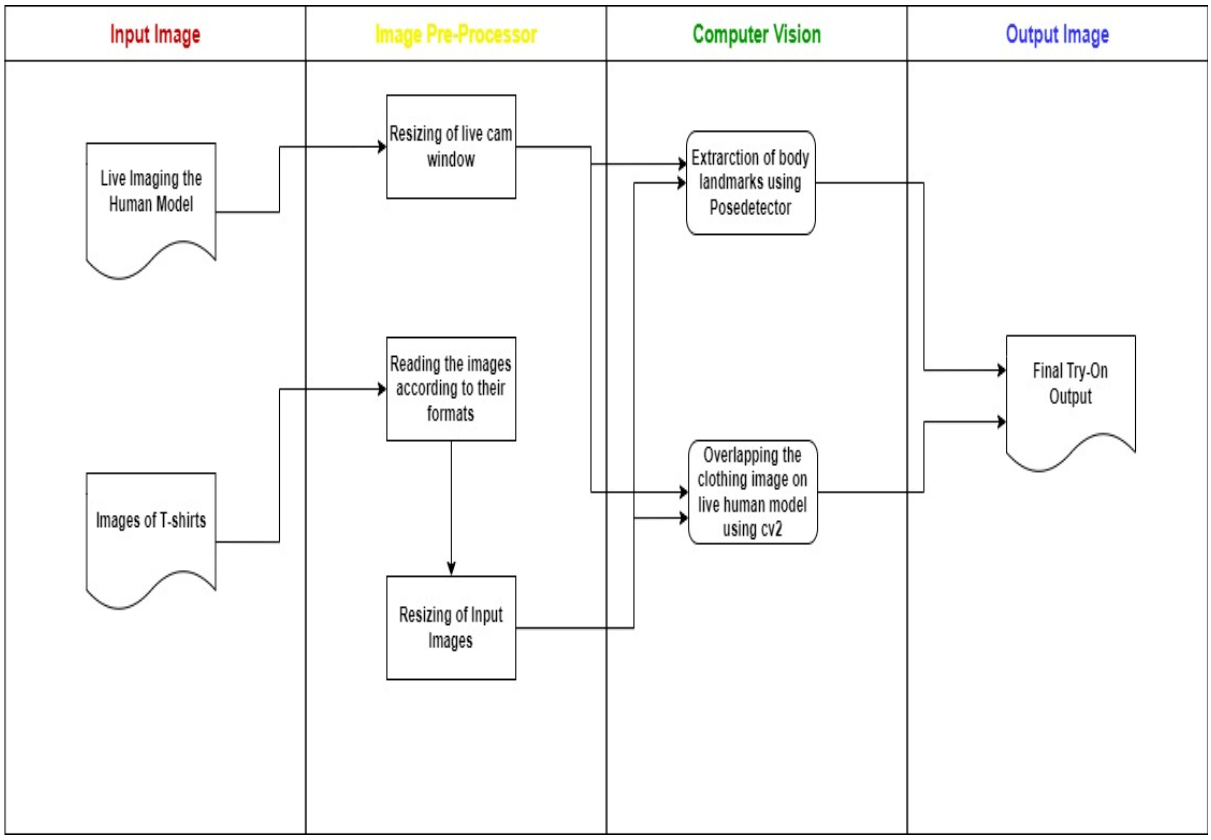
Sales Representatives: Sales representatives are another user class that may benefit from a virtual try-on project. They may use the technology to assist customers in selecting and trying on products, as well as to provide product information and recommendations.

Designers: Designers may use virtual try-on technology to visualize and test their designs before production. This user class may include fashion designers, interior designers, and product designers.

Marketing and Advertising Professionals: Marketing and advertising professionals may use virtual try-on technology to create more engaging and immersive marketing campaigns. This user class may include social media marketers, digital marketers, and creative directors.

Product Developers: Product developers may use virtual try-on technology to gather data and feedback on product performance and customer preferences. This user class may include individuals in research and development roles, product managers, and quality assurance professionals.

2.6. Design Diagrams



2.7. Assumption and Dependencies

The main assumption of this project is that the user will be provided with image input of any clothing item. If the image doesn't contain any clothing item, it can't visualize anything on the user.

3. System Requirements

3.1. User Interface

The user can interact with our project via our GUI

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3.2. Software Interface

Following are the softwares for our SER GUI.

Software used	Description
Operating System	We have chosen the Windows operating system for its best support and user-friendliness.
Database	To save the images files we used .png format and the user is captured directly via the webcam of the device used.
Visual Studio Code	To implement the project we have chosen python language and its more efficient for machine learning based projects.

3.3. Database Interface

Not Applicable

3.4. Protocols

Not Applicable

4. Non-Functional Requirements

4.1. Performance Requirement

The project must meet the end user requirements. Accuracy and fast must be imposed in the Project. The project is development as easy as possible for the sake of the end user. The project has to be developed with a view of satisfying the future requirements and future enhancement. The project has been finally implemented satisfying the needs specified by the company. As per the performance is concerned this system is performing This processing as well as time taken to generate well reports even when large amounts of data were used.

4.2. Security Requirement

Web applications are available via network access, it is difficult. If not possible, to limit the population of the end-user who may access the applications? In order to product sensitive connect and provide secure mode be implemented throughout the infrastructure that supports the web application and within the application itself. Web Applications have become heavily integrated with critical corporate and database. E-commerce applications extract and then store sensitive customer information.

4.3. Software Quality Attributes

A software component that is developed for reuse would be correct and contain no defects. In reality, formal verification is not carried out routinely, and defects can add to occur. However, with each reuse, defects are eliminated, and a component qualifies improve as a result. Over time the components virtually defect free. This project will be developed on a daily basis for further logical and performance-based enhancements. Software reliability is defined in statically term as" the probability of faultier-free operation of a computer program in a specified environment for specified time". The software quality and reliability, failure is non-conformance to software requirements. Failure can be only anything or catastrophic. One failure can be corrected within 12 seconds while another requirements week even mouths to correct. Complicating the issue even further, the correction of the one failure may in fact result in the introduction of the errors that ultimately result in other failure.

5. Other Requirements

5.1. Appendix A: Glossary

Virtual Try-On technology enabling users to try on clothing and accessories digitally, via a computer or mobile device. It involves AR and 3D modelling techniques to overlay the products on the user's image, captured through body scanning. Computer vision, machine learning, and deep learning are employed to recognize and analyse the user's body movements, ensuring a seamless and realistic virtual try-on experience. Real-time rendering enables instant visualization of the product on the user. A virtual fitting room creates a simulated environment for the user to try on different items. Haptic feedback and gesture recognition allow for a more immersive and interactive virtual try-on experience.

5.2. Appendix C: Issue List

Accuracy of fit: One of the biggest challenges in a virtual try-on project is ensuring that the clothing fits accurately on the virtual model. This requires accurate measurements and precise mapping of the clothing onto the 3D model.

Realistic movement: Another key issue is ensuring that the clothing moves realistically with the virtual model's body movements. This requires accurate modeling of fabric physics and how it interacts with the virtual model's body.

Variability of body shapes: People come in all shapes and sizes, and clothing must fit well on all of them. The virtual try-on project should take into account the variability of body shapes and sizes and provide solutions that work for everyone.

Realistic appearance: Clothing textures, colors, and lighting must be accurately represented in the virtual environment to create a realistic and convincing experience for the user.

Integration with e-commerce platforms: A virtual try-on project must be integrated with e-commerce platforms to provide a seamless user experience. This requires integration with product catalogs, payment gateways, and shipping and return processes.

Ease of use: The virtual try-on project must be easy to use, even for people who are not tech-savvy. This requires an intuitive user interface and clear instructions for how to use the virtual try-on feature.

Data privacy and security: The virtual try-on project must ensure the privacy and security of user data, including their measurements and images. This requires robust security measures and compliance with data privacy regulations.