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Enhancing Virtual Try-On Experience with AR: A Virtual Dressing Room Approach

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Abstract: *The expanding demand for immersive and personalized online shopping experiences has driven advancements in virtual try-on technologies. This project presents the development of an AR-powered virtual dressing room integrated within an e-commerce platform, enabling users to try on clothing items in real time using their device's webcam. The system allows users to visualize how different garments fit and appear on them before making a purchase, aiming to reduce return rates and improve customer satisfaction. Built using HTML, CSS, and JavaScript with webcam integration through the WebRTC API, the platform provides interactive features such as product browsing, size selection, and virtual trial, all within a responsive and intuitive user interface. The solution leverages front-end technologies and local storage mechanisms to simulate essential e-commerce functionalities like cart and wish list management. By enhancing the virtual shopping environment, the proposed system not only bridges the gap between physical and digital retail experiences but also promotes sustainable fashion practices by reducing unnecessary product shipments and returns. The results of this project highlight the effectiveness of lightweight web-based implementations in delivering scalable, user-friendly, and engaging shopping solutions that align with modern consumer behavior and expectations..*

Keywords: WebRTC

I. INTRODUCTION

Mold retail may be a quickly advancing industry, with e-commerce playing a central part in how shoppers associated with brands. In any case, conventional online shopping strategies frequently need the intelligently and personalized involvement that physical stores give, especially when it comes to attempting on dress. This hole leads to issues like instability in fit, appearance, and expanded return rates. To address these challenges, this venture centers on creating a virtual dressing framework pointed at improving the online attire shopping encounter. The framework is built as a web-based stage utilizing HTML, CSS, and JavaScript, giving clients with an intuitively interface to browse clothing things, select sizes, and visualize articles of clothing in a virtual try-on environment. By joining real-time camera get to and a demonstrate overlay framework, clients can see how dress might see on them or a virtual figure, advertising a more locks in and educated shopping prepare. The stage moreover highlights responsive plan components and item determination choices, guaranteeing a consistent and natural client involvement. This venture illustrates the potential of merging web advancement and intuitively innovation to form more immersive, personalized, and viable e- commerce arrangements within the design industry.

II. LITERATURE REVIEW

Virtual dressing frameworks have developed as a transformative instrument within the mold retail division, pointing to bridge the crevice between physical and online shopping encounters. Analysts have proposed different approaches to move forward the authenticity, precision, and interactivity of virtual try-on stages. Fast GAN, for occasion, has been presented to bolster real-time virtual dressing with quick rendering speeds, making frameworks more responsive and user-friendly [4]. Accurate garment division could be a basic component of these frameworks, and DeepLabV3+ has been utilized to identify clothing locales and client body forms beneath changing postures and lighting conditions [6]. To

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upgrade the arrangement and fit of virtual articles of clothing, HR Net has been utilized, empowering way better versatility of clothing overlays to differing body shapes and developments [2]. These headways collectively contribute to the advancement of shrewdly virtual dressing arrangements that upgrade client certainty, decrease item returns, and advance a more personalized and immersive online shopping involvement. These studies demonstrate the potential of combining real-time processing, deep learning, and advanced segmentation to create immersive, accurate, and user-friendly virtual dressing platforms.

III. METHODOLOGY

The proposed virtual dressing framework is planned to supply an interactive platform for clients to imagine attire in a virtual environment, reenacting a real-time try-on encounter. The framework engineering is partitioned into four primary components:

front-end interface, 3D model integration, camera interaction module, and client controls. Within the to begin with stage, a responsive front-end site was created utilizing HTML, CSS, and JavaScript to serve as the client interface. The site allows users to browse clothing things, see item points of interest, and select sizes. Within the moment stage, a 3D avatar or show was coordinates into the interface to reenact the try-on involvement. This model is utilized to show articles of clothing and makes a difference clients visualize how dress might show up when worn. Within the third stage, a camera interaction module was consolidated to empower live video input from the user's gadget. This allows for arrangement and overlay of the chosen piece of clothing with the user's picture or a virtual model, enhancing immersion. Within the last stage, client interaction components such as measure choice, amount input, and add-to- cart/ wish list buttons were executed to form the framework utilitarian as a shopping stage. The interface is outlined to be available over gadgets and browsers, giving a consistent encounter. This strategy emphasizes ease of utilize, real-time interaction, and visual exactness, making a establishment for future development into more progressed highlights such as personalized fitting and body measurement-based suggestions.

IV. WORKING

The virtual dressing stage capacities through the interaction of web advances and camera integration to make a real-time try-on involvement for clients. The clothing things are shown as pictures or overlays inside a organized HTML page, styled utilizing CSS for visual consistency and responsiveness. The client interface permits the determination of clothing from a catalog, which incorporates subtle elements such as cost, measure choices, and portrayal. When a client chooses a piece of clothing and clicks on the try-on button, a JavaScript work is activated that actuates the device's camera utilizing the browser's media API, The overlay remains responsive to the screen size and user input, giving the illusion of a real-time try-on. Although the current version uses static positioning for the overlay, it simulates the look and feel of the selected garment being worn Client intelligent such as measure choice or changing articles of clothing overhaul the overlay powerfully without requiring to reload the page. Extra capacities permit clients to include the thing to a wish list or cart. The whole working stream is executed on the client side, guaranteeing a quick and consistent involvement. The framework gives a disentangled however locks in virtual try-on interface that can be encourage improved within the future by joining movement following or energetic article of clothing fitting based on body location

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V. BLOCK DIAGRAM

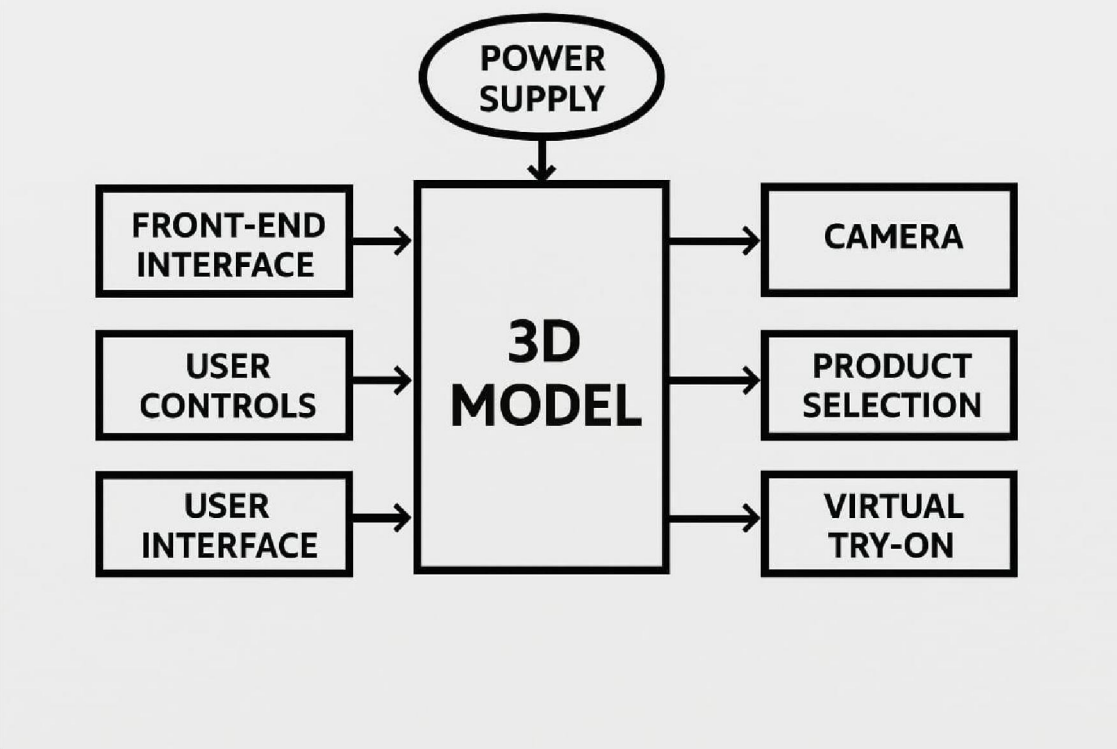
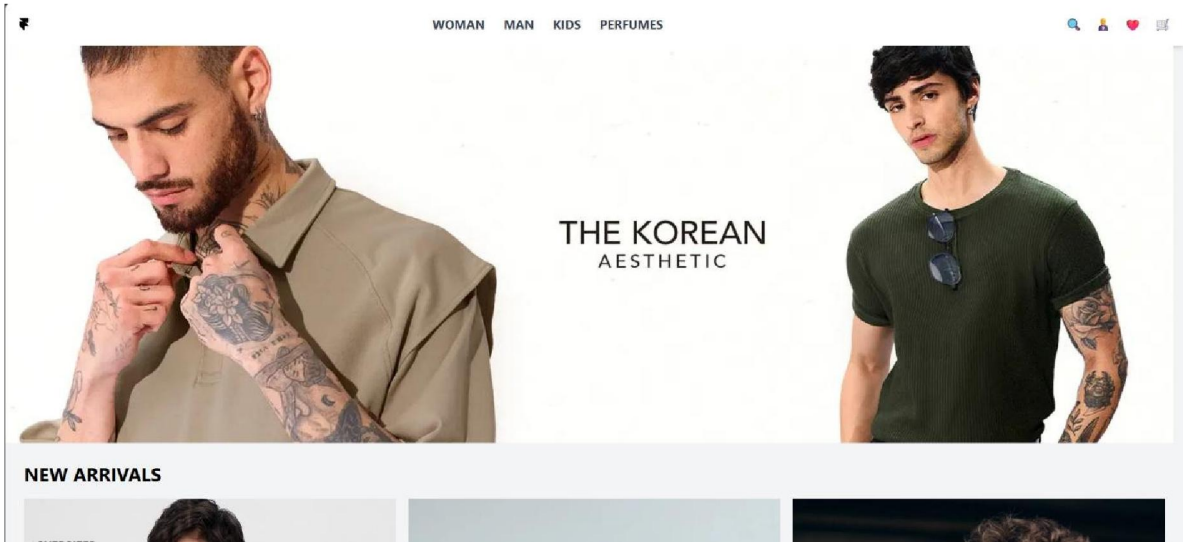


Figure1. Block Diagram

VI. COMPONENT DESCRIPTION

Front-End Interface



The front-end interface is the essential stage through which clients connected with the virtual dressing framework. Built utilizing HTML, CSS, and JavaScript, it gives a responsive format that permits clients to browse attire, see item subtle elements, and start the try-on handle. The plan centers on user-friendliness and visual clarity, advertising categorized route, item thumbnails, and intelligently controls such as measure determination and add-to-cart buttons. This layer guarantees consistent communication between the client and other framework components.

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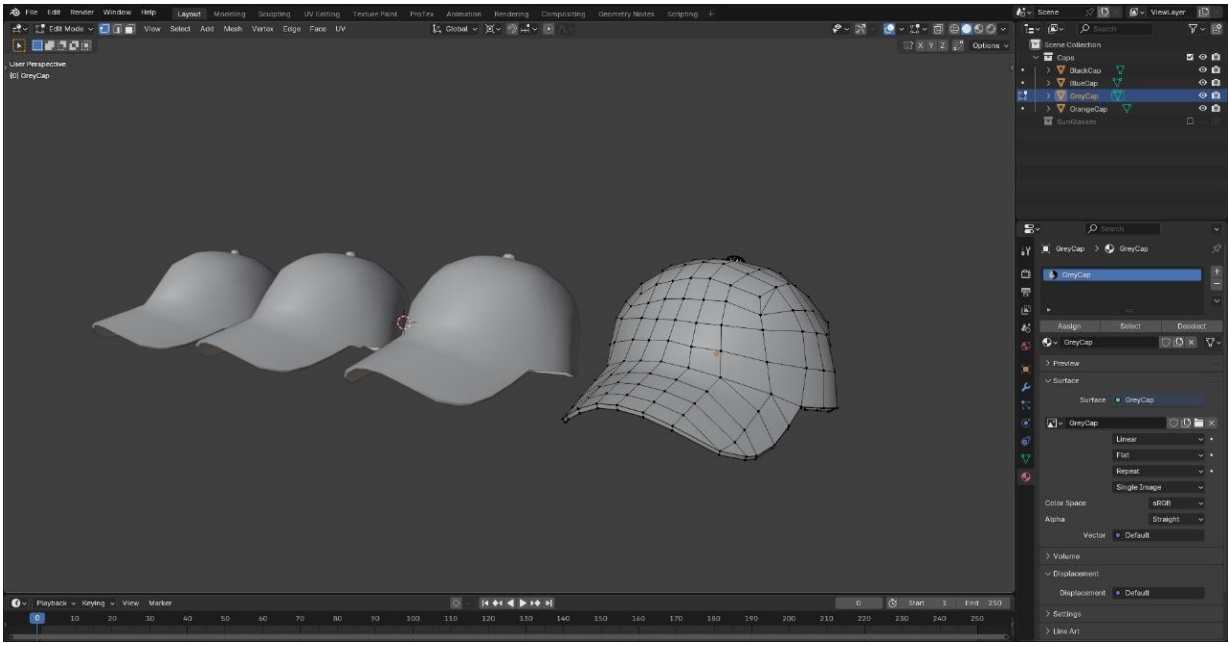
Camera Module

An Augmented Reality Experience

Launch

The camera module is capable for capturing live video input from the user's gadget, permitting real-time interaction inside the virtual dressing framework. Utilizing the browser's media API, it gets to the webcam and streams the nourish onto the interface through a component. This bolster acts as the foundation on which virtual pieces of clothing are overlaid. The module guarantees clients can adjust themselves appropriately for an exact and immersive try-on encounter. It moreover incorporates client prompts for camera authorization and arrangement direction to improve ease of use

3D Model System



The 3D show or overlay framework is at the center of the virtual try-on encounter. It permits articles of clothing to be outwardly superimposed onto the live camera nourish or a virtual avatar. In this venture, a pre-configured 3D demonstrate or clothing overlay is adjusted over the video stream utilizing CSS situating and JavaScript controls. This makes the figment that the client is wearing the chosen article of clothing. In spite of the fact that inactive in arrangement, the overlay framework successfully illustrates how the clothing thing would show up when worn, upgrading item visualization and client engagement.

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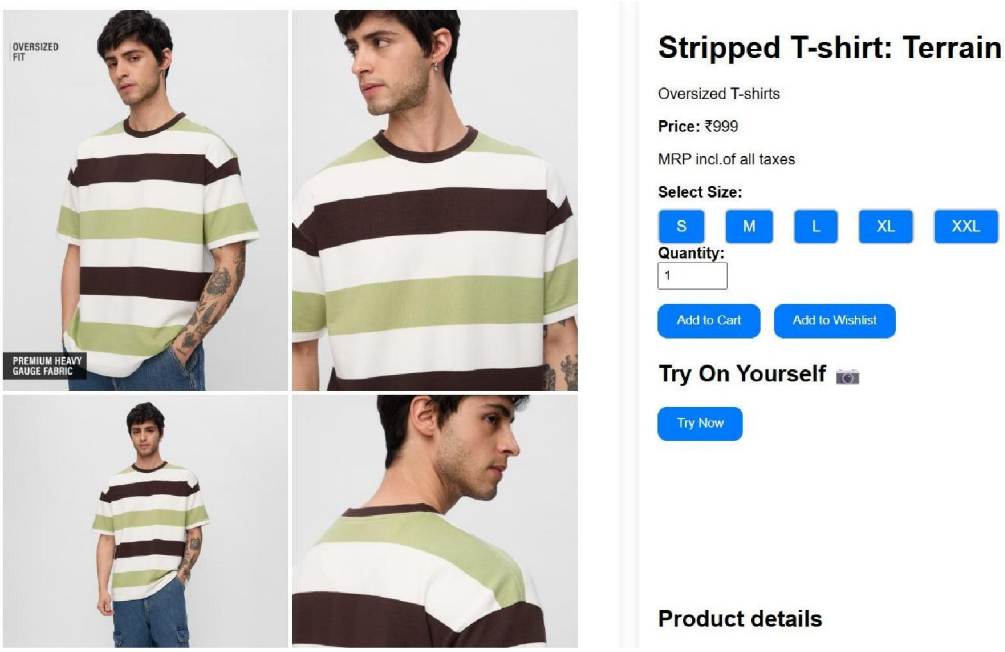
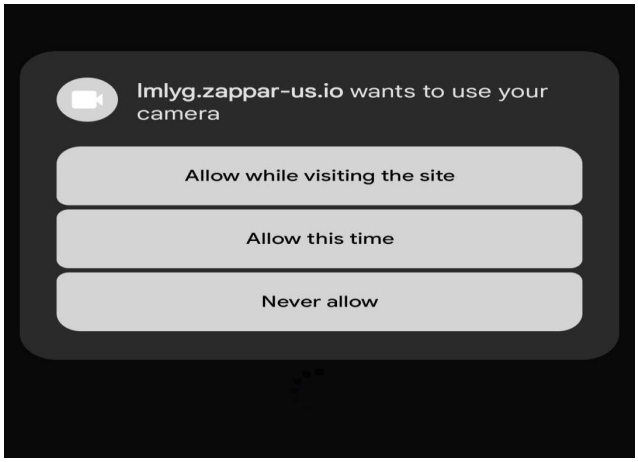


User Controls

Client controls give intelligently usefulness that upgrades the in general client encounter inside the virtual dressing stage. These incorporate highlights such as measure determination, amount input, and buttons to include items to the cart or wishlist. Executed utilizing JavaScript and styled with CSS, these controls react powerfully to client input without requiring a page reload. They permit clients to personalize their shopping session, encouraging smooth item choice and interaction. The natural format guarantees that indeed first-time clients can explore and utilize the framework effectively

Camera Access



Camera integration could be a center highlight of the virtual dressing room, empowering clients to reenact the try-on encounter in genuine time. By leveraging the WebRTC API, the framework gets to the device's webcam to stream live video straightforwardly inside the browser. This usefulness permits clients to see themselves whereas connection with clothing things, making a more immersive and personalized shopping experience. Implemented utilizing JavaScript and styled with CSS, the camera interface incorporates user-friendly components such as a authorization provoke, a live video outline, and on-screen direction to assist clients position themselves accurately.

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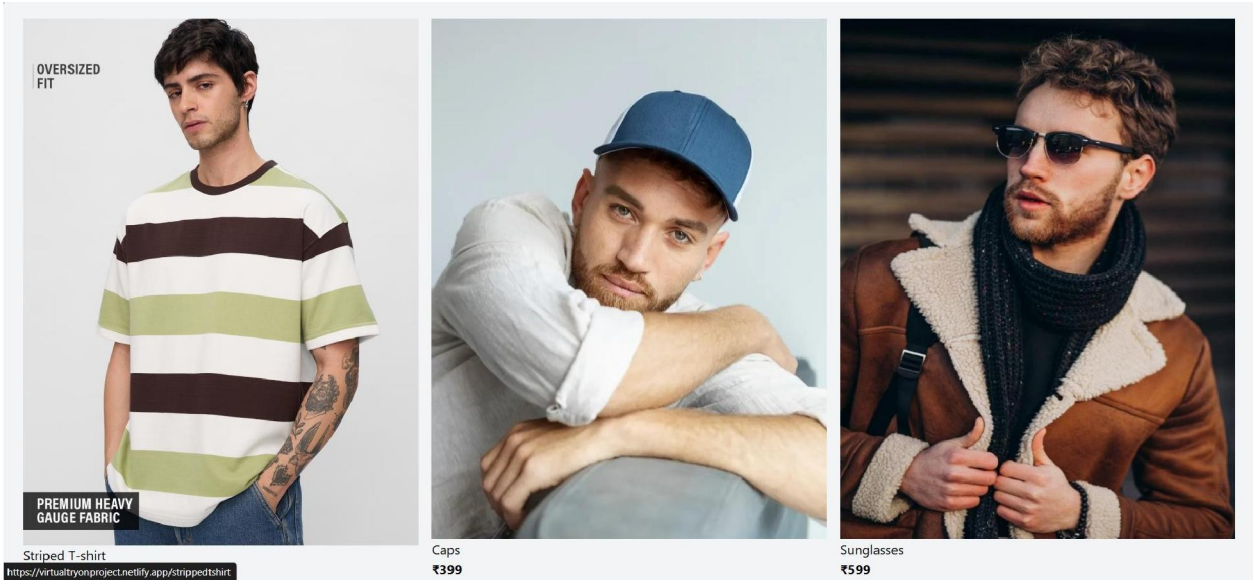
VII. PROJECT IMAGE



VIII. RESULT

IX. CONCLUSION

The AR-powered Virtual Dressing Room offers an successful and inventive arrangement to common challenges confronted in online attire shopping. By joining real-time webcam get to with an intelligently, browser-based interface, the framework permits clients to essentially attempt on clothing things, upgrading certainty in buy choices. Key highlights such as estimate determination, amount input, and cart/wish list usefulness are actualized utilizing HTML, CSS, and JavaScript, giving a consistent and responsive client involvement without the require for outside equipment. The platform's lightweight plan guarantees compatibility over gadgets, whereas camera-based interaction brings an immersive and personalized feel to the shopping prepare. By lessening the probability of returns and empowering economical obtaining behavior, the framework contributes to more productive e-commerce operations. In general, this venture illustrates the potential of lightweight web advances to improve client fulfillment, advance more astute retail hones, and bridge the crevice between physical and advanced shopping encounters.

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X. FUTURE SCOPE

1) Integration with Counterfeit Insights and Body Discovery:

Future forms of the virtual dressing room can join progressed AI and body discovery innovations to outline clothing things more precisely to the user's body structure. This would empower energetic fitting recreations, moving forward authenticity and making a difference clients survey estimate and fit more accurately.

2) Expanded Reality (AR) Integration:

By coordination AR capabilities, the stage seem permit clients to extend clothing things onto themselves in a more immersive environment utilizing their portable gadgets. This would bridge the hole between real-world and computerized try-on encounters, improving client engagement and visual exactness

3) Support for Numerous Clothing Sorts and Customization:

The framework can be expanded to handle layered outfits and adornments such as coats, caps, or shoes. Furthermore, highlights like texture swatch sneak peaks or color-changing alternatives can give clients with more profound customization, permitting for a more comprehensive and intelligently shopping encounter.

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