Action Potential XR Lab Experience

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Introduction

Academic institutions have been gradually developing XR lab exercises such as virtual field trips or chemistry labs. I have personally completed a couple of these XR labs myself while at Douglas College. These experiences are usually developed to be played on a web browser and are restricted to augmented reality (no object manipulation). This limits their immersion and intuitiveness.

Purpose

This research project seeks to determine if an XR experience:

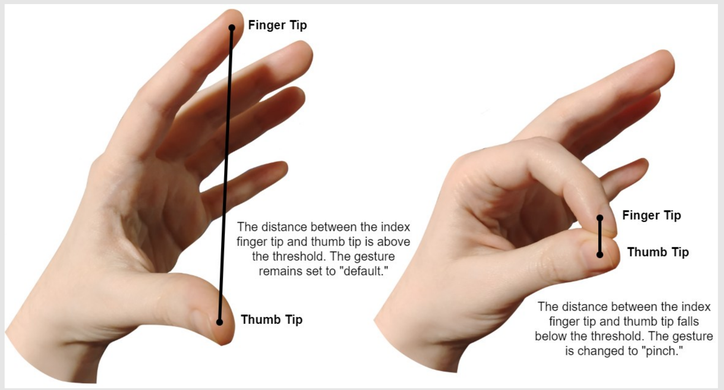
1. can be developed such that it can run on the Meta Quest 3 as a native application
2. has the potential to enhance learning and engagement in an educational setting

Methodology

- **Unreal Engine 5** was used for its rapid prototyping via Blueprints and the performance of its base language: C++.
- **Meta Quest 3** was used to facilitate colour passthrough along with hand & gesture tracking.
- **Blender** was used to model meshes and precise collision volumes to ensure proper collision behaviour.

Results

This research has resulted in a successful XR experience prototype that implements:



- hand and gesture tracking
- object manipulation
- colour passthrough
- 1-to-1 navigation

Discussions

This project's results did not come without difficulties. The Meta Quest 3 –and its supportive MetaXR plugin– is a relatively new technology that undergoes frequent changes. These changes often introduce new bugs that can break the plugin's functionality. In addition to the instability and bugginess of the Quest 3, there currently is not a lot of documentation or tutorials for developing XR

Future Work

- test whether using an XR experience could contribute to enhanced learning and engagement
- increase fidelity to increase immersion
- incorporate additional learning tools such as a quiz, tutorial, and performance reports

Conclusion

The main take-away from this research is that it can be done! Despite the difficulties that come from working with new technology, it is possible to develop an XR experience for an educational setting and it can be made playable –and testable– within a short period of time.

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