

sdmay18-03: Use of imaging devices and machine learning software to assist in autonomous veh

Week 7 Report

October 16 - October 25

Team Members

John — *Finished SSD paper*

Souparni — *Meeting Facilitator*

Fahmida — *Tester*

Ashley — *Document Manager*

Eric — *Webmaster*

Bowen — *Hardware Maintainer*

Summary of Progress this Report

Over this work period we gained access to a linux computer with a TitanX and cuda capabilities. We successfully installed and trained SSD on this computer and tested it to show about 77% accuracy. We also read the SSD paper, the YOLO paper (the paper on Darknet) and the YOLO 0900 paper (the paper on Darkflow). While reading through these research papers, we learnt that Darknet and Darkflow do not work well in unfamiliar aspect ratio and configurations while SSD works well in unfamiliar aspect ratios and configurations and also SSD has a higher mAP score compared to darknet and darkflow. In contrast, we discovered that SSD would work well with large and dissimilar objects which aligns well with the objects we need to identify - fences, terraces and ditches. So we have decided to work further with SSD and test it in real time.

Additionally, we set up ROS on two computers to work with the FieldSAFE data, and began researching different methodologies for determining distance from images.

Pending Issues

MobileNet-SSD was unable to find the OpenCV library on the TitanX computer and we do not have permissions to install anything on it.

We are also unable to run SSD in real time because we run it remotely.

Additionally, the ROS bag FieldSAFE files are up to 112 GB which we are currently unable to accommodate using VMs.

Plans for Upcoming Reporting Period

We plan to get try to get permissions on the TitanX computer so that we can install OpenCV and anything else we end up needing.

We are also going to test and run the SSD in real-time on a local machine and test its performance.

We will also try to train SSD on the farm images we have acquired so far, and begin implementing some distance determination tests.

Individual Contributions

Team Member	Contribution	Weekly Hours	Total Hours
John	Finished reading SSD paper and examined pros and cons when compared to YOLO. Installed ubuntu on a personal computer so	7	42.5

	that we could have SSD running on a computer without permission issues, but ran into more installation issues. Began experimenting with depth maps from stereo images in OpenCV.		
Souparni	Read SSD paper and compared the results against YOLO. Successfully installed the Caffe framework with the help of Xian, a graduate student upon the suggestion of Dr. Zambreno and was able to install SSD on a Linux box with a Titan X. Trained SSD on a dataset found online and tested it with 77% accuracy and mAP score on the training set to be 0.66. Worked with Bowen to figure out complications with training MobileNet-SSD (permission issues).	12	44.5
Fahmida	Read through YOLO paper and compared it against SSD. Setup and configured ROS on a virtual machine. Tried extracting images from FieldSAFE but ran into memory issues with the VM.	7	36.0
Ashley	Worked on scrapping images to use for training set but ran into issues saving pictures.	5	35.0
Eric	Worked through ROS tutorials to become familiar with the platform. Worked on implementing javascript to automatically upload reports to the website.	6	36.0
Bowen	Tried to install SSD locally on an Ubuntu computer but ran into errors. Worked on installing MobileNet-SSD on the Titan X box but ran into issues when it couldn't find OpenCV and we did not have permission to install it.	6	36.5