

CprE/SE 491 Weekly Report 3

Date: 2/7/2017 - 2/13/2017

Dec1709 - ALVINN

Autonomous Vehicle Mission Processor with Machine Learning

Team Leaders:	Bijan Choobineh Darren Davis	Advisors:	Dr. Jones & Dr. Zambreno
Communicator:	Tracy La Van	Client:	Josh Bertram - Rockwell Collins
Key Concept Holders:	Jesse Luedtke David Schott	Email:	dec1709@iastate.edu alvinn@iastate.edu
Webmaster:	Robert Stemig		

Weekly Summary:

This week we met with advisors and Dec1710 to figure out how to proceed with this project. We will begin to combine Dec1710 and Dec1709 together when we have client and advisor meetings. Details on how we plan to move forward are detailed in meeting minutes. Both groups decided to keep doing tutorials the rest of the week so that we could meet next Tuesday after class to make an informed decision on the overall big picture goal of the project.

Past Week Accomplishments:

- **As a Group:** Met with Dec1710 & with advisors to discuss how to move forward with the project.
- **Bijan Choobineh:** Looked over machine learning tutorials and other tutorials on NVIDIA site. Learning Machine vision and trying to understand applications to our project.
- **Darren Davis:** Looked over the deep learning frameworks on NVIDIA website, continued with udacity tutorials, started looking into MatLab to see what it can do.
- **Tracy La Van:** Worked on weekly report 3, meeting minutes, and tutorials.
- **Jesse Luedtke:** Worked on Udacity tutorials and sent in request for NVIDIA boards
- **David Schott:** Went through more Udacity tutorials focussing on neural nets.
- **Robert Stemig:** Continued tutorials on Udacity and began on nvidia tutorials provide by the client. Worked on getting a wiki set up for project related materials that can be accessed by both groups for collaboration. Getting connected to our webpage so i can post group info and weekly reports.

Pending Issues:

- **As a Group:** Need to establish an idea of what will be included in the final demo so that in 2-3 weeks we can have a more aggressive target in mind for the demo and ultimately begin to break apart the project into pieces and set up timelines/code drops/milestones.
- **Robert Stemig:** Having some small issues in creating a wiki for the project, I have contacted the department in charge of wiki requests to hopefully get it resolved quickly.

Plan for Coming Week:

- **As a Group:** Meet with Dec1710 to establish a big picture goal of the final demo. Meet with advisors on Thursday.
- **Bijan Choobineh:** Will continue to go through tutorials for vision, machine learning, etc. Will establish through future meetings next moves.
- **Darren Davis:** Will continue going over tutorials and looking into MatLab and other software we may use.
- **Tracy La Van:** Will continue working on tutorials: NVIDIA, TensorFlow, etc.
- **Jesse Luedtke:** Get started with TensorFlow or other frameworks supported by NVIDIA. Will report back when request for NVIDIA boards has been approved.
- **David Schott:** More tutorials to familiarize myself with theory as well as slowly moving to experimenting with machine learning libraries with CUDA support.
- **Robert Stemig:** Look into the possible simulators that could be used in place to create a demo/environment to work in. as always continued tutorial usage.

Individual contributions:

<u>NAME</u>	<u>Individual Contributions</u>	<u>Hours This Week</u>	<u>Cumulative Hours</u>
Bijan C.	Tutorials, Meeting Setup, Advisor Coms	8.0	18.5
Darren D.	Frameworks, tutorials, other software	8.0	17.5
Tracy L.	Weekly Report, Meeting Minutes, Tutorials	6.0	14.5
Jesse L.	Order request for NVIDIA boards and tutorials	7.0	14.0
David S.	Tutorials and meetings	4.0	8.0
Robert S.	Tutorials, web page and wiki setup, and meeting	7.0	14.0
Totals:		40.0	86.5

Summary of Weekly Team Meeting (2/8/2017):

- Present: Bijan Choobineh, Darren Davis, Tracy La Van, Robert Stemig
- Absent: Jesse Luedtke, David Schott
- Decided whether to reschedule client meeting based on lack of specifications from advisors
 - Cancel meeting this week due to not having anything concrete information to share
 - **Bijan** will contact the client and will check on the Sponsor Acknowledgement Form
- **Robert** began discussing what he would do with the webpage at this point and time
- **Bijan** will talk to advisors about weekly meeting
 - Confirm meeting time and place
 - Email via alvinn@iastate.edu in order to check that the address is working
- **Darren** will email everyone to let them know we will have a group meeting Thursday at 2pm in Library

Summary of Weekly Team Meeting with Dec1710 (2/9/2017):

- Present: Bijan Choobineh, Darren Davis, Tracy La Van, Jesse Luedtke, David Schott, Robert Stemig, and also Chris, Evan, Sean, Lixing (VOLDEMORT)
- Decided who will be at the weekly advisor meetings
 - Tuesdays @ 2pm in 353 Durham
 - Attendees: Tracy, Darren, Robert, Bijan, David, Jesse, Chris, Lixing, Sean, Evan
 - Tracy will take meeting minutes & email them to the other team
- Decided who will be at the biweekly client meetings
 - Mondays @7pm in Coover 1012
 - Attendees: Robert Jesse David; Sean, Lucas, Alex
 - Sean will take meeting minutes & email them to us
 - Next meeting will be 2/20
 - Bijan will email Josh to let him know we will be combining group meetings
- Roles for other team
 - Alex is team lead
 - Chris is webmaster
 - Sean is communications
 - Lixing and Evan are key concept holders
 - Lucas is nothing specific (will not be here next semester)

Summary of Weekly Advisor Meeting (2/9/2017):

- Present: Dr. Jones, Dr. Zambreno, Bijan Choobineh, Darren Davis, Tracy La Van, Jesse Luedtke, David Schott, Robert Stemig, and also Chris, Evan, Sean, Lixing (VOLDEMORT)
- Need to get familiar with video processing and machine learning
- Then get an idea of what can be included in the demo
- 2-3 weeks come up with a more aggressive target for demo
- Then begin to figure out how to break it apart and set up timelines
- Demo-wise - single demo but may have different features put into the demo
 - E.g. "I see 5 objects / I see 2 people, 3 planes": Another team is looking at frontend as data comes in while other team works at processing those images

- Still work in individual teams - if you want to cross groups for a specific topic that's ok (supporting each other)
- Probably will not have a live demo; however, if we use a simulator, we can loop it back around at the end and have "live" data flowing through
- **Jesse:** Buy a couple boards, see what we can do with them (find limitations that way); order them (\$192TK1/\$435TX1)
 - Talk to Lee Harker - next to TLA for info (development kit)
 - Get one TX1 and one TK to start
 - <http://www.nvidia.com/object/jetson-tx1-module.html>
 - <http://www.nvidia.com/object/jetson-tk1-embedded-dev-kit.html>
- **Jesse:** Get Zambrino to bring cookies - to make up for missing out initial meeting ;)
- **Robert:** Build a wiki so we have a way of collaborating and sharing information
 - Sean already requested a wiki location from Jones
- We need to come up with a vision statement then come up with the next set of action
 - Big vision (both groups) first, then education, and finally break it up into two groups and figure out what our needs are from advisors
 - To what extent do we need machine learning? Maybe just trying different approaches?
 - (My question for Josh - where do you want to see machine learning taking place? - Maybe more education prior to asking)
- Dr. Jones will check on reserving a conference room in Durham
 - **Bijan** - double check that he does it this time :)
 - Meetings will be 2-3pm on Thursdays in 353 Durham
- **Tracy:** Email other team info
- **Everyone:** Tutorials, links - figure out what we want to do for a project

Summary of Weekly Client Meeting (2/9/2017):

- CANCELED THIS WEEK
- Moved to Mondays @ 7pm
 - Current Location: Meet by the Multimedia Wall in Coover
 - **Sean:** Get a more permanent location for client meetings
 - Coover 1012 has been reserved 2/20, 3/6, 4/3, and 4/17 for Client meetings
- Recap from Dec1710's client meeting 2/8/2017:
 - Look into Jetson TK1 approved cameras
 - Getting initial data to try out (Google maps or attaching a camera to a drone, pull stuff from the Internet)
 - Pro-process images (make them clearer)
 - Flight simulator, take many screenshots (classify if the image has the object or not)
 - Start with a red 'X' images
 - Implement image classifier (may have to make our own, but a pre-built one will get us started)
 - Work on examples and try to make them do more
 - Determine milestones
 - What needs to be done

- When it needs to be done
- If possible, what to do if the milestone cannot be reached
- Some focus:
 - Detect an object
 - Determine if a particular object is in the frame
 - Distance or relative position to the camera/drone
- Worries:
 - Space
 - Power, enough cpu

Summary of Advisor Meeting with Client (2/7/2017):

- Present: Josh Bertram, Bijan Choobineh, Darren Davis, Tracy La Van, Jesse Luedtke, David Schott, Robert Stemig
- The primary objective of the meeting was to discuss with the client what would be acceptable outcomes of this projects.
- Both the client and advisor agree that having a nice demo of the technology being explored would be a great outcome. Over the next 2-3 weeks the teams, working with the Advisors and Client, need to:
 - 1) Identify a list of features that could be demoed.
 - 2) Specify several alternatives for the final demo, beginning with an ideal demo which may be a bit aggressive for the team to accomplish, and then thoughts for how the demo could be gracefully scaled down as the team gets a better feel for the effort and time required to accomplish the idea demo
 - 3) The teams will need to discuss options for how to interact to work toward this end demo.