CMPT 371 Luxsonic Project: Hardware/Software Evaluation

Our team recommends developing this project for the Oculus Rift headset using the Unity engine.

Introduction

This document will outline the hardware and software design choices for developing the program requested by Luxsonic. Features of each system will be discussed, along with their advantages and disadvantages which contribute to our recommendations for the project.

Unity vs Unreal Engine

The engine chosen to design the project for Luxsonic will be Unity 5.

The first significant factor that impacted our choice was the experience much of the project team already has working with Unity. Most members of this project have some experience working with Unity and C#, compared to Unreal Engine where only one member has any experience. While our team would be more than capable of learning to use a system, this would require time. It would be more efficient for us to work with Unity and quickly teach others how to use it than for all of us to spend time learning how to use Unreal Engine since time is a factor we must optimize.

Another deciding factor in choosing Unity over Unreal Engine is continuous integration. Unity subscriptions currently come with a Cloud Build which allows for easy seamless integration. Continuous integration is also easily feasible with Unreal Engine, but would require the use of additional software frameworks (such as Jenkins).

Since Luxsonic's intention is to sell the product produced by us, it was important to look at some of the legal policies involved in selling products developed using Unity and Unreal Engine.

- Unity takes no royalties from products produced with its game engine, whereas Unreal will take 5% of gross earnings after $3000 of profit earned selling the program.
- Developing commercial software on Unity requires a subscription ranging from $35 to $125 per month. (Using an educational license to develop commercial software using Unity is prohibited). If a company's earnings in the past fiscal year exceeded $100,000 then the subscription cost would increase. This subscription cost would only have to be paid for the three months required to develop the software.

Although Unreal Engine requires no such subscription, the costs over time payed into royalties could eventually exceed the initial subscription costs of using Unity.

Oculus Rift vs Vive

Our team recommends the Oculus Rift as the VR hardware for this project. The primary reason for selecting this device is due to its availability. The University of Saskatchewan currently has an Oculus Rift workstation available for use by students, with another scheduled to be delivered during the term. The additional available workstations could allow for faster development and better testing.

The two pieces of hardware have some notable differences:

- Both devices have a comparable resolution and refresh rate.
- The Oculus Rift is cheaper (approx. $800 CDN) than the HTC Vive (approx. $1150 CDN), but the Oculus Rift's Touch controllers come at an additional cost.
- The HTC Vive requires a more powerful graphics card to run than the Oculus Rift, while the Oculus Rift uses more RAM than the Vive while running.
- Both devices require an HDMI port. The HTC Vive requires one USB port, while the Oculus Rift requires at least two (additional ports for the Touch controllers are necessary). **Advantage: HTC Vive**
- For development purposes, any Oculus Rift unit may be used, but the HTC Vive requires a special development unit. **Advantage: Oculus Rift**
- The HTC Vive has an additional camera that allows it to map and scan the surrounding area better, and is more appropriate for developing "room-scale" VR applications. However, it is also larger and heavier than the Oculus Rift. The target audience for the software is not likely to require room-scale features, and a heavier piece of hardware would be less comfortable for extended periods of use. **Advantage: Oculus Rift.**

The last point is an important concern. Radiologists can spend long periods of time reporting, and the HTC Vive would increase the physical strain of using the application considerably. This, combined with the advantage of the university's workstations, makes the Oculus Rift a more appealing choice for the development team.