CN1 Project Proposal

Virtual Reality Game using Oculus Rift

Group Members

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Statement of Contribution

By submitting this document, all students in the group agree that their contribution in the project so far, including the preparation of this document, is as follows:

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Introduction

Our topic focus on making Virtual Reality Game (VR Game) that people can interact via VR controller. In this case, our game will use Oculus Rift (a VR headset) as the main devices to experiences VR world, while using Leap Motion Controller (a movement tracking device) as the VR controller. Because the Oculus Rift itself is not so interested to play, and the experiences players will get is not different from playing video game on a big screen. So by using Leap Motion Controller, players can also interact with the VR world and objects they see.

Figure1 [1]: A man interact with VR world using the Leap on his Oculus Rift

The game we are going to make will be educated game, because we did some research and found that there's not many VR game that can educated players and it will be interested by other people. The game will use two VR devices' functions as much as we can to let player experiences VR world as much as they want. Of course the game should be as realistic as it could be, so we need to design the game environment by our own too see which type of environment will make players to enjoy the feel of realistic. Also, the game models need to be well-made too so do gameplay functions. So we choose Unreal Engine 4, a 3D game development engine, to make this VR game.
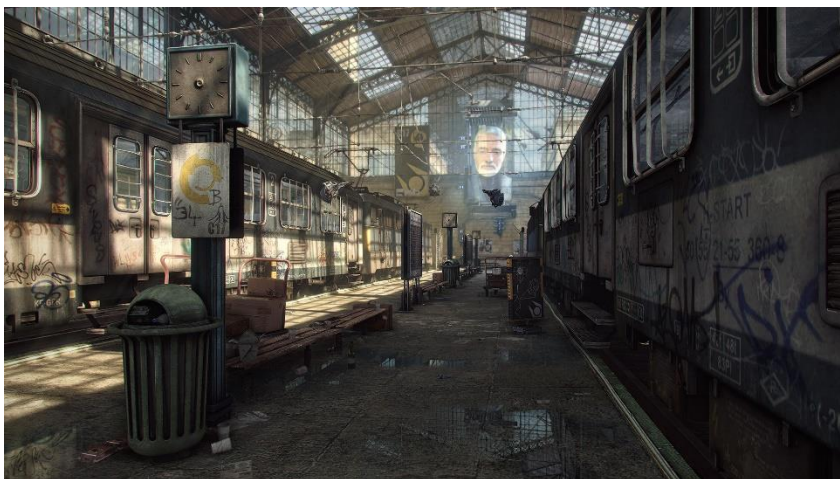

Figure2 [2]: An example of rendered scene from Unreal Engine 4

The game we are going to do is a cooking game, which players can interact with VR materials and educated in cooking. We choose Thai-food in order to make the game looks interesting to foreigners, and did some research on process of cooking to design a proper class/functions for our game to make it as realistic as we can. We also will make the game looks fun and interesting for all people around age 18-40, because we think that people who are under 18 and greater than 40 cannot handle the VR monitor for a long and it might affect their health. So we will make a secret system at the end of the game for players to enjoy the game.

The next section of the proposal will provide background knowledge that required in order to understand the project. The 3rd section is the objective of this project. The 4th sections will be the output from this project and how it can make benefits. The 5th section will give similar game that use same concept of VR as our game. The 6th will be the approach or the process of our game development, follow by the references' section.

Background

Have you ever know or experiences a virtual world or virtual reality?

Virtual Reality (VR) is a technology that let you experience a virtual world and interactive with it by either using controllers or motion captures. Most of virtual reality are games which let you experience a fantasy that you cannot experience in real world.

Nowadays, many VR technologies grow very fast, such as Oculus Rift, Leap Motion Controller, Cyberith Visualizer (body actions tracker). The most famous and popular one is the Oculus Rift which many game developers using it in their game to amuse players more (such as the Classroom Aquatic, Roller Coaster). Our group notice that point and try thinking of something to make VR game more interesting, which is a game that can interact with VR technologies, not with game controllers. So we use another device in this project, which is Leap Motion Controller as the main controller in our game. Because what Oculus Rift can do is only acting like a monitor (the infrared position tracking is not guarantee for our old develop kit).

Figure3 [3]: An Oculus Rift development kits

So now which game would let the player to use all of the devices function and be educated? A cooking game is our answer. You can cook like a real chef with no danger from cooking (ex. real knife). Also the food will be Thai-food which we think can attract the foreigner and also give knowledge about how to cook the food to Thai people who have never cook before using VR experiences. Our goal is people between 18-40 years old, to prevent side effects of using VR monitors which could harm players below 18 and greater than 40.

Figure4 [4]: *A player enjoy their experiences with Roller Coaster VR*

To do so, we need a program called "Game Engine" which can render realistic 3D environment and game models. We did some research and found that top 3 is Unity3D, Unreal Engine, and Cry Engine that we could obtain licences. In this case, we choose Unreal Engine because it is free for education and can rendered high-quality 3D models. Of course we can use outsource models (which is free), but in case where quality are needed, do it ourselves by 3D engine like Maya or 3DMax will give best results.

Why a virtual game and educated? From last two years, virtual game become more and more popular and interested by many players. For example, Project Morpheus from Play Station (full HD head set VR), Razor Hydra (full motion controller) are used in many games which will be released next year. Also, VR can gives realistic experiences from VR world, which could be anything, without experiences dangers (ex. spaceship, bungy jump). Also, we want to start something new, and education game is less popular. So we want to make one that popular and creative than others.

Objectives

This projects aim is to develop a Virtual Reality Game that educated and interesting. To achieve our aim, we should get all these 3 objectives:

- Develop a game that educated for most people include foreigners.
- Design and develop game environment as realistic as we can.
- Use as much function as we can of VR devices

Outputs and Expected Benefits

3.1 Outputs

The output of this project is a virtual reality game that helps people understand more about Thai food and give education for those who don't know. Of course the game should be interesting enough for people to invest.

3.2 Benefits

This new educated game could make other developers interesting in a VR interaction game like us and develop more interesting, educated game. Also if there are people who want to invest with us, we could improve it and add more features in the name of the University to sale it worldwide. If no, our junior can continue our project to make it better with more features or use our project as a base to develop a new interesting VR game.

Literature Review

There are already some people who developed a program that sync VR devices to interact with the game. For example, Vireio Perception (http://www.vireio.com) which can make a PC game into Oculus VR by divide monitor view into two equal halve and scale the view of each halve to fit the Oculus Rift view.

Figure5 [5]*: First Person view of normal PC game using Vireio Perception program*

Another example is First Person Controlling (http://tangochen.com) which let you control FPS game through the Leap Motion Controller using setting of your gestures and interact each gestures with a command to a game. For example; lift your thumb to fire or move your hand down to crouch.

Figure6 [7]: First Person Controlling App using Leap Motion Controller

Not only the sync-program, there are also games that could not play without Oculus Rift too. Classroom Aquatic Simulator is one recommended example of how to use Oculus Rift in an effective way. The game is about cheating the exam using Oculus Rift to look at others' exam and a controller to lean towards them without notice the teacher.

Figure8 [8]: Classroom Aquatic

Methodology

5.1 Approach

Our approach start by do some research on the hardware first, about how it works, what and how many functions does it has. Then we gather these information to next step, to design our game system and class diagram. Here's an example of our class diagram.
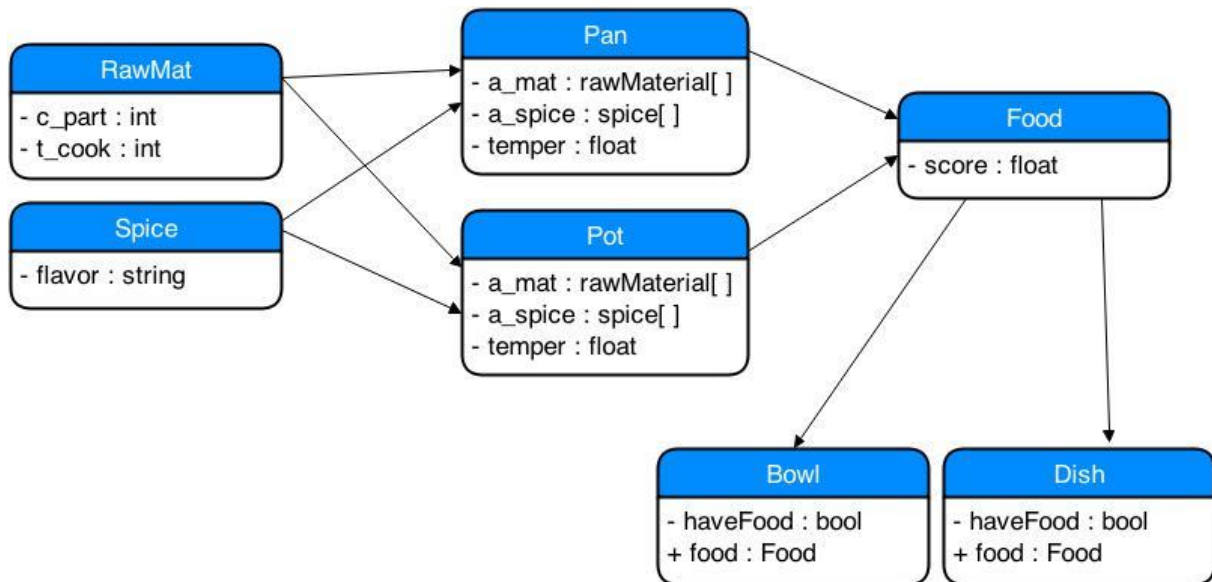

Figure8: Our class diagram (temporary)

More classes will be added after the research is completely finish. Then create group of tasks and separate to each of us. After that, we begin to design art works and references game art for 3D modeller. Then start modelling 3D models. While waiting for them, the programmer should finishing their class analysis to get the actual class diagram. When 3D models finish, we start combine and coding right away to test the environment renderer quality and check if it can catch the schedule with this rate. We repeat these steps until the environment finish. *More added later depends on software…*

5.2 Tools and Techniques

Working with hardware required many software to sync them with a computer. For our project, we mainly use Unreal Engine to make a game system, environment and coding game functions and elements. For 3D models, we use 3DSMax to create and inserts bone for models. We use Oculus SDK and Leap SDK toolkits to sync data with Oculus Rift and Leap Motion and use those data to create 3D model and receive input and output in some cases. For coding we use Camel Case template for naming variable and functions and coding using Top-Down method.

Project Schedule

Task	Description	Person	Duration	Deadline	Status
1	Environment design	Chatpol	1 week	12 Dec 14	In progress 0%
2	Food design	Chatpol	1 week	19 Dec 14	In progress 0%

Project Progress (optional)

If you have started doing work, then in this section you should report on the current progress of the project. You can consider the previous sections as the "Proposal" of what you intend to do and why, whereas this section reports on what you have done. You may break into multiple sections or sub-sections if necessary. You should include any designs and implementation details.

References

[1] The Air Tactical Assault Group – Forum: http://theairtacticalassaultgroup.com

[2] Game Spot – News http://www.gamespot.com

[3] Wikipedia: http://en.wikipedia.org

[4] Flat Panels HD: http://www.flatpanelshd.com

[5] Rift Mod: http://riftmod.com

[6] Vireio Perception: http://www.vireio.com

[7] TangoChen Blog: http://tangochen.com

[8] Classroom Aquatic Kick Starter:

https://www.kickstarter.com/projects/2094628033/classroom-aquatic