

Real - Time 3D Game Using Various Technologies: A Review

S. Khapekar¹, P. Thakre², N. Fulzele³, P. Gadlinge⁴, A. Pinjarkar⁵

¹²³⁴⁵Student, Computer Science and Engineering department, DBACER, Nagpur, Maharashtra, India

Abstract

This paper is about designing a Game by using a various Technologies., To achieve this goal, we have used combination of technologies and developed a 3D Game which will enhance game capabilities in Gaming World by providing good look and feel. The paper deals with development of simple firing game wherein, the user needs to shoot the enemy seen on projector screen. The various technologies involved viz. Sixth Sense, Haptic Technology and Artificial Intelligence makes a plus point in interaction between game and user. Developing such Game in a custom built environment and user with Jacket, Gun with proper touch less interface increases rigidness of game.

Keywords: Real time ,3D Unity game, Artificial Intelligence, Haptic Technology, Sixth Sense

1. INTRODUCTION

A video game is an electronic device which generates a visual feedback on the video devices involving the human interaction with user interface. Platforms are the electronic systems made to play video games; examples of these are personal computers and video game consoles. Game controller is the input device primarily used is to control video games which consist of only a button or a joystick, while another may feature a number of buttons and one or more joysticks. Many modern computer games require the player to use a keyboard, mouse, gamepads simultaneously., As gaming trends have undergone shifts in keeping with consumer demand, video games have evolved through many stage of changes from their inception. Video games typically use additional means of providing interactivity and information to the player. With audio being the most universal feedback, other feedback may come by using haptic peripheral, such as vibration and force feedback. A Sixth Sense Technology frees information from its confines by seamlessly integrating it with reality and thus making the entire world computer. The sixth sense prototype includes pocket projector, a mirror, mobile components, colour markers and camera. The sixth sense technology helps us in interacting to the digital world in most efficient and direct way.

Thus in this paper game development using combination of above technologies is discussed.

2. SYSTEM MODEL

We have proposed to develop a game which makes combination of Technologies, enhancing the game capabilities in Gaming World by providing good look and feel. Technologies involved are Sixth Sense, Haptic Technology and Artificial Intelligence. By making use of these technologies we will develop 3D Game Application that provides you to play and interact with computer. Developing such Game in a custom built environment increases rigidness of the Game.

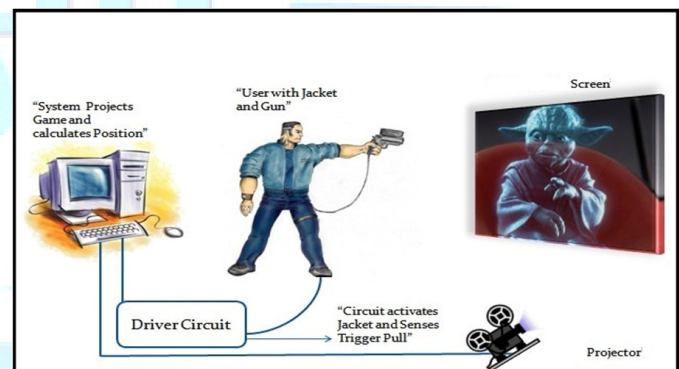


Fig. 1 : Game Overview

3. PREVIOUS WORK

Jingming Xie shows the emergence of game engine. Game engine is the core of game development. Unity3D is a game engine that supports the development on multiple platforms including web, mobiles, etc. This paper introduced main technology characters of Unity3D firstly. The component model, event-driven model and class relationships in Unity3D are analyzed. Finally, a generating NPCs algorithm and a shooting algorithm are respectively presented to show common key technologies in Unity3D.

[Kumar, S.P.](#) and [Pandithurai, O.](#) gave just introduction about sixth sense. Sixth Sense technology is a technology with which a system could be trained to recognize and percept real world objects and react as desired. Sixth Sense technology bridges the gap between the physical world and the digital world, bringing intangible, digital information out into the tangible world, and allowing us to interact with this information via natural hand gestures. Sixth Sense technology is implemented in 'Sixth Sense/WUW (wear your world) using gesture recognition, augmented reality, computer vision and radio frequency identification. We have proposed that Sixth Sense technology could be integrated with voice recognition. Also bluetooth device and laser projectors could be used.

4. PROPOSED METHODOLOGY

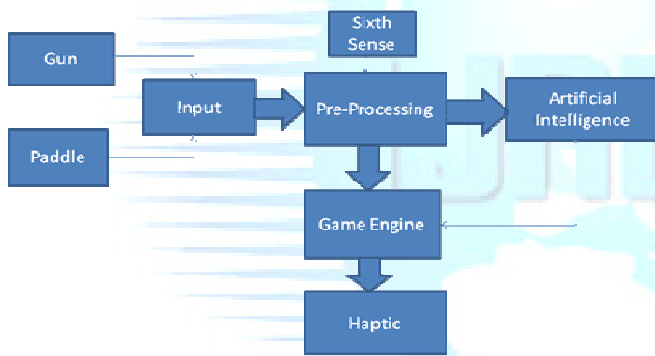


Fig. 2 : System Flow

0. Game Engine

A Game Engine is a system designed for the creation and development of games which provides a software framework that developers use to create games for video game consoles and personal computers. The core functionality typically provided by a game engine includes a rendering engine for 2D or 3D graphics, a physics engine, collision detection, collision response, sound, scripting, animation, artificial intelligence, networking, memory management, localization support and scene graph. Hence for creating our game we need this software to handle the virtual environment and render it to the screen.

The process of game development is often economized, in large part, by reusing/adapting the same game engine to create different games. It provide functionality common to all such things mentioned and also access to various hardware devices includes keyboard, mouse, graphics accelerator and so on. A main loop is there that control event handling. In graphics application an iteration of loop typically results in a new frame that is

rendered to the screen. The main loop, which is common to all applications, just spins a loop that continuously renders the scene filled with meshes. Every character that appears is set of connected polygons which in terms form mesh.

Rendering is handled in 3 steps:

Step1) Clears the previously rendered objects.

Step2) Render the new scene in memory

Step3) displays newly rendered scene on the screen.

These steps continue to loop at a predetermined frame rate. The loop is exited only after the program sets the loop variable to false. Graphic rendering is controlled by default run loop. In every iteration, loop broadcast events to all parts of the game engine and to application that initializes rendering events to all parts of the frame and then tells the game engine what should be rendered. Application can register for event handler to game engine, allowing the application to communicate with different parts of the engine. For example if user guides to close application through keyboard.

1. Sixth sense

The Sixth Sense prototype is comprised of a pocket projector and a camera. Both the projector and the camera are connected to mobile computing device in the user as pocket. The projector projects visual information enabling surface, walls and physical objects around us to be used as interfaces; while the camera recognizes and tracks user's hand gestures and physical objects using computer-vision based techniques. Code processes the video stream data captured by the camera and tracks the locations of the coloured markers (visual tracking fiducials) at the tip of the user's fingers using simple computer-vision techniques. The movements and arrangements of these fiducials are interpreted into gestures that act as interaction instructions for the projected application interfaces. The maximum number of tracked fingers is only constrained by the number of unique fiducial, thus Sixth Sense also supports multi-touch and multiuser interaction. The map application let user navigate display on a nearby surface using hand gestures, similar to gestures supported by Multi-Touch based systems, letting user zoom in, zoom out or pan using intuitive hand movements. The drawing application lets the user draw on any surface by tracking the fingertip movements of the user as index finger. Sixth Sense also recognizes user as freehand gestures (postures). For example, the Sixth Sense system implements a gestural camera that takes photos of the scene the user is looking at by detecting the a framing gesture. Sixth sense also lets the user draw icons or symbols in the air using the movement of the index finger and recognizes those symbols as interaction instructions. For example, drawing @ symbol

lets the user to create any weapon for fighting. Now for detecting the fiducial as mouse cursor we are using red marker. Each pixel has two properties

- i) X,Y position
- ii) Color property i.e RGB value

When the main loop starts executing, camera starts to analyses the video frame getting to it by using two loops.

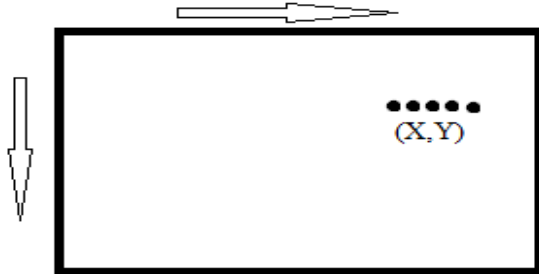


Fig 3 : Loop for finding color marker

One loop will start for finding the appropriate color vertically and another loop at same time in horizontal direction so that complete camera frame is analyze and wherever we get our desire pixel then another counter start which start to count the pixel of similar property which should be greater than five then only it will be treated as pointer and then base upon the aspect ratio of the screen mouse pointer moves.

2. Haptic Technology

In this we are using three haptic devices which includes Jacket, Gun and a paddle. Jacket is made by using vibrators located inside it which will vibrate when enemy shots the actor. Gun is hardware device which includes accelerometer ADXL series which gives us three dimension i.e X,Y,Z. But here we are using only two axis i.e. X,Y. When the gun is pane at left control will move the gaming window towards left in map and same when pane towards right for that we are making use of $-X$ and $+X$ coordinate. When actor want to look at up and down then by moving gun in upward and downward we can do it for that we are using $+Y$ and $-Y$ axis coordinate. Now finally paddle is there which helps us to give access to third dimension i.e. Z, when actor want to move forward he simply press the paddle i.e $-Z$. These devices are connected by using parallel port and serial port.

3. Artificial intelligence

When we create simple enemy it don't have intelligence and but we have to develop a competitor enemy for that we are applying AI. In simple game player fires at enemy and it doesn't shows any intelligence. We will try to use expert-

based systems and simple finite state machines to show the illusion of a somewhat intelligent opponent. Not only does the computer agent have to play in an intelligent manner but it also needs to be able to learn as the game progresses.

4. REFERENCES

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