Immersion Horror Game Development through Augmented Reality by using Unity with Vuforia

Azka Hanif Imtiyaz - 13514086
Informatics & Computer Science
Sekolah Teknik Elektro dan Informatika
Institut Teknologi Bandung, Jl. Ganesha 10 Bandung 40132, Indonesia
13514086@std.stei.itb.ac.id

Abstract — **Horror is one of the most popular genres for video games, mainly because of its immersive design towards the game. With augmented reality, this immersive aspect of the horror video game will be further enhanced, thus improving the user experience in playing the game.**

Keywords — **augmented reality, horror, immersion, realism, Unity, Vuforia, video game**

I. INTRODUCTION

Players play video games because of the game itself is fun. But what is considered fun varies greatly between people, thus making the definition of fun subjective.

However, it is very different for horror genre in video games. Because horror, by its definition, is a genre of video games that tries to instill the feeling of fear to the player. While as mentioned before; fun is subjective, majority of people that play horror video games do not enjoy being neither scared nor terrorized; they do not play horror video games for their enjoyment or amusement.

Nowadays, many horror video games try to achieve their horror genre objective, that is, to instill the feeling of fear, by trying to make the game as immersive as possible to its players. A horror game that is immersive will surely be scarier to the player because the player is immersed into the game; as if the player himself is in the game.

One of the ways to achieve this immersion is through augmented reality. As surely a game that modifies the reality around the player, will give the feeling of realism, thus improving the immersive experience. In this paper, writer will try to discuss this immersion via augmented reality by implementing a horror game through Vuforia software development kit in the Unity game engine.

II. LITERATURE STUDY

A. Horror

According to Varma (1966), horror is the feeling of revulsion that usually occurs *after* something frightening is seen, heard, or otherwise experienced. It is the feeling one gets after coming to an awful realization or experiencing a deeply unpleasant occurrence. In other words, horror is more related to being shocked or scared (being horrified), while terror is more related to being anxious or fearful. While according to Carroll (1990), horror has also been defined as a combination of terror and revulsion.

B. Augmented Reality

According to Merriam-Webster online dictionary, Augmented reality is an enhanced version of reality created by the use of technology to overlay digital information on an image of something being viewed through a device (such as a smartphone camera).

In this paper, writer will discuss the augmented reality aspect of the game on smartphone camera, particularly smartphone with Android.

C. Vuforia

Vuforia is an Augmented Reality Software Development Kit (SDK) for mobile devices that enables the creation of Augmented Reality applications. According to Vuforia's website, Vuforia uses Computer Vision technology to recognize and track planar images (Image Targets) and simple 3D objects, such as boxes, in real-time. This image registration capability enables developers to position and orient virtual objects, such as 3D models and other media, in relation to real world images when these are viewed through the camera of a mobile device. The virtual object then tracks the position and orientation of the image in real-time so that the viewer's perspective on the object corresponds with their perspective on the Image Target, so that it appears that the virtual object is a part of the real world scene.

D. Unity

Unity is a cross-platform game engine developed by Unity Technologies. Unity is notable for its ability to target games to multiple platforms. Within a project, developers have control over delivery to mobile devices, web browsers, desktops, and consoles. According to Unity's website, Supported platforms include Android, Apple TV, BlackBerry 10, iOS, Linux, Nintendo 3DS line, macOS,

PlayStation 4, PlayStation Vita, Unity Web Player (including Facebook), Wii, Wii U, Nintendo Switch, Windows Phone 8, Windows, Xbox 360, and Xbox One.

III. METHODS

A. Game engine

For the game's game engine framework, Unity will be used as the primary framework. This framework is chosen because of its ease of access and easy deployment towards any platform, in this case, deploying towards Android.

B. Augmented Reality Tools

To develop the application, Vuforia plugin will be used. Vuforia is used for its computer vision library, mainly for its object tracking and object movement in real time in real world's space.

C. Augmented Reality Environment

Vuforia, by default, does not consider movement of the camera it is currently processing, thus, any object will be rendered at the same place regardless of camera's position and orientation. To consider the camera's orientation, vuforia will need input from sensors of the smartphone (gyro sensor and accelerometer), thus making the target of deployment to be devices with those two sensors, in this case, Android smartphone. Unfortunately, vuforia library does not enable the consideration of camera's position simply. The consideration of camera's position could be enabled by the usage of the smartphone's GPS. However, due to complexity, writer will not implement this feature, as the focus of this paper is to implement immersion of horror games, camera's position should be of less priority in development.

D. Horror Environment

Horror genre usually relies on horrifying image or situation to deliver the feeling of revulsion or fear. However, relying solely on horrifying image or situation will not be effective as there will need to be some kind of build up situation, which what will lead to those horrifying image or situation.

This can be achieved by giving hints to the player as to what the game is about and what is to be expected in the game. In fig. 1, writer tries to create a dark environment applied from user interface to the filter applied to the camera in the game which will hint the player that the game is dark, and the player should expect dark entities in the game.
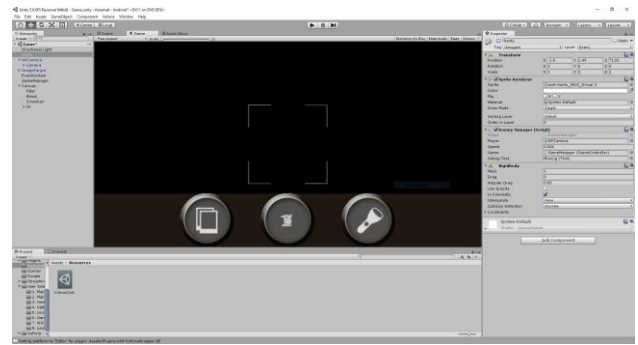

Figure 1. Dark themed UI and dark filter applied to the camera to create darker impression of the player's surrounding.

After the build up is set, horrifying entity in fig. 2 that is meant to scare the player is set up and will be in accordance with the build up environment developed before. This entity will appear randomly, to instill fear to the player when they least expect it.

Figure 2. Horrifying entity appearing in front of the camera.

E. Gamification

Player's objective in the game is to drive away all entities known as ghosts by triggering artifacts. In doing so, the ghosts will try to chase the player and will damage and initiate jumpscare to the player if the ghosts successfully chased the player. Player will have limited health so they cannot ignore the ghosts as is and proceed with the game.

Player could protect themselves from the ghost by taking a photo of them. If successful, the ghost will hide temporarily only to chase at another time.

To trigger the artifacts, player will need to scan a pre made mark through the camera so that the artifact appear, as in fig. 3.
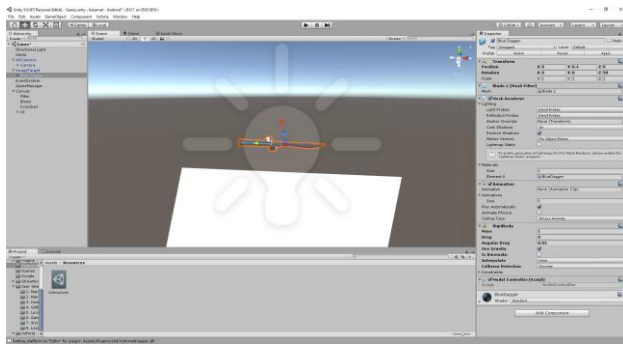
Figure 3. Artifact that will appear after scanned.

IV. RESULTS AND DISCUSSION

Fig. 4, 5, 6, and 7 are in game screenshots played through Android smartphone.

Figure 4. Screenshot of starting screen of the game.

Figure 5. Screenshot of menu screen of the game, which consists of menu for playing "PLAY", menu for tutorial and explanation "HOW TO PLAY", and menu for setting for the game "SETTING".
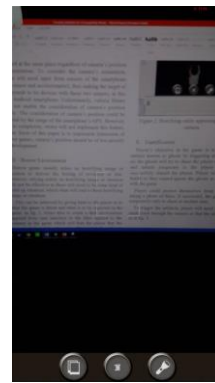

Figure 6. Gameplay screenshot with dark themed user interface and applied dark filter.

Figure 7. Ghost appeared in front of the player.

As mentioned before, by immersion, a game could be more effective in achieving its ultimate goal as a genre; to instill feeling of revulsion or fear. By utilizing augmented reality as the main focus of immersion, the game would feel more real as the game will be played on real world's space. Player would feel as if the game is happening around them and as if the ghosts are real by creating a dark themed user interface and applying a dark filter through the camera.

V. CONCLUSION

Immersion of a horror game through augmented reality is effective as the gameplay's space is also the real world's space thus deluding the player into a sense that the game environment is real and is happening real time.
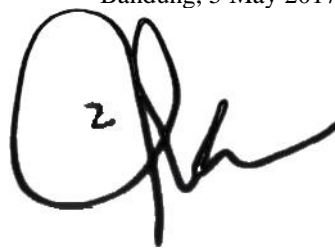
REFERENCES

[1] Varma. (1966).
[2] Carroll. (1990).
[3] Augmented Reality. (1992). In Merriam-Webster.com. Retrieved May 5, 2017, from https://www.merriam-webster.com/dictionary/augmented%20reality

[4]   Build Once, Deploy Anywhere. (n.d.). In unity3d.com. Retrieved May 5, 2017, from https://unity3d.com/unity/multiplatform/.

[5]   Vuforia is the leading AR platform. (n.d.). In vuforia.com. Retrieved May 5, 2017, from https://vuforia.com/.

[6]   John Riccitiello sets out to identify the engine of growth for Unity Technologies (interview). (October 23, 2014). In venturebeat.com. Retrieved May 5, 2017, from https://venturebeat.com/2014/10/23/john-riccitiello-sets-out-to-identify-the-engine-of-growth-for-unity-technologies-interview/.

[7]   Why People Play Video Games. (December 3, 2012). In teachthought.com. Retrieved May 5, 2017, from http://www.teachthought.com/uncategorized/why-people-play-video-games/.

[8]   Top 10 Greatest Video-Game Genres. (n.d.). In toptens.com. Retrieved May 5, 2017, from https://www.thetoptens.com/video-game-genres/.

DECLARATION

I hereby declare that this paper is my own work, not a copy or translation of others' works, and not an act of plagiarism.

Bandung, 5 May 2017

Azka Hanif Imtiyaz
13514086