Augmented Reality Application for Watches & Wrist Accessories (Try-on)

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Abstract – For several years, augmented reality has become a popular topic for software developers and development circles. However, with the emergence of technologies related to AR and release of gadgets like Google Glasses, using your device's camera, augmented reality technology incorporates visuals, audio, video, turning other sensor-based inputs into actual objects by means of computer vision-based recognition algorithms. It is a useful method for rendering and presenting interactive real-world data so that virtual components blend in with the physical world. Your field of vision may be superimposed with information via augmented reality, which can transport you to a new environment where the virtual and real worlds are closely integrated. It is not exclusive to mobile or desktop computers. When a user takes a picture of an actual item, the supporting platform recognises a marker and adds a simulated object superimposed over the actual picture, which shows on your camera screen. This is a basic use case for augmented reality.

Keywords- Augmented Reality (AR), Watch Models, Blender, Marker-Based AR, Unity, Vuforia, Android Studio, AR-Core, Emerging trend, Augmented Reality ads.

I. INTRODUCTION

For bridging the gap between the actual and digital worlds, augmented reality (AR) has become a transformative tool that offers users experiences that are unmatched. Immersion and interactive solutions are in high demand because of the rise in e-commerce and the growing preference for online purchasing. Considering this, our suggested project aims to transform the way customers browse, try on, and buy watches and wrist accessories by utilizing AR.

The conventional method of buying watches and wrist accessories usually entails going to actual stores where consumers may try on different items to evaluate how well they fit, look, and feel. Nevertheless, this procedure may be laborious, cumbersome, and occasionally constrained by the stock levels of the products in the store. Furthermore, the advent of internet shopping platforms has presented fresh difficulties because buyers can no longer physically inspect things before making a purchase. Although products are frequently pictured and described by online retailers, it's possible that these depictions don't fully capture the product's style, size, or wearability. This is where augmented reality technology may profoundly change things.

AR applications allow users to see products in their physical surroundings by fusing virtual and real-world aspects. This provides a level of interaction and engagement that is unmatched by traditional purchasing methods. Users may visually try on assorted styles, colors, and patterns of watches and wrist accessories using augmented reality (AR), giving them a realistic sample of how the product would look on their wrist. This not only improves the in-store try-on experience but also solves the drawbacks of conventional in-store

procedures, providing customers with an easy-to-use substitute. The suggested augmented reality application makes use of marker-based AR technologies to give users a smooth and engaging try-on experience, including Vuforia and Unity 3D.

Users can use the platform from their smartphones or tablets thanks to the application's wide device compatibility, which is ensured by the integration of these technologies with Android Studio. Furthermore, the program implements a marker method hybrid using Unity3D and AR-Core SDK, which improves the accuracy and precision of virtual try-ons. Users can examine a wide variety of them.

II. LITERATURE REVIEW

[1] "**Sharma, Santosh; Kaikini, Yash; Bhodia, Parth; Vaidya, Sonali"**

It improves user experience and improves perception by using marker-less augmented reality as its foundation. The fact that the camera and the object are lined up such that it travels along with the camera is a drawback, but the plus is that there are no surface area markers required.

[2] "Snehal Mangale, Nabil Phansopkar, Safwaan Mujawar, Neeraj Singh"

Using an online application, customers must place a marker in the area where they want to evaluate our furniture. The user is going to use their webcam to record a live broadcast of the room after turning it on. The application takes the picture and applies a pre-programmed marker detecting algorithm to it. The system is built on image processing methods that detect the marker by utilising colour and other characteristics as input. First, the user chooses which furniture to install from the supplied database. The furniture is superimposed over the original image by the application, and its centre lines up with the centres of the marks in both directions. A two-dimensional visual frame generated by a webcam is superimposed with the furniture parts. This will seem as though it's happening. When the furniture is finally in place, the user can see how the room is laid up.

[3] "Khushal Khairnar, Kamleshwar Khairnar, Sanket kumar Mane, Rahul Chaudhari"

Put the marker in the area where he plans to assess our furniture to get started. To record a live stream of the area, the user will switch on his webcam. The fiducial marker detection algorithm is then used by the software to search for the marker.

III. EXISTING SYSTEM

Conventional online purchasing design strategies incorporate 2D visuals and spoken explanations to assist customers. Nonetheless, this method restricts the amount of information that can be provided regarding a watch and accessories, resulting in inefficient purchases and misunderstandings.

The primary issues with this methodology are: Insufficient perspective: The absence of various angles in the design hinders the ability to ascertain whether the watch fulfills our requirements. Dearth of specifics: Determining critical pieces of information such as size and comfort level can be challenging.

Within the domain of e-commerce, conventional design approaches utilize support systems and counseling mechanisms, relying primarily on verbal explanations and two-dimensional visual aides to aid customers. Nevertheless, this methodology is intrinsically limited +in its capacity to communicate exhaustive details regarding specific watch models. As a result, the purchasing process experiences a reduction in efficiency, which in turn causes consumer confusion.

The primary shortcomings of the of existing system are: The unchanging perspective on design are that they are hard to explain, Unable to decide if the watches will meet our needs and requirements. As this is usually objective and

varies from person to person, Information like the size and comfortability cannot be known and are a major selling point thus greatly effecting a sale.

IV. PROBLEM DEFINITION

Customers purchase a variety of watches online, but the online display is limited to photos or 2D images, making it impossible to assess whether the watch is right for them or not. Thus, to get around that, we can utilize this program to use augmented reality photos to place the watch in someone's hand and determine whether it is suitable. A step in the right direction is our application, which lets users examine a 3D generated model of the watch a virtual image that our augmented reality software allows you to examine and modify in real time. This study presents a revolutionary application of augmented reality technology to watches, allowing a user to interact with 3D virtual watch data and examine virtual timepieces through a dynamic and adaptive user interface.

V. PROPOSED SYSTEM

The development of augmented reality (AR) software has made this much easier to accomplish. People these days are proficient with this technology and use AR-capable smartphones. Consequently, the notion of developing a watch try-on application moves designers toward adopting new technologies. We are using the Vuforia Framework in our current application implementations because of the significant improvements in camera quality and sensor precision in incoming mainstream devices. By precisely recognizing features of the physical world, such as walls and junctions, this framework enables users to easily incorporate virtual objects into their environments.

The suggested solution, which aims to improve perception and user experience, is based on image tracking augmented reality. When a user points their phone at a picture, the software detects it, overlays a 3D model for a more realistic experience, and users may continue using their phone normally. The basic idea behind the suggested approach is to use a camera to superimpose digital 3D models over target photos. This programme will scan the target image and display the augmented watch item on AR-capable smartphones, allowing users to assess how well it fits their hands and preferences.

A whole range of artistic tools for 3D computer graphics, animation, modelling, simulation, rendering, and composition are offered by Blender software. Using different Unity 3D components, the following phases involve setting up lighting, shadows, and camera orientation for these models.

Next, a watch model is picked, and using the Vuforia Framework, it is rendered and processed to be put onto the scanned target picture. The 3D model is mapped onto the smartphone screen to determine its appearance and size before it is rendered and shown on the screen.

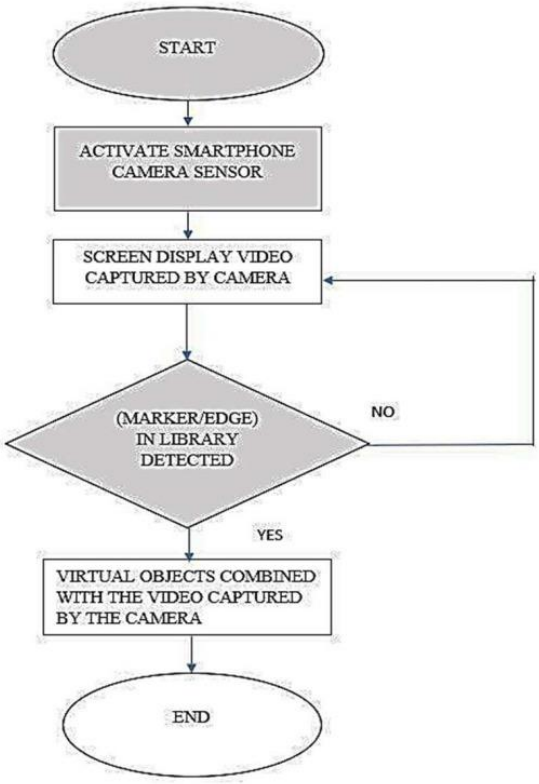

Figure 1. Working of the system flowchart

VI. MODEL IMPLEMENTATION

a. Creating Augmented Reality Objects.

To build 3D furniture models, we must first create virtual models using the Blender software. Keyframe and emotion animation technologies are used for the animation of these models, which are mainly modelled using Polygon and NURBS techniques. Important details about every model are saved in the file once it has been created in Blender.

To render the model, you need to know its vertex coordinates, texture coordinates, normal coordinates, and total polygon count. This information is kept in memory by the application and is retrieved through the rendering function when modelling models. The model contains a significant quantity of data, so to make loading into the program convenient, a loading module is required. Next, we export Blender's model data, which is usually saved as a.obj file.

The information indicated above is contained in this file. After that, we use a model loader to transform this data into a file format that the application can understand, and we call the header file to get the model data. After the model data has been loaded, we can use Unity 3D to render and show it in the scene.

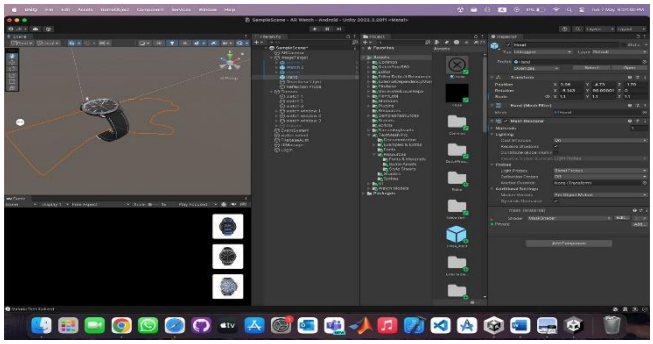

Figure 2. 3D Watch Model & Hand Model

The graphic above illustrates how Blender is used to create 3D objects for this application. The front and three-dimensional views of the constructed object are displayed in the figure.

b. Developing Scenes for User Interface

We create scenarios for every application slide in this module using Unity 3D. To use the main interface, select a key and slide to navigate. Watch models, buttons for adjusting the watch's colour, and watch explanations make up the main user interface. such the brand, price, and variants of the model. The watch column stores the key for each watch and permits slide browsing. One watch at a time is shown. To perform these tasks, we modify the scene's display to fit the aspect ratio of the Android screen and incorporate buttons that make it easier to go on to the next scene.

Figure 3. Placing the Marker Image on Hand Object

As can be seen in the accompanying image, the scene for the Blender-imported watch model is created using the Unity 3D platform. For every watch model, we will create a different scene, and in the end, we will combine all the scenes.

c. Place the Virtual Object on the Surface Area In this scenario.

We modify the imported Vuforia package to help us scan the target image where we need to place the virtual object in the real world. 3D Unity. Once Vuforia has finished adjusting, we will create a setting where the user can tap the touch screen after the surface area has been scanned to ensure that the watch model suits their needs. This will render or combine the user's hand with a virtual 3D model.

d. **Verification of placed objects**

After determining that the item meets his needs, the user can examine the description by clicking the information button, which provides details on the watch's colour, model, and cost. We build another scene that aids in displaying all the necessary information to view this description. We include an additional button that facilitates the model's colour change. To achieve this colour shift, we utilize a C# application.

VII. OUTPUT SCREENS

a. Home page

Upon launching the program, the home screen displays, allowing us to choose the watch models we need to purchase and confirm if they fit the user. Additionally, the target image is displayed in the camera.

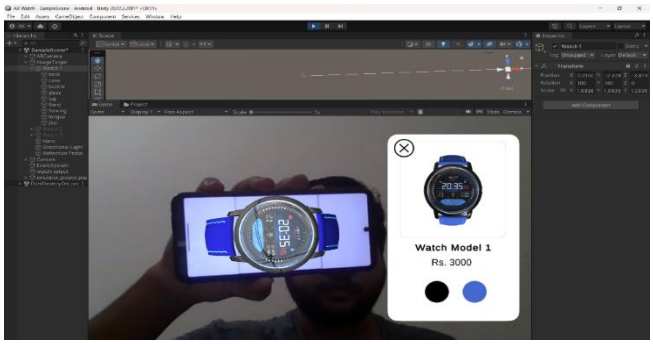

Figure 4. UI of the Application

b. Placing the object scene

The user interface (UI) displaying the watch's details appears after the target image has been scanned and the points of the image have been acquired. In addition, UI buttons for colour changes and information display about the watch are included.

VIII. Methodology

a. Building Augmented Reality Objects

- Model animation using keyframe and animation technologies.
- Modelling with Polygon and NURBS methods.
- Keeping Blender files containing crucial model data.
- Exporting.obj files with model data.
- Using a model loader to convert model data into an application-compatible format.
- Utilizing Unity 3D for rendering and presenting models.

b. Creating User Interface Scenes

- Create scenarios for every application slide using Unity 3D**.**
- Creating the main interface components, like watch models, buttons that change colour, and descriptions of the watches.
- Modifying the scene display to conform to the Android screen's aspect ratio.
- Incorporating buttons to facilitate switching between scenarios.

c. Situated the Virtual Object on the Surface

- Tailoring the Vuforia bundle to scan target photos.
- Adding a setting that allows users to tap the touchscreen to verify the location of virtual objects.
- Enabling users to drag and drop virtual watch models into actual scenarios as well as interact with them.

d. Verification of Placed Objects

- By clicking on an information button, consumers can review watch details.
- Setting up a setting to show the watch's necessary information.
- Including a C# application-implemented button for altering the watch’s colour.

e. Output Screens

- Creating a home page that allows users to choose watch models and verify that they fit.
- Showing the intended image in the camera when the application first launches.

f. Placing the Object Scene: -

- After scanning the target image and obtaining image points, the user interface presenting watch data is presented.
- Including user interface buttons to adjust the watch's colour and display its information.

IX. INNOVATION/NOVELTY

a. Customized Augmented Reality Experience:

Although augmented reality (AR) applications are becoming increasingly common, this project focuses on wrist accessories and watches. The application can offer users interested in learning more about these products a highly customized and engaging experience by focusing only on this specific niche market.

b. Marker-Based AR Integration:

By using marker-based AR technologies, such Vuforia and Unity 3D, virtual timepieces and accessories may be overlayed onto a user's wrist in real-time with accuracy and precision. This method overcomes the drawbacks of the conventional 2D, or 3D photos usually utilized in online purchasing by improving the realism of the try-on experience.

c. Improved Online Shopping Experience

The suggested augmented reality application tackles the drawbacks of conventional in-store try-on techniques in addition to improving the online shopping experience. Using mobile devices, consumers can easily peruse a wide variety of watches and wrist accessories from well-known companies without having to visit physical stores.

d. Better Consumer Decision

Making Customers may choose more wisely when they buy watches and wrist accessories since they can virtually evaluate them on. They can evaluate things like fit, size, and general attractiveness, which can eliminate ambiguity and even lower return rates for products.

e. Extension to Other Product Categories

Although the project's initial focus is on watches and wrist accessories, it lays the groundwork for potential extensions to other product categories, including apparel, jewelry, and eyewear. This extension creates additional opportunities for research and development while enhancing the AR application's usefulness.

X. CONCLUSION/FUTURE SCOPE

Analyzing the application of augmented reality to portray the watch model in the actual world is the primary goal of this "Augmented Reality Watch Try-on Application." Customers may choose and interact with the timepieces in real life thanks to augmented reality technology, which opens new possibilities for online shopping. It facilitates the customer's viewing and comprehension of the watches for their needs. Customers will learn as a result that they may purchase watches whenever and wherever they choose. Since customers benefit from these kinds of applications and are better able to make informed decisions when buying watches online, augmented reality support for watches helps to open a lot of new avenues for research in the field of online shopping. In the realm of computer science, augmented reality is a new and developing technology that will be far more useful than previous technologies.

Our dataset and scope for the **"Augmented Reality Application for Watches & Wrist Accessories (Try-on)"** will be extendable in the future. The user may be able to evaluate out this application by trying on clothes, goggles, hairstyles, and other items in addition to testing out various watch models. It can also be

applied in a variety of settings, such as medical science, retail centers, and interior design. In the future, innovative technologies might emerge that will make it easier to create 3D models automatically.

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