

Development of Smart Game Based on Multi-Platform Game Engine

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Abstract

This study aims to design and develop smart game based on Unity3D engine that is a multi-platform game engine. The functions that Unity3D supports autonomously are very abundant. All game developments are possible such as shader, physics engine, network, terrain manipulation, audio, video, and animation, and it is enabled so that it is possible to revise, meeting demand of user according to the need. For the efficiency of game development process, this study aims to plan, design, and develop a smart game based on multi-platform game engine.

Keywords: *Android games, Multiplatform games, Smart games, Unity 3D games*

1. Introduction

Unity3D game engine is an integrated development tool for producing other interactive contents such as video game, architectural visualization, real-time 3D animation. Its editor runs on Window, Mac OS X, so it could make games as the platforms of Window, Mac, Wii, iPad, and iPhone. It could also produce web browser game that uses unity web player plug-in. This is a similar form of flash, and it is designed so that flash user could easily adapt even with cross domain security policy and scripting [1].

IMGUI (immediate mode GUI) was introduced for realizing GUI. It has an advantage that it could realize GUI with simple and small amount of script through this, but it is difficult to write GUI in complex form and event handling procedure. Currently, the version 3.1 does not support the function of writing GUI in editor and not in script.

The functions that Unity3D supports autonomously are very abundant. In fact, all game developments are possible such as shader, physics engine, network, terrain manipulation, audio, video, and animation, and it considered so that the revision is possible to the taste of user according to the need. Unity3D that produces based on Java script and C# can apply and manage after producing the desired functions with script, not producing all of the programing at once. GUI composed on screen helps the first-time developer to approach easily, and the script and program that programmer made with simple mouse drag [2].

This study aims to design and develop smart game based on Unity3D engine that is a multi-platform game engine. The functions that Unity3D supports autonomously are very abundant. All game developments are possible such as shader, physics engine, network, terrain manipulation, audio, video, and animation, and it is enabled so that it is possible to revise, meeting the demand of user according to the need. For the efficiency of game development process, this study aims to plan, design, and develop a smart game based on multi-platform game engine [3].

2. Unity3D Game Engine

In order to produce multiplatform games, for each platform, all the different settings of the system must be controllable. In this paper, the use of Unity3D engine is proposed based on the reason that codes can be written with C#, JavaScript and Boo, the Unity3D engine was developed as a C#- and Mono-based code. The runtime part of the engine was developed with C++ and Microsoft NET API, and the editor program was developed with C#. As for the script, it cannot be modified directly in Unity, and it can be modified in script editors, such as Mono Develop, *etc.*, that support Unity. Although Visual Studio also supports through plug-ins, it lacks overall debugging functionality and in the Express version, debugging is not supported. In the case of Unity3, not only simple physics engines or shaders, but also realistically, all conditions, including network or terrain manipulation, audio, video, animations, *etc.*, are supported. By converting web-based games and contents developed using Unity 3D into 'IOS' or 'ANDROID,' they can be serviced as smartphone-use (Figure 1) [4-5] .

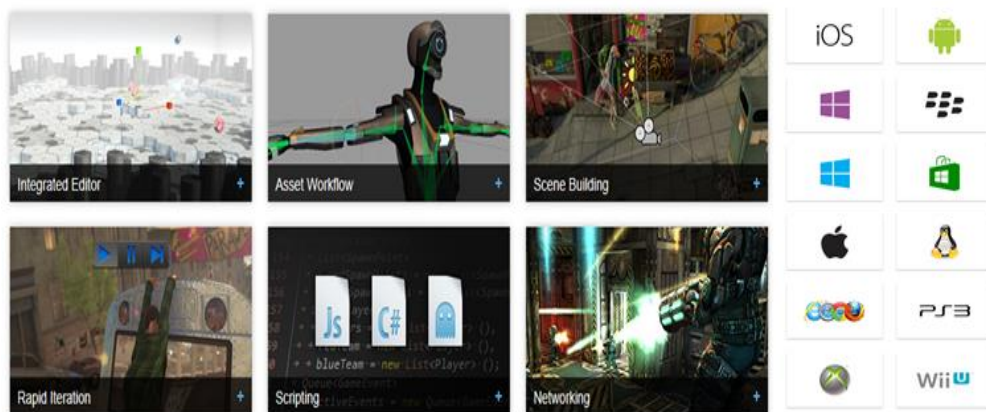


Figure 1. Unity3D Game Engine

Unity3D supports 3 type of script languages: Java Script, C# and Boo. All three are capable of the same fast interaction, capable of utilizing .NET libraries, and all three support databases, standard expressions, XML, networking, *etc.* Even though scripting is normally considered to be limited and slow, Unity3 operates with very fast iteration times and, by pairing up with a compilation of easy native code, becomes almost as fast as the C++ level. In addition, the implementation of Java Script for Unity3D operates at the same speed as C# or Boo. Game logic is executed in the .NET platform Mono open source; which provides a best-in-the-world programming environment that offers the best speed and flexibility [6-7].

Application using a smart Camera-Device has been remained on the level of recognition of business card, bar code and searching for words. The developments of game contents with upgraded technology will contribute to the growth of the application market. Therefore in this dissertation, we developed smart augmentation reality technology introducing recognition of a marker, 3-D characters and character animation utilizing Camera-Devices based on Android platforms in order to develop health educational games for elementary students.

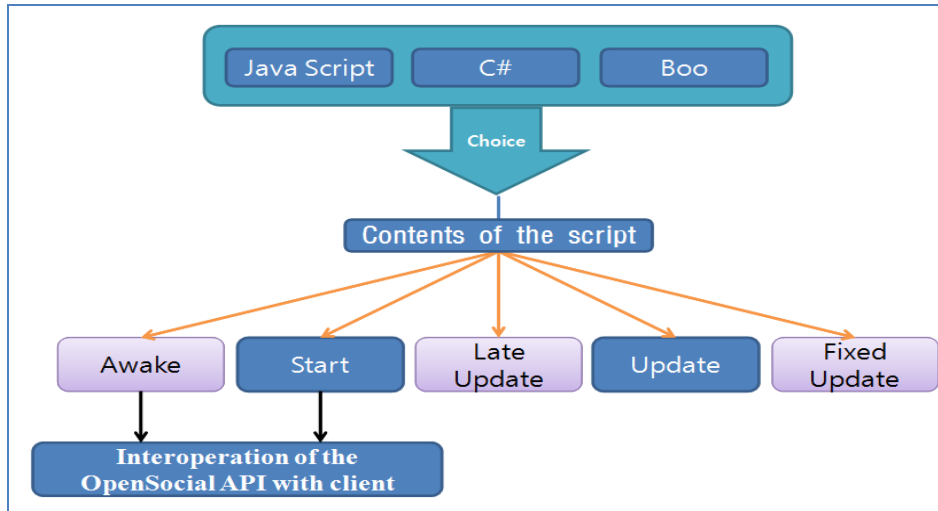


Figure 2. Unity 3D Game Programming

3. Game Development

Escaping the general frame of action game that move, attack, defend, and avoid by controlling the existing occupation characters, users must immediately respond to the sound. It is a speedy and thrilling game that requires high concentration even with simple control. Enemies randomly attack with previously recorded “S!” “Pa!” “R!” “Ta!” or other special voices, and users must defend the enemies with two methods of responding to the short shout of the enemies through touch gesture or pushing buttons, not gestures, to the special voices. When it is hard to hold the enemies’ attack, users can use items purchased from a store within the game or deadly technique to escape from a crisis, which can be used when the action gauge becomes full after succeeding an attack.

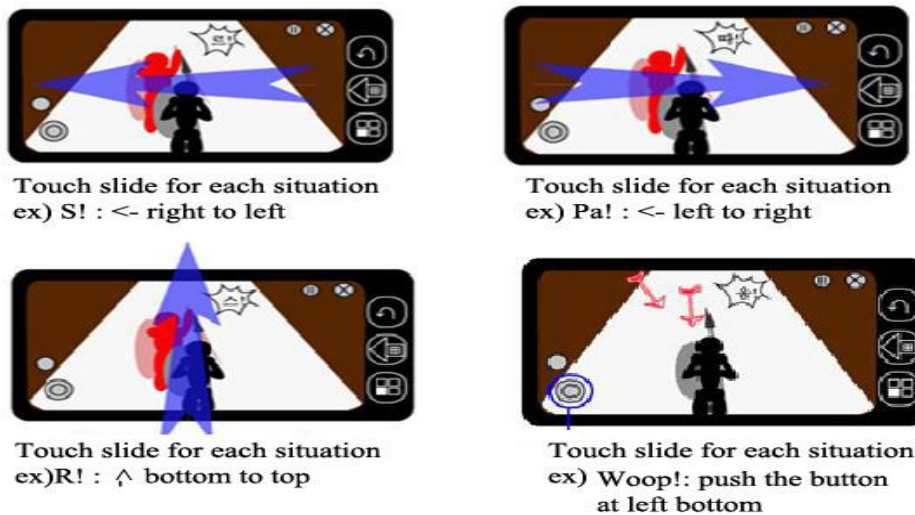


Figure 3. Game Design

The platform of the game is android smart tablet base, and the genre is sound action game. It is designed with the Battle of Thermopylae in Greece Sparta as the material.

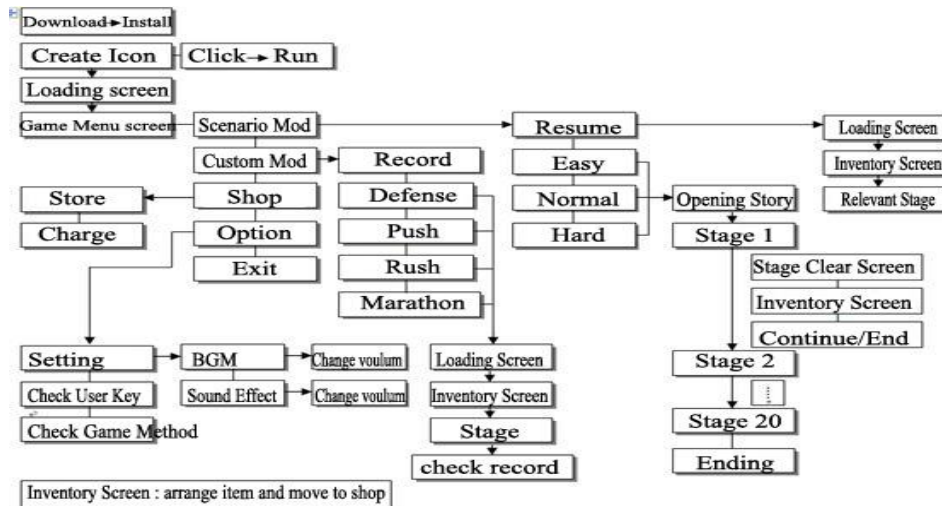


Figure 4. Game Process

▷ Scenario: It is the very first menu that begins the game, and when beginning, it shows the story and instruction for how to play the game. User can select the difficulty of gameplay (Easy, Normal, and Hard) and play the game.

▷ Custom: It is a mode that enables user to enjoy different mode other than the scenario mode (Defense, Push, Rush, and Marathon), and user can enjoy diverse event games (currently, yet to be materialized).

▷ Shop: User can purchase items that can be helpful to gameplay. Currently, only consumable items are materialized.

▷ Option: This is the place where user sets up the options, and user can set touch sensitivity and sound and choose whether to skip the story when the scenario is playing.

▷ Exit: Confirm whether to end the game or not.

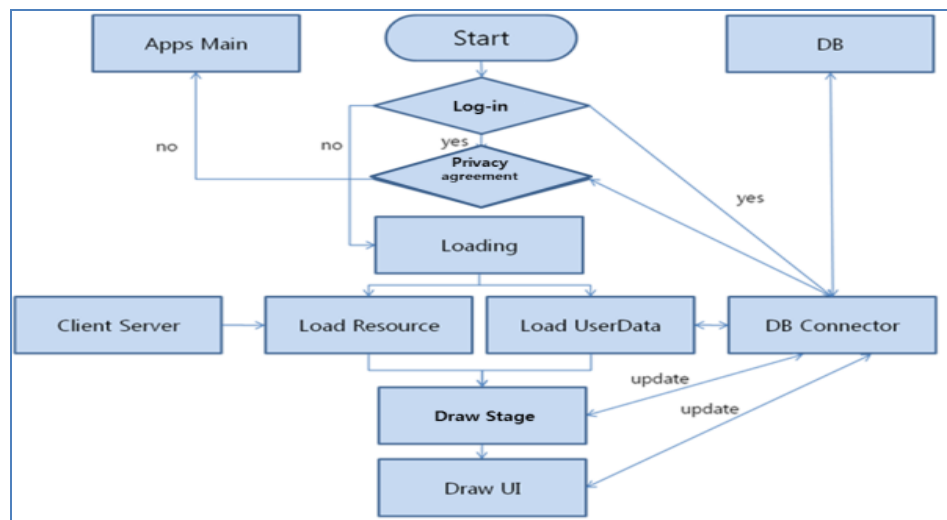


Figure 5. Flow Chart

4. Game Play

▷ Currently, only the scenario mode is materialized, and it is planned to materialize the custom mode in future.

▷ Before the gameplay, a short story and instruction on how to play game appear. User can move onto the next page by touching the screen, and the game continues.

Select the difficulty of scenario mode-> Scenario progress screen -> Explanation on how to continue the game-> Screen of easy gameplay of scenario-> Menu screen within the game->the screen of game ending (Victory or Defeat)



Figure 6. GamePlay

Select the difficulty of scenario mode-> Scenario progress screen -> Explanation on how to continue the game-> Screen of easy gameplay of scenario-> Menu screen within the game-> The screen of game ending (Victory or Defeat)

▷ It shows all the explanation on the game interface, and when user plays it for the first time, it is shown at the end of the scenario. When beginning from the option window, user can check the indications.

▷ In the window above, if user touches one more time, then it shows the instruction related to the game on the window that has appeared. Similarly, it can be set in the option window, and when touching the screen, it moves on to the beginning of the game, and the loading screen that loads the game is created in the middle.

5. Conclusion

This study aims to design and develop a smart game based on Unity3D engine, which is a multi-platform game engine. The functions that Unity3D supports autonomously are very abundant. All game developments are possible such as shader, physics engine, network, terrain manipulation, audio, video, and animation, and it is enabled so that it is possible to revise, meeting demand of user according to the need. For the efficiency of game development process, this study aims to plan, design, and develop a smart game based on multi-platform game engine.

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