

EE/CprE/SE 491 WEEKLY REPORT 7

3/21/22 – 3/27/22

Group number: sddec22-14

Project title: Machine Learning for Human Biometrics

Client &/Advisor: JR Spidell & Akhilesh Tyagi

Team Members/Role:

Ritvik Maripally: Security Manager

Ron Mei Hang Teoh: Database Manager

Yee Shen Teoh: Hardware Manager

Zi-Jan Wong: Machine Learning Manager

Nathanael Morris: Machine Learning Manager

○ **Weekly Summary**

This past week we met with our client to go over our weekly accomplishments. We also talked about different requirements that should be considered for each of the components of our system. The requirements should be specific and follow a script: [component] shall [meet certain requirement]. After coming up with a few requirements during the meeting, we assigned one component to each member of the group, and then we were tasked with completing more requirements for our component throughout the week.

○ **Past week accomplishments**

Yee Shen Teoh: Work on translating the video into frames through python so that the Machine Learning algorithm can process the video frame by frame. Learned more about Vivado to get myself prepared for writing the FPGA and to get familiar with the software side of Ultra96. Getting familiar with translating videos to frames and the Vivado software will help with the future implementation of the project since those skills are one of the building blocks for the project.

Ron Mei Hang Teoh: Worked with the rest of the team to obtain the details of the data types and characteristics that are going to be stored in the database.

Zi-Jan Wong: Understand machine learning algorithm from Nathan. Our machine learning algorithm uses multiple matrices to do calculations and to predict the outcome.

Ritvik Maripally: Understand the inner workings of isolation methods more in depth, talked with ron about database workings in isolation methods for the machine.

Nathanael Morris: Met with Jan to go over convolutional neural networks and the

basics of how machine learning classifications are made. We also went over a Python database to outline the important steps in the code to make eye movement classification predictions. I also spent time coming up with a list of requirements for the eye-movement classification component of our system and requirements for the interface between the pupil detection component and the eye-movement classification component.

○ **Pending issues**

Yee Shen Teoh: Failed to complete a task involving playing video through Ultra96.

Ron Mei Hang Teoh: Some data types are just a rough estimate/prediction. Might change as the project progresses.

Zi-Jan Wong: N/A

Ritvik Maripally:N/A

Nathanael Morris: N/A

○ **Individual contributions**

<u>NAME</u>	<u>Individual Contributions</u> <i>(Quick list of contributions. This should be short.)</i>	<u>Hours this week</u>	<u>HOURS cumulative</u>
Ritvik Maripally	Isolation methodology Learned more about how to implement a database in terms of how it works in a NSW environment.	6	42
Ron Mei Hang Teoh	Created and updated the database use case profiles	6	42
Yee Shen Teoh	Playing around with Vivado (Software for Ultra96). Worked on translating video to frames through python.	6	42
Zi-Jan Wong	Understand convolution layers in machine learning algorithm, came up with requirements for pupil detection algorithm	6	42
Nathanael Morris	Learned more about machine learning convolutional networks for image processing. Came up with requirements for eye movement classifications	6	42

○ **Comments and extended discussion**

N/A

- **Plans for the upcoming week**

Yee Shen Teoh: Talk to our client about playing video through Ultra96, and hopefully, finally manage to complete the task. Play around Vivado software more, including the SDK, to get myself prepared for the implementation of our project.

Ron Mei Hang Teoh: Look up on InfluxDB tutorials, and maybe study up on how to integrate the database to the rest of the system.

Zi-Jan Wong: Tutorials and researching about convolution layer machine learning

Ritvik Maripally: Just more work on transporting data safely from one place to another. Isolation method finalization and database. Meet with team about which way

Nathanael Morris: Determine the accuracy of the existing machine learning algorithm, and calculate the error percentage. I will then start brainstorming about ways to decrease the error and make predictions more accurate.

- **Summary of weekly advisor meeting** *(if applicable/optional)*

We met with the advisor and gave him a general update on our progress.