A Survey on Game Development in Virtual Reality

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Abstract:- Virtual reality is a technology for simulation of a real or virtual world in which one can immerse, touch, sense the objects with the virtual presence in that 3-D world. Most of the games are played on the keyboard, mouse, gamepad, joystick. They don't give that great level of interaction with gaming environment whereas, if we take a look on the virtual reality gaming controls which oculus, htc provides are bizarre. The Head-mounted display(HMD) is used to have the 360-degree view in thegaming world which works like a charm when a user wants an immense experience. Mostly, the first-person shooter games are developed by game developers, and secondly the real- life stimulations like fire fighter training, shopping mall counter workers, factory worker stimulations, etc. Aritificial intelligence is nowadays use to make the games more interactive and make some self- learning model so that opponent can use the new move most of the time and keep the game engaging

Keywords:- Virtual Reality, Gaming, Behavioural Cloning, Artificial Intelligence.

I. INTRODUCTION

Introduction Let's just start with a brief history of VR that how VR is founded. The virtual reality was first introducedin 1994, what is intended for the development of the virtual worlds without dependency on the headset later the companycalled the consortium web 3-D was founded in 1997 for the development of the industry standards for the web-based 3D graphics. The consortium subsequently developed X3D from the virtual reality framework as an archival, open- source standard for web-based distribution of VR content webVR is an experimental JavaScript application programming interface API that provides support for the various companies such as HTC vibe, oculus etc. Now the biggest question arises what is the VR why are we using VR. In short, if we say what we do actually we tried to mimic reality through a gadget. Distinguish between two types of VR immersive VR and text- based network VR(alsoknown as cyberspace VR) Actually, Immersive VR changes your view (like when you move your head in the real world actually there is the head movement for the same in the virtual world) whereas cyberspace is for distance learning actually they both are complementary to each other and we just put mainly focus on the immersive VR in this paper.

For the hardware implementation, we actually use the technology known as gyroscope and the Some motion sensors to track the movement of the hand and other things in the virtual world. These components give the flexibility in the development process for the developers which lead to 2012 oculus rift kickstart that is offering the first independently developed V.R headset.

As VR is looking quite good there are several problems with the VR. Now let's talk about these issues. There are many health and safety consideration of virtual reality. Several unwanted problems have been caused due to the prolonged use of virtual reality sometimes it is seen that people are getting difficulty in differentiation between the real world and the virtual world.

It might be hard to see it now but VR will play a major role in our lives in future. I estimate about 10 to 15 years until everyone will grasp the technology virtual reality has the potential to disrupt almost every single industry on the planet.

II. VIRTUAL REALITY GAMING

Gaming Industry is now focusing on the virtual world because it provides a new level and gives the experience which would never be possible before.

Currently, the highest of VR gaming within the current market are companies like Oculus, who make products and content for VR. The Oculus Rift for instance has room tracking, so you'll move around within the physical world which are going to bea mirror into the virtual world. Your head and your hands are tracked, and you can interact, to some extent, with the virtual environment.

As much as this might be an enormous leap from PS3 gaming in 2012, VR gaming still features a great distance to travel and it's really exciting. So from this, the natural evolution is first for wireless VR with room tracking. Which has already been announced by Oculus with their project Santa Cruz. Even though other companies have attempted to do the same with attachments or standalone HMDs, this will make it start to enter more mainstream VR.

After this we'll presumably see full-body tracking enter in how into VR gaming, using as setup almost like Microsoft Kinect, or a replacement way. I don't believe that wearing a full tracking suit is that the way forward for VR gaming, it's a short-lived fix that folks understand. We will also see the birth of VR rooms in houses, which can either replace a guest room or just be a further room. It'll be an empty room, tracking is going to be done through the walls, ceiling, floor. A wireless headset will lie there within the centre, and from it, you'll be ready to meditate, take a vacation, kills zombies or just virtually attend work. Over the years serious work is going to be done so that we will

"feel" textures in VR, hold objects without there being a requirement for one within the physical world. This could be done through molecular vibrations within the air to simulate hard surfaces. Or other ways that we will find. But this may be a really important step in VR. Though before this the headsets will become smaller and smaller until they disappear entirely. wearing anything on our heads, including a bulky headset, isn't the longer term of VR. We will want to feel as we neutralize reality, not holding controllers or wearing HMDs.

The future of VR gaming is big, and therefore the details which will form first are the sector of vision, the body tracking, and therefore the tactility of the virtual environment. Once we've mastered these and replicated reality, we will start to figure on what's beyond reality.

III. ARTIFICIAL INTELLIGENCE IN GAMING

We human are born with the intelligence which helps us to stimulate in the real world. Similarly, the synthetic humans or we can say non player character in the games stimulates in the digital environment using set of the predefined rules or uses the reinforcement learning algorithms. Gaming environment provides the best platform for the RL agent to learning using the surrounding objects and apply different strategies to defeat the opponent. Mostly, the q-learning is use for the RL agents but nowadays most the RL agent are programmed using the deep Q- learning for the better tactics.
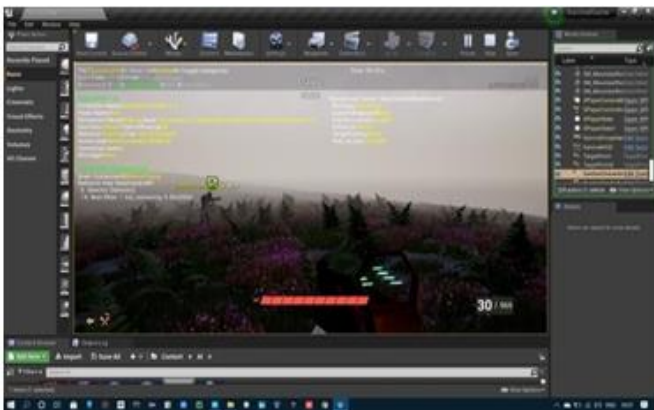

Figure 1: Self-Learning bots

When we develop the game using Unreal engine4, we are open to program the bot with the behavioural tree or the using the C++ directly. Other ways to program the bot is computer vision, reinforcement learning etc. but the nowadays developers are interested in behavioural cloning. The aim of behavioural cloning is to achieve playing pattern for the real payer while the game-play. By this technique images of real player are obtained using computer vision which later used by the bot to mimic the player's vision, and then make the strategical moves to compete the real player. Based on the images from the computer vision program, the neural network is trained using deep learning. Using this trained deep neural network bot tried to predict the next move of the real player.

IV. CONCLUSION

From Our survey we have concluded that VR is one of the finest discovery of our mankind. With the help of AI we can make it even better and can pull out its complete potential

V. ACKNOWLEDGEMENT

REFERENCES

[1]. Jelena Kocic´; Nenad Jovicˇic´; Vujo Drndarevic´, "Driver behavioral cloning using deep learning,"2018 17th International Symposium INFOTEH-JAHORINA (INFOTEH),21-23 March 2018

[2]. William J. Shelstad, Dustin C. Smith, Barbara S. Chaparro,Gaming on the Rift: How Virtual Reality Affects Game User Satisfac- tion,Proceedings of the Human Factors and Ergonomics Society Annual Meeting,

[3]. Jonas Schild; Leonard Flock; Patrick Martens; Benjamin Roth; Niklas Schu¨nemann; Eduard Heller; Sebastian Misztal,'2019 IEEE Conference on Virtual Reality and 3D User Interfaces (VR)', 23-27 March 2019

[4]. Farzam Kharvari; Wolfgang Ho¨hl "The Role of Serious Gaming using Virtual Reality Applications for 3D Architectural Visualization," 2019 11th International Conference on Virtual Worlds and Games for Serious Applications (VS-Games),4-6 Sept. 2019

[5]. Joa˜o Pedro Assunc¸a˜o Campos; Rafael Rieder, "Procedural Content Generation using Artificial Intelligence for Unique Virtual Reality Game Experiences," 2019 21st Symposium on Virtual and Augmented Reality (SVR),2019 21st Symposium on Virtual and Augmented Reality (SVR