

ASAP – AR Based Virtual Try-On with AI Styling Assistance

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Abstract - The objective of this project is to develop an "AR Virtual Try on" for online or in store fashion environments, allowing users to wear virtual clothes in real time. By using **AR Foundation** with Snap AR, the system tracks the user's body and overlays 3D clothing models and gives a realistic try-on experience. Users can select clothes from a given set and use the AR interface to see what the outfit looks like without actually having to wear the outfits/accessories. This virtual mirror enhances customer experience, reduces dependence on fitting rooms, and introduces a new, modern efficient store shopping experience for retailers of fashion through integrating **technology, convenience, and innovation** for fashion merchants.



Fig.1 illustrates the idea of "Virtual mirror."

Key Words: Augmented reality (AR), Integrating Technology, Convenience, Innovation

1. INTRODUCTION

AR (Augmented reality) is changing the way customers interact with a product, especially within the boundaries of the fashion and retail industry. This project focuses on the design and development of an AR-based virtual mirror that allows users to wear virtual clothing immediately on their mobile phones.

Utilizing the robust AR toolset "Snap AR", this project is looking at the creation of a seamless and realistic virtual try-on experience, making the product accessible yet scalable to any fashion retailer and consumer.

From 3D clothing models, body tracking, and interaction features, users can directly "see" how clothes fit and look, without physical interaction.

Snap AR delivers readily available AR capabilities, through which interesting, immersive experiences can be built with minimum development. The project uses the capability of a lens for an interactive virtual mirror that shows fun engagement with users, enhanced customer satisfaction, and a quick approach of shopping experience for trying fashion.

2. PROBLEM STATEMENT

"Shoppers face uncertainty when buying clothes online due to the inability to try them on, leading to wrong size selection and high return rates. In stores, trial rooms are inconvenient and time-consuming, creating a need for a faster, interactive, and hassle-free solution."

In online shopping, customers often struggle with uncertainty as they cannot physically try on outfits before purchasing. This leads to incorrect size selection, and increased return rates (30-40%), negatively impacting both consumers and retailers. Similarly, in physical stores, traditional trial rooms pose challenges such as long wait times, hygiene concerns, and inconvenience, making the shopping experience less efficient.

As a result, a growing need for a new, engaging, and interactive way to try on clothes/accessories—one that blends technology with fashion to create a fun, immersive shopping experience.

3. SOLUTION

We propose a Virtual Trial Room using Augmented Reality (AR). This system allows customers to digitally try on clothes in real time, and complementing physical trial rooms to enhance both in-store and online shopping experiences.

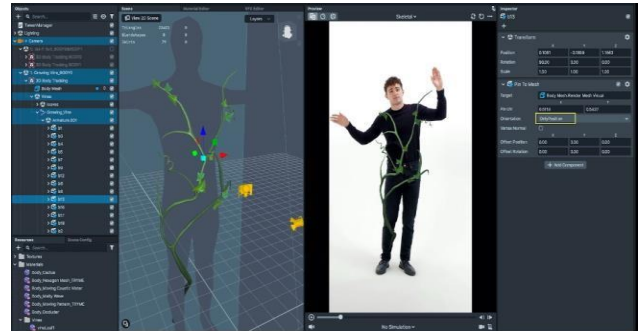
Using Snap AR, the solution overlays digital clothing onto a user's body through a camera, providing an accurate preview of how an outfit would look. This interactive and engaging approach not only makes shopping faster but also adds a fun and immersive element to fashion exploration.

Additionally, we integrate a Chatbot assistant. This AI-powered chatbot can recommend outfits based on user preferences, and provide style suggestions, making shopping even more personalized and efficient.

This technology has the potential for seamless e-commerce integration, enabling online shoppers to make confident purchase decisions while reducing return rates and improving overall customer satisfaction.

4. OBJECTIVE

- Online Shopping Improvement – Minimize uncertainty while buying clothes online by allowing customers to virtually “try on” clothes, boosting the confidence in buying and lowering returns.
- Simplifying In-Store Trial Rooms – Adding to existing fitting rooms an AR- based option, reducing dependency on in- store trials while retaining their availability for customers who demand them.
- Personalized Fashion Support – Incorporate an AI-driven chatbot to offer immediate styling tips, size recommendations, and customer assistance, enhancing the shopping experience and ease.
- Technology Innovation – Utilizing Snap AR's advanced body tracking and 3D clothing overlays to deliver an engaging and high-accuracy virtual try-on experience.



Technology: Lens Studio

Fig. 2 Body tracking offered by Snap AR

- Future E-Commerce Integration – Establish a foundation for integrating this technology into online retail platforms, allowing users to experience virtual try- ons before making digital purchases.

5. LITERATURE SURVEY

There were many studies that provided very important insights into virtual try-on systems, powered by AR and computer vision technologies, that happen to be the base of our project.

Thus, the paper "Virtual Mirror: A Hassle-Free Approach to Trial On Using Deep Learning" discuss virtual try-on clothing through deep learning in identifying posture configuration of the human body and overlaying virtual garments.

The study introduces a hybrid approach of 2D image processing and 3D depth estimation that may lead to the generation of realistic virtual try- on models.

This is the conceptual base of our project-it helps in simulating the idea of how users can imagine putting garments on their bodies with the help of augmented reality.

The second paper is "Fashion Accessories Using Virtual Mirror," which further develops this aspect and details how AR and webcams can be used to produce real-time tracking. It delves into the virtual try-on application in real-time, whereby users interact with the system to get immediate visualization of fashion accessories in motion.

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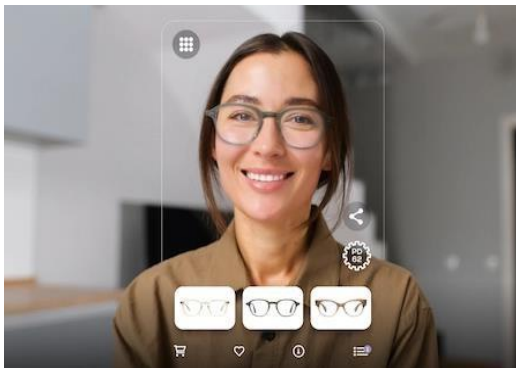


Fig.3 represents idea of a 3D try on version.

This is the approach on which we rely to include real-time virtual clothing try-ons in our project, and its concentration remains on the real-time overlaying of virtual garments from body tracking.

These papers together provide for a conceptual and practical framework for building a real-time, AR-based virtual mirror for fashion stores infused with deep learning for garment fitting and real-time AR to enhance user interactivity.

6. METHODOLOGY

1. Snap AR (Lens Studio) for AR Development -

The AR try-on feature is developed using **Snap AR (Lens Studio)**, which utilizes **real-time body tracking** to accurately map 3D clothing onto the user's body. The system detects posture, movements, and body dimensions, ensuring that virtual garments fit naturally and adjust dynamically as the user moves.

For **3D model integration**, clothing items are designed in **Blender or Maya**, where textures, rigging, and animations are fine-tuned for realism. These models are exported in **FBX or OBJ formats**, optimized for performance in Lens Studio, ensuring smooth rendering on mobile devices & web.

2. Web Platform (HTML, CSS, JavaScript) -

The **web platform** is developed using **vanilla HTML, CSS, and JavaScript**, ensuring lightweight performance and broad compatibility. It serves as a demo for brands

to integrate **AR try-on and AI styling** into their e-commerce sites. Key features include:

- **Product Catalog:** Displays clothing items with images, descriptions, in a clean, user-friendly layout.
- **AR Try-On Button:** Triggers the Snap AR experience, allowing users to virtually try on clothes directly in their browser.
- **AI Chatbot Interface:** A pop-up or embedded chat window where users interact with the **Deep Seek + Llama3** model for styling advice.

The platform is **static (no backend server)**, making it easy to deploy and integrate with existing websites while maintaining fast load times and smooth functionality.

3. AI Styling Chatbot (Deep Seek + Llama 3)

The **AI styling assistant** is powered by **Deep Seek with the Llama 3 model**, providing **intelligent, conversational fashion recommendations**. Unlike rule-based systems, this AI understands natural language queries, allowing users to ask for styling advice, outfit pairings, and trend-based suggestions in a fluid, human-like conversation.

The **chatbot UI** is built with **HTML, CSS, and JavaScript**, offering seamless and interactive user experience. Users can type or speak their requests, and the AI responds with personalized recommendations, making the shopping experience more engaging.

7. SYSTEM ARCHITECTURE

1. User Interaction Layer:

- Users interact with AR outfits via **Snap AR interface**.
- AI Assistant provides real-time **styling recommendations** (optional, based on user preference).

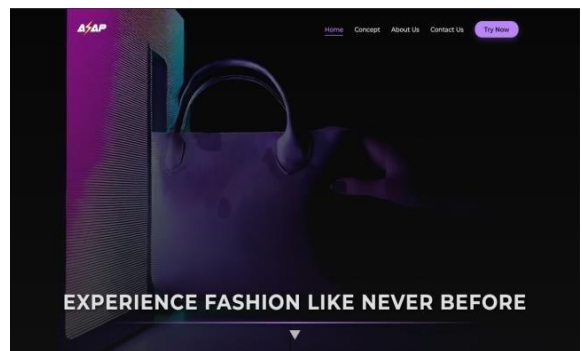


Fig 4. User Interface

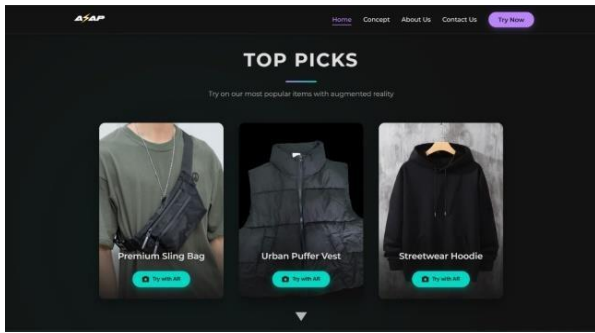


Fig 5. User Interface

2. AR Processing Layer:

- Uses **Camera Kit SDK** to access clothing models from the web.
- Real-time body tracking aligns outfits accurately on the user.
- **Rendering Engine** ensures fabric physics, lighting, and realism.

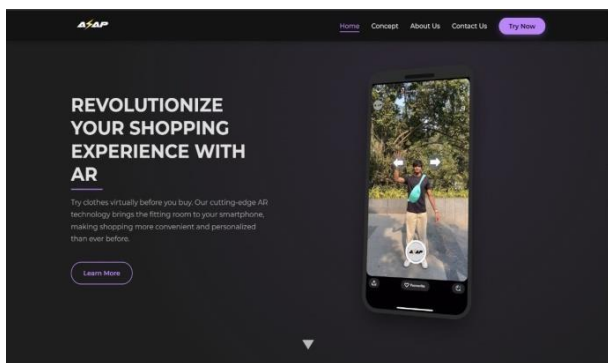


Fig 6. User Interface with AR try on video

3. AI Styling Engine (Optional):

- Analyzes the user's outfit selection.
- Suggests **color combinations, accessories, and trendy fits.**
- Future scope: **Machine learning** for personalized recommendations.

4. Cloud-Based Clothing & Rendering:

- Clothing assets are **fetches dynamically from the web.**
- Cloud-based **high-fidelity rendering** for realistic textures.
- Supports **scalability** and ensures lightweight AR processing.

5. Display & User Feedback Layer:

- The final AR outfit is rendered on-screen.
- Users can interact, change outfits, and receive AI suggestions.
- Future scope: **Social sharing & feedback integration.**

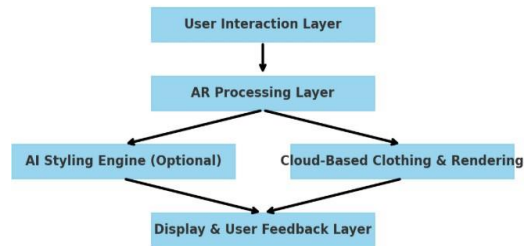


Fig.7 showcasing ASAP system architecture

8. TOOLS

- **Lens Studio (Snap AR):** Core platform for building the AR lens, managing body tracking, and 3D rendering.
- **Body Tracking:** In-built Snap AR body tracking for fitting clothes to the user's body.

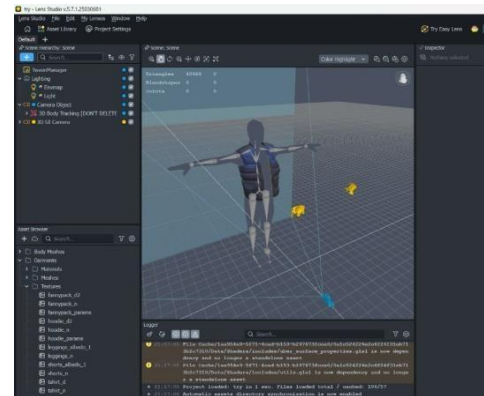


Fig. 8 Lens Studio interface

- **3D Modeling Tools:** Tools like **Blender** or **Maya** for creating and exporting 3D clothing models in formats such as FBX from CG traders.
- **Scripting in Lens Studio:** For adding interactions like tap-to-change.
- **Chatbot Integration:** A virtual assistant within the AR experience to guide users through outfit selections, provide styling tips, and enable voice/tap commands for trying on clothes.

9. APPLICATION/IMPLEMENTATION

- **E-commerce Integration:** E-commerce platforms can integrate virtual try-on technology to let customers visualize clothing before buying. This reduces return rates and improves customer confidence, making online shopping more effective.
- **Offline Fashion Stores:** Virtual mirrors in physical stores allow customers to try on clothes without needing fitting rooms, enhancing convenience and reducing wait times during busy periods. This also helps stores optimize floor inventory and boost customer engagement.
- **New Season Sales:** Virtual mirrors can showcase new season collections, letting customers instantly try on the latest trends, driving sales and offering personalized recommendations for seasonal promotions. **Similar Example - NIKE.**

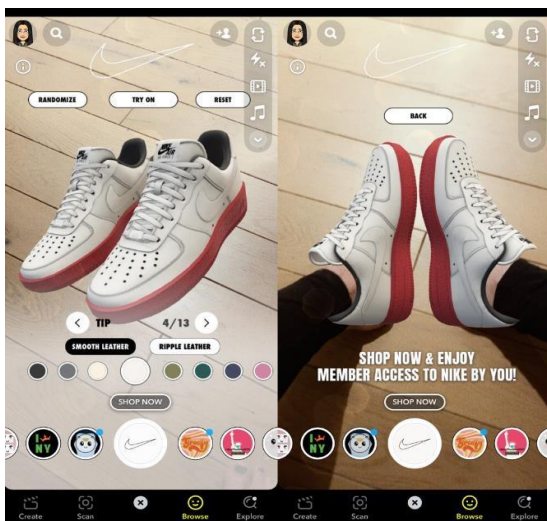


Fig.9 Screenshots of Nike's AR shopping lens on Snapchat

- **AR Redirect to Website:** After virtually trying on clothes, customers can be redirected to the product's page online for easy purchasing. This is ideal for hybrid retail models, where in-store or pop-up experiences drive online sales through AR interactions.

10. LIMITATIONS AND CHALLENGES:

A) Limitations:

- **No Unity/Unreal Engine Integration:** Due to limited expertise in high-end AR tools, we opted for a more accessible approach.

- **Hardware Constraints:** Advanced tools require powerful hardware, making it impractical for all users.
- **Prototype Stage:** The system is a working prototype using Snap AR, limiting advanced customization.
- **Rendering Realism:** While functional, the current rendering approach lacks ultra-realistic fabric physics and dynamic lighting.

Addressing these through better physics engines and adaptive lighting algorithms could enhance AR realism and reliability.

B) Why? Snap AR challenges:

1. Cost Factors of Web AR -

Platforms like 8th Wall provide multiple advanced features but are costly, therefore not usable for low-budget projects. Alternative is free options, but they lack some of the functionalities and do not include real-time body tracking or realistic cloth simulations, so we have to look at alternatives.

2. Unity's High Processing Requirements -

While **Unity** provides robust AR tools, its high-end processing demands make it unsuitable for mobile devices with lower specifications. This limits its accessibility and consistent performance across different user devices.

3. Snap AR's Cross-Platform Compatibility is Limited-

Most AR platforms are either feature-poor or require intense investment. It is rare to stumble on platforms that offer affordability coupled with advanced AR capabilities.

Therefore, Snap AR is a balanced choice as it offers a user-friendly interface along with sufficient functionality.

11. FUTURE SCOPE

- **E-Commerce & Social Shopping -** AR try-ons will boost live shopping. AI stylists will host virtual consultations. 3D printing will enable instant customization.
- **Advanced AI Stylist-GPT-4** will suggest outfits based on preferences. Mood-sensing AI will design clothes matching emotions. Custom AI-generated styles will trend.

- **Blockchain for Digital Fashion** - NFT- linked outfits ensure exclusivity and resale value. Smart contracts will automate designer royalties. Cross-platform wearables will dominate metaverse fashion.
- **Hyper-Realistic Digital Clothing** - Physics engines will mimic fabric movement accurately. Photorealistic textures will enhance virtual garments. AI will perfect digital fit predictions.
- **Metaverse Integration**-Avatars will try outfits in VR stores, enabling immersive shopping. Virtual fashion shows will let users buy looks instantly.
- **Sustainability & Ethical Fashion** - Digital collections will reduce textile waste. Blockchain will track eco-friendly sourcing. AI will optimize sustainable material usage.
- **Biometric & Adaptive Fashion** - Smart fabrics will monitor health metrics. Climate- responsive wearables will adjust automatically. Gesture-controlled outfits will personalize style dynamically.

12. CONCLUSION

This project merges online and offline shopping through an AR Virtual Try-On + AI Styling Assistant, enhancing engagement and reducing returns.

Customers can try clothes digitally in real-time, complementing physical fitting rooms and boosting e-commerce confidence.

Future upgrades like cross-platform AR and fabric simulation will deepen realism. By blending innovation with convenience, this solution transforms retail—driving sales, cutting waste, and delivering a seamless, futuristic experience.

The future of fashion is here: smarter, more immersive, and customer-centric.

13. ACKNOWLEDGEMENT






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Additionally, we appreciate the assistance of our colleagues and peers who offered their feedback and suggestions.

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15. BIOGRAPHIES

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