Individual Report

Introduction:

The main aim of our project was to translate our learnings which we have gained through the whole semester and bring out a Deep Learning project using neural networks. We thought of using Convolution Neural Networks by using different models and comparing them. We were looking forward to do it in different frameworks and then analyze which one of them is better in terms of the speed, accuracy and the ease of use.

About the Dataset:

We used ASL alphabet classification dataset. The data set is a collection of images of alphabets from the American Sign Language, separated in 29 folders which represent the various classes. Each folder has images of different alphabets and has different folders for Space, Delete and Nothing. The training data set contains 87,000 images which are 200x200 pixels. There are 29 classes, of which 26 are for the letters A-Z and 3 classes for *SPACE*, *DELETE* and *NOTHING*. These 3 classes are very helpful in real time applications, and classification. The test data set contains a mere 29 images, to encourage the use of real-world test images.

Why this Dataset:

Our aim was to do image classification and try to contribute something with the help of our project. While going through the web we found out a lot of different datasets and because we wanted to do something like this only so we thought of going forward with this. It is very difficult to understand sign language and looking at this dataset we wanted to see if we could classify the alphabets. If we are able to do this we could also build something to read the whole sign language.

Individual Work:

We all divided the work in such a way that there is not much pressure on anyone. My task was to work with cloud, load the data and then help Junior with the validation and visualization of the work he will do. We tried two frameworks tensorflow and pytorch. We started our project by taking a subset of the data we have instead of taking the full dataset at once. We took 4 classes A,B,C,D and started working on it. We started with using tensorflow but realized that we are not very familiar with that so have to switch all our work to pytorch. We started loading the data we had and prepared three models.

I started my work by creating a bucket in Google cloud and saving the data on it, but was facing a lot of problems while doing so. Due to some issues the data was not loading onto the cloud and was stopping and breaking in between. So, I shifted to AWS and created a S3 bucket. I made it public so that people can download the file from it by using the wget command directly from the terminal. I uploaded a zip file since the data was too big to upload quickly. I also created a script which could unzip the file and save it in the same directory.

I then loaded the data which would read all the files at once and since we have data in different folders with the name of the folder as the labels, we found a similar code online which would take the data from the folder and take the label from the name of the folder and used it. We also did some data preprocessing by splitting the data into test and train. Following that Junior worked on the models and we prepared three models which we used in our project and compared those.

We found out that the way we are loading the data is not good enough because it was changing the structure of the data we have so junior found out another way of doing it by loading the data converting it into numpy and then splitting the data in test, train and validation set, and then converting it back to pytorch compatible data.

We found out our accuracy to be 97%. I created a ROC curve and tried creating confusion matrix from the code we wrote in exam1. I was able to create the ROC curve but was unable to figure out creating the confusion matrix. I have put all my codes in the folder as mentioned.

My task was also to help junior with whatever material he wants to work. We decide to use tensorboard but since pytorch doesn't have it we decided to go with tensorboardX which is similar to tensboard and helped him connect to it so that he can get figures out of it, whatever he required.

Learnings

The first thing I learned in this project is team work. How tasks are divided and how to acknowledge the work done by your teammates. Now the tasks I was given doesn't involve much result oriented work but I was able to learn a lot from the work I had done. I was able to work somewhat with cloud and also was able to figure out problems that we could face at the first stage of data loading. I learned some new techniques for data preprocessing. My task involves a lot of reading and I also learned a lot about the models we used and how they work.

Percentage of code copied : 73%(Approx)

References:

https://github.com/lanpa/tensorboardX/blob/master/docs/tutorial.rst

https://tensorboardx.readthedocs.io/en/latest/tutorial.html

https://docs.aws.amazon.com/AmazonS3/latest/dev/UsingBucket.html

Deep Learning with Pytorch by Vishnu Subramanian

Exam 1