EE / CprE / SE 491 – sddec20-proj01
PROJECT TITLE : Machine learning for pilot biometrics
Week 3-4 Report

2/3/2020 – 2/16/2020
Client: Rockwell Collins
Point of contact: JR Spidell
Faculty Advisor: Akhilesh Tyagi

Team members:
Jianhang Liu--Data Manipulation SME
Feng Lin--Hardware SME
Xuewen Jiang --- Camera Interface SME
Xiuyuan Guo --- Algorithm SME
Sicheng Zeng - python SME
Junjie Chen --- C code SME
Sicheng Zeng - Team leader

Bi-weekly Summary

For these two weeks, all team members get their tasks and challenges from the client, start working on the project and discussing the way to improve the accuracy, latency and memory requirements. we get the Ultra 96 board and start to set up the board. We flash system images to the existing board, and setup the development environment.

Individual Contributions

Xuewen - I got my challenge of getting a camera interface to the ULTRA96 to work. So, firstly, I need to choose a camera interface which can perfectly support our project. I found two types of camera interface: MIPI camera and USB camera, both can connect to the Ultra 96 board. But, I needed to compare two of them which is the best. So I did a trade study on camera interface, and made a presentation in our group to show my work. We finally found the USB camera is the best camera interface for our project.

Junjie Chen - I am responsible for working closely with the reference process. So I set up the ultra96 board, flashed images to the board, and read documentation about the process of 'host to PL' process. I set up a ubuntu operating system and have the development tool 'vitis' set up.

Feng Lin- I am in charge of hardware, and trying to figure out how to accelerate ML algorithm with a logic circuit. So, I set up an environment for Vivado which is a tool for IP block build based on PYNQ. I also test pre-manipulated data from one of my teammates and calculate latency improvement for it which is 42% faster than the original data.

Sicheng Zeng- I am setting up the Ubuntu system in my laptop for further tasks. I successfully set up the anaconda environment and ran the open eye algorithm. I also learn python for tensorflow in coursera. And I started to learn different ways to decrease memory during machine learning.

Xiuyuan Guo- During this time, I have found out the efficient way to increase the accuracy of the given algorithm and downloaded an set up the tensorflow board to observe the behavior of each model and how their performance is for each model.

Jianhang Liu- I'm responsible for data per-manipulation in this work. This week, I've set up and getting re-familiar with Matlab and simulink, the data processing tool, and manipulate hundreds of images to the specified size and color for machine learning training and testing.

Team Member	Contribution	Hours Worked for the Week	Total Cumulative Hours
Junjie Chen	Set up vitis, set up ultra96 board with flashed image 'PYNQ'	10 h	8+ 10 = 18h
Sicheng Zeng	set up the Ubuntu environment, get the ultra96 board, successfully set environment and run the open eye machine learning code.	10h	8+10= 18h
Xuewen Jiang	Camera interface trade study - 6h, Trade study presentation prepare - 5h, Vivado download + setup - 4h	15h	6 + 15 = 21h

Feng Lin	Set up Vitis, build a vivado project and set up IP block for 'PYNQ', test the pre-manipulated data with open eye algorithm. Study how to set up an ultra96 board.	10h	8+10=18h
Xiuyuan Guo	Download the tensorflow and observe the behavior of each model and change the hyper parameter of the algorithm to increase the accuracy of the current given algorithm.	10h	8+10=18
Jianhang Liu	Set-up and getting re-familiar with Matlab and simulink, using Matlab to process given images to specified resolution and color for machine learning training and testing purpose.	10h	6+10=16

Pending Issues

There might be some problems during the ULTRA96 board setting, such as wifi connecting or accessing files.

Plans

1. Get the USB camera interface and set it up. Continue learning the Ultra 96.
2. Have ultra96 set up and start video processing on existing image recognition algorithm
3. Run our algorithm on board and study various ways to accelerate algorithms by building digital logic.