EE/CprE/SE 491 Biweekly Report 5

Oct 26 - Nov 8

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

Past week accomplishments
Jan - Worked with Nathanael to feed the output of CNN model into the input of ReModNaV model. The CNN model has been trained and the model, model weight, and other training fittings and weights are saved. These models and weights can be used simply importing tensorflow and using command *tensorflow.keras.models.load_model(saved_model)* in the Ultra96 and streaming to ReMoDNaV. Worked with Yee to specify and install dependencies such as sklearn, tensorflow, pickle, numpy, and so on to test if the CNN model would work on the Ultra96. The error calculation for saccade might be done, but will need some time to verify the correctness.
Yee Shen - Working with Jan to implement the algorithm into Ultra96. Also worked on downloading some additional library on the board to run the database and algorithm.
Ritz-Finished bounce diagram application of PKI methods and hippa rule regulation.
Ron - Documented work to be passed on to future teams. Setting up the client side of the database.
Nathanael - Worked with Jan to feed the output of CNN model into the input of ReModNav. Looked at ways to save and load both the ML model and the scaler. Investigated ways to stream the data through the CNN model for when video is streamed as input.

Pending issues
- N/A

Individual contributions

NAME	Individual Contributions	Hours this week	HOURS cumulative
Ron Mei Hang Teoh	- Documented past work to be passed on to future teams - Setting up the client side of the database	12	60
Yee Shen Teoh	- Downloading libraries to support algorithm and database. - Working with Jan to implement the algorithm on the Ultra96.	12	60
Zi-Jan Wong	- Working with Nathanael to feed output of CNN model into input of ReModNaV model. - Working with Yee to put CNN model into Ultra96. - Error calculation for saccade might be done.	12	60
Nathanael Morris	- Worked with Jan to feed output of CNN model into input of ReModNaV model. - Looked at ways to stream data through both models from a video stream.	12	60
Ritvik Maripally	- Worked on PKI Methods - Making sure HIPPA is being followed - PKI applications to bounce diagrams	12	60

Comments and extended discussion

- N/A

Plans for the upcoming week

Jan - Will continue to work on algorithm of error calculation especially for the fixation part, continue working with Yee to integrate the CNN model into the Ultra96, and test the prediction using current dataset, which is already a saved video. Then, we will need to try streaming the input from a camera and test if the CNN model would work in real time. I will also continue to work with Nathanael to combine CNN and ReMoDNaV, and hopefully able to integrate them into the Ultra96 as well.

Yee Shen - Meet with Ron and Nathaneal to start integrating their part of the code into the Ultra96 board. Also continue working with Jan to make sure that the algorithm he implemented is working fine on the board.

Ritz- Working on PKI applications

Ron - Will try to integrate the server side of the database on to the Ultra96 board.

Nathanael - Will use the output of remodnav to make the classifications on whether a user is stressed, fatigued, or under cognitive overload. Will then work on streaming data from a video stream through the models by creating blocks of data (every 10,000 frames) and sending it through the model.

Summary of weekly advisor meeting

Our advisor advised us to start on the integration of various parts to the Ultra96 as soon as possible as we don’t have much time left. Besides, he also mentioned that the training environment for the CNN model, which is just images of an eye, is too clean.