Project Documentation

Project Name : Kinect Dodge Ball

Team Name   : The Team Dexter

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Basic Aim:

Our application is essentially a virtual dodgeball game. The object of the game is to avoid the balls which will be "thrown" at the player by another player using an android application. The player will stand in front of the Microsoft Kinect and be able to see a human avatar following his motion on a computer screen or on a projector screen. The balls generated will have the direction and initial coordinates provided by the android app Ideally, the game will be so simple to setup that the user will not need any training to play.

Motivation:

We started with the idea of key glove but the project was not approved because the project was not feasible.

We got this idea after watching videos of people playing games using Kinect. This application will provide users with a fun game they will be able to pick up and immediately begin to play with very little, if any, instruction. This game also promotes exercise by forcing the player to actually move in order to play.

Theory:

The Kinect is a very useful tool for working with augmented reality as it provides high quality information about the world around it.

The Kinect is sold as the device that makes "you" the controller. It does this by introducing a new kind of camera that could view a scene and measure the "depth" of objects in front of the Kinect sensor bar. This allows the software in the controlling device to build an image of the scene in front of the sensor. This can detect the position and orientation of players in front of the sensor and build a virtual "skeleton" that describes where they are and how they are standing.

Kinect Skeleton Tracking

A program can use the depth information from the sensor to detect and track the shape of the human body. The Kinect SDK will do this for our programs and provide skeletal position information that can be used in games and other program. The skeletal tracking in the Kinect SDK can track six skeletons at the same time. For four of the bodies only simple location is provided but two will be tracked in detail. For those two bodies the SDK will provide the position in 3D space of 20 joint positions. The software will infer the position of joints if it is not able to view their position exactly, for example of the user is wearing clothing such as a skirt that obscures their limbs.
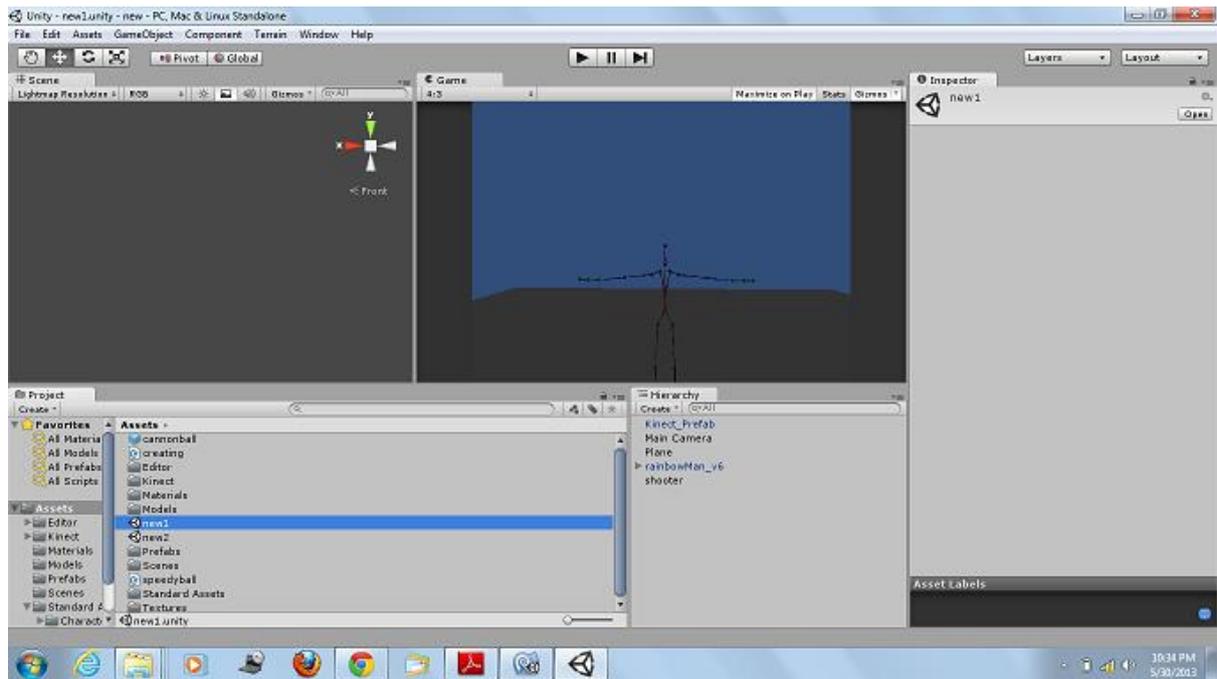
Unity 3D

Unity 3D is a gaming engine which can be used along with kinect by including the Kinect Wrapper package. The Kinect Wrapper package has pre-defined scripts for skeleton tracking and depth tracking.We import the Kinect Wrapper Package to start using kinect in Unity 3D.The Unity 3D asset store also provides with several humanoid models for a pre-defined script which is used to control the character in unity.

Overview

Firstly ,we need to control the motion of the character. Although the pre defined script follows the motion in real world but the character was not moving in space .It was fixed at a point .We need the avatar to move in space or else we will not be able to dodge the ball.

For Android app development and networking we are using eclipse.

Our Approach

Moving the avatar by using the position of hip center of the body. We found out the position of the hip center joint of the body then in the update function we changed the position of the avatar as per the change in position of the joint.

Generating a ball by using the android app. We have to get the coordinates from the application. The Android application sends the coordinates in the form of a string in a text file. The float numbers in the string are converted into their corresponding float values and are further used to instantiate the balls in the game.

The android application sends the initial and final points of the touch. We find the unit vector of the flick in unity and give the velocity to the ball in the same script.

We have a character we can control by our motion in the real world and we can also create the ball from the android app .We used a few gestures to start and quit the game in the main menu scene.

The simple mesh collider of the unity doesn't work for the avatar. We added simple sphere collider to the head and capsule collider to other body parts according to their sizes.

Final Game:

1. When the exe file is opened the main menu appears

2. Raising the right hand starts the game and raising the left hand quits the application

3. A timer starts with the game as we have made it a one minute game.

4. The number of balls dodged by the person is displayed as score.

5.As the timer reaches zero the game ends.

Further Development

1. Show the player in the mobile as well.

2. Include better graphics and gestures to make the game interesting.

3.Connect more than one android devices to the game.

Useful Links

To download unity 3D http://unity3d.com/unity/download/

For unity 3D tutorials http://www.youtube.com/playlist?list=PL7rVTwUzzPyKpthE-8A_ObeNGb3OflUUh

 For C# http://www.robmiles.com/c-yellow-book/

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