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IJIEMR Transactions, online available on 05th Apr 2023. Link

[:http://www.ijiemr.org/downloads.php?vol=Volume-12&issue=Issue 04](http://www.ijiemr.org/downloads.php?vol=Volume-12&issue=Issue 04)

10.48047/IJIEMR/V12/ISSUE 04/49

Title **PERFECT FIT AUGMENTED REALITY WRIST WATCH**

Volume 12, ISSUE 04, Pages: 410-418

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Perfect Fit Augmented Reality Wrist Watch

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Abstract

Augmented reality (AR) technology has become increasingly popular in recent years for creating interactive and immersive experiences. One potential use case for AR technology is in the development of watch try-on applications, which allow users to virtually try on different watch models and variations in real time without needing to physically try them on. These applications are designed to provide a more streamlined and convenient shopping experience, eliminating the need to visit physical stores to try on watches in person.

Keywords: *interact, technology, augmented reality, user engagement, Vuforia, 3D models*

Introduction

A. Augmented Reality

A technology known as augmentation of reality places virtual things in your physical environment in real time. Computer-generated elements are added to the real world. It produces a view composition of user-perceived real-world scenes and a virtual scene that was artificially created and enhanced with more data. The objective of augmented reality is to create a setting where users are unable to distinguish between actual

and virtual objects. It is one of the most important technology trends of our day.

B. Virtual Reality

"The use of computer technology to create a simulated environment" is the definition of virtual reality. When you watch VR, the world you are seeing in front of you is totally different. An animated scene or a genuine location that has been shot and added to a virtual reality app are examples of artificial virtual reality.

You can move around and see in all directions using virtual reality, including up, down, sideways, and behind you, just as if you were physically there. Through a specialized Virtual Reality viewer, such as the Oculus Rift, you may view virtual reality. Some Virtual Reality viewers use your phone and Virtual Reality apps like Daydream View or Google Cardboard.

C. Android

Android is a mobile operating system that was created specifically for touch screen mobile devices such as smart phones and tablets. It is built on a modified Linux kernel and other open source software. Android is created by a developer collective called the Open Handset Alliance with funding from Google. It is free and open source software, and the Apache License is largely used to license the Android Open Source Project, which is the name of the project's source code.

D. 3d Visualization

The words 3D rendering, 3D graphics, computer-generated imagery (CGI), and other terms are interchangeable with 3D visualization. They all essentially discuss the method used to produce graphic material using 3D software. It is a technology that has advanced into one of the most practical choices for creating high-quality digital content over the last few decades and has entered the mainstream. In the context of this project, the products which are on display for sale can also be visualized apart from experiencing the product in an augmented

reality environment. To get better understanding of the real item, the Visualization feature enables viewing the item as a 3D model that can be rotated and viewed from all directions. All these features help in having an enhanced shopping experience with the help of Augmented Reality.

E. Smart Cards

Smart Cards, in terms of the Augmented Reality Experience, are cards that allow portrayal of information through videos or different 3D models that help the user understand the product better. It is similar to scanning a card to experience the product but instead a promotional or informative video starts playing when the card is scanned. This feature allows the user to easily access realistic product tutorials and explanations that help them set-up the products for the first time. These videos can also be used to fix problems by pointing out to the user the exact issue. It would allow companies to interact with users more effectively and allow the users to fix their own issues before raising complaints.

F. Interactive Objects

Interactive Objects are special objects that can respond to the user's input in pre-specified manners. They enhance the interaction and communication between the application and the user. In the context of our application, we have implemented a unique feature that helps the user have an all-round wholesome experience while exploring the products.

For instance, the Refrigerator opens and shows the inner space of the refrigerator when the user comes close enough. When the user reaches a certain distance from the object, the objects interact with the user in some way. This feature can also be expanded to multiple other products and be activated by different types of gestures. Interactivity of objects enhance the user experience and makes users stay on the application for longer periods increasing the chance of purchase of the product.

LITERATURE

We propose a technology called "Augmented Reality based Watch Catalogue", an Android based application where the user puts a marker on their hand where they want to wear a watch. Users can use the application to browse the watches and "try them on" virtually. The AR technology will allow the user to see the watches on their own wrist as if they were actually wearing them, providing a more immersive and interactive shopping experience. Additionally, it also includes features such as the ability to change the color and see the price details of the watch.

AEC (2009) provides an in-depth analysis of the company's ARs, a survey of some significant prior exploration efforts, and a categorization of the various AR progressions according to their advantages and disadvantages. et al. (2013) examines 120 articles published

between 2005 and 2011 in various journals and compiles databases focused on augmented reality discoveries in made-up settings. The document is organized into five components that serve as an all-accessible toolset for reality prototyping. 3D article acknowledgment portable, marker-less device, 2D marker AR-based PC and webcam, and 2D marker AR-based GPS compass. Three categories of AR writing were identified during his analysis: (2) AR Framework layers: concept and hypothesis; (1) Application areas; (including four sub-layers: calculation and performance, appropriate structure, evaluation system and innovation selection), (3) other special measures. They include implementation (with two sub-layers: programming and tools), evaluation (with two sub-layers: feasibility and usability), and industry allocation. The report reviews the best innovations in each area and makes suggestions for future research avenues. Chi et al. (2013)'s study of models in AR applications for AEC/FM highlights the four AR improvements of containment, simple UI, distributed computing, and mobile phones.

METHODOLOGY

A. Vuforia Image Tracking

Images are represented as Image Targets, which the Vuforia Engine can find and recognize. The Engine recognizes and tracks the image by comparing the obtained natural properties from the

camera image against a database of recognized target resources. When the Picture Target is found, the Vuforia Engine will find the picture and seamlessly add to your data using the greatest image tracking tech. available. Games using pictures frequently use targets to visualize objects in their proper contexts, as well as to recognize and improve printed materials and product packaging for marketing purposes. The Image Targets sample app exemplifies the main functionalities of Vuforia and can be a fantastic place to start when setting up Picture Targets in an application.



Fig.1. Vuforia image tracking

B. Vuforia Object Tracking

Developers may monitor and identify 3D things in the real world using the Vuforia Object Tracking functionality of the platform. It functions by identifying and tracking the object using sophisticated computer vision algorithms, allowing virtual content to be projected on or around it in real-time. Developers must generate a 3D model of the object they wish to track and upload it to the Vuforia database in order to use the Object Tracking feature of Vuforia. As the object enters the camera's field of view, the

Vuforia engine will utilize this model to identify it.[3]



Fig.2. Vuforia object tracking

C. Vuforia Ground Plane Detection

With the use of computer vision algorithms, the ground plane identification function in Vuforia can automatically find and identify horizontal surfaces in the physical environment, like floors and tables. Developers can overlay digital material, such 3D models or animations, on top of the surface of the real world when the feature identifies a ground plane. Vuforia's computer vision algorithms examine the video feed and recognize elements in the environment to carry out the ground plane detection process. The feature creates a virtual plane that can be utilized to anchor digital material when it identifies a horizontal surface. Developers can arrange their AR content to precisely match the surface of the real world once the plane has been constructed.



Fig.3. Vuforia ground plane detection

Flat-screen e-commerce is a thing of the past. Consumers today demand a better shopping experience and want to make sure they are buying things they truly enjoy. A 3D watch can be viewed with Watch Catalogue's augmented reality feature. Thus you can quickly test out various colours and sizes on your wrist. With augmented reality, try out the latest watches on your wrist and discover your ideal fit. Online watch shopping is simple. Easy steps to virtually test the watch:

1. Launch the Watch Catalogue application.
2. Aim your phone towards the wristband bearing the designated target image.
3. Place various watch brands on your wrist.

PROPOSED SYSTEM

Based on the idea of 3D watch model try-on project using augmented reality technology, the proposed system will use image tracking AR as the basis for tracking the user's wrist and displaying virtual watches in real time. The project will be developed in Unity3D using the Vuforia SDK, which provides the necessary tools and resources for implementing AR features and tracking markers.

The AR camera functionality in Vuforia will be used to capture a live video feed of the user's wrist and surroundings, which will provide on the basis for the AR experience. The virtual watches will be then integrated into the AR environment using Unity. The user will be able to select different watch models and variations. The proposed system will also include features such as the ability to change colour of the watch and details about the watch's price.

Flow Chart

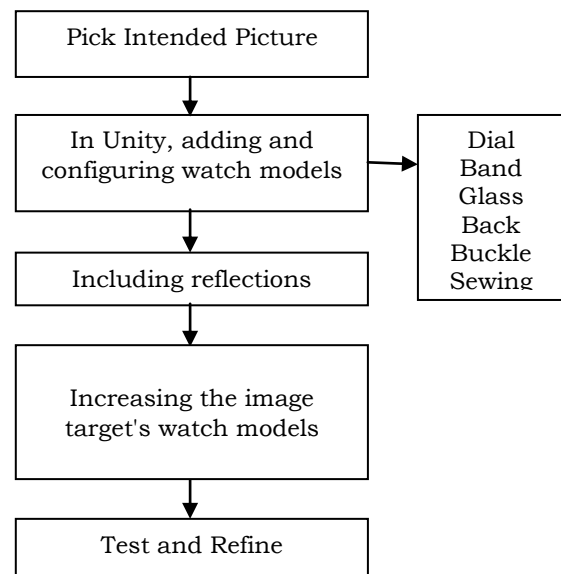


Fig.4.Creating Core Functionality

To create the core functionality for an augmented reality (AR) watch try-on project, you will need to use a combination of AR technologies and programming tools.

Step 1: Define the tracking image: In order for the AR application to recognize the watch, you will need to define a tracking image. This is typically a 2D QR code or an image that is identifiable by the AR application.

Step 2: In unity Create a 3D model of the watch: You can either create your own 3D model of the watch or use a pre-built

model from an online library.(by including reflections)

Step 3: Write the code to overlay the watch model on the tracking image: Use the AR platform's programming tools to write the code that will overlay the 3D model of the watch onto the tracking image. You may also want to add additional features, such as the ability to move the watch around or change its color.

Step 4: Test and refine: Test the AR application on different devices and in different lighting conditions to ensure that it works as expected. Refine the code as needed to optimize performance and improve user experience.

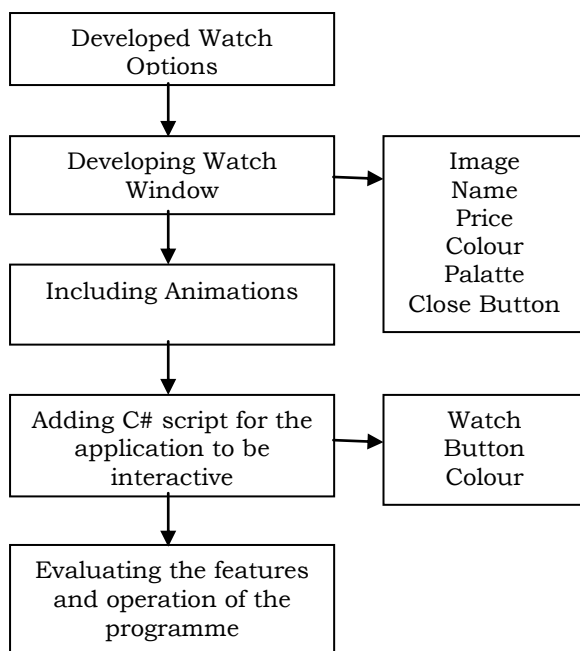


Fig.5. Creating App UI and adding Functionality

To create App UI and adding Functionality for an augmented reality (AR) watch try-on project, you will need to use a combination of AR technologies and programming tools.

Step 1: In this, we have developed a Number of watch phases that you can try

on (we have three watch phases at present)

Step 2: In this phase, we have developed a watch window which includes watch's image, name, price, colour palatte and close button

Step 3: Now we include animations of the watch to overlay the watch's 3D model on the tracking image.

Step 4: For the application to be interactive we have added feature where users can change the watch or color of the watch and close the application

Step 5: In this final step we test and evaluate the features and operations of the application on different devices and in different lighting conditions to ensure it works as intended, and refine the code as needed to optimize performance and improve the user experience.

MODEL IMPLEMENTATION

A. Development of Augmented Reality objects

In this phase we should create a 3D model using software like blender. After creation of models in Blender. Blender mainly stores four important information of the model, first is models' vertex coordinate, second one is texture coordinate, third one is normal coordinate and the last one is total number of polygons. Then we export this model data into a file exported as .obj file..[2].

B. Introducing user interface models

Using Unity 3D, we construct scenarios for each application slide at this phase.[1] The primary interface includes watch models, color-changing buttons, descriptions of the timepieces, including model name, price, and variants. The watch column, which displays one watch at a time and permits browsing and sliding, saves the key for all watches. To implement these functionalities, we scale the scene display to the size of the Android display and add buttons to the scene to make transitioning to the next scene easier.

C. Project the Virtual Object on the Plane

In order to scan the target image and put the virtual object in the real scene, we utilize the Vuforia package, which will be loaded into Unity 3D. Once Vuforia has been altered, we'll create a scene where the user touches the touch screen after the surface area has been scanned. At that point, a virtual 3D model is created or combined with the user's hand, enabling them to validate that the watch model meets their requirements. The virtual watch model can now be dropped into the actual scenario as requested by the user using the user interface.

D. Validating the objects added

After the user decides that item is a good fit for his requirements, then he can see the details of the watch by clicking the information button, which provides

details on the watch's colour, model, and cost. We include another button that aids in adjusting the model's colour. We then utilize C# programming to implement this colour change.[4]

EXPERIMENTAL RESULTS

When target image will be scanned and its points have been gathered, the watch will be now displayed on the screen and the User Interface with watch details pops up. Together with it, we also get User Interface buttons for changing colours and a display of the watch's information.



Fig.6.Application UI



Fig.7.Application UI



Fig.8.Original view of Scanner

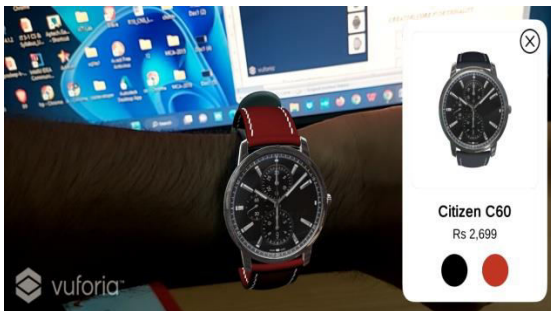


Fig.9.Without Reflection

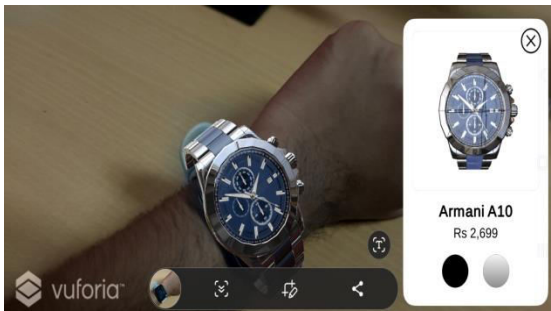


Fig.10.With Reflection

CONCLUSION

A. Enhancing The Business

The exclusive ability to view the product at any time is provided by the Virtual Watch Catalogue. In general, it is observed that online eCommerce platforms can be used to purchase watches.

Yet, users are not entirely satisfied because they are unsure of whether or not the watch will fit. Access to a sizable collection of watches: This solution

enables users to browse a sizable assortment of timepieces with various dial, size, kind, and brand characteristics. Individuals can choose where to put their money in advance.

B. Friendly Interface

A user-friendly user interface makes it easy for customers to view various luxury timepieces from various perspectives with only one swipe.

C. Easy To Use

Using an AR watch is not difficult. All you need to do to view the watches collection is download and install it to your mobile phone, then follow the onscreen instructions.

D. Saving Of Quality Time

Instead of visiting the store and trying on several timepieces, it allows customers to save their valuable time.

E. Saving Of Resources

It decreases the consumption of resources like electricity and gasoline. Also, it occasionally helps clients save money.

FUTURE WORK

Because hands can vary in size, it may not fit perfectly when a buyer virtually tries it on. So that customers don't need to use any other platforms to make purchases, we can include a purchasing option for the products. There are only a few versions or designs available.

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