Evaluation of Touchless Navigation for Health Records Via Hand Gesture Recognition With and Without Eye Tracking

Bryan Havens, MS Human Systems Engineering (User Experience Research)
Mentor: Heejin Jeong, PhD
Ira A. Fulton Schools of Engineering | The Polytechnic School

Research Question

How does the inclusion of eye tracking affect the usability of a touchless, hand gesture based system for navigation of electronic medical records (EMR)?

Introduction

Within medical environments, the prevention of the bacterial and viral contamination is crucial [1]. When a medical provider reviews a patient's EMR, they interact with a device (e.g., a mouse, keyboard, or touchscreen) by touching it. Because of this, they need to disinfect their hands again.

With the advancements of artificial intelligence, image recognition, and machine learning, a touchless method of interaction is possible.

Methods

This research utilizes two methods of touchless interaction for navigation:

- Hand Gesture Recognition
- Eye Tracking

The usability of the hand gesture recognition would be evaluated with and without the eye tracking as the participant would navigate a fictitious EMR.

Software and Progress Made

Hand Gesture Recognition

- The hand gesture recognition software is powered by Google's MediaPipe Solutions [2,3].
- It tracks and estimates the location of each finger, thus allowing multiple gestures and hand motions to be recognized.

Eye Tracking

- The commercially available Beam Eye Tracker is being used for this project to collect the gaze location [4].
- Gaze location will be used like that of a mouse cursor when eye tracking is enabled.

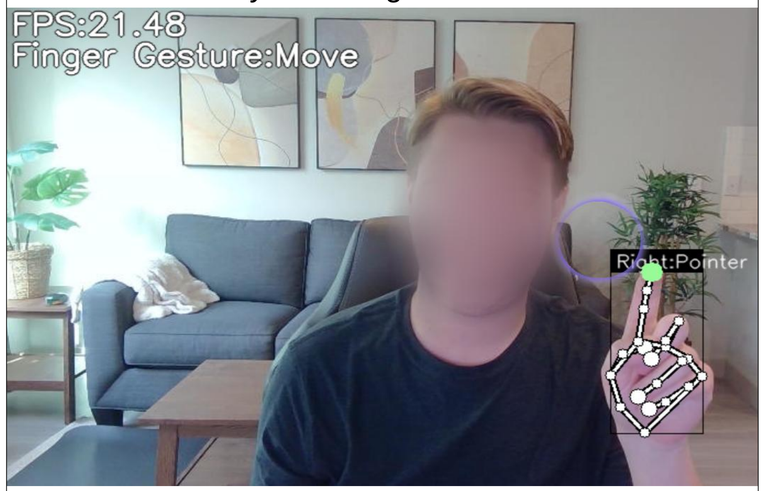

Figure 1: Software's View for Hand Gesture Recognition and Eye Tracking (The Blue Circle is the Gaze Location)

Future Work

- Further development of the various functionalities for navigation
- The ability to recognize two hands at once, thus permitting the use of multi-hand gestures
- The software can function outside an EMR environment.

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