Project title: Development of 3D Games Over 3D Virtual Reality System
Project code: MWH1-12

Name: Ho Ching Ki, Li Ho Yeung, Lau Kim Kwan

Supervisor: Professor Mow, Wai Ho
Co-supervisors: Professor Woo, Tim K.T.
Professor Chung, Albert C.S. (CSE)

Introduction

Nowadays, a large amount of new and surrounding technologies are assimilated into human’s daily lives. These amazing technologies are coordinated to improve quality of life by providing new functions and benefits.

Due to the development of 3D Virtual Reality Systems, a better interaction between the real actions of users and virtual movements in devices is simulated. Users can interact with the system by controlling remote sensors with the support of the current developed platforms. There are three types of Virtual Reality Systems: Desktop Virtual Reality, Video Mapping Virtual Reality and Immersive Virtual Reality. The system can enable a lifelike experience for users by providing a real world vision in 3D.

Our project is developing a 3D game which uses Kinect as the sensor system. The project is divided into two parts:
1. Tracking System
   a. Tracking the position of the player by Kinect
   b. Calculating the interaction distance between the player and device
2. Game engine
   a. Touching the ball’s gate

Objectives

The aim of this project is to develop a 3D demo game with a better performance of 3D Virtual Reality System.

There are two objectives:
1. Improving the responding time and accuracy of the existing system by using Kinect instead of the previous system sensor system.
2. Developing a 3D game that is imported to 3D Virtual Reality System which will use Kinect as the sensor system.

Methodology

Hardware

Kinect Tracking the position of the player

3D Projector Projecting the 3D image

Software

OGRE Producing 3D graphics with C++ language

Maya Drawing 3D project

Working Principle

Setup

Maya

Result

We found that the receivable frequency is quite high for the Kinect, as the OGRE response time. The response time is less than 0.1 seconds in average, so we are satisfied with the resolving response time. However, there may exist some point that will result delay during our movement, for example, moving to the left corner side will lead to a pause of around 1 second.

In a whole, we successfully made the interaction between the player and the ball become more effective. Also, the counter helped us to check the ball was touched or not.

Our project was to develop a low-cost, user-friendly 3D Virtual Reality System and improve the performance of the previous system such as decreasing the responding time between the viewer and the 3D scene, increasing the accuracy of detecting the position of the viewer by using the camera to capture the position of the viewer. The computer would generate the 3D image responded to the viewer. The size of the 3D object was created corresponding to the position of the viewer. If the viewer is far away from the Kinect sensor, the 3D object would be created in a smaller size. It made the viewer to have the virtual reality experience. Also, we used both hands as controllers to control the 3D scene.