

VAREAL

Virtual Reality Gaming Unit – A Review on Current Advancement & Future Scope

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Abstract: Virtual reality means a three dimensional computer generated which can be interacted with and also explored at the same time by any person. That one person becomes part of the virtual world he is subjected to and immersed into the virtual world thus being able to manipulate the environment and also perform a number of actions. A very less number of individuals knew about this technology but over the period of years the number has gradually increased also because of simultaneously growing media coverage. In this paper along with virtual reality and its historical review, its current possible applications and the problems faced with their solutions are presented. During the entire process, a detailed study of a typical VR system was done. All components of VR applications and their inter-relations were thoroughly examined. At the very end, the future technological and social aspects of VR and also its positive and negative influence on life of people are discussed. VAREAL is a VR controller that will change the way we look at everyday media. It's a four unit device that does immerse any individual into the virtual world. With these devices VAREAL will sense all the movements of the subjected individual and will display them as virtually simulated movements resulting in a virtual experience.

Keywords - Virtual Reality, Media, VR Systems, Devices

I. INTRODUCTION

Understanding Virtual Reality arrives at a time when the technologies behind virtual reality have advanced to the point that it is possible to develop and deploy meaningful, productive virtual reality applications. The aim of this thorough, accessible exploration is to help us take advantage of this moment, equipping us with the understanding needed to identify and prepare for ways VR can be used in our project. During the past two decades, the virtual reality community has based its development on a synthesis of earlier work in interactive 3D graphics, user interfaces, and visual simulation. Hence for exploring more within the same, we intend to create this project which would enable people from all over world to experience the VR Environment. The main idea behind taking up this project is to create a cost-effective Virtual Reality device which could be interfaced with any system to make it possible for people across the different strata of the society to experience the VR environment. We came across this idea after analyzing different VR devices in the market and found that none of them can be interfaced with multiple systems. Other than that, no device present in the market caters to a complete immersive experience where the user can actually feel the VR environment. Our aim is to create a medium to simulate physical movements of the user into virtual environment. This will allow the user to interact with the virtual environment in a way which was never possible before. This can be further used for various purposes such as medical usage for architectural purposes, for project simulations, etc. VAREAL enables user to simulate their movements into virtually simulated movements which enables the user to have a completely immersive virtual reality experience. This device will be economical and wouldn't be restricted to specific consoles such as the pre-existing products available. Our product can be used with PC and Android phones as well.

II. LITERATURE REVIEW

Parth Desai and his team made in his review paper on Oculus Rift-A Virtual Reality Headset [1] discusses about one of the most important widely used device of the current generation operates to give a user a seamless 3D Experience. The Oculus Rift head tracker constantly analyzes the player's head movement and uses it to control the view, position tracking which allows the user to see their physical actions translated into the virtual world. Thus it describes the entire built of the device and how the Rift provides a truly immersive experience that allows one to step inside his favorite game.

Stefano Scheggi and his team in their paper Touch the virtual reality: using the Leap Motion controller for hand tracking and wearable tactile devices for immersive haptic rendering [2] present their very own novel haptic system for immersive virtual reality interaction. This device consisted of Leap Motion controller, a small USB peripheral device that uses two monochromatic IR cameras and three infrared LEDs to track the position of the fingertips in 3D space, and five wearable tactile devices that together gave opportunity to the user to be able to literally touch the virtual reality. They validated their system in a virtual reality scenario where every time the hand came in contact with a virtual object, the tactile devices applied a suitable amount of force to the users' fingertips, providing them with sensation of touching the virtual environment.

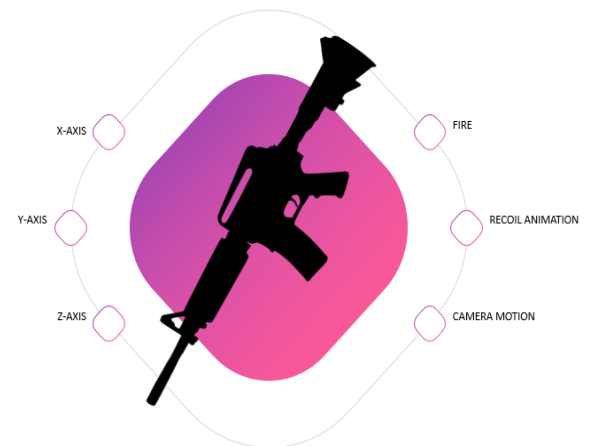
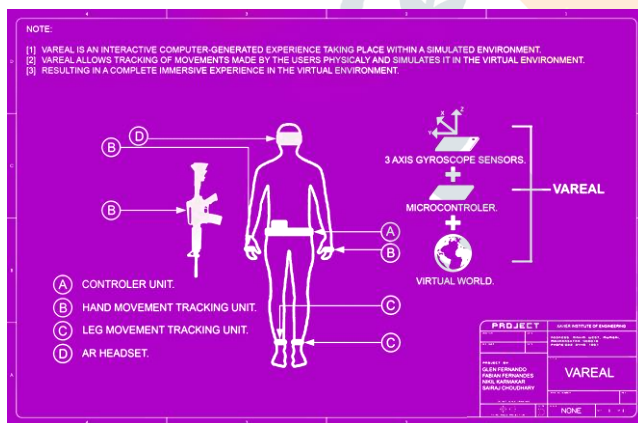
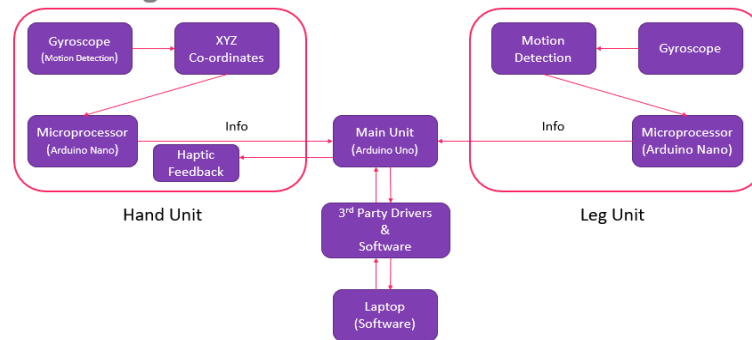
Galen Faidley and his team of researchers from Virtual Reality Applications Center Iowa State University in their research paper of Developing an Integrated Wireless System for Fully Immersive Virtual Reality Environments [3] display how they created a new integrated wireless communications system, for interaction devices in VR environments. They identified that with the advent of fully immersive six-sided Virtual Reality (VR) theaters, users needed to be untethered from cables as it serves as anchors to reality in a virtual environment and make it difficult for the users to completely suspend disbelief. So they replaced the wired devices with wireless components of equal functionality which introduced challenges of adding new types of sensing

devices and signal interferences between wireless devices. Their system consist of Motion Star, Motion Star ERT, Palm Top/Tablet PC, RF Wand, Microphone and Stutter Glass for the purposes of Positioning, 2D Interaction, 3D interaction, Speech Recognition and Stereo Graphics Viewing. The sample application uses four types of sensors: two-axis accelerometers, light intensity sensors, a pressure sensor, and a bend sensor which was tested by means of virtual teapots.

III. IMPLEMENTATION

The VAREAL controller is segregated into three main blocks – Hand Unit, Leg Unit and Main Unit. The Hand Unit consists of a gyroscope, motion detectors and sensors which helps in calculation of the X, Y and Z co-ordinates of its motion. These co-ordinates will be captured and processed by the Arduino Nano which we have used for the Hand Unit. Also, the Hand Unit has a Haptic Feedback mechanism that helps in detection of even smallest of trigger vibration made by the subjected person. The Leg Unit also consists of a gyroscope, motion detectors and sensors to calculate the X, Y and Z co-ordinates of its motion and also helps identify directions. Just like the Hand Unit we have also fixed an Arduino Nano in the Leg Unit. The Main Unit collects all the information from the micro-processors of the Hand Unit and the Leg Units. The Main Unit also consists of Arduino Uno which acts as a central processor. It compiles strings of code from the data received from the Hand Unit and the Leg Unit. This data is further processed by the 3rd Party Drivers and Softwares which creates the exact same action within the VR Environment in the interfaced Laptop or Gaming Unit.

Block Diagram



IV. APPLICATIONS

1. Creating incredible training programs for employee’s at corporates.
2. In areas of healthcare which range from diagnosis, treatment, e.g., surgery, rehab and counselling.
3. Virtual Reality can allow individuals to attend concerts without actually being there.
4. Roller coasters and theme parks have incorporated virtual reality to match visual with Haptic Feedback.
5. For treating anxiety disorders such as PTSD and phobias through exposure therapy.
6. To train astronauts while they are still on earth which includes training in zero-gravity environment and how to space-walk.

V. REFERENCES

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