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Augmented Reality for Implementation of Virtual Watch

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Abstract: *Augmented reality is an interactive experience of a real-world environment where the objects or images that reside within the world are enhanced or supplemented by computer-generated perceptual information. Augmented Reality adds a thing to the existing world. It is an enhancement to the real world where we mix the real world with the virtual objects. In this paper, we are proposing a methodology that builds a preview of the virtual watch object alongside the real environment. Using this methodology users can place the virtual watch on their wrist and visualize it in their personal space. This eventually reduces the challenging task of walking into a showroom and trying different watches, as the user gets a clear preview before purchasing the actual item. This methodology is best suited for this technology-driven environment.*

Keyword: *Augmented Reality, Virtual Objects, Real Environment, Virtual Watch*

I. INTRODUCTION

Augmented reality (AR) combines and integrates real-world entities and objects into digitally augmented data. At present, the AR system uses live images, which the system processes digitally to feature computer-generated graphics. Definition for AR stated by Encyclopedia Britannica: "Augmented reality is a process of combining or augmenting video or photographic displays by overlaying the images with useful computer-generated digital data." [15]. This technology is a compound of simulations, sensors, and mixed reality that creates the perception of real scenes by the users, presenting them the feeling as if the person is in the real situations. AR is considered as one of the latest technology that has spread all over the Information Technology (IT) market successfully and is still progressing to achieve more. While the technologies that make the augmentation possible are around for quite a while, only recently has AR become "doable" on consumer-grade devices. The implementation of Flash-based AR detection algorithms, alongside the growing popularity of mobile platforms (e.g., iOS and Android), has eventually opened the door, allowing AR to become accessible to the masses. Already AR is becoming visible in our audio-visual media (e.g., news, entertainment, sports) and is starting to enter other aspects of our lives (e.g., e-commerce, travel, marketing) intangible and exciting ways. As a continuation of the development of Emerging technology, this methodology provides an interactive experience to the users through overlaying the virtual watch objects to the physical world using a smart phone or an Android device. The application uses the mobile's camera and sensors to scan the marker and place the watch. This allows users to visualize the watch by placing the marker on the wrist. With this methodology, the user will get a proper perspective of the watch in all directions without even walking into a showroom to physically try the watch. In this new era of buying everything online, our methodology is very helpful in visualizing the watch before buying. The main motto of the ideology is to reduce time consumption and improve the accessibility of the watch try-on using the technology of augmented reality.

II. LITERATURE SURVEY

Augmented reality is similar to the thought of virtual reality (VR). Virtual Reality attempts to create an artificial world in which a person can experience and explore interactively through his or her sense of vision, but also via audio, tactile, and other forms of feedback [1]. Augmented Reality also brings an interactive experience, but aims to supplement the important world, instead of creating a completely artificial environment [1]. This concept can be applied in diverse areas such as education, advertising, and games, bringing the concept more and more to people's lives and to mobile technologies that they use on a daily basis [2].

By utilizing Mobile AR, people not only can communicate with it to display the related information to act and resolve uncertainty but can also collaborate with people. This then makes the planet becomes an interface (UI) [4].

Diverse research papers have described the blending of Augmented Reality innovations with inherent outcomes obtained by the implementation of modern engineering advancements in Augmented Reality. Most referred study papers demonstrate that Augmented Reality will help in improving the standard of practice in the implementation of real environment circumstances in systems.

In the literature, there are a few works where Kinect sensors are used as hardware for AR applications[7, 9], which develop marker-based AR applications for human arms. There is a group of work [5, 6, 8], which studies pose estimation of the hands from Kinect data. Mostly, they study hand pose and articulation estimation from a close view. Kinect is a line of motion sensing input device designed by Microsoft and initially released in 2010. The technology comprises a set of hardware basically developed by PrimeSense, including RGB cameras, infrared projectors, and detectors that mapped depth through each structured light or time of flight computations, along with software and artificial intelligence from Microsoft to enable the device to perform real-time gesture recognition, speech recognition, and body skeletal detection. This work is the first of its kind as it concentrates on forearm pose estimation and 3D model visualization around it from a distance.

Several research studies were published in late 2013, forecasting the future of the Augmented Reality market [10]. For instance, Juniper Research has estimated that the amount of mobile AR users worldwide will steadily grow to 200 million by 2018 [11]. The AR technology has made great improvements on mobile phones, and Juniper Research moreover predicted in 2012 that over 2.5 billion mobile AR apps are going to be downloaded annually to smartphones and tablets by 2017 [12].

These theories drive towards the research question – “Which is currently the most reliable open framework for developing an Augmented Reality mobile application?”. Towards this intention, we evaluated open AR frameworks for Android mobile development, since the iOS platform has been evaluated over the years and clear outcomes can be found in Dominik Rockenschaub’s Master’s Thesis [13]. Another motivation for researching the Android-specific open AR frameworks is that the modern job market growth registered in Android development [14].

III. METHODOLOGY

The development environment for this ideology is Unity Game Engine, Vuforia SDK, and C# language was used for achieving the functionalities. AR – a technology that superimposes a computer-generated objects on a user’s view of the real-world, thus providing a composite scene. It uses primary two hardware components of a smart-phone’s camera: Gyroscope and Accelerometer to track the movement of the object in 3D space. Together with reliable Software Development Kits and Engines, it creates an immersion - the virtual sense that digital objects belong in the physical world. Breaking immersion means that the sense of reality has been destroyed; in AR this is usually by an object performing in a way that does not meet our expectations.

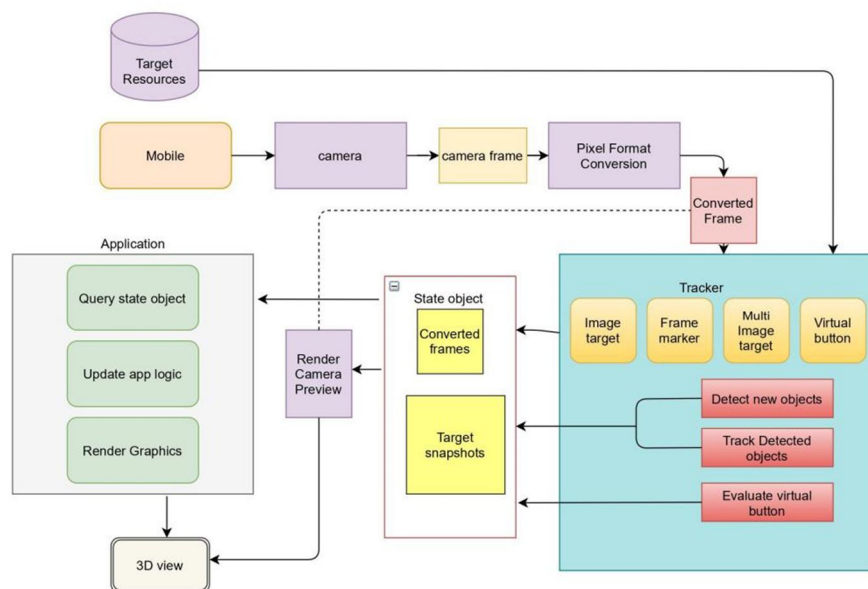


Fig 1: System design

Image Target with visually distinct features is placed on the user’s wrist. The camera scans the image target. Thereafter, it augments the 3D model of the Watch on top of the image marker and makes sure the back portion of the watch is occluded using another 3D model of the Hand/Wrist and applying Mask Shader on it. Users can change the colors of the band by using the animated UI. Switching between different models of watches is possible using C# Scripting. Manual Testing is done to verify the functionalities.

IV. RESULT

We have developed an android application with the help of AR. This application allows the user to visualize the 3D watch according to their comfort.



Fig 2: Watch model view 1.



Fig 3: Watch model view 2.



Fig 4: Watch model view 3.

V. CONCLUSION

Using AR technology, users can experience comfortable and virtual experiences at their convenience in-home or any other place. In recent years online shopping is the norm and by using augmented reality we can provide the users an interactive experience of wearing different watches from the comfort of their homes in their busy scheduled life. But in today's situation as the COVID virus has spread all over the world there is a high risk for the customers to go to a shop to try on real watches. The concept of maintaining a well-sanitized environment in the shop every day is a costly process for the shopkeepers. By using this methodology, it is not mandatory for the customers to visit the shop.

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