The Ottawa Hospital Virtual Reality Treatment Simulation

### Team B11: Adi Makkar, Luke Marshall, Kerollos Guerguis, Andrea Boulanger, Alison Nandram

# Abstract

A VR platform for the Ottawa Hospital where patients can explore cancer treatment scenarios prior to receiving treatment.

# Functional Requirements

The program will use video footage taken with two 180-degree video cameras and a VR headset to create a virtual environment that simulates cancer treatment and diagnosis procedures. The virtual reality program must be compatible with the Oculus Quest and the Oculus Rift virtual reality headset, as this is the type of equipment the client has. The program should have an interface that allows users to choose between different virtual reality scenarios provided, as well as contain an option to have all scenarios play end to end, so the hospital can have several options to suit its diverse clientele. The program should allow users to pause and play the video as well as rewind and move the video forward. The program should be bilingual (in English and French) and the hospital should be able to add subtitles and audio prompts for user accessibility. Lastly, the program should have a disclaimer saying that the video contains static and that while patients may look around in the simulation, they must remain still during actual procedures to give patients a better idea of what to expect during treatment.

# Constraints

The project is limited to a budget of $100 or less. Individuals of age nine and older should be able to use the program, so they may experience future medical treatment with more ease. The design must be able to accommodate video footage taken by two 180-degree videos. The final constraint of this design project would be the size of the hard drive, this would affect the size of the program since there would need to be large allocated memory just for the input videos.

# Non-Functional Requirements

As the program will be designed to read in text inputted by the user, features such as subtitles for hearing impaired patients and values of the patient’s orientation can be added by the hospital if required. In order to optimize the experience as well as prevent disorientation of the patient, patients will be in the required position during the VR session. The program will be designed with a navigation menu where an option for a child friendly version of the recording could be put in to make the program able to accommodate younger users Additionally, options for making the program available on other platforms and an option to use stereo audio can also be made available. Lastly, options for storing files on the cloud as opposed to the headset hard drive can be explored.

# Benchmarking

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Company | [VR Vision](https://vrvisiongroup.com/healthcare-solutions/?gclid=EAIaIQobChMI0PyPybPv5AIVB56fCh0MZQOhEAAYASAAEgIKrvD_BwE) | [Stanford Children’s Hospital](https://www.stanfordchildrens.org/en/innovation/virtual-reality/anxiety-research) | [VR Health](https://www.forbes.com/sites/jenniferhicks/2018/09/30/see-how-this-company-uses-virtual-reality-to-change-patient-healthcare/#56da378e455e) | [BC Children's Hospital](https://www.cbc.ca/news/canada/british-columbia/b-c-hospitals-using-virtual-reality-to-help-kids-cope-with-painful-procedures-1.5046092) |
| Cost | Not specified | Not specified | Not specified | Not specified |
| Compatible with Oculus Rift | Yes, as well as HTC Vive Focus Plus and Pico Neo | Yes, the project was developed to be used on the Oculus | Yes, the company is in partnership with Oculus | Yes |
| Compatible with Oculus Quest | Yes, as well as HTC Vive Pro Eye and Pimax 5K Plus | Yes, the project was developed to be used on the Oculus | Yes, the company is in partnership with Oculus | yes |
| End to end/selectable options | yes | yes | yes | Not specified |
| 180 Degree Video Display | Yes - as well as high quality video for anti nausea | Yes, there was a complete recreation of the operational experience. | Not specified | 360 degree video |
| Interface to Select Different VR Scenarios | Not specified | Not specified | Not specified | No |

# Bibliography

<https://www.cbc.ca/news/canada/british-columbia/b-c-hospitals-using-virtual-reality-to-help-kids-cope-with-painful-procedures-1.5046092>

<https://www.forbes.com/sites/jenniferhicks/2018/09/30/see-how-this-company-uses-virtual-reality-to-change-patient-healthcare/#56da378e455e>

<https://www.stanfordchildrens.org/en/innovation/virtual-reality/anxiety-research>

<https://vrvisiongroup.com/healthcare-solutions/?gclid=EAIaIQobChMI0PyPybPv5AIVB56fCh0MZQOhEAAYASAAEgIKrvD_BwE>

<https://www.cfp.ca/content/63/12/932#sec-2>