CprE/SE 491 Weekly Report 21

Dates: 10/19/2017 - 10/25/2017

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

                           David Schott   **Email:**   dec1709@iastate.edu

Webmaster: Robert Stemig   alvinn@iastate.edu

Weekly Summary:

This past week we have decided to abandon efforts with DetectNet and try YOLO due to being unable to solve the errors while trying to stream video. The team has been split into two subcommittees for the coming final presentation - one committee will work on poster development and one committee will work on the final report. We received the final information this past week and we will begin to start looking at what we have not done yet, such as testing of our project.

Past Week Accomplishments:

- **As a Group:** Bi-weekly report and HW1. We were in contact with Dec1710 to exchange progress updates.

- **Darren, Jesse, David, and Robert:** Worked in the lab trying to get DetectNet running with different input sources for video from GStreamer to usb webcam. We were able to get DetectNet to process a webcam feed.

- **Bijan Choobineh:** Investigation with the YOLO network. Continued to test images on detect Net.

- **Darren Davis:** Besides what is listed above I also was able to get YoLo working on the board with a video stream. There are two versions, a full version and a tiny version. The tiny version has acceptable speed but is less accurate than the full version, need to do comparison to see how much. The full version has a latency of 1-2 seconds.

- **Tracy La Van:** I worked mainly on administrative duties for 492 this past week including beginning to gather what will be needed for the final report. Due to timing constraints this past week, I was unable to directly contribute to the project.

- **Robert Stemig:** Worked on gathering FlightGear images of different aircraft in the simulator for testing purposes, as well as working on issues with FlightGear controller script for live demo

- **Jesse Luedtke:** Looked into image format issues when converting YUV to RGBA when receiving the latest frame a live video stream from our host machine running the flight simulator.

Pending Issues:
- **As a Group:** Streaming video

Plan for Coming Week:
- **Bijan Choobineh:** Testing with DetectNet boxes to see if accuracy can be increased in the created boxes around detected aircraft. Working with FlightGear scripting to be able to create a demo environment.

- **Darren Davis:** We have a couple of models on the board but have accuracy issues with the fast models and speed and memory issues with the accurate models. Will try and work out some of those issues to get something we can demo.

- **Tracy La Van:** Based on the decisions this past week to move away from DetectNet and try YOLO and the past issues with streaming video on the board, we have decided to abandon the creation of our own neural network. I plan to turn my focus towards helping test and possibly train the board.

- **Jesse Luedtke:** Exploring additional CNN models that we could use for testing and looking into FlightGear's scripting language for demo scenarios.

- **David Schott:** Will work on seeing through the installation of Caffe-SSD (if possible to do so without breaking existing Caffe installation), support team efforts with getting other off-the-shelf neural nets working on our environment.

- **Robert Stemig:** Testing with FlightGear captured images based on different factors with images such as resolution, type, etc.

Individual contributions:

NAME	Individual Contributions	Hours This Week	Cumulative Hours
Bijan C.	YOLO, Testing with DetectNet, HW1, Bi-weekly report	5.0	33.0
Darren D.	HW1, Bi-weekly report, DetectNet, YOLO	8.0	77.5
Tracy L.	HW1, Bi-weekly report, weekly report	3.0	38.0
Jesse L.	HW1, image formatting	5.0	60.0
David S.	HW1, Bi-weekly report, DetectNet	7.0	50.0
Robert S.	FlightGear scripts/images, Hw1, DetectNet	7.0	42.0
	Totals:	35.0	300.5

Summary of Weekly Advisor Meeting (10/20/2017):

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

- Absent: Bijan C.
- Updated our current position and what needs done
  - Streaming working
  - FlightGear working with board
  - Capture images from FlightGear
  - Coordinates of bounding box
- Other team able to do training on board itself (possibly?)
- Maybe try using webcam and model airplane
- Set up standard TCP Socket
- May look into GStreamer's Playbin

Summary of Weekly Team Meeting (10/24/2017):

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

- Absent:
- Hw1
  - Bijan & Robert still need to complete Hw1
  - Can someone please also do the last article? Preferable someone who has not done two yet
- DetectNet will allow a camera but we cannot figure out live feed
  - Possibly a formatting issue?
  - Switch to YOLO?
  - Abandon efforts to create our own neural network from scratch
- Someone needs to email the other team on our progress