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ARMOIRE: An Augmented Reality Fashion Try-On

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Abstract: The use of virtual try-ons has evolved greatly with the help of Augmented Reality (AR) especially in the field of fashion e-retailing. These AR try-ons help the users to try the jewellery without actually trying it on which makes the experience more interactive and can be beneficial for online shopping to enhance the sales. Here, the authors presented a comprehensive approach to developing a website that supports AR-based jewellery try-on as and the explained UX the considerations functional that architecture, helped technology to stack, create and seamless, development precise, practices and that enjoyable were virtual used, try-on as experiences.

Keywords — Augmented Reality, Virtual Try-On, Jewellery testing, Web Development, User Experience Introduction

I. Introduction

This is one of the most compelling issues for the fashion industry coming out of online retail: customers cannot try on their jewellery , which translates into high returns over mismatches in fit or style. Using Augmented Reality, virtual try-ons are possible, where the user can see how a jewellery might look on their own body in real-time, bringing the digital to life, and closing this gap between that digital and the in-store experience. This paper shows how a browser-based AR platform can be designed to let users try on jewellery without having to download extra applications, which increases convenience and accessibility

The website developed here uses WebAR technology where 3D jewellery models are overlaid onto the video feed of users, making the experience interactive and personalised. A few of these challenges that have been addressed include real-time body tracking, model scaling, and performance optimization so that the task runs smoothly across the different devices. This AR try-on solution will provide an enhancement in customer confidence and engagement, thereby being able to decrease the return rates as well as enhance the online shopping experience. The following framework attempts to guide developers and retailers in wanting to add AR, moving with shifting consumer expectations on e-commerce.

II. LITERATURE REVIEW

It focuses on using AR in virtual try-ons of online fashion retail, showing how return rates are a big issue for the industry in fit and style mismatches, especially in comparison to in-store purchases. Online shopping cannot compete with the physical "try-before-you-buy" experience of in-store purchases. AR technology solves this problem by allowing users to see how jewellery might appear on their bodies in real time, thereby providing a much more immersive and realistic way of shopping that can result in fewer returns and increased customer confidence (Poushneh & Vasquez-Parraga, 2017; Javornik, 2016).

Different types of AR try-on tools have already entered practice-from mobile applications for makeup and jewellery to augmented reality mirrors in physical stores (Kim & Forsythe, 2016). Nevertheless, such solutions normally involve an app download, adding friction to the customer journey. The study proves that such app-based requirements can frighten away users with concerns regarding storage, compatibility, or privacy. In contrast, a browser-based AR platform could remove these barriers so that customers could try on jewelry directly in a web browser, making it more accessible and convenient for them (McLean & Wilson, 2019; Lee & Rhee, 2020).

While the promise of browser-based AR is there, technical challenges will include achieving real-time body tracking and realistic rendering across different devices and browsers. Additionally, privacy and security concerns are critical since AR captures user information, and this information requires careful handling and transparency if users are to be put at ease. There must also be optimization for smooth running on different devices and browsers in such diverse online retail settings (Lin & Chai, 2019).

In the near future, developments in AR technology in association with machine learning, are going to help the fit accuracy, reality, and personalization in virtual try-ons. Such

changes would transform online fashion retail from dull and user-unfriendly into fun, accessible, and centered around the user. As AR continues to bridge the digital and in-store experience, it affords retailers a road towards cutting returns, increased customer satisfaction, and a probable chance at a purchase in the fast-paced world of online shopping (Pantano & Servidio, 2012).

III. Technology Stack

3.1 Determine the AR Framework and Libraries: To develop AR jewellery try on and integrate it with the camera we used Lens Studio which is a powerful desktop application developed by Snap Inc. for creating and publishing augmented reality (AR) experiences, mainly for use on Snapchat. It lets users design custom AR filters, lenses, and interactive experiences that can be shared on Snapchat or used with the Snapchat app's camera.

3.2. Preparation of 3D Models:

Digital jewellery models. Develop 3D models of jewellery items users could wear. Using software such as Blender or CLO 3D helps designers create photorealistic models of jewelleries.

Model Optimization. Web-based applications necessitate optimized models so that it loads quickly. This could be achieved by reducing the textures without compromising quality.

Standard Formats: Save models in formats accepted by WebAR libraries like GLTF/GLB (GL Transmission Format), which are already optimized for web-based rendering of 3D scenes.

3.3. Web Frontend Development

Implementation of AR on a webpage: Add an AR viewer to the product page where users will enable the try-on option. Place the AR viewer component as if it were, say, a <canvas> element and use methods exposed by the AR framework for starting rendering.

UI:Add buttons for interacting with AR, like switching between jewelleries, adjusting the fit, and rotating the view.

Use overlays to guide users, with instructions like "Stand back," "Align your body," or "Click here to try on."

Responsive Design: Ensure the UI is responsive to accommodate different screen sizes and orientations.

Language used are HTML CSS and Java Script.

3.4. Backend Development for Model Storage and Retrieval

Store 3D Models: Use a server or cloud-based storage solution for your 3D jewellery models and metadata. Services like AWS S3, Firebase, or a custom backend server can take care of storage.

CDN: Since 3D models are large, it would be great to use a CDN to improve loading times for users across different regions.

API for Model Retrieval: Develop an API that fetches 3D models based on the user's selection. The API should respond within a reasonable time frame to ensure that the AR experience is smooth.

3.5. Privacy and User Permissions

Camera Permissions: Request camera permission explicitly from the user and only use it when necessary.

Data Privacy: Make sure to communicate the appropriate privacy policy to users if some images or data have to be processed on the server.

Anonymize and secure any sensitive information where possible.

3.6. Deployment and Monitoring

Deploy AR Experience: Deploy feature on live website, making sure the same is available for use with both desktop and mobile browsers that support WebXR, or similar frameworks.

Monitor Performance: Track loading times, API calls, user engagement with the AR feature, and error rates. Analytics would be used to understand usage patterns and areas for improvement.

IV. Overall Flowchart

V. Result

The results from testing further indicate that the higher the users' engagement with AR try-ons, the greater their increased intent to buy if users have realistic virtual fittings. Latency remains an issue on low-spec devices and should thus be further optimized in the rendering pipeline of AR.

VI. Conclusion

This paper presents a framework to build a website with AR try-on capabilities for jewelleries. While the initial implementation looks promising, future work could refine body tracking algorithms and include AI-driven style recommendations for enhanced user experience. This approach may soon become the standard in online fashion retail as browser-based AR technologies continue to advance.

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