Deliverable G

The Ottawa Hospital Virtual Reality Treatment Simulation

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Table of Contents

Figures

Why are we doing the test?

This deliverable outlines Prototype II and devises a test plan while developing the prototype. Prototype I had a lot of malfunctions and therefore we decided to scrap the oculus software and go ahead with this prototype which has a basic code and can work with every equipment available at the hospital. The prototype includes a stereoscopic screen with buttons put on which helps the patients choose if they wish to start/stop the video.The test itself is a representation of how usable and valuable our product is to the client/end user. As a group, the general objective is learning and adapting. Since this is our second prototype now, we are getting used to the fact that if the prototype is functional with the patients or not. As we say in the first prototype, the code completely crashed and we were back to square one. After scrapping most of our ideas from Prototype I we now think that our final project would work comfortably for all the patients.

Tests Objective Description

What are the specific test objectives?

The specific test objectives includes:

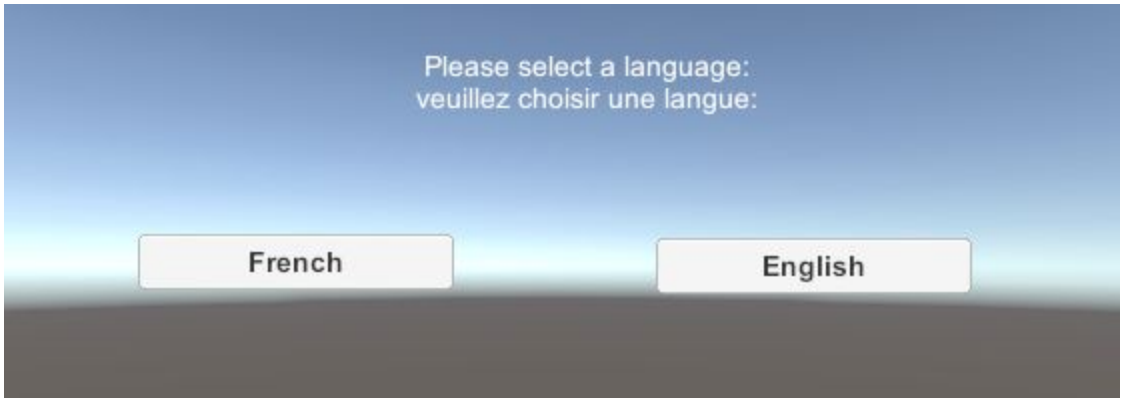
1) User-Friendly: The most important thing is user-friendly. We are specifically looking at answers for questions such as how user-friendly is the prototype for the patients? If the patients do face problems, what kind of problems they are facing in operating the system or can they sit through it during their operations without feeling overwhelmed?
2) Efficiency: The second most important thing would be how efficient the program is. This project should be self running and should require minimal support for anyone else. That is something our group is keen on assuring and making sure we test it before the patients/end users start using it.
3) Expense: The third thing is expenses. We as a group are trying to minimize our expenses and make sure that this project doesn't require a lot of money. After our project is up and running we will also try to minimize the operating costs by making sure the video component is very cheap and affordable and can easily be accessed through a file on the VR.
4) Software: Since this project doesn't have any hardware components we are trying to make sure unity works perfectly for this project. We encountered a bunch of problems while testing Prototype I so we are trying to eliminate all the discrepancies for Prototype II.

What exactly is being learned or communicated with the prototype?

The prototype provides us with the stepping stones of the project. After the design, completion, and testing, the second prototype reflects on what we as a group intend to achieve through this project which includes creating a proper software (unity) based stereoscopic video and incorporate buttons for the patients in the hospital. The prototypes sheds light on how the project would look like. For us as a group, we intend to focus on working with the unity. In terms of communication, we are trying to focus on we can make it easier for the patients to undergo overwhelming operations at the hospital.

```
using System;
using System.Collections;
using System.Collections.Generic;
using UnityEngine;
using UnityEngine.EventSystems;
using Valve.VR;
public class VRinput : BaseInputModule

{
    public Camera m_Camera;
    public SteamVR_Input_Sources m_TargetSource;
    public SteamVR_Action_Boolean m_ClickAction;

    private GameObject m_CurrentObject = null;
    private PointerEventData m_Data = null;
    private List<RaycastResult> m_RaycasResultCashe;
    private GameObject pointerUpHandler;

    protected override void Awake()
    {
        base.Awake();

        m_Data = new PointerEventData(eventSystem);
    }

    public override void Process()
    {
        m_Data.Reset();
        m_Data.position = new Vector2(m_Camera.pixelWidth / 2, m_Camera.pixelHeight / 2);

        eventSystem.RaycastAll(m_Data, m_RaycasResultCashe);
        m_Data.pointerCurrentRaycast = FindFirstRaycast(m_RaycastResultCache);
        m_CurrentObject = m_Data.pointerCurrentRaycast.gameObject;

        m_RaycastResultCache.Clear();

        HandlePointerExitAndEnter(m_Data, m_CurrentObject);

        if (m_ClickAction.GetStateDown(m_TargetSource))
        {
            ProcessPress(m_Data);
        }
        if (m_ClickAction.GetStateDown(m_TargetSource))
        {
            ProcessRelease(m_Data);
        }
    }
```

Figure 1. The code involved in Prototype II for buttons.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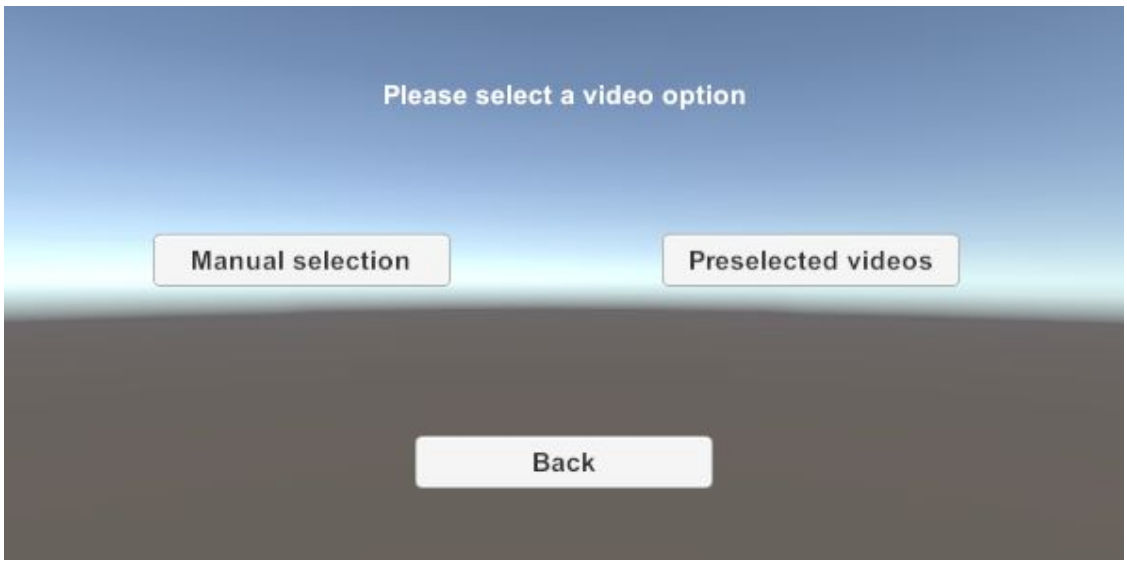
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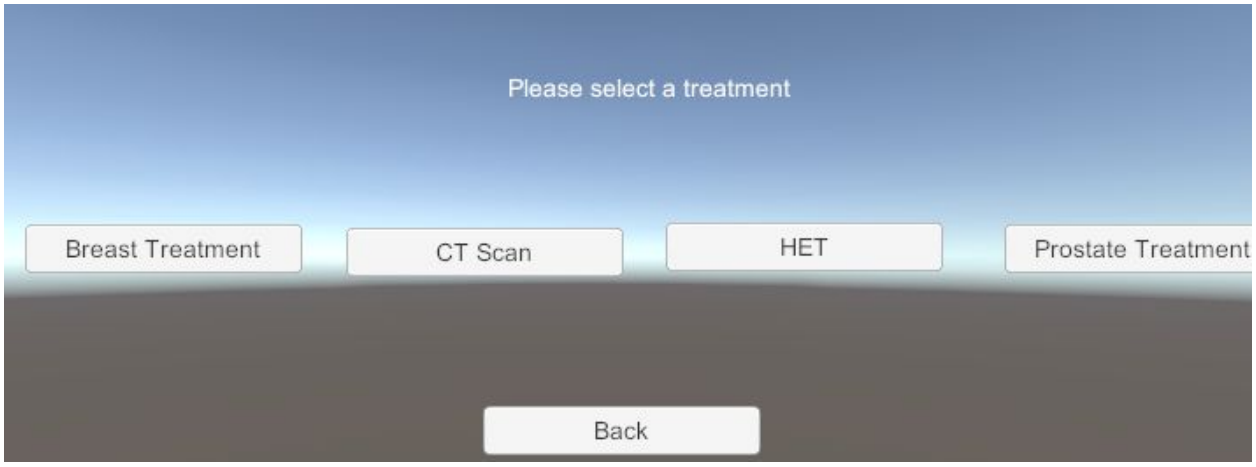


Figure 2. The results on Unity.

What are the possible types of results?

After the first client feedback the client said that they like the creativity and that we have a good workflow coming along. Also the client mentioned how we could still use the oculus but in response we talked about using steam VR which works on everything the hospital has and the client also agreed. Now, since the prototype I was scrapped out due to wide variety of discrepancies. Possible results includes the client asking for more details and a variety of videos incorporated, the patients/client not liking the design and fully scrapping it, and the software not running properly for the steam VR which would be a mistake on our part. Rest assured we are looking at a very positive result from prototype II unlike prototype I.

How will these results be used to make decisions or select concepts?

The results would be very fruitful in yielding exactly what the client is looking for and how we can provide them with that desired output. We as a group would use the method of elimination and then addition. We would focus on criteria provided us all throughout the course, follow up on the client feedback and make sure we incorporate the changes that are recommended to us and take out the ones that are not liked by the client/patients.

What are the criteria for test success or failure?

In the end what we look at as a group are three major things which happen to be:

1) The software and videos we make on unity must meet all quality requirements mentioned in the project and that are also outlined by the client/patients' expectations.
2) The project itself must be developed within the time frame provided to us and the prototypes must also be developed before they are due.
3) The project itself must be developed within the budget and to be fair the project would be very much in the costs mentioned which less than $100.

What is going on and How is it being done?

Describe the prototype type and the reason for the selection of this prototype.
The prototype we as a group are aiming for are comprehensive prototypes. We choose comprehensive prototype as our approach because that offers us the opportunity to do rigorous testing of our prototypes and every testing lets us reach a milestone and integrate our prototypes accordingly. As we progress in the project, comprehensive approach also helps us to implement many attributes of the project into different prototypes which accordingly (after the client feedback) helps make our project better.

Talking about what the project encomposses (critical components or systems) based on our current knowledge of engineering science or other knowledge, the project currently encompasses

Describe the testing process in enough detail to allow someone else to build and test the prototype instead of you.
The file for the prototype, including the codes, buttons, and stereoscopic videos were uploaded to unity. The work was divided where two people in the group worked on buttons and two worked on stereoscopic videos so we made sure that they all binded together and we got the base setup for prototype II. A steam VR was setup in order to run the machine. And then in the end the whole function was set up the way it would be built for an actual patient.

What information is being measured?
The functionality of the stereoscopic scene and the buttons for the option selection menu was being measured. The overall look of the scene in VR was also being tested and how the two components blend together and work.

What is being observed and how is it being recorded?
It is being observed how the video runs on Steam VR and the way it is being recorded is going through all the mobility possible from the patient's point of view in the VR.

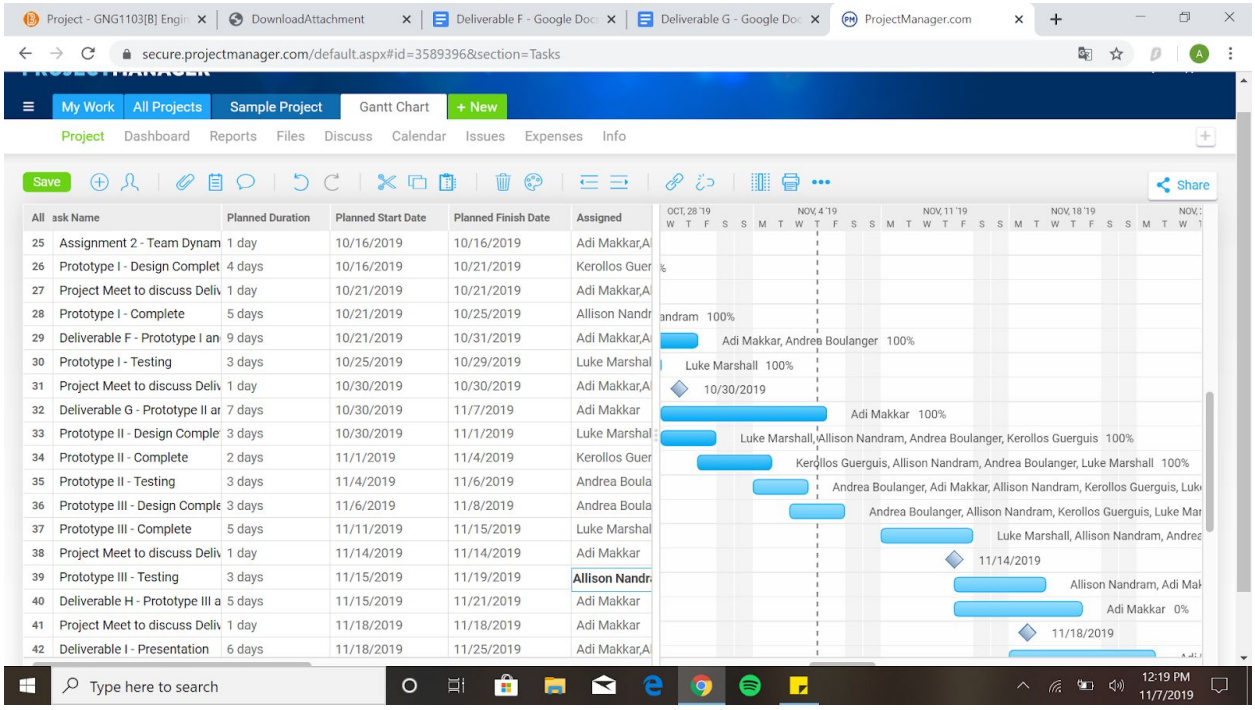
What materials are required and what is the approximate estimated cost?
Since this project based around unity and mostly software based we would only need unity to finish this project. If we happen to have any plugins involved and any other editions for buying unity group that would be the only cost involved and would amount to about $50-70 maximum.

What work needs to be done?
The project would be tested on unity and subsequent research would include knowing about more applications on unity and how can we make the prototype better and in the form of the project which the client would like.

When is it happening?

How long will the test take and what are the dependencies?
The test should not take long and could be completed very quickly by checking the prototype. Before we start beginning the testing we are supposed to set up a base prototype for the project and then design the prototypes according to the requirements mentioned in the project and also outlined in client expectations and feedback.

A separate test planning Gantt chart can be created to help make sure that the testing fits with the overall project schedule or it can be defined as part of that schedule.
A separate xlsx file representing the Gantt Chart for the testing has been attached but a screenshot is also posted below showing the various prototype work dates. It shows how it would be incorporated into our project work such as deliverables.



	Task Name	Planned Duration	Planned Start Date	Planned Finish Date	Assigned
25	Assignment 2 - Team Dynam	1 day	10/16/2019	10/16/2019	Adi Makkar,Al
26	Prototype I - Design Complet	4 days	10/16/2019	10/21/2019	Kerollos Guer
27	Project Meet to discuss Deliv	1 day	10/21/2019	10/21/2019	Adi Makkar,Al
28	Prototype I - Complete	5 days	10/21/2019	10/25/2019	Allison Nandr
29	Deliverable F - Prototype I an	9 days	10/21/2019	10/31/2019	Adi Makkar,Al
30	Prototype I - Testing	3 days	10/25/2019	10/29/2019	Luke Marshal
31	Project Meet to discuss Deliv	1 day	10/30/2019	10/30/2019	Adi Makkar,Al
32	Deliverable G - Prototype II ar	7 days	10/30/2019	11/7/2019	Adi Makkar
33	Prototype II - Design Comple	3 days	10/30/2019	11/1/2019	Luke Marshal
34	Prototype II - Complete	2 days	11/1/2019	11/4/2019	Kerollos Guer
35	Prototype II - Testing	3 days	11/4/2019	11/6/2019	Andrea Boula
36	Prototype III - Design Comple	3 days	11/6/2019	11/8/2019	Andrea Boula
37	Prototype III - Complete	5 days	11/11/2019	11/15/2019	Luke Marshal
38	Project Meet to discuss Deliv	1 day	11/14/2019	11/14/2019	Adi Makkar
39	Prototype III - Testing	3 days	11/15/2019	11/19/2019	Allison Nandr
40	Deliverable H - Prototype III a	5 days	11/15/2019	11/21/2019	Adi Makkar
41	Project Meet to discuss Deliv	1 day	11/18/2019	11/18/2019	Adi Makkar
42	Deliverable I - Presentation	6 days	11/18/2019	11/25/2019	Adi Makkar,Al

Figure 3. Gantt Chart

When are the results required?
Since we had a lot of discrepancies during the formation of the Prototype I we will focus furthermore on the results of this testing through which we aim to decide on what do we have in box for prototype III. We would especially look at client feedback received in the first meeting and turn our prototype II into something more advanced. The project is concrete and something more advanced would serve its purpose with the client and the patients.

Stopping Criteria

For the stopping criteria we are looking at the following figure shown below:

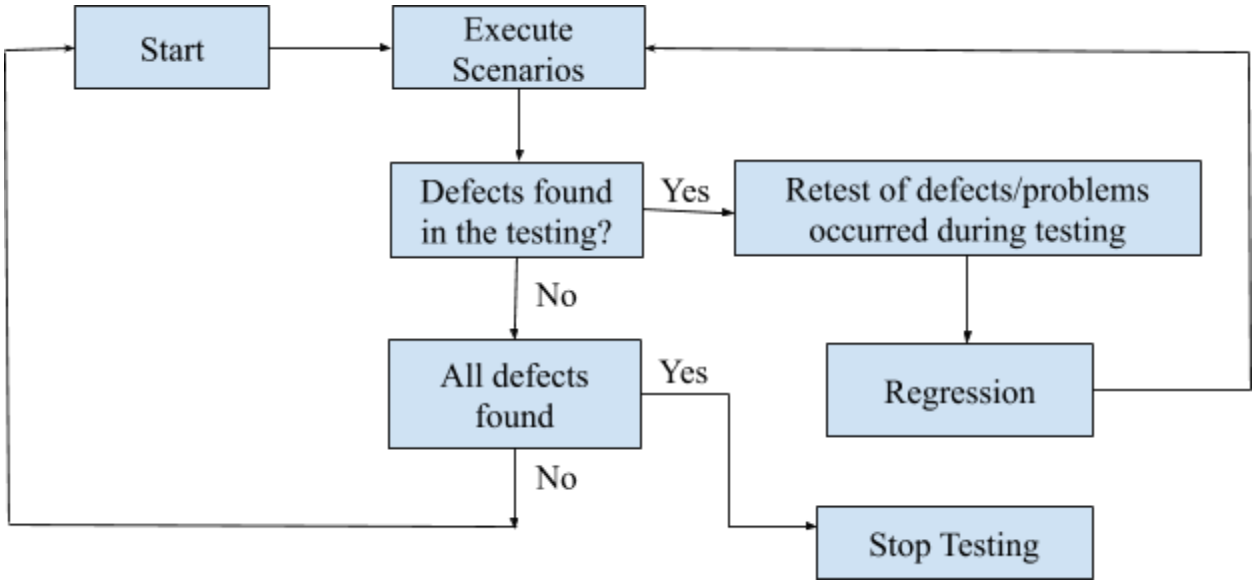


Figure 4. Stopping Criteria for Prototype II