EE/CprE/SE 491 Biweekly Report 3

Sept 28 - Oct 11

Group Number: Sddec22-14

Project Title: Machine Learning for Human Biometrics

Client: JR Spidell (Collins Aerospace)

Advisor: Akhilesh Tyagi

Team Members/Role:
- Ron Mei Hang Teoh - Database Manager
- Yee Shen Teoh - Hardware Manager
- Zi-Jan Wong - ML Manager
- Nathanael Morris - ML Manager
- Ritvik Maripally - Security Manager

Weekly Summary
We changed our weekly meeting with the client from Monday 6 pm to 7 pm to Thursday 6 pm to 7 pm because of some scheduling conflict. We did not meet up a lot for these two week since we are not working on any joined parts. But each of us spent time working on our own parts of the project to get it ready for the hardware.

Past week accomplishments
Jan - Researching on ways to better calculate errors using existing algorithms instead of writing new ones as suggested by advisor. Discussion with client and Nathan on modifying the current NN algorithm to detect iris instead of pupil as the iris has a fixed size while the pupil size would change.
Ron - (9/28) In the process of setting up a Linux environment, still deciding to use VM or to partition the hard drive. Got a few errors trying to install the python library on Mac, still in the process of fixing that.
(10/10) Installed a linux Ubuntu VM on an unused windows laptop. In the process of installing the necessary libraries to run InfluxDB
Nathanael - Experimented with changing parameters into the ReMoDNaV algorithm to reduce the error of saccade, fixation, and smooth pursuit eye movement predictions. I also brainstormed ideas for improving the ML algorithm to get the X and Y coordinates of the pupil from a video.
Ritz- Finished most scenarios, still talking about database protection
Yee Shen - Downloaded the image for PYNQ and flashed it onto the SD card for ultra96. I also tried using the ultra96 with the SD card, which worked as intended. Jupyter Notebook with

python code was used for the ultra96. I have also tried using a webcam with ultra96, and it worked fine.

Pending issues
- N/A

Individual contributions

NAME	Individual Contributions	Hours this week	HOURS cumulative
Ron Mei Hang Teoh	- (9/28) Setting up a linux environment outside of the Ultra96 board - (10/10) Got a Linux VM up and running. Now installing the necessary libraries.	12	36
Yee Shen Teoh	- Downloaded PYNQ images and flashed it onto the SD card. - Testing the ultra96 with PYNQ. - Testing webcam with ultra96.	12	36
Zi-Jan Wong	- Research and understanding various error calculating algorithms to use for the NN. - Discussion and brainstormed on NN detection of iris instead of pupil.	12	36
Nathanael Morris	- Continued experimenting with ReMoDNaV parameters to reduce error - Brainstormed ideas for improving accuracy of eye movement ML algorithm	12	36
Ritvik Maripally	- Research about hipaa - Database Security - Discussion about final aspects	12	36

Comments and extended discussion
- N/A

Plans for the upcoming week

Jan - Understand and choose error calculating algorithms as well as calculating the accuracy of our model. Might need to work on changing some parameters in the NN so that it is detecting iris instead of pupil.

Ron - (9/28) Get the Linux environment running, and start installing python and influxdb libraries to get the database up and running

(10/10) Got the linux environment running. Now installing the necessary libraries to run influxdb.

Nathanael - Work on throwing away test data that is not needed in the ML algorithm to get eye movements (such as when the eye is closed). Blink data can also mess up the predictions because when the eye is blinking, the eye is smaller so it is harder to find the circle of the eye. So to find the eye before and after the eye closes during a blink, I will be using a hue circle algorithm to predict where the eye currently is.

Ritz- Getting rolling with actual practice on database security

Yee Shen - I tried the webcam for taking pictures, but next week I will work on saving the taken photo to a folder and having the webcam take video. Might need to schedule a discussion with the client to figure out how to do that because of my limited experience on python and jupyter notebook.

Summary of weekly advisor meeting

(10/4) - Advisor meeting with last week, we updated on our weekly progress, and he gave us some advise on how to continue. One of them was recommended Jan to research some existing error calculation algorithms instead of writing a new one from scratch.

(10/11) - A short meeting was held to give a quick update on our progression.