Team 3 Bi-weekly Report : 02
January 27th - February 9th

Summary

- We did more research and proof of concept work with regards to the distance calculation system since we did not have any hardware to actually implement it with, however we obtained cameras to use at the end of this work period
- We were able to get the objects trained and the NN was able to recognize the objects but accuracy is not very good in real-time.

Pending Issues

- Improving accuracy of the images detected.

Plans for the Upcoming Work Period

- We have obtained a pair of stereo cameras from SmartAg, so we will calibrate them and begin implementing and testing the distance calculation system
- We are planning on exploring a different NN and testing to see if our accuracy improves on that neural network.
- Make a report of the loss, accuracy and things learned during training.
- Figuring out how to output 3D pixel coordinates for the object detected.

Individual Contributions

John:

- Team Role: Communications Lead
- Contribution:
    - Researched neural networks provided by SmartAg to measure distance and determined that they will not likely be the best option for out project
    - Simulated distance measurements using triangle similarity to understand how accuracy changes with distance as well as with errors in original size estimation. This turned out to be a substantial error, so we will not go with this route.
    - Wrote a python script to find an object in an image, if its location is already known in a matching stereo image
- Hours Worked: 9
- Total Hours: 14

Souparni:

- Team Role: Meeting Facilitator
- Contribution
    - Collaborated with Bowen and Eric to train the MobileNet SSD on the Amazon EC2
    - Acquired more images (of tractors, combines and farm animals) for training.
    - Tried to sort out issues with training of multiple objects.
    - Discussed with group about ways to implement getting the 3D pixel coordinates from picture.
- Hours Worked: 7
- Total Hours: 15

Fahmida:

- Team Role: Tester
- Contribution:
    - Read Depthnet and w-net papers to determine their feasibility in calculating distance
    - Researched on calibration of cameras using OpenCV, stereo correspondence and creating disparity map from two webcam feeds
    - Experimented with code examples of Epipolar Geometry and optical flow examples provided by OpenCV to get a better understanding of pixel movement works
- Hours Worked: 8
- Total Hours: 13

Ashley:

- Team Role: Document Manager
- Contribution:
    - Read documentation on Smart-Ags provided neural network
    - Researched how to take a live input stream and collect the different frames for distance calculation
- Hours Worked: 9
- Total Hours: 15

Eric:

- Team Role: Webmaster
- Contribution:
    - Collaborated with Bowen and Soup to train the MobileNet SSD on the Amazon EC2
    - Researched information of working with bounding boxes in tensorflow to figure out how to output 3D pixel coordinates for the object detected

- Hours worked: 6

- Total Hours: 13

Bowen:

- Team Role: Hardware Maintainer
- Contribution:
    - Trained the fence data and testing the results.
    - Setup environment for Tensorflow object detection.
    - Trained tractors, combines, animals, and fence together and testing the results.
    - Hours Worked: 8
- Total Hours: 16