CprE/SE 491 Weekly Report 23

Dates: 11/2/2017 - 11/8/2017

Dec1709 - ALVINN
Autonomous Vehicle Mission Processor with Machine Learning

Team Leaders: Bijan Choobineh   **Advisors:** Dr. Jones & Dr. Zambreno
                        Darren Davis

Communicator: Tracy La Van   **Client:**   Josh Bertram - Rockwell Collins

Key Concept Holders: Jesse Luedtke
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Weekly Summary:

The group working on the final report have started to gather the necessary information for documentation. The poster group has yet to meet about the requirements. The team is prepping for testing for the results section of our report.

Past Week Accomplishments:

- **Darren, Jesse, & David:** Worked on increasing frames per second and decreasing latency between input feed and output. Determined how to measure power and memory usage when running a model so when can capture this as part of our test data. Discussed possible testing methods.

- **Bijan Choobineh:** Finalized FlightGear setup and demoing. Work on Project Poster.

- **Darren Davis:** Worked on trying to increase fps for YOLO by changing filters and layers without losing any accuracy. Also, figured out how to get Tiny YOLO to run on the COCO dataset instead of VOC so all models can be tested on the same dataset.

- **Tracy La Van:** Worked on the final report - getting the layout ready for editing, making notes for additions/deletions/corrections, and checking requirements. Emailed Josh a comprehensive update of our progress this semester.

- **David Schott:** Worked on playing around with CPU clock frequencies to boost performance, ensuring GPU was correct installed and working on Caffe-SSD, and other workarounds such as loading Caffe model in a separate thread (and passing only a subset of the images captured from stream to improve performance).

- **Robert Stemig:** Worked on gather more specific FlightGear images for testing data sets, specifically multiple planes.

Pending Issues:

- **As a Group**: N/A

Plan for Coming Week:

- **Darren, Jesse, & Tracy:** Will work on the final report. Testing and comparing the different models. Documenting steps to get everything running.

- **Bijan Choobineh:** Continued work on poster/ testing

- **David Schott:**   Will work on getting the poster started and looking into getting very rough documentation about how to run the different Caffe models deployed onto our board created. And of course midterms.

- **Robert Stemig:** Will try to work on FlightGear images and testing, but will be out of town that week so may not be able to help much.

Individual contributions:

NAME	Individual Contributions	Hours This Week	Cumulative Hours
Bijan C.	Poster, FlightGear	4.0	43.0
Darren D.	Improving throughput of models and setting up for testing	9.5	97.0
Tracy L.	Weekly Report, Final Report, Communications	7.0	52.0
Jesse L.	Helped set up models for testing	3.0	70.0
David S.	Caffe-SSD, improving latency / FPS issues, preliminary (manual) comparison of Caffe models.	10.0	71.0
Robert S.	FlightGear	4.0	51.0
Totals:		37.5	384.0

Summary of Weekly Advisor Meeting (11/3/2017):

Zoom: https://zoom.us/j/7680301181

- Absent: Dr. Zambreno, Bijan C., Tracy L.
- We discussed that we had two YOLO models, two SSD models, and DetectNet working in some capacity. We also went to the lab and demonstrated the performance and issues with each network. Jones stated documenting steps to get each model working and changes made to improve speed or accuracy on our wiki page. He also stated referencing models for specific task such as faster models for flight and slower models for more accurate classification processes.
- Discussed that we are moving on to testing to determine the best model for use on a drone based on number of detections, classification accuracy and confidence of those detections, image processing time. These would be evaluated over different images of different plane styles,

positions, size of plane, and images that look like planes but are not planes. These images would also be tested at different sizes/resolutions. For video we will test fps, power consumption, and memory usage. We have determined how to get power and memory usage while running each model.

Summary of Weekly Team Meeting (11/7/2017):

Zoom: https://zoom.us/j/393292249

- Absent: David S., Robert S.
- Cancel advisor meeting for this next week (not enough info to hold a meeting, poster and final report committees can meet during this time)
- Need to start testing
- Poster & final report need to be ready for approval on 11/26