Virtual Reality Gaming

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Abstract

The proposed project is about user interface in a virtual reality game environment. This game is based on the very ordinary game environment which comprises of 3D objects and animations. As the game environment is showcasing Virtual Reality(VR) which can be referred to as immersive multimedia or computer simulated life, replicates an environment that simulates physical presence in places in the real world or imagined worlds and lets the user interact in that world. Virtual reality artificially creates sensory experiences, which can include sight, hearing, touch, smell, and taste. Virtual reality gaming is where a person can experiences being in three dimensional environment and interact with that environment during a game. Based on Virtual Reality (VR) technology, we provide a more interesting and convenient way for people to play virtual reality game on Google Cardboard and other platforms.

In this work, we propose a Virtual Reality in Gaming for on Android platform through VR goggles (Wearable Device). The game is rendered when player aims using his/her eye sight at the specific marker. The players can view the virtual scenario through the lenses of Google Cardboard. Player moves the device to control the game. The experiment results show that the proposed game system can work effectively and provide winner result to the player.

The players may need to use their phones as well as wearable device to view the virtual world. Player only has to put android device in Cardboard and play the game

Keywords: virtual reality, games, interaction, google daydream

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Introduction

Virtual reality is a computer simulation environment that gives the user the experience of being present in the environment. It is a 3-Dimensional computer generated environment. VR not only provides immersions of vision but also of sound and tactile feedback.

Basically, VR is a theory based on the human desire to escape the real world boundaries and this is done by embracing the cyber world. It is a new form of human machine interaction that is beyond keyboard, mouse or even touch screen for the matter It is a means by which one can interact with full visual immersion. Immersion is based on two main components: depth of information and breadth of information. Depth of information includes resolution, quality and effectiveness of audio visuals etc. Breadth of information is the number of sensory present at a time.

Virtual reality

A virtual reality headset is a head-mounted device that provides virtual reality for the wearer. Widely used with computer games but they are also used in other applications, including simulators and trainers. They comprise a stereoscopic head-mounted display, stereo sound and head motion tracking sensors.

Levels of immersion in vr systems:
In a virtual environment system a computer generates sensory impressions that are delivered to the human senses. The type and the quality of these impressions determine the level of immersion and the feeling of presence in VR. There are three level of immersion for virtual reality system.

Non-Immersive (Desktop VR) systems
Desktop Virtual Reality is a lower level of immersive VR that can be easily employed in many applications without the need for special devices. Sometimes called Window on World systems. This is the simplest type of virtual reality applications. Desktop Virtual Reality has begun to make its way and popularity in modern education because of its ability to provide real time visualization and interaction within a virtual world that closely resembles a real world.

Semi-Immersive (Fish Tank VR) systems
Improvedversion of Desktop VR. These systems support head tracking and therefore improve the feeling of "of being there" thanks to the motion parallax effect. They still use a conventional monitor but generally do not support sensory output.

Immersive systems – the ultimate version of VR systems.They let the user totally immerse in computer generated world with the help of HMD that supports a stereoscopic view of the scene

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accordingly to the user's position and orientation. These systems may be enhanced by audio, haptic and sensory inter-faces.

Virtual reality based on UnityPlatform

A powerful cross-platform 3D engine and a user friendly development environment Easy enough for the beginner and powerful enough for the expert. To build games and applications for mobile, desktop, the web, VR/AR and consoles**.**

Unity is a feature richmulti-platform game engine for the creation of interactive 3D content. It includes an intuitive interface while at the same time allowing low-level access for developers. Thousands of assets provided by other content creators can be reused to quickly develop Immersive experiences. Because of its intuitive interface, well designed architecture, and ability to easily reuse assets, 3D software can be developed in a fraction of time compared to traditional development. Attendees will gain an understanding of how to use multiple VR components with Unity and will have enough knowledge to start building VR applications using Unity.

Unity3D is one of the most famous virtual reality tools, it is cross-platform game development software, and now besides Mac OSX, Unity3D can fully support Windows/Vista/7, Unity3D supports three scripting languages: JavaScript, C#, and a dialect of Python called Boo. Scripting is frequently thought of as limited and slow, but in Unity3D scripts are compiled to native code and run nearly as fast as C++. It is easy to get the fast iteration times and ease of use for someone who likes scripting

Languages. These three languages in game development projects can also be mixed-use. The Unity3D game engine and the Unity3D development environment are tight integrated, so it provides a very powerful visual editor and language levels of the network.

Existing work

Real world and computer games have their own distinct strengths. By allowing us to combine these strengths, we can achieve great gaming experience for the user by immersing the player into the game environment. We consider a player's gaming experience as consisting of four parts; physical, social, mental and emotional. Research into VR gaming serves another purpose beyond the improvement of gaming styles and the development of new ones, as gaming environments are well suited for exploratory research. We examine the strengths of real world and computer games, the role of VR in combining and extending them, and the value of gaming research area. We can use VR to improve existing game styles and produce new ones. We strongly believe that Virtual Reality can enhance the player's gaming experience by providing exciting new ways to control their actions, through motions and 3D movement.
There are different virtual reality device which is used for VR gaming,

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Google Cardboard

Google Cardboard is a VR platform developed by Google for use with a head mount for a smartphone. Named for its fold-out cardboard viewer, the platform is intended as a low-cost system to encourage interest and development in VR applications. Users can either build their own viewer from simple, low-cost components using specifications published by Google, or purchase a pre-manufactured one. To use the platform, users run Cardboard-compatible applications on their phone, place the phone into the back of the viewer, and view content through the lenses.Google cardboard was only one control panel which over whole game with one button.

Google Day Dream

Daydream is essentially a platform that sets the standards for VR hardware, which it is expected that other manufacturers will follow and build on. The idea is to make the VR experience of viewing 360-degree content more immersive, with support for more Android phones.

The Daydream hardware includes a headset called Daydream View, a motion controller for navigating the apps and support for a wide range of Android phones. To run this hardware, you will need to download the Daydream app (free) from the Google Play Store to set up the hardware, get access to apps and more. Google day dream support different control panel such as keyboard, joystick, etc. user can feel VR environment and also can control player motion with sensor which is provided by google day dream.

Oculus Rift

The Oculus Rift is a light weight headset that allows a user to step into the game and look in any direction.The oculus rift kits come with three sets of lenses-A, B and C. lens pair A is to be used by people who have excellent long sighted eyesight as the rift is focused at infinity. The pairs B and C are to be used by people having problems with near sightedness, though cannot be used by all, especially people with major vision complications.

Also precise care should be taken while changing the lenses. A tiny dust particle if gets settled on the lens creates a dead pixel view in the VR. To worsen it further one can expect dust particles in both the lenses at different locations. Furthermore glasses can also be worn along with the oculus rift goggles, provided that the glasses are not huge.

It was different feature such as head tracking, position tracking, control box, interfacing, etc.
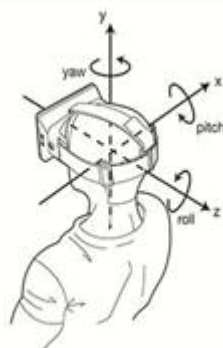
Figure: VR HEADSET   Figure 2: DAY DREAM

Problem definition

The game is to find hints which lead to few items. Theplayer's task is to move around the place and observe for hints to solve the mystery.Player has to walk around the house to find the places where the hints are hidden.Each hint takes to a mini puzzle, on solving it player gets a mystery item.On finding all the items the player finds out the big mystery.

The game is rendered when player aims using his/her eye sight at the specific marker. The players can view the virtual scenario through the lenses of Google Cardboard. Player moves the device to control the game. The experiment results show that the proposed game system can work effectively and provide winner result to the player. The players may need to use their phones as well as wearable device to view the virtual world. Player only has to put android device in Cardboard and play the game.

Proposed system

In our project we proposed a game which can be played by level based game

In level based game, game will be divided into some numbers of levels. Player must clear or complete the level and unlock another level with get more power and more hints to unlock the mystery.

Player's task is to move around the place and identify the hints to solve the mystery. Where each hint will be contain mini puzzle, on completing the puzzle player will one mystery item to unlock big mystery. Player must complete each mini puzzle and can unlock the next mini puzzle to get mystery item to know the something about what he wants to know

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One of our mini puzzle is maze, player will placed in some unknown place and find way to get out it. In this maze game, it contain three levels. After completing three levels player will get one hint to lead what he need to know about the mystery.
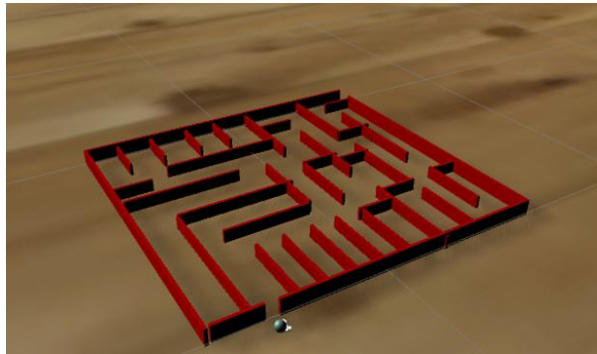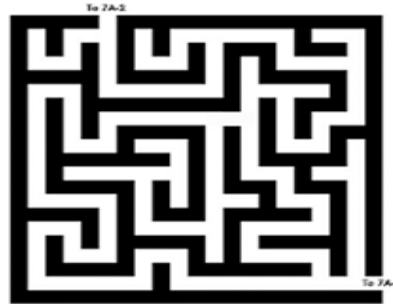

Figure 3:   Maze Diagram

Figure 4: Level 2

Another mini puzzle is zombie shooting. Player wanted to kill zombies to clear the puzzle and get hint to know the mystery. Player will get more powerful weapons to kill zombies. The game will get harder once player kill high number of zombies will lead to endless based game.

The more zombies get killed more powerful weapons will be unlock to complete the game and get the hint to solve the mystery.

Another mini puzzle is pin point game. Player wanted to clear bricks with one ball and one layer to stop and bounce back and hit the bricks. Pin point game contain three levels. Player was to clear all three level to unlock the hint to get mystery.
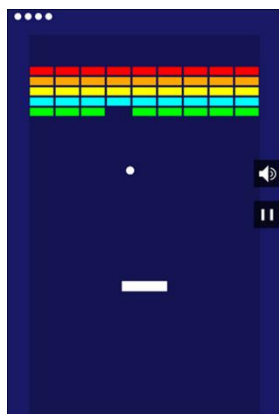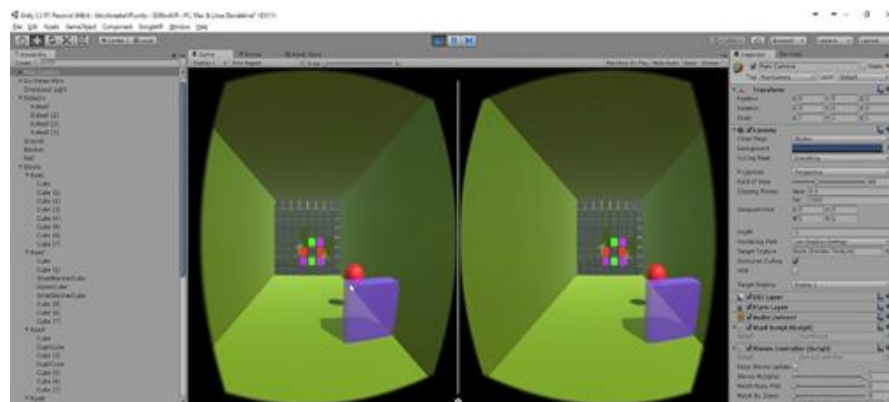

Figure 5: Pin Point Game

Figure 6: Unity Development

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So, player has to clear all the mini puzzles to get hints to solve the mystery.
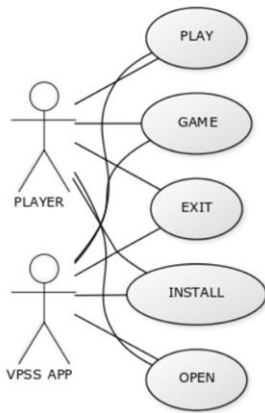
Algorithm Design

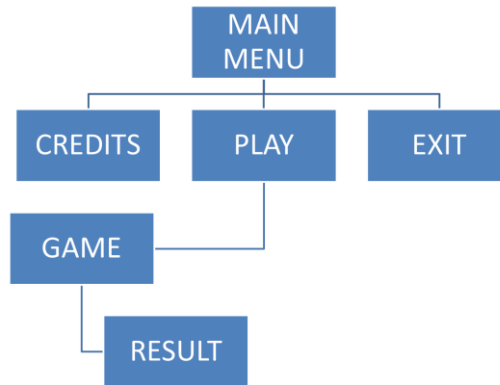Figure 7: VPSS Use Case Diagram   Figure 8: Game Model

Methodology

Usually in the development of gaming, there are different text cases

- Functionality testing

Functionality testers look for general problems within the game itself or its user interface, such as stability issues, game mechanic issues, and game asset integrity.

- Compatibility Testing

This is used to find whether a game is functioning properly or not with respect to the hardware, graphics and software configuration that the device is built with.

- Play Testing

Play testing is the method of game testing by playing the game to analyze non-functional features like fun factors, difficulty levels, balance, etc.

- Load Testing

To determine the performance of a system under real-time loads. Load testing shows the reaction of an app when multiple users use the app simultaneously.

Conclusions

In this project, we have presented a 3D game system based on Virtual RealityTechnology. In this game, we combine the advantages of both wearable device supported game and traditional

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smartphone o games. The game is to find hints which lead to few items.Player has to walk around the house to find the places where the hints are hidden. Each hint takes to a mini puzzle, on solving it player gets a mystery item.Users can experience the immersive gaming and maintain the realism of the gameenvironment.We implement the game system through an application on Android platform. To illustrate the effectiveness of the system, we adopt Unity Framework. The experimental resultsat our developed system can work effectively on android devices with wearable Device (Google Cardboard). Friendly user interface is very important for anapplication. Most of people decide whether to use an application only by its user Interface. Thus, the3D virtual Environment looked more real. Moreover, although the game system can show fantastic virtual game scenario, the improvement of accuracyand sensitivity of the system is still needed.

Acknowledgement

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