

Independent Study with Professor Jeff Huang

Final Project Report

By Yuze He

I joined the HCI group in the beginning of the spring semester in 2017, worked with Alexandra Papoutsaki and Professor Jeff Huang. We were working on WebGazerPlusPlus, an improvement for Webgazer, a package on webcam eye tracking on the browser developed in Brown HCI group.

Offline Eye Tracking and Visualization

Previous WebGazer only works on real time webcam. I've added codes so Webgazer can generate predictions on recorded video. So in the user study happened later, we could generate predictions after recording the video, instead of generating at real time. The change saves computation time while in the study, and we are then able to tailor Webgazer based on the same dataset.

I've also implemented visualization for Webgazer prediction, aligned with webcam video and Tobii prediction (the compared data as ground truth). The visualization gives us a better sense on how Webgazer performs and compared to state-of-art eyetracking. Given the visualization, we have better intuition to come up ideas to improve the prediction.

Building Dataset on User Study and Webgazer Analysis

I've helped fixed bugs and loggings in WebgazerPluPlus, and starting in the late March, Alexandra have conducted over 60 user studies on WebgazerPlusPlus. In the meantime, I've written codes to automatically process user study data, converting to a standard dataset. The dataset will set a benchmark for WebgazerPlusPlus, and our goal is to release the dataset to the public to encourage further improvement on the prediction.

I've also done analysis on: 1, Ground truth user eye-gaze interaction, based on Professor Jeff Huang's paper "User See, User Point". I've replicated what's in Jeff's paper and confirmed his findings; 2, Typing vs eye-gaze interaction, which will be on the coming paper in discussing the typing interaction with gazing location.

Conclusion and Future Work

We've found typing can be a strong indicator for gaze prediction, an improved Webgazer version is developed. The analysis of typing and gaze prediction is going to appear in a paper later in this year. The dataset is setup and is going to be the Final Project in Introduction to Computer Vision taught by Professor James Tompkin in the following semester.

I would like to thank you for the opportunity I've got to work in the HCI group. Alexandra and Jeff have given me lots of advice. I also want to thank Aaron for tackling hard problems. Last but not the least, I want to thank all the participants in the study.