EmbarkVR: Outdoor Virtual Reality Experience

Software Requirements Specification

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1 INTRODUCTION

1.1 Purpose

The main goal of the project is to make customers feel more inclined to purchase Columbia gear through the use of an immersive, outdoor Virtual Reality experience. This document exists both for development of the project and to provide a detailed description of the technical requirements for the clients.

1.2 Scope

We want to create an outdoor virtual reality experience for customers at a Columbia retail store. The application will consist of both visual and audio experiences to create an outdoor world in which the user can navigate. The main activity available will involve fly fishing in one of the rivers within the environment. Users will also have the ability to interact with Columbia products while in the experience and gain specific product information.

1.3 Definitions

Virtual Reality	Sometimes shortened as VR
HTC Vive	A virtual reality headset produced by HTC
Unity Game Engine	The Unity Game Engine, developed by Unity Technologies is used in this project to develop the virtual reality simulation.
Avatar	An icon or figure representing a particular person.
Wands	Controllers that are used with the HTC headset.
Base Stations	These allow the Vive to track the movement and location of the wands and headset.

1.4 References

[1] H. Corporation, "Vive ready computers," 2016.

[2] C. Hall, "Sony to devs: If you drop below 60 fps in vr we will not certify your game," 2016. [Online]. Available: http://www.polygon.com

1.5 Overview

The next chapter of the document will give an overview of the basic functionality of the Virtual Reality product. It contains informal requirements to provide background for the third section, Specific Requirements. The third section will provide more detailed requirements. This section is intended for a more technical audience like developers.

2 Overall Description

2.1 Product Perspective

This VR product may be new to Columbia Sportswear but will still have ties to existing products. Within the experience, users will have the ability to view and interact with Columbia gear. Users will also be given the opportunity to wear Columbia gear while participating to learn how the clothes feel while executing certain movements.

The product will rely heavily on Virtual Reality Hardware. Specifically, the HTC Vive System. This system consists of the the headset, two wands, and two base stations. Additionaly a Virtual Reality compatible computer is needed to actually run the software. In terms of software the product will rely on the Unity Game Engine. Unity will do the heavy lifting when it comes to rendering the virtual environment and making it look as realistic as possible.

2.2 Product Functions

The VR setup will allow the user to simulate outdoor experiences. Specifically, the user will be able to virtually see Columbia Sportswear gear in the environments they are intended to be used in. This will be done using the HTC Vive headset and wands. The final product will allow the user to travel to a number of environments in a given session to test a variety of clothes and equipment. This product will also give customers the ability to save the gear they liked in the VR, and access that information after the experience is over.

2.3 User Characteristics

The general type of user of this project will be a customer at a Columbia Sportswear retail store. Under this umbrella lies a few different types of customers. First there are customers who are inexperienced in the outdoor activity they are buying gear for. This target audience will benefit most from the VR expreience as it will allow them to experience the activity without a lot of commitment. Secondly, there are customers who are experienced in the activity they are buying gear for. This audience will benefit from the VR experience because it will allow them to view themselves actually using the gear.

2.4 Constraints

A virtual reality headset like the HTC Vive has some inherent restrictions. The first one is space. The HTC Vive tracks how much space you have set the system up in and creates virtual barriers. This limitation can be alleviated by using the controllers to move the users within VR environment. Besides physical space, space in the virtual display is also a concern. Information needs to be supplied to the user without obstructing the VR experience. A second limitation are the graphics within the VR environemnt are not entirely realistic. Because we are trying to promote Columbia Sportswear Gear it needs to be as authentic as possible.

2.5 Assumptions and Dependencies

An important assumption made in this requirements document is that the virtual reality experience will be run on a computer system that can run the HTC Vive software. The following are the minimum specifications to run Vive, as found on the HTC Vive website [1]:

- Processor: Intel Core i5-4590 or AMD FX 8350, or better
- Graphics: NVIDIA GeForce GTX 1060 or AMD Radeon RX480, or better
- Memory: 4GB RAM or better
- Operating system: Windows 7 SP1 or better

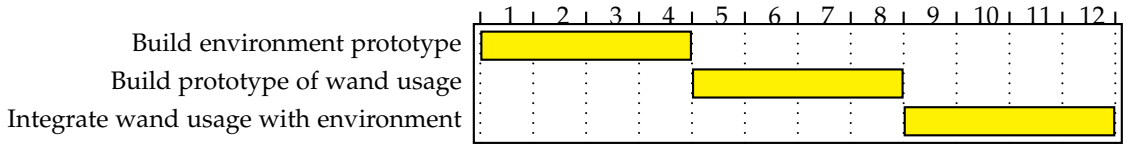
Design decisions and optimizations will be made so that a computer with the above specifications can run the experience with little noticable lag, but if the machine drops below the minimum capabilites the requirements regarding responsiveness will have to change.

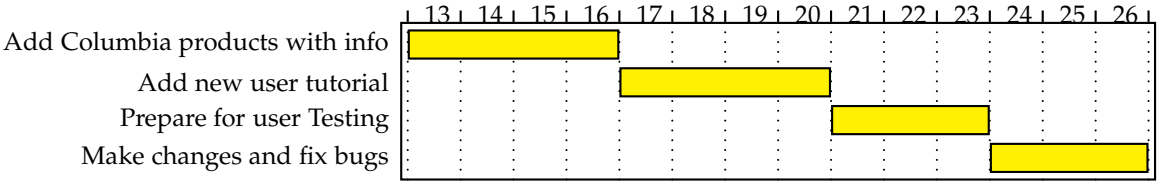
Also, the requirements often depend on the availability of a set of Columbia and Unity 3D assets. If either of those sources of assets is not available, the requirements about being able to see Columbia Sportswear gear in a realistic environment will have to change.

2.6 Apportioning of Requirements

One part of the project that will likely be delayed until later versions is the social aspect. Ideally the user would be able to share their VR experience on social media sites like Facebook or Youtube. This could be in the form or 360 degree images or videos. At the moment this requirement is not a high priority.

Gant Chart (measured in weeks)





3 Specific Requirements

3.1 External Interfaces

- 360 degree view of outdoor scenario within VR experience using HTC Vive headset. This will contain optional user guidance (visual) and offer Columbia product information (visual).
  - Input: Movement of headset
  - Output: Visual data
- Immersive noises from outdoor VR experience. This includes audio from the optional user guidance.
  - Output: Audio through speakers and/or headphones.
- Ability for other users not using headset to see user's current view.
  - Output: Visual data on external monitor.
- Controller available to be held by user.
  - Input: HTC Wand movement

3.2 Functions

- Ability for users to interact with fly fishing equipment.
- Ability to see Columbia fishing apparel in use.

3.3 Performance Requirements

- Must maintain 60fps throughout experience.[2]

3.4 Software System Attributes

Our unity environment should be portable and work on all htc vive systems. Correctness can be evaluated by how authentic the real-world experience we're trying to replicate is. We should be able to adjust the scenes easily and accommodate for any changes that the client wants.

3.4.1 Reliability

The system will be considered reliable if it can provide the virtual reality experience consistently without failure. Failure can be defined as any technical issue that breaks immersion. This could include noticeable lag between the user and avatar's actions, distortion of the environment or a software defect that causes the system to crash.

3.4.2 Availability

The system should be available to customers whenever the virtual reality station in the store is set up. There should be no downtime when the customer puts on the headset and the customer should almost immediately be placed in the immersive environment.

Many of the attributes of our system (such as availability and reliability) will be handled through the Unity game engine.

3.4.3 Security

The environment will be designed to not require a system with internet access, and will not need any user information. The expected implementation will be on a closed system in a Columbia store, where physical and remote access will be controlled by Columbia employees.

3.4.4 Maintainability

As time goes on it should be easy to adapt the product to easily include more Columbia Sportswear products and virtual reality environments to accompany them. Changes to the environment through the addition of assets should not be difficult and an updated scene should be accomplished with a small patch.

3.4.5 Portability

The environment should work on all HTC Vive systems with the minimum requirements to be Vive Ready [1].

Intel Sponsor	Date
Columbia Sponsor	Date
Student Team Members	Date