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AUGMENTED REALITY GAME DEVELOPMENT USING UNITY & VUFORIA

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ABSTRACT:-*This paper presents a Game that will be developed under an Augmented Reality (AR) technology. The main objective of this paper is to analyse development of an efficient Augmented Reality game. This game is playable on almost every Android device that is possible. By using the camera in a AR Device the scene should be captured. The captured device has more intensity compared to the scene captured by other device. This problem also analyse the problem of no UI buttons for some AR games which are mostly unofficial.*

In this paper the UI buttons for the fighting game actions should be added into an AR Concept. The usability of this game is simple to use by using different controls. The game developed using UNITY game development engine (Game developing software) with VUFORIA extensions in it with the Vuforia license provided is mostly discussed in this paper. The single image target problem is generally avoided here. This paper analyse the multi image targets so that it can be used to play the game in any target image or any object, which is to be shown to camera with good detail of that image.

Keywords:-*UNITY2017.3.1F1, VUFORIA, ANDROIDSDK, MONODEVELOP, AUGMENTED REALITY (AR)*

I.INTRODUCTION:

Video Game Development:-

Video game development is the process of creating a video game. The effort is undertaken by a game developer, which may range from a single person to an international team dispersed across the globe. Unity is a cross-platform game engine with a built-in IDE developed by Unity Technologies. It is used to develop video games for web plugins, desktop platforms, consoles and mobile devices. It uses c#, and unityscript (JavaScript), which is supported by the source code in c, and c++ plugin support.

Augmented reality (AR):-

Augmented reality (AR) is a direct or indirect live view of a physical, real-world environment whose elements are "augmented" by computer-generated perceptual information, ideally across multiple sensory modalities,

including visual, auditory, etc. An enhanced version of reality where live direct or indirect views of physical real-world environments are augmented with superimposed computer-generated images over a user's view of the real-world, thus enhancing one's current perception of reality.

Vuforia:-

Vuforia is an Augmented Reality Software Development Kit (SDK) for mobile devices that enables the creation of Augmented Reality applications. It uses Computer Vision technology to recognize and track planar images (Image Targets) and simple 3D objects, such as boxes, in real-time.

Creating an Image Target:-

An image target is required in order for a device's camera to recognize a reference and track it. The orientation and actual size of the target image directly affect the same attributes of the superimposed images.

Any image can be assigned as a target. However, the features of the target image effectively determine how well the target is tracked. In this tutorial, we are going to use an online tool to generate feature-rich target images. Generate an image target by using the Augmented Reality Marker Generator online tool, and save the image on your computer.

Prepare the markers:-

Markers are the images that Vuforia will use as the points of reference to display our objects. The more distinct key points the image has, the more accurate or "augmentable" markers will be. The easiest way to create such marker is to generate a QR code. QR codes have a lot of key points and they work like a charm.

Create Database:-

Once the marker is prepared, the Vuforia should be uploaded. In the Vuforia Target Manager page and click on the "Add new database" button. Type the preferred name for your database and choose the "Device" as a Type option.

Add Target:-

Click on the "Add the new target" to the database. Select the Single Image type, pick the marker you've downloaded before, set the width to 1, name it the way you want it and click "Add". There are other types of targets, for example Cuboids, Cylinder or a 3D object. These can work as 3D markers (you can make them if you feel like it), but preparing them would take a lot more time, because you'd have to create and upload every side of that cuboids to Vuforia and. Click "Download Database" and import the package to Unity.

II.EXISTING SYSTEM:

The existing systems (games and apps) are Imagenie, man of war, some card AR fight games, etc.There are many Augmented Reality Apps and Games, which mostly use Marker Based Augmented Reality. Marker-based augmented reality (also called Image Recognition) uses a camera and some type of visual marker, such as a QR/2D code, to produce a result only when a reader senses the marker.

Marker based applications use a camera on the device to distinguish a *marker* from any other real world object. Distinct, but simple patterns (such as a QR code) are used as the markers, because they can be easily recognized and do not

require a lot of processing power to read. The position and orientation is also calculated, in which some type of content and/or information is then overlaid the marker.

IMAGINE:-

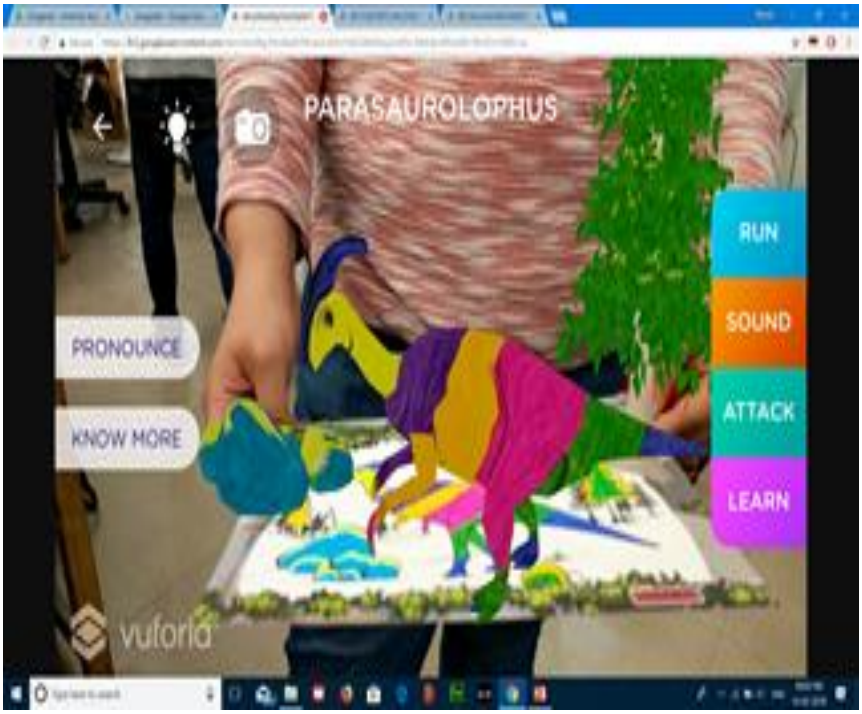
To **imagine** means to form new images and sensations that is not perceived through the five physical senses. **Imagine** may refer to Imagination.

Object:-

Win the most points by guessing and getting the other players to guess enigmas with the help of the transparent cards.

Set Up:-

1 Arrange all of the transparent cards in a large circle on the playing surface.
2 Put the tokens within easy reach.
3 Shuffle the Enigma cards and place them in a pile.



How to Play:-

- The most creative player goes first. (If you cannot decide, the youngest one starts). On your turn, you have to get the other players to guess an enigma.
- Draw an Enigma card. Another random player calls out a number between 1 and 8 which tells you which enigma on the card has to be guessed.
- If you do not know this enigma you can pick the next one down or above (for line 1 choose between 8 or 2 and for line 8, between 7 and 1.)
- Get the other players to guess your enigma using the transparent cards. Look around at the all of the transparent cards, and then take as many as you like to create your clue.
- You may use the cards however you want, according to these guidelines:

YOU MAY:

Use as many cards as you wish.

- Put the cards together, put them on top of each other, combine them, and MOVE them.
- Hide parts of the cards with your fingers.
- Make 3D models of the cards by lifting them up from the table.

YOU MAY NOT:

- Speak, make noises or sing.
- Mime with your hands.
- Make letters or digits with the cards

Next Turn:-

Return all of the used transparent cards back to the circle. Then it is the next player's turn (clockwise) to get the players to guess a new enigma.

Ending the Game:-

The game ends when each player has managed to get the other players to correctly guess 2 enigmas. The player who accumulates the highest number of points is the winner. If there is a tie, play one more deciding round!

II.DRAWBACKS OF EXISTING SYSTEM:

- There many systems which use it , but there is a problem with some AR games , that is the game or the app of AR needs some specific Image to be shown to camera so that the working of that game starts or execution or working begins.
- These Games works only when the predefined image is used, if any other image is shown in camera then it will not work. These images are predefined while developing itself. This concept is also said to be Single target image AR apps. However, there are multi target image Apps also exists.
- Another Problem is there some more AR based games but they look like a game not exactly a game, as they will not have interactive Buttons for the gameplay.
- They are just a simulation games without interactivity.

- There is another type in these AR games where the users has to draw an specific image on a paper and then scan it in their camera using the app, then working of that game or app will be started ,but mostly these games may have UI Buttons, But the problem is with drawing of the characters.

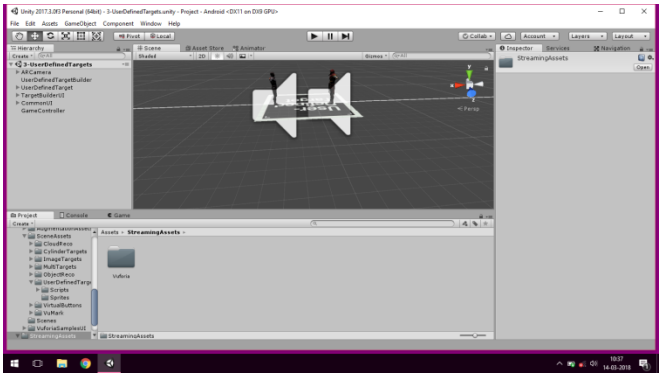
III.PROPSED SYSTEM:

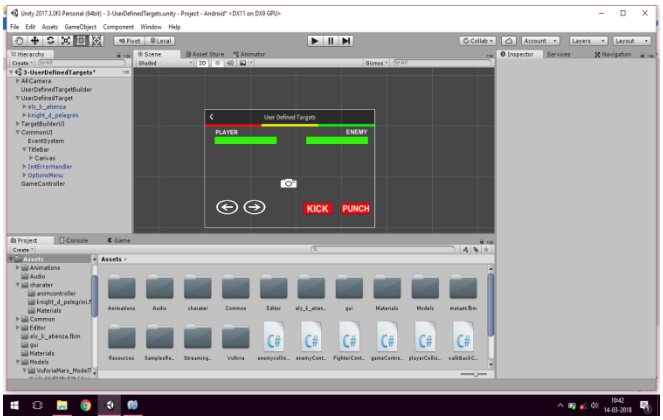
The proposed system is a simple AR Fighting style game, which will be developed using Unity with Vuforia extension in it. This game is just to overcome the disadvantages in one game by adding all the features like adding UI buttons, having multi image targets, & avoiding of any drawings, specific image, or single specific object.

The Game will have two characters fighting one another for three rounds. It will be started by scanning any image or object i.e., multi-image targets. It can also use plain surface objects.

These are the advantage in the proposed system by adding all features to make an easy use of an AR app in an efficient way.In this AR Game Development, a simple AR game that is based on fighting concept is to be developed. It will have two animated characters that is designed by Unity.

This game consists of User Interface Buttons to control the game objects. It will also have a feature that it does not require any special character to be drawn on paper or any specific designed image to be shown to the camera in order to start the game.This game will require an Android device with a fair clarity camera in it, so that it can be used to scan some surfaces or any objects like ground, floor, or any object to make the game play.





IV .MODULE DESCRIPTION:

The Modules used to create the proposed game are:

- Import Vuforia to unity
- Importing Assets
- Do animations using animator
- Create Scripts
- Build the Game for required platform

Import Vuforia to unity:

First of all download & install the unity 2017.3 software with its required extensions like Android Build, Window scripting frontend &Backend ,& Augmented Reality Extension(Vuforia tools).After doing it just start the game project by

setting up the AR camera into the unity and with the main camera of unity this imports all the AR packages into the unity . It also creates a resource file which consists of license of vuforia.

Importing Assets:

Assets created outside of Unity must be brought in to Unity by having the file either saved directly into the "Assets" folder of your project, or copied into that folder. ... Unity will automatically detect files as they are added to Assets folder, or if they are modified. An asset is representation of any item that can be used in your game or project. An asset may come from a file created outside of Unity, such as a 3D model, an audio file, an image, or any of the other types of file that Unity supports. These assets are just png image files for characters, some audio files in wav or other formats, 3D models which are pre-animated using adobe's mixamo or other tools.

Do animations using animator:

An Animator Controller asset is created within Unity and allows you to maintain a set of animations for a character or object. An Animator Controller Asset in the Project Folder. Animator Controller assets are created from the Assets menu, or from the Create menu in the Project window. It allows the 3D models to work on trigger events like On Click events, on hold events,etc.

Create Scripts:

Creating and Using Scripts. The behaviour of Game Objects is controlled by the Components that are attached to them. Unity allows you to create your own Components using scripts. These allow you to trigger game events, modify Component properties over time and respond to user input in any way you like. The scripting language used in unity is c# and java scripts. It uses c#, and unity script (java script), which is supported by the source code in c++, and c++ plugin support(source code, and plug-in require pro). The unity3d script reference is really easy to understand/use if needed, probably the easiest out of engines like cryengine, udk, etc.

Build the Game for required platform

It is the phase where after completion of the entire game developing, the game has to be build for a platform for which the game was developed as a main scope. There are various platforms like Android, IOS, MAC, Windows, etc. For this proposed game system it has to be built for android, so it will be built for the Android Version to play the game. After Building, the game is ready for Run and Publish in the Android Market that is the Google Play Store.

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