

Hand Gestures

in VR and Proposal of socially acceptable gestures

Abstract

The aim of this project is to explore the hand tracking and gesture recognition technology in Virtual Reality Head Mounted Devices (VR HMDs) and to propose a set of new gestures that are socially acceptable by the users for generic functions that are used in the VR environment. A video prototype was created using Figma and Adobe Premiere Pro. It was tested using Wizard of Oz testing methodology with positive feedbacks and the few recommendations were addressed as well.

Introduction

A computer-generated simulation of a 3D environment that can be interactive in an intuitive and in a realistic way for the user through an head mounted device (HMD) is called Virtual Reality (VR). The primary way to interact with the VR environment is through handheld control devices. Whereas, the alternative interaction method include hand tracking and gesture recognition using cameras and sensors that are on the VR HMD. And this project will be exploring hand gestures in VR HMDs.

Study Methodology

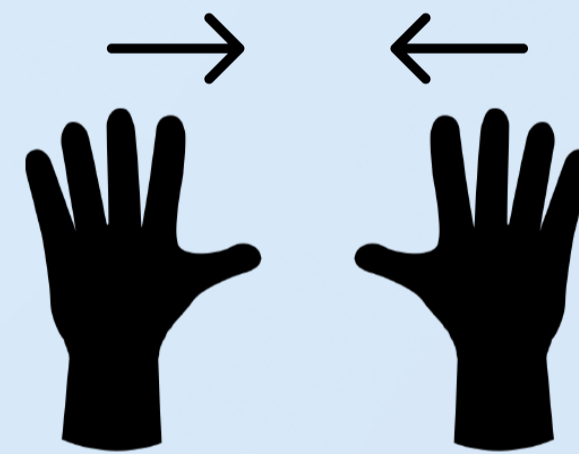
I first started off with initial **Literature Review**, followed by **Comparative analysis, Questionnaire** and then **User Feedback interview**. Literature review helped gain intense knowledge about the research's that was done and possible future scopes in hand gestures in VR; Questionnaire helped gain users preference on different VR HMDs and their knowledge about hand gestures in general; user feedback interviews helped collate users preferences on different gestures for different functions.

Gesture Proposal



Scroll

Wave Gesture



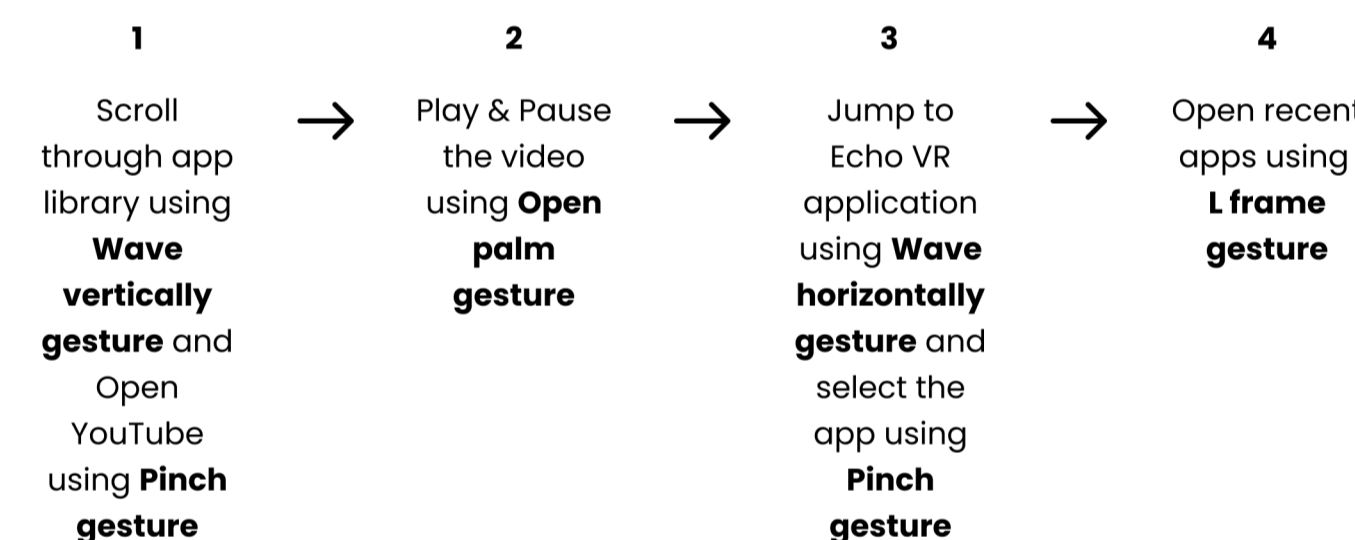
Recent Apps

L Frame Gesture

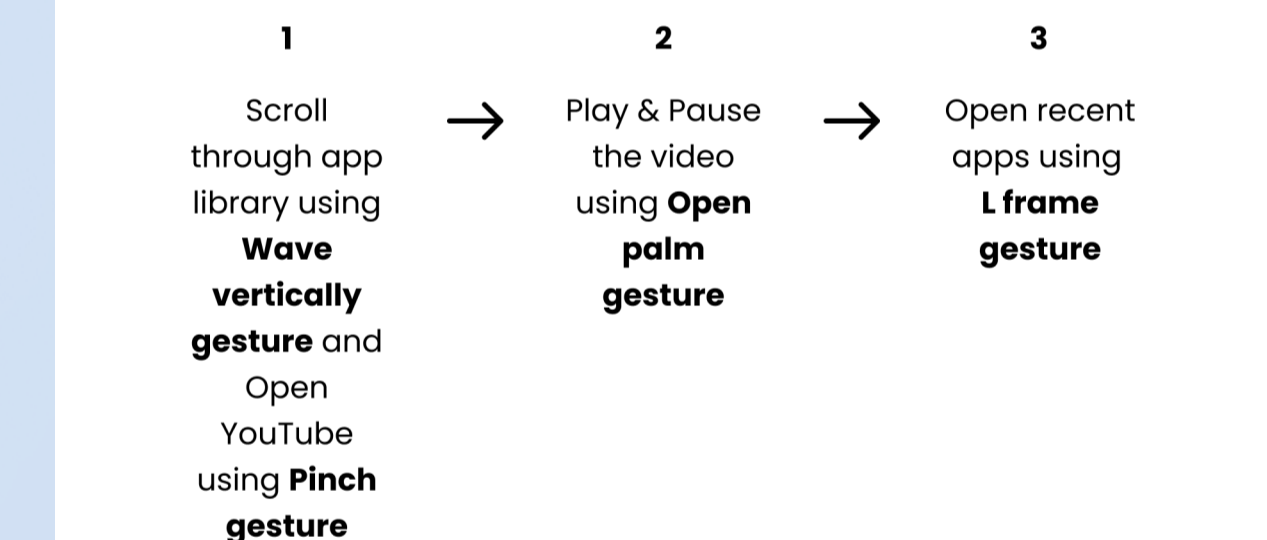


Play & Pause

Open Palm Gesture



User flow before testing



User flow after testing

Testing & Evaluation

In order to test the video prototype for its usability and acceptance, I had to follow the Wizard of Oz testing methodology due to its efficient and straight forward approach. Nature of the prototype depicts that this is just a proposal of gestures with proper justification and support; not an exact working prototype. Considering time constraints, Wizard of Oz will be the best suited method to test. I got it tested and evaluated by 6 experts in the field of VR and UX. The feedback was that both "Jump to other" and "Recent apps" might confuse the users and it is better if these two functions are combined and clubbed under one function "Recent apps" with the "L frame" gesture.

Future Works

I could not successfully create the proposed gestures in Meta Quest 2 HMD using Unreal due to time constraints and unavailability of resources. I could not concentrate specifically on finding participants from different ethnic groups and that could have affected my study. In the user feedback interview session, more than 50% of the users prefer to use nudge as their primary gesture. So, future works will include:

1. Studying more participants from even more diverse ethnic groups to make my socially acceptable gesture proposal even stronger.
2. Exploring nudge as the primary gesture and possible UX enhancements.
3. Designing the proposal in Unreal Engine & implementing it in a VR HMD.