

## SCOPE OF SOFTWARE ENGINEERS IN METAVERSE

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**Abstract** – Metaverse is a combination of multiple technologies in which we are able to connect with the others in virtual reality. Metaverse is a virtual 3D Immersive world where people interact through Digital avatar it replicate physical experience through immersive technologies like AR/VR .Metaverse is an multi user platform interconnected web of social network environments in which we have many examples like playing multiples platforms games like fifa, fortnite in which we play will other player while we are in a virtually present in the game only also, like we are giving zoom meeting virtually while sitting in the home. Also, zoom is currently working on creating a virtual avatar which can be shown while representing a meeting. Some of the major elements of the metaverse are like, Digital Currency, Online Shopping , Social Media, NFT, Digital Assets.

**Keywords** – Metaverse, Virtual Reality, Immersive, Currency, 3D.

### I. INTRODUCTION

When we think about metaverse we are sort of pushed this direction that it has everything to do with VR but that's not exactly the case. A metaverse is anything where you can experience something in virtual world. For eg. Experiencing your college graduation in minecraft that is the extension of the metaverse, experiencing of a music concert in fortnite server that is metaverse. We don't need to be building VR stuff to get involved in the metaverse but one common thing that all of these things have if you want to build something for the metaverse. So, we have to build something in 3D.

3D is the sort of the core concept about what is metaverse is and how we might to build our own metaverse? We need to have a good understanding of 3D programming.

What is 3D Programming?

The first thing that come in mind when you think 3D programming is Unity, unreal Engine or god. All these game development Engines. But 3D coding has a lot more. So game development is just a specific part of 3D programming. 3D programming is used in different industries and some of the industries including architecture, engineering, supercomputing media , entertainment, movies and manufacturing. Examples of 3D coding in Industries

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- Gaming - Minecraft, Call of Duty WarZone
- Super computing - Waymo, Tesla
- Media and Entertainment - Marvel ,Unity and unreal Engine
- AR/VR Exprience - Instagram, Snapchat , Apple
- Engineering - Autodesk

### II. WHICH BIG TECH COMPANIES WORKING ON METAVERSE?

#### 1. FaceBook/Metaverse

Facebook is the company that is easiest to explain because obviously it went all in the metavesre. So, most of you have probably seen the Facebook CEO video where he talks about being in metaverse and having virtual meeting in it.

#### 2. Amazon

Decording home with furniture using augmented reality. So if you have a phone and you trying to buy furniture you can use AR to place it in your house. Amazon is built a mmorpg gaming space affected by fornite which made 4 billion dollors in 2019.If we think more about amazon games. So, one of the leading game is Lostark and that game is another example of mmorpg game. Most of the games which made by amazon which is based on Open 3D Engine.This company is also trying to run these 3D games in AWS cloud platform to achieve metaverse.

3. Google Google already into the 3D programming. Google stadia is one of the example google stadia is street game streaming service. Another example is android has to power instagram, snachat. So that users can create those cool visual effects. Chrome the web browser where you can run 3D experience things.

4. Microsoft Metaverse Microsoft is the biggest company in 3D programming because of xbox. They also bought minecraft for 2.5 billion dollars and recently acquire activision blizzard for 70 billion that is because game development is at the core of the 3D programming which is at the core of the building the metaverse.

### III. Metaverse Tech Stack

Frame Works for implementing 3D coding

- Unity and unreal engine
- Aframe.io
- Babylon.js
- Play canvas
- three.js

### IV. METAVERSE IDEOLOGIES

### A. Physical world-virtual world interaction

Each non-mutually-exclusive stakeholder in the physical world controls The components that influence the (V.R) virtual worlds. The key stakeholders are:

- Users can experience the virtual worlds through Head Mounted Displays (HMDs) or AR goggles .The users can in turn execute actions to interact with other users or virtual objects.
- IoT and sensor networks are created in this world to survey the environments and count the Details which can be further used for usage .

The digital twin is a digital replica of the physical world which is created to check how the environment effects will take place on that twin which can be used for further studies on that.. traded, and consumed in the Metaverse.

- Physical service providers (PSPs) operate the physical infrastructure that supports the Metaverse engine and respond to transaction requests that originate from the Metaverse. There are many operations of communication and computation resources at the edge of the network, or logistics services for the delivery of physical goods transacted in the Metaverse.



B. The virtual worlds are generated, maintained, and enhanced with these inputs.

AR/VR enables users to experience the Metaverse visually, whereas haptics enable users to experience the Metaverse through the additional dimension of touch, e.g., using haptic gloves. This enhances user interactions, e.g., through transmitting a handshake across the world, and opens up the possibilities of providing physical services in the Metaverse, These technologies are developed by the standards that facilitate interoperability, e.g., Virtual Reality Modeling (VRM) , that govern the properties, physics, animation, and rendering of virtual assets, so that users can traverse from far place in which places it is not possible to go or in some emergency call .

- Tactile Internet enables users in the Metaverse to transmit their virtual body in the virtual world.

### C. Blockchain

The distributed ledger technologies provided by the blockchain will be the key to preserving the value and universality of virtual goods, as well as creating the economic ecosystem within the Metaverse ideology. It is very difficult to carry virtual goods as they are in numerous numbers that's why the platforms on which they are traded or Stored sometimes virtual goods are also created on that platform

also.. Blockchain technology will play an essential role in reducing the reliance on such centralization. For example, a Non-fungible token (NFT) serves as a mark of a virtual asset's uniqueness and authenticates one's ownership of the asset This mechanism protects the value of virtual goods and facilitates peer-to-peer trading in a decentralized environment. As virtual worlds in the Metaverse are developed by different parties, the data of the users are also managed separately in the form of tokens and coins.. To enable seamless traversal across virtual worlds, multiple parties will need to access and operate on such user data. Due to value isolation among multiple blockchains, cross-chain is a crucial technology to enable secure data interoperability. In addition, blockchain technology has found recent successes in managing edge resources.

### D. Multiplayer Online Role-playing Games

Many people thinks that metaverse is not the new concept as it is already been long implemented in the gaming concepts from very earliest stages in making the games. But in today's worlds we can't say that a game is fully based on metaverse rather than some of the concepts are basically only use in the games like VR concept. Massive multiplayer online role playing games, players can enter the game and live in the digital world using their avatars. These avatars have roles tagged to the players, just as how one has a job in the physical world.

1) Second Life: This is among the first attempts to create a complete virtual world in which players could live in. In the second life, players control their avatars and can do almost anything they can in the physical world, from racing to playing sports . Besides, players can customize the environment or world they live in.

2) Minecraft: The popular game allows anyone to create their own content by using 3D cubes in an infinite virtual world and it supports user access using VR devices such as Wild Rift. In fact, digital copies of cities around the world, e.g Kansas and Chicago, have been built using Minecraft and can be accessed by any user.

### E. Tools, Platforms, and Frameworks

We will discuss a variety of key tools, platforms, and frameworks used currently in the development of the Metaverse. Some examples are, Microsoft Mesh, Structure Sensor, Canvas, and Gaimin.

1) Unity: Unity is a 3D content creation environment that includes a fully integrated 3D engine as well as studio design . Virtual reality, augmented reality, and Metaverse experiences can be created using the aforementioned features.

Decentralization options in the Metaverse are provided by the Unity components store, which includes features such as edge computing, AI agents, micro services, and blockchain.

2) Unreal Engine: Unreal Engine is a Metaverse development tool. It includes designing studios, i.e., MetaHuman Creator, and an asset marketplace. Using MetaHuman Creator, it can help to create a digital human and with the help of this digital

human which is gonna be created in months can easily be created in an hours and with flexibility, fidelity, and realism.

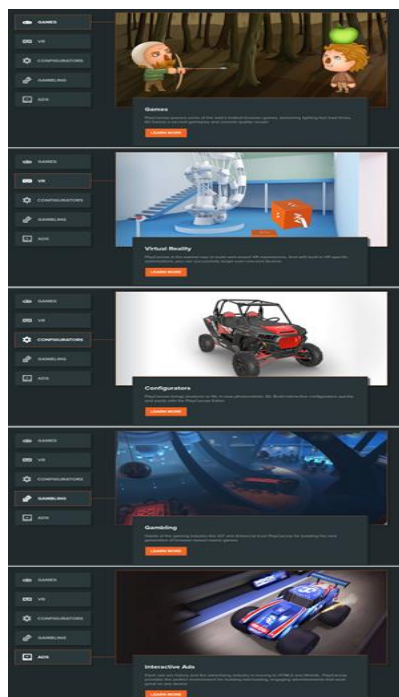
3) Aframe.io: This is a frame which helps us to build 3D project from a plain HTML file without installing anything. Glitch is the one the best example .Glitch an online code editor that instantly hosts and deploys for free. Alternatively, create an .html file and include A-Frame in the <head>:



4) Babylon.js: Babylon is a real time 3D engine using a javascript library for displaying 3D graphics in a web browser via HTML5.The source code is available on Github and distributed under Apache License.



5) Play Canvas(WEB-FIRST GAME ENGINE): Play Canvas is an open-source 3D game engine/interactive 3D application engine alongside a proprietary cloud- hosted creation platform that allow for simultaneous editing from multiple computers via a browser-based interface runs in modern browsers that support WebGL, including Mozilla Firefox and Google Chrome. The engine is capable of rigid-body physics simulation, handling three-dimensional audio and 3D animations.



6) three.js: Three.js allows the creation of graphical processing unit (GPU)-accelerated 3D animations using the JavaScript language as part of a website without relying on proprietary browser plugins. This is possible due to the advent of WebGL, a low-level graphics API created specifically for the web. High-level libraries such as Three.js or GLGE, SceneJS, PhiloGL, and many more make it possible to author complex 3D computer animations for display in the browser without the effort required for a traditional standalone application.



## V. COMPLETE ROAD MAP OF METAVERSE

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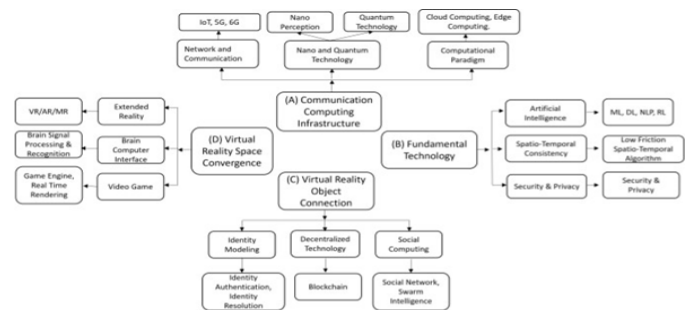


Figure 1. A complete Technological Roadmap of Metaverse

## VI. CONCLUSION

Metaverse is not a dream any more now a days the things we use to dream is possible by these latest technologies. Like the experience of virtual reality will take our generation to the next level we can't even imagine.so much employment and job can be created by this technology and even more reliable works can be done in easier than we can expect. But every sides has to face so metaverse also has some good thing and some bad things its depend on how people use that thing in their personal life.

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