

EE/CprE/SE 491 WEEKLY REPORT 03

2/14/22 - 2/20/22

Group number: 14

Project title: *Machine Learning for Human Biometrics*

Client &/Advisor: *JR Spidell & Professor Akhilesh*

Team Members/Role:

Ritvik Maripally: Team Leader

Ron Mei Hang Teoh: Database guy

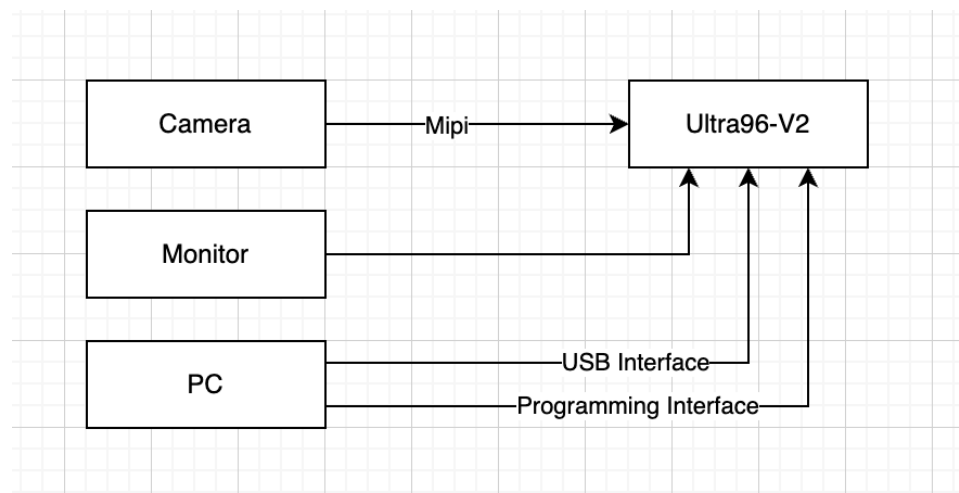
Yee Shen Teoh: Ultra96 hardware guy

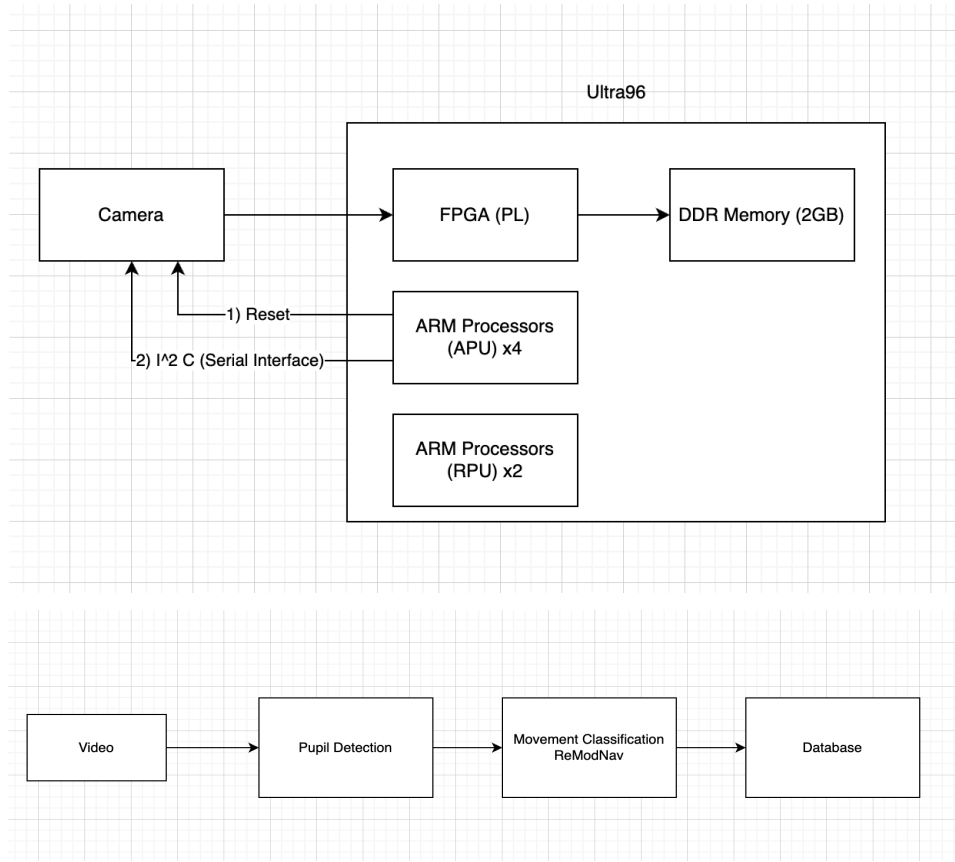
Zi-Jan Wong: Machine Learning guy

Nathanael Morris: Machine Learning guy

○ Weekly Summary

- The objective for this week was to start organizing our project, and decide what technologies we would use for it. We discussed which database and hardware we would be using for this project. Ron presented three different databases: MongoDB, InfluxDB, and PostgreSQL. We decided to use InfluxDB because it is designed for real-time data with timestamps, and it's good for real-time analysis, which is what our project needs. Yee gave a presentation on the Ultra96, the hardware we will be using for this project, and briefly told us how it works. We will be using the Ultra96 since there are plenty of resources online, it is suitable for machine learning, and our advisor has lots of experience with it. We also designed the communication diagrams to show how hardware components will interact with each other.





○ Past week accomplishments

- Advisor advises to list down as many responsibilities and constraints as possible to narrow down the scope of our project.
- Ritvik Maripally:
 - Looked at Isolation methods in Zynq
 - Tinkered around with UltraScale MPSoC Architecture
- Ron Mei Hang Teoh:
 - Researched on how to use InfluxDB (free, subscription, etc)
 - Researched on the many different functionalities of InfluxDB
 - Watched several InfluxDB tutorials.
- Yee Shen Teoh:
 - Worked on compiling all the information about Ultra96 on a slides, and presenting to my team. Content on slides are about where we all can find important information relevant to us quickly and easily on website and documents.
 - Find information about Ultra96 and Kira KV260 and determine which board are best suited for our project. We went with Ultra96 in the end because our client, JR Spidell, who is also teaching and guiding us with our project, has more information and background with Ultra96. Information regarding Ultra96 are also more abundant online, which would make it easier when errors occurs.
- Zi-Jan Wong:
 - Learning Python to better understand machine learning code provided by JR.
- Nathanael Morris:

- Learned about REMoDNaV by reading a research paper given to me by our client and prepared a presentation on it for this week's meeting.
- Watched more videos on and read about machine learning, neural networks, and image recognition.

○ **Individual contributions**

<u>NAME</u>	<u>Individual Contributions</u>	<u>Hours this week</u>	<u>HOURS cumulative</u>
Ritvik Maripally	Isolation methods in zynq and UltraScale MPSoC Architecture	6	18
Ron Mei Hang Teoh	Researched on InfluxDB's features and watched several tutorials on InfluxDB	6	18
Yee Shen Teoh	Making slides with information about Ultra96. Presenting about Ultra96. Compare Ultra96 and Kira KV260	6	18
Zi-Jan Wong	Learned Python code, looked at YouTube videos on Python, looked at multiple eye movement detection images	6	18
Nathanael Morris	Learned more about ML, researched REMoDNaV for fixation saccade to determine if someone is fatigued, stressed, or work overloaded.	6	18

○ **Plans for the upcoming week**

- **Ron Mei Hang Teoh:** Set up basic InfluxDB environment, talk to JR regarding future steps, possibly narrow down the features that we need to use.
- **Yee Shen Teoh:** Continue studying about Ultra96. If I get the board during the upcoming work, I will work on small project using the board to get familiar with it.
- **Zi-Jan Wong:** Continue working on learning Python, sharing eye movement .csv files with Ron to work on database
- **Nathanael Morris:** Continue learning about REMoDNav algorithm and start learning Python
- **Ritvik Maripally:** Continue working on Isolation methods and cybersecurity measures for this class

○ **Summary of weekly advisor meeting**

- We talked to our advisor about our projects. We told him about what board we are using, what technical skills will be used in the project, and which of us are responsible for what aspect of the project. Our advisor also suggested us to think about our requirements for the project, such as our expectation for the final products, the hardware, and the software.
- Meeting minutes:

2/14 Advisor meeting

- Come up with any requirements logically, and present it to Spidell
- Requirements should be specified by the client
- How do you know if your product is successful
- Is it only eye movement, is it something more than eye movement
- What does it mean to be under distress?
- Have more use cases (surgeons, truck drivers)
- Are you restricted to a portable platform? (Consider energy needs, might need to use battery)
- Is the machine learning happening in the cloud
- Think of any restrictions and constraints (eg. A 3000mah battery should last 3 hours)
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