

# Virtual Environment Using Metaverse

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**Abstract—** In today's web context, where participation and collaboration are the foundation for the development of common knowledge, the usage of Metaverses as a platform for human interaction is a worldwide trend. It's a virtual or augmented reality universe that allows you to create virtual social interactions. Neal Stephenson coined the term "metaverse" in his 1992 science fiction novel "Snow Crash," which envisioned lifelike avatars meeting in realistic 3D buildings and other virtual reality scenarios. However, the term "metaverse" was coined by Facebook, now known as Meta, to define its goal of working and playing in a virtual environment. Metaverse is all about 3D models and virtually created environment. In this paper I am going to discuss about sample implementation of metaverse by building an application based on augmented reality. It is an android application which is developed with unity framework.

## Keywords:

*Virtual reality, Augmented reality, 3D Modeling, Artificial intelligence, metaverse, cyber world, avatar, extended reality.*

## I. INTRODUCTION

The concept of a persistent, networked, 3D universe that includes many virtual spaces is known as the metaverse. It can be compared to a future version of the internet. Users will be able to collaborate, meet, play games, and socialize in these 3D environments thanks to the metaverse. Virtual reality (VR) and augmented reality (AR), which blends aspects of the digital and physical worlds, are examples of metaverse technology. The goal of this research paper is to create an Augmented Reality application. This application is an example of a metaverse implementation in action.

Much to the early days of the Internet, the Metaverse represents a new beginning to create something new. Hundreds of millions of dollars are being invested in the metaverse's development., which tech tycoons refer to as the future, but what exactly is metaverse? Neal Stephenson, a science fiction writer, created the phrase "metaverse" in 1992. "The concept of a fully immersive virtual world where people assemble to socialize, play, and work," according to its most basic definition. It's a simulated digital environment that combines augmented reality, virtual reality, blockchain, and social media ideas to create environments that resemble the real world for rich user interaction.

This study aims to provide a comparative analysis on various aspects in implementation of Metaverse using an augmented reality application which is developed on unity platform. A sample 3D visualization of virtual model is created using Vuforia Engine. A database is created in Vuforia developer portal with an image and then it is imported in unity with the help of Vuforia engine plugin. The Metaverse demands a scalable setting that can handle a huge number of people to reinforce social significance.. Three factors were required for a large-scale Metaverse implementation are: (i) hardware improvements (e.g., GPU memory, 5G); (ii) the development of a recognition and expression model that takes advantage of the hardware's parallelism; and (iii) the availability of content that people can immerse themselves in and participate in. It is capable of providing an immersive experience with a story through user involvement, in addition to just producing a physical, virtual setting. With three techniques (i.e., user interactions, implementation, and applications), this research gives a thorough analysis on the applications and technologies that might create social significance in a Metaverse hardware, software, and content.

## II. LITERATURE SURVEY

This section reviews some papers that are related to similar studies and are analysed. Implementation of metaverse is still an emerging technology but there are some research papers available which describes the future and advancement of Metaverse technology.

S.-M. Park and Y.-G. Kim proposed the research paper 'Metaverse: Taxonomy, Components, Applications, and Open Challenges'[1]. In Metaverse, avatar, and XR research, they sought for connected Metaverse concepts. After that, they took care of all three of Metaverse's essential components (hardware, software, and content). They also talked about the most up-to-date Metaverse approaches (such as user interaction, implementation, and application) that are currently available and will be required in the future.

Ariel Vernaza, Ivan Armuelles V., Isaac Ruiz proposed the research paper 'Towards to an Open and Interoperable Virtual Learning Environment using Metaverse at University of Panama'[2]. In this paper, they demonstrate how virtual worlds and hybrid realities can be a fun approach to incorporate new technology into the classroom. It's

conceivable that many teachers are concerned while handling a projection of a virtual object, thus the interaction between the virtual and actual worlds needs to be improved. Another appealing element of Metaverse is the ability for students to attend lessons from wherever they are.

Dionisio, J. D. N, Burns III, W. G., and Gilbert. R Dionisio proposed the research paper '3D Virtual Worlds and the Metaverse: Current Status and Future Possibilities'[3]. Technologies and methodologies for enhancing immersive realism, particularly for the senses of sight, hearing, and touch, continue to grow independently of virtual worlds due to their usefulness in other sectors such as games, entertainment, and social media. Due to the added demand for bidirectional information flow (i.e., input and output) and real-time performance, bringing these advancements into the Metaverse is often a step behind innovations in these other contexts.

Aggarwal,Riya; Singhal, Abhishek proposed the research paper 'Augmented Reality and its effect on our life '[4]. They researched Augmented Reality and its diverse applications in medical, manufacturing, entertainment and games, robotics, and education. Some apps, such as EyeDecide, were introduced to us .AugThat, Zookazam, and other AR apps are examples. They also came to the conclusion that Augmented Reality can be useful in our daily lives.

Jain, Ravinsingh; Iyengar, Srikant; Arora, Ananyaa published research paper 'Virtual World for Education and Entertainment'[5]. They conclude that Virtual Worlds can be used in 3D simulations, computer games, and online commerce. The approach, however, is still broader and more fundamental. It also tackles the difficult task of comprehending the fundamental principles that allow massive groups of interacting constituents to self-organize and form emergent phenomena in the natural world. As a result, the study of Virtual Worlds is particularly concerned with the formal basis of synthetic universes and offers a promising new way to contribute to the understanding of nature and complex systems in general.

Different from earlier research's on metaverse, This paper propose a sample implementation of metaverse using augmented reality mobile application.

### III. SYSTEM DESIGN

#### A. Augmented reality

Augmented reality (AR) is a digitally enhanced version of reality created via the use of digital visual components, music, or other sensory stimuli. It's becoming more common among companies dealing with mobile computing and commercial apps.

It consists of three basic steps:

(i) Augmented reality (AR) is a method of improving one's experience by superimposing visual, auditory, or other sensory data onto the real world.

(ii) Augmented reality can be used by retailers and other businesses to offer items and services, run innovative marketing campaigns, and collect unique user data.

(iii) Unlike virtual reality, which creates its own virtual world, augmented reality adds to the one that already exists.

#### B. Vuforia Engine

Vuforia Engine is an Augmented Reality (AR) software development kit (SDK). Advanced computer vision technology can be simply added to any program, allowing it to recognize images and objects as well as interact with real-world spaces. Vuforia Engine may be used to create AR apps for Android, iOS, Lumin, and UWP devices.

Various steps involved in creating database in Vuforia are:

Step 1: Create an account in vuforia developer portal.

Step 2: Create a database in vuforia developer portal under Target manager panel.

Step 3: Open the database which is created and add a targeted image.

Step 4: Then download the database and import it in our project.

#### C. Avatar

The word avatar is derived from the Sanskrit word for "descent," which refers to deities descending to the earth and taking on human-like forms. Avatars were popular in the 1980s as an on-screen representation of internet users, particularly gamers. The release of Ultima IV: Quest of the Avatar in 1985 reinforced the need for realistic on-screen user depiction. Avatars aren't exactly new in the social media realm, but Facebook's metaverse gives them a whole new depth. Facebook delivered a number of announcements about virtual reality technologies, future directions, and research at Connect 2021, in addition to its rebranding to Meta. Hyper-realistic 3D avatars that combine artificial intelligence, sophisticated modelling techniques, and electromyography to precisely portray human characteristics and movements in a virtual space are anticipated to appear in Facebook's metaverse. These avatars are still in the development stage and will most likely debut several years from now. Meanwhile, other firms, such as Microsoft, are revealing their visions for metaverse user avatars, and the future seems bright.

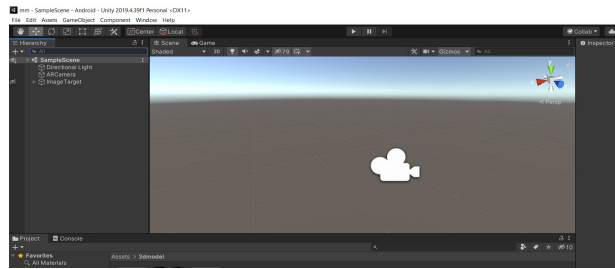
### IV. METHODOLOGY

The suggested system is built on a set of procedures. The system is implemented using Augmented reality

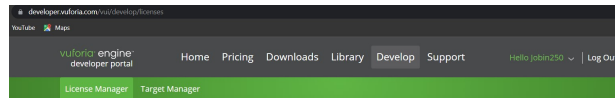
Step-by-step directions in implementing the system are:

Step 1: Download and configure unity hub application.

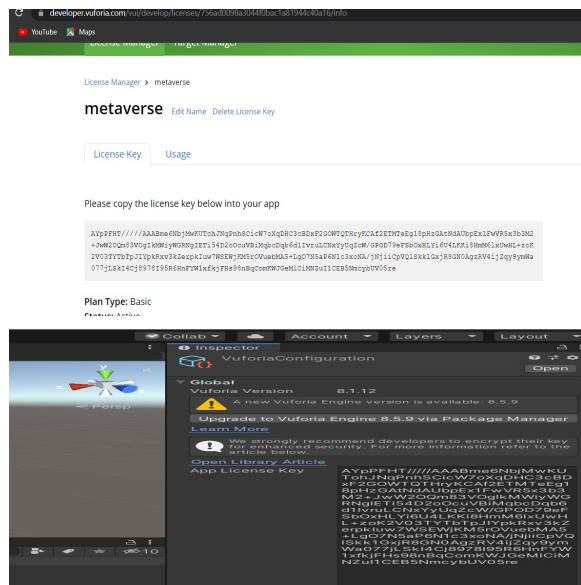
Step 2: Then create a new 3D project.



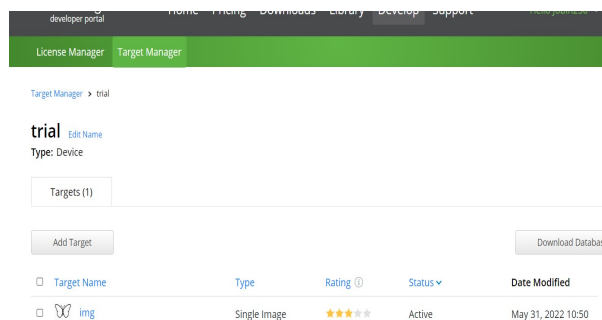
Step 3: Then create an account in Vuforia developer Portal.



Step 4: Generate a license key in Vuforia and the key to unity

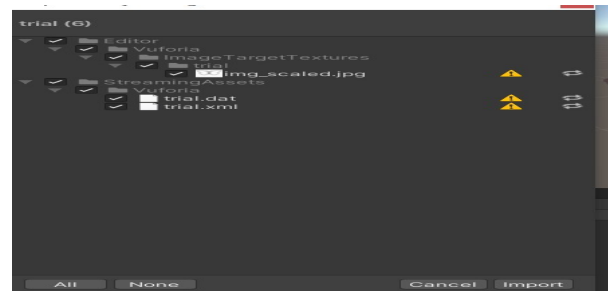


Step 5: Create a new database in Vuforia developer Portal and add an image.

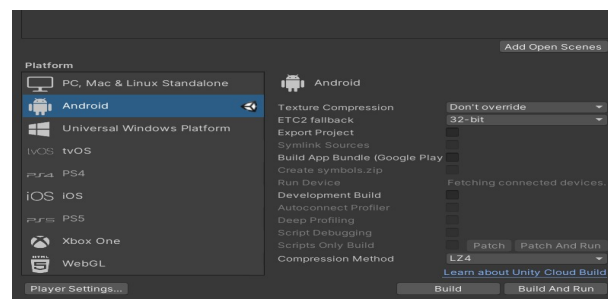


Step 6: Add the Vuforia plugin into unity hub.

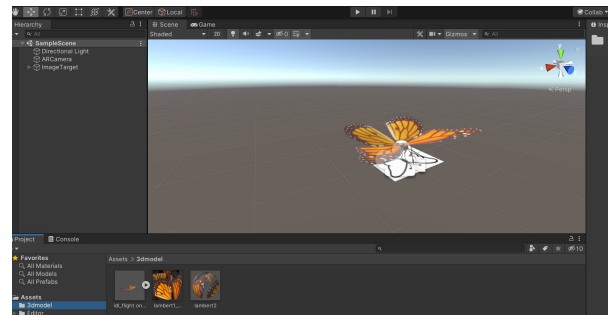
Step 7: Download and import the database created on Vuforia.



Step 8: Switch the unity build version to android build.



Step 9: Import a new 3D animation model and arrange it above the image on the database.

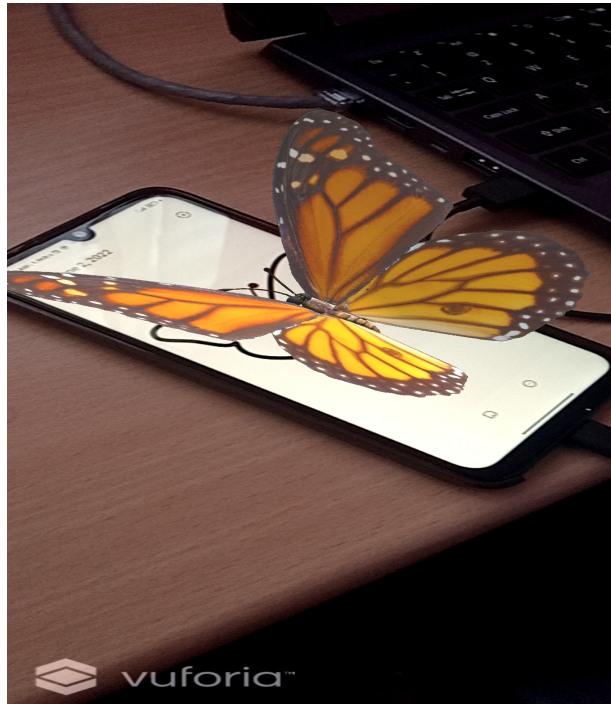


Step 10: Arrange the animation duration, size and orientation of animation.

Step 11: Then build the application apk and run it on a Real time device.

## V. RESULT AND DISCUSSION

After successful build of application, we can see the avatar in an augmented way. This application augments a 3D animation when the camera is focused to the image which we created in database.



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## VI. CONCLUSION

In my paper on virtual environments using metaverse, I came to the conclusion that metaverse is the emerging technology of the future world. I looked at studies for Metaverse concepts like avatars and augmented reality in my study. After that, I took care of all three of Metaverse's essential components (hardware, software, and content). I also looked at the most recent Metaverse techniques such as user interaction, implementation, and application that were available at the time and will be necessary in the future. I also created an augmented reality application that enhances a 3D animation. This application is a sample working example of metaverse development. Many studies and developments are being conducted to advance the development of metaverse technology.

## VII. REFERENCE

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