Week 1

Progress:

Wednesday – Cloned the GitHub repo https://github.com/matterport/Mask_RCNN (Links to an external site.)Links to an external site. for a segmination network. We will be using this network to identify a patance hand in an image and crop it out for our bio-marker network.

Thursday – Worked on configuration bugs for the cloned repo.

Friday - Fixed all bugs on my end for the network. however a single epoch of training time will take me over 2 hours. It is suggested at least 100 epochs. So, a total of 200 hours.

Problems:

Training time has been the biggest issue this week. We moved it to Chases computer, as he has a NVIDIA card, to train. But, we ran into version configuration issues. As of submitting this document we are currently working on resolving this issue.

Plans:

We plane to fix all bugs with this network then precede to train it on a hand data set. Once the network identifies hands we will scale it down to a mobile version.

Week 2

Progress:

This week I had to fly to Baltimore Maryland for a three day job interview, so I was not able to work on the capstone project Tuesday through Friday. I did however, find a new paper published on identifying mental disability's based off an individuals face. This is interesting and relates to our project because prototypes were successfully extracted from just an image of a face.

Problems:

My main problem is not having access to hardware. This has almost stopped me in my tracks from working with Tensorflow or Keras. My machine will use 100% of its resources for me to wait 3 hours for a very small set of data.

Plans:

Currently Chase is the only one in our group that has a cuda supported graphics card. I plan to meet with him tomorrow to continue working on the project and also to work on coordinating our elevator pitches.

Week 3

Progress:

I thought I submitted this but I suppose it never processed.

The only progress I've made during this week was setting up my own personal Amazon web server. I will be using this to explore training our Mask RCNN network.

Problems:

Problems again during this week were still hardware related.

Plans:

For this week I will continue investigating the training methods for the Mask RCNN.

Again my apologies. I am unsure why this never successfully submitted.

Week 4

Progress:

This week I've been following a few blog post from others who have successfully trained the Mask RCNN network on their own data sets. So far I have had some success getting training and validation images segmented out by the end of Today (Thursday) or Friday the 1st, I plan to have a proof of concept network running.

Problems:

The main issue for me currently is bugs. In one of the python files (model.py) I had to fix a few deprecated Keras functions.

Plans:

I plan to have a proof of concept network done by the end of the work week.

Week 5

Progress:

Monday - Working on getting on my own personal AWS. Was fixing bugs relating to the mask rcnn network and tensorflow-gpu.

Tuesday - Continued on the same issues from Monday.

Wednesday - Continued with the same issues from Monday and Tuesday.

Thursday - Fixed my bug issues from Monday - Wednesday. Was able to finally train my first network. Also received access from Keven to the school's AWS account.

Friday - Produced our first segmented image after 3 training epochs. Seen below.

Problems:

The Problems I was running into all related to how TensorFlow interacted with the GPU on AWS. This has been resolved. Once we have a well trained network I will need to move to the next phase of image processing. This next phase will be to remove the gray scaled background data that is irrelevant to the image.

Plans:

Will XOR or AND a full gray scaled image with the segmented image on condition True. The resulting image will force the pixels of background data to [0,0,0].

Week 6

Progress:

Monday - I ran a training session using data Chase labeled.

Tuesday - Did not work on anything this day, was studying for a midterm on Wednesday.

Wednesday - Labeled 80 images to train and validated on. Did not notice much improvement at this point unless the hand was coming from the top of the image.

Thursday - Did not work on the project this day as I was studying for my midterm on Friday.

Friday - Will be labeling rotated images.

Problems:

The segmentation network is cutting off parts of the hand if the hand comes from the left, right, or bottom of the image.

Plans:

To fix this we will need to rotate the images we have not used and label them. All the hands from the 11k data set we are using start form the top of the image.

Week 7

Progress:

Monday - Annotated 75 more images for training. The training increased the accuracy of the segmentation network do to having more rotated images.

Tuesday - Wrote a script using the mask rcnn API to to work with opencv for image annotation from a live video stream. Issue: need a more powerful GPU for live video my cpu will not work for this.

Wednesday - Worked on a webcam client server for taking video from my machine moving it up to the AWS for processing. The processed image would then be sent back to my machine for display.

Thursday - Finished working on the web cam server client. Issue: only works well on a local network, trying to send the images to AWS results in image tarring because I chose to use a UDP stream.

Friday - Spent five hours today trying to resolve this image taring but have had no success.

Problems/Plans:

If we are going to show a live example of our application at expo we have two options. (1) obtain a gpu to handle the processing for us. (2) resolve the web camera issue as stated on Thursday and Friday. However, another issue with this solution that needs to be taken into account is that we will need to preform some sort of port forwarding if we are to do this. The solution that might fix both of these issues, I have yet to explore, is to send the data from the web camera to the server, however, have the server displays the data on a web page instead of sending data back to the client. This removes the need to port forward and may remove the screen taring issue.

Week 8

Progress:

Monday - Finished working on the progress report with Chase and Jared.

Tuesday - Focused on other classes.

Wednesday - Focused on Other Classes.

Thursday - Fixed the webcam server client application, and integrated it into the instance segmentation network.

Friday - Have a bunch of reading to catch up on. But, if I finish all that before 8:30 I will continue reading architectures of Imagenet winners. I've been looking for a good network model that might help wit extracting information from the hand for inference. Will probably use the ZF model.

Problems/Plans:

I was able to fix the webcam server and client by watching the TCP data exchange using Wireshark. This will allow us to demonstrate live image segmentation so long as we can connect to a live internet connection. This will also allow machines with little processing power to take advantage of the same technology. In the image above you can see it running a weights trained on the coco data sets. This is a proof of concept above and will be used to preform live segmentation on individuals hands at expo. I may need to go back through and create documentation for the code and how to use the software.

The next issue I know I will struggle with is teaching a neural network to look for patterns that suggest disease activity in a patients hand. Not sure how to force that behavior. Still digging around for a solution.

Week 9

Progress:

Monday - Not able to work on project this day.

Tuesday - Not able to work on project this day.

Wednesday -. Worked with Chase on how we might host images to be segmented by the AWS mechanical turk.

Thursday - Looked into modifying the network to just do bounding box classification.

Friday - Not able to work on project this day.

Problems/Plans:

Modifying the network to only implement bounding boxes should not be to difficult. I would like to set up a meeting with Jared so we can integrate the segmentation network with the application's server next week. Possibly this weekend.

Week 10

Progress:

Monday - Was working on material for other Classes this day.

Tuesday - Met with Jared and Chase. Jared and I discussed how to merge the neural network and the app he has been working on.

Wednesday - Was working on material for other Classes this day.

Thursday - Was working on material for other Classes this day.

Friday - Will be looking into assisting Chase with modifying the VGA segmentation tool to allow those that work for Amazon's Mechanical Turk to have easy access to the images we need segmented and to make documentation easier.

Problems/Plans:

I need to modify the neural network server code I made to expect a single image and not a stream of images for Jared's app. I also need to fix a session disconnect issue. Will also later today be looking into modifying the VGA segmentation tool to assist Chase.