EE/CprE/SE 491
Heterogeneous Computing for Machine Learning Algorithms
Week 5 Report

2/13/24 - 2/19/24
Faculty Advisor : Phillip Jones
Client : JR Spidell

Team Members:

Jonathan Tan	- DPU Management, Kira Board Manager
Josh Czarniak	- Pupil Center Location Algorithm, Meeting Leader of the Week
Justin Wenzel	- Blink/No-Blink Algorithm
Kai Heng Gan	- OpenCV
Santiago Campoverde	- Data Profile/Model Analytics

Summary for Progress This Week

This week's objectives were to continue with regular meetings and share our research findings in our specific roles. We met with our advisor and ETG to get assistance in setting up a workstation on campus to support our project. ETG has assisted the team by providing a system to support our project environment and allow group members to access hardware via in-person or virtual machine. After receiving the Kria board, our team members met to run some of the code from previous team to further understand the workflow of the project.

This Week's Individual Contributions

- Justin
  - Presented VART topic and presentation to team.
  - Researched different isolation methods of subsystems created by Xilinx.
- Jonathan
  - Received Kira board and ran old code to understand the process of starting an inference on the Kira board.
  - Met with team to help everyone understand the process of running an inference on the Kira board.
- Josh
  - Researched further on VART for blink detection
  - Studied previous team's code
- Kai
  - Researched on how to run multi thread simultaneously.
  - Update OpenCV slides deck with overall image processing and multi-threading.
- Santiago
  - Created a presentation on Profiling and Vitis AI Profiling tools.
  - Led client meeting and ask clarification questions
    - What does it mean to run 4 different models/algorithms?
      - Goal: Achieve 5ms interval between each frame processing
      - 2 models run in parallel sharing the DPU (eye track & blink)
      - 1 model is for pre-processing and assisting the OS
      - (Extra) 1 algorithm helping the pipeline and OS

Team Member	This Week's Task	Completion Date	Hours Took	This Week's Hours	Total Project Hours
Justin Wenzel	Attended meetings	NA	3	5	16
	Researched Isolation Methods	2/18	1		
	Presented VART to team	2/17	1		
Jonathan Tan	Attended meetings	NA	3	6	15
	Test run inference on Kira board	2/14	2		
	Met with team to help understand how to use Kira board	2/17	1		
Josh Czarniak	Attended meetings	NA	3	10	17
	Looked at previous team's code	2/17	4		
	Looked to understand main.cc	2/18	3		
Kai Heng Gan	Attended meetings	NA	3	9	18
	Worked on image processing slide deck.	2/17	1		
	Do research on how to run multi thread simultaneously		5		
Santiago Campoverde	Attended meetings. Led client meeting and asked clarification questions	NA	3	5	16
	Created Presentation on Profiling and Vitis AI Profiling tools	2/16	2		

Note: 1. This is per week hours, Σ "hours taken" = "week hours". 2. Due to multiple meeting times, meetings' "completion date" are "NA".

Plans for Coming Week

Team Member	Plans for Coming Week	Planned Completion	Planned Hours Required
Justin Wenzel	Lead and create agenda for client and team meeting	2/24	3
	Meet with previous team to discuss past implementations and previous project details	2/26	1
Jonathan Tan	Learn how to compile h5/pb model files into xmodel.	2/23	5
	Continue talking to ETG about hosting Kria board on a machine accessible remotely for members to use.	2/23	0.1
	Set up workstation's development environment.	2/26 (< 6pm)	3
Josh Czarniak	Understand more about machine learning	2/25	5
	Now in charge of multi-threading slides	2/30	3
	Understand more of the previous Teams code	2/27	3
Kai Heng Gan	Code a basic program that consist of multiple threads running simultaneously.	2/24	3

	Continue updating my slide deck (multi-threading)	2/24	1.5
Santiago Campoverde	Research document on improving prediction accuracy (given by client)	2/23	3
	Test and understand Profiler with sample data demo	2/23	2