



Developmental Approach of 3D Pacman for Android Platform

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Abstract— This paper proposes, Pacman, the most popular arcade game of 80s which was released in May 22, 1980. The main aim of our project is to introduce this fabulous game with 3D features and ameliorated graphics. This gaming project is developed in unity3D and implemented on Android platform, due to day by day increasing demand (Multitasking, Easy access to thousands of application via play store, Utility application features and facilitate of notifications). The game will give more preponderant gaming experience to Smartphone users in terms of graphics, speed, gaming environment and sundry functional parameters.

Keywords— Smartphone; Arcade; Unity3D; Blender; Mesh

I. INTRODUCTION

The purport of making this project is to introduce Android based gaming application, “Pacman 3D Version”. The conception behind this was, to make a 3D version of arcade game “Pacman”. Pacman is an arcade game which was developed by Namco[1]; it was most popular game at that time. To develop this game with 3D feature, we are using Unity3D[2]. It is a cross platform 3D gaming engine to build 2D games as well as 3D games. It provides tools for building, importing, scripting and animation. There are many Assets, GameObjects and Components which utilize for making different types of games for different platforms. We wanted to develop a game with real time graphics. For this characteristic, Blender[3] is a perfect software. Blender is an open source 3D animation and graphics software which authorize for modelling, rigging, rendering and simulation. In our game we use Blender for design maze, GameObjects and many other animations and characters. The programming is mostly done in C# and JavaScript. The Script is added to the player and objects to control the motion and 3D effects. In today’s world 3D games are preferred than 2D and if a popular 2D game can be re launched with 3D graphics then its market value will be enhanced.

II. NEED FOR ANDROID GAMING

Demand of android games is increasing rapidly. Android[4] Operating System is the latest platform which is used by millions of Android Users. Basic advantage of Android Operating system is it can run multiple apps at the same time. The number of frames per second (FPS) is quite high in android devices so any 3D game with high resolution can run smoothly. Development of game has introduced a very consequential aspect to the online market - the ability to develop, and launch video games in present times is far more feasible compared to earlier times due to its high demand and fast monetary returns. Android app store requires only one time submission of fees. So developing a game for Android is more sufficient than other Operating Systems.

III. EXISTING SYSTEM

The arcade Pacman game is fundamentally a 2D game in which single Pacman and four enemies moves around the game. It contains 2D blue maze in which Pacman moves, eating dots and fruits, when it eats single dot the score increase by one. When all dots are eaten, Pacman moves to the next level. Four enemies chase the Pacman and endeavor to catch the Pacman. If any enemy collides with Pacman, Pacman dies and life decreases by one. When Pacman’s all lives has been lost, Pacman shrink, dies and eventually game ends.

IV. PROPOSED SYSTEM

PACMAN 3D is plenary featured 3D game in which player can visually perceive the maze or world in any direction. Rudimentary principle of arcade game remains as it is in terms of scoring, lives, and powerups. Unity3D and Blender are used to develop the game. We used Unity3D software to control gaming environment, light mapping, character control. Blender is mainly utilized for modeling and designing the gaming character and other objects with real time effects. The effects of motion and animation are controlled by scripting in C#. The goal is to create a Pacman game with 3D effect

V. EXPERIMENTAL SETUP

Unity3D- For developing 3D games in android platform, we have to cull software according to our circumstantial requisites. Therefore we chose Unity3D software, a Powerful rendering engine completely integrated with a complete set of intuitive tools and rapid workflows to create interactive 3D and 2D content; facile multiplatform publishing; thousands of quality and ready-made assets in the Asset Store.

Blender-We have also used Blender to design the gaming World and characters. It allows 3D modeling, simulation of particles, animation, texturing, rigging and various other complex blending activities. Designing and 3D modeling is much simpler and more efficient in Blender. Thus the designing is done in Blender and then imported to our game project title and author details must be in single-column format and must be centered.

VI. METHODOLOGY

Planning of a game is the first step before designing and modelling phase. The presentation of the game, the game canvas, the story board and its stages are decided in the planning phase. The complete 3d Pacman game design process is illustrated in Figure 1.

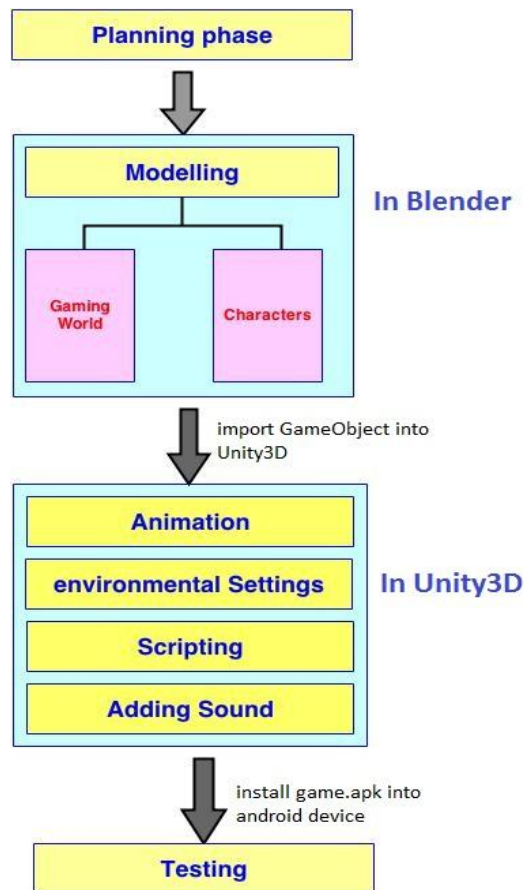


Figure 1: 3D Pacman design methodology.

A. Modelling

After planning the following steps are followed for designing and modeling.

- 1) *Gaming World Modelling*: Gaming world contain various objects, characters, different assets, terrain and camera motion. With the help of Unity3D, we can arrange our gaming world according to our requirements.
- 2) *Character Designing*: With the help of Blender, we designed our gaming characters. Two main characters are required for Pacman:
 - *Pacman*, the player: This is the main character of the game, designed in blender. It will collect the coins and destroy the devil on collecting power up.
 - *Three Devils*, the enemies: Designed in Blender, they are made to chase the Pacman. They will try to catch the pacman and destroy it when it will not have the power up option.

Table 1: Proposed 3D Pacman game stage details.

Gaming World	Description (Estimated Time – 6-7months)		
	Stage Name	Using Software	Level Of Difficulty
1	Forest	Unity3D	Lowest
2	Halloween	Blender, Crazybump	Moderate
3	Ice Age	Unity3D,Blender	High
4	Galaxy	Unity3D,Blender	Highest

B. Importing GameObjects and Texturing

After creating all the necessary game objects in Blender, we move them into Unity3D by importing the game objects. Files which are moving from Blender to Unity3D having the extensions like .obj, .fbx and .mtl. In the build settings we set the platform to Android and set the path.

C. Animation

Animation is done at the character's (Pacman and Devil) and the camera level.

1) Character Animation

- *Rigging* - Rigging is the setting up of a skeleton that moves the mesh. A skeleton was created with bones, and then bones were moved in order to move the character. Rigging has been done using Blender.
- *Motion* – For motion we have used three different animations as: jump, run and shoot. These animations were done using Unity3D.

2) Camera Animation

Camera animation has been used for creating 2D to 3D effect and this is done in unity3D camera Controller. We have used a sequence of small frames usually of 2 seconds to make an entire animation sequence. We have used quadratic Spline curves [5] with second order continuity constraints to specify the motion path. This detailing makes the animation appear smooth and continuous without jerks.

D. Environmental Setup

This step involves the setup or the overall environment including world, characters, player motions, camera motions and how the overall game will look like. One has to arrange these things in such a way that it looks visually attractive and challenging to the player. Figure 2 illustrates one such snapshot of our proposed 3D Pacman game.

E. Scripting

For Scripting we used C# and JavaScript, which control various motions and manage scoring as well as lives.

F. Adding Sound

Sound effects are used to enhance the overall gaming experience and increase thrill and the real time feel of the game. It has been used as a game object in Unity3D. This includes audio listener and audio source components. Audio Listener[6] has been added as player component and Audio source enables the sound.

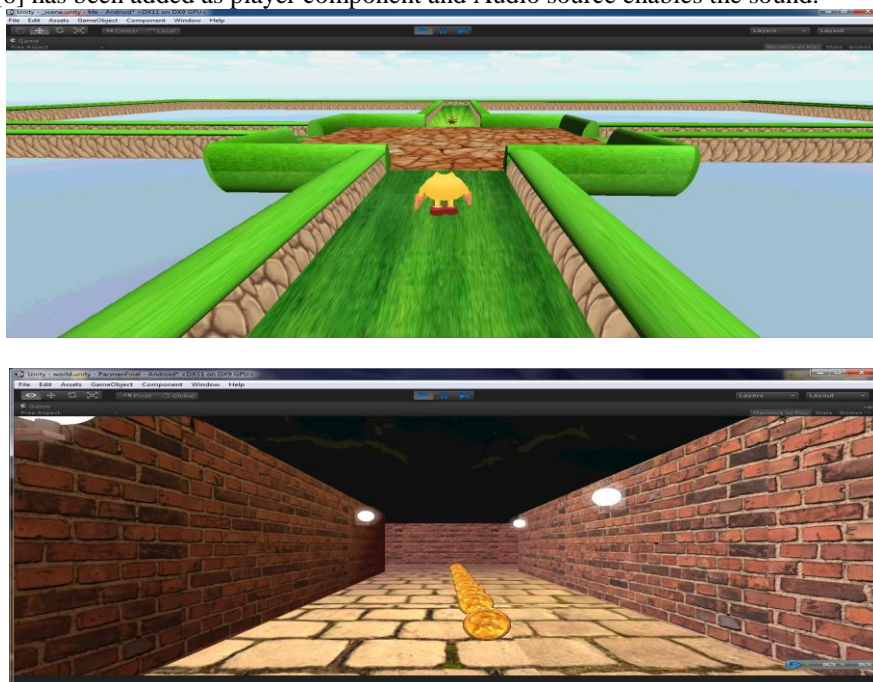


Figure 2: A snapshot of the environmental setup of the proposed 3D Pacman game

VII. CONCLUSIONS

This project results in a successful definition of the 3D game development as an android base gaming application. To develop a game in 3D for Android device using unity3D, Blender and Unity Scripts. We have successfully designed the game using all the things mentioned above and established a successful pipeline for the development of 3D android games. We have proposed a 3D Pacman game with advanced, interactive and attractive features for real time graphics. It provides an immersive environment with great sound effects. Compared to existing 3D games like Asphalt, Real Racing and NFS Shift our game only uses 40 mb(estimated) memory and requires android platform for a real time gaming experience.

ACKNOWLEDGMENT

This work was undertaken at the Department of Computer Science and Engineering, MNIT Jaipur under the guidance of Dr. Neeta Nain.

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