

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

Week 2 Report

September 7 - September 12

Team Members

John Orefice — *Communications lead*
Souparni Agnihotri — *Meeting Facilitator*
Fahmida Joyti — *Tester*
Ashley Dvorsky — *Document Manager*
Eric Himmelblau — *Webmaster*
Bowen Zhang — *Hardware Maintainer*

Summary of Progress this Report

We all spent the beginning of the work period trying to find sources to research neural nets and image recognition. We found out that Stanford has a class CS231n: Convolutional Neural Networks for Visual recognition which covers the basic concepts of neural networks and delves deeper into topics such as CNN architectures which would be very useful for our projects. Also, we found the documentation of OpenCV and video lectures of sentdex on OpenCV very helpful. Once we found this information, we created a resources doc in our google drive where we put all the links to useful resources in one place so everyone could access it, and we all began watching Stanford's lectures on convolutional neural nets. We learnt how to minimize loss functions in order to obtain an optimal model, so that it would assist us with training our convolutional neural network in the future. We also spent some time getting everyone on the same page with git, setting up our issue tracking platform (through git), creating github pages containing instructions on how to install relevant softwares like Opencv to assist members and made sure everyone had python and the required libraries installed, as well as learned how to perform computations on a GPU instead of CPU. We also researched information about the GPU used by our client: Nvidia TX2 GPU and found out that it is significantly slower than the GPUs in computer. Additionally, we brainstormed the basic aspects of our project such as its need, potential usefulness to the farmers and some competitors such as Tesla, John Deere and Nasa.

Pending Issues

As a team, we are still waiting to get a response from Dr. Stoytchev about his thoughts on the project. We are also still awaiting access to development hardware, but this should be taken care of by next Tuesday.

Plans for Upcoming Reporting Period

After meeting with our client today, we were tasked with doing further research into neural nets. We were also advised to get a local POC going, which could demonstrate recognition of arbitrary objects (even if they will not be used in practice), using the libraries and tools that SmartAg is currently using such as the Darknet. Darknet is an open source neural network originally in C. SmartAg uses the python version of it so we plan to look specifically into that. This will primarily serve to introduce our team to the specific technologies we will be using over the next two semesters. We also need to finish getting all of the necessary forms signed and

turned sent to their respective parties, so we are hoping to do that by the end of the week. Additionally, since we only have one team member with access to a powerful GPU, we may look into getting access to the game design lab on campus so that we can utilize the GPU's in those computers.

Individual Contributions

Team Member	Contribution	Weekly Hours	Total Hours
John Orefice	I handled all of the communications with the client and helped find resources to help research the project.	7	11
Souparni Agnihotri	Researched various aspects of deep learning and computer vision, shared machine learning slides from internship	7	11
Fahmida Joyti	Experimented with opencv image operations, thresholding, color filtering etc and familiarised with the basics of neural network	7	11
Ashley Dvorsky	Researched topics related to deep learning and computer vision	7	10
Eric Himmelblau	Researched topics related to deep learning and computer vision	7	9
Bowen Zhang	Researched topics related to deep learning and computer vision, got familiar with git	6	9