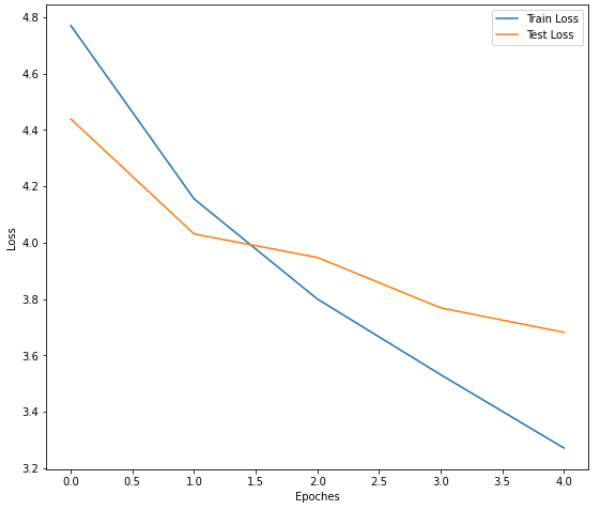
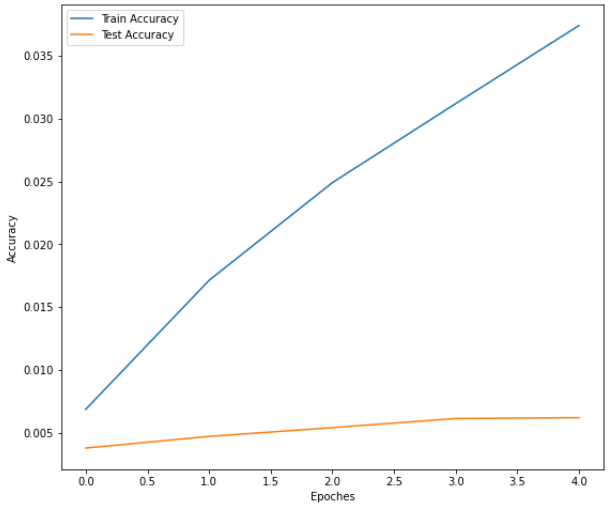
DLOps_Assignment: 1

- Import required libraries
- Write device agnostic code for check device it is GPU or CPU
- Get Image net dataset
- Preprocess row dataset
- Get train and test dataset
- Visualize the data
- Make data loader with 32 batch size
- For restriction in gpu i reduce some train data
- Build the ResNet18 model
- Make train and test loop
- Write plot function for loss and accuracy
- Take multiclass accuracy function as accuracy function
- Create cross entropy loss and Central loss from scratch
- Now train model for cross entropy and central loss respectively

CrossEntropyLoss:

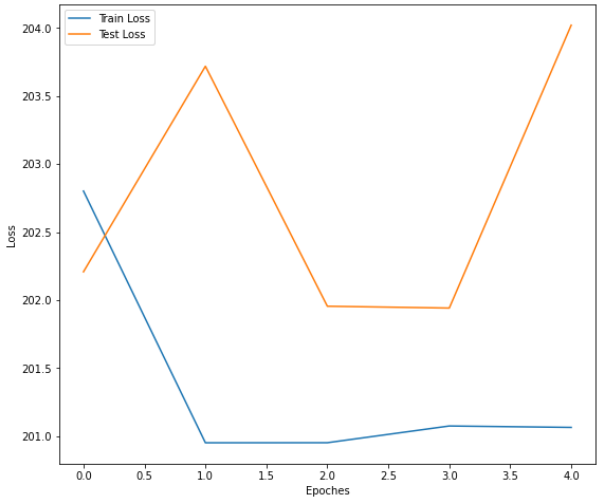
```
Epoch: 1  Train Loss: 4.7711 | Test Loss: 4.4392 | Train Accuray: 0.0069 |
Test Accuracy: 0.0038
Epoch: 2  Train Loss: 4.1556 | Test Loss: 4.0311 | Train Accuray: 0.0171 |
Test Accuracy: 0.0047
Epoch: 3  Train Loss: 3.8001 | Test Loss: 3.9476 | Train Accuray: 0.0249 |
Test Accuracy: 0.0054
Epoch: 4  Train Loss: 3.5315 | Test Loss: 3.7686 | Train Accuray: 0.0312 |
Test Accuracy: 0.0061
Epoch: 5  Train Loss: 3.2710 | Test Loss: 3.6820 | Train Accuray: 0.0374 |
Test Accuracy: 0.0062
```

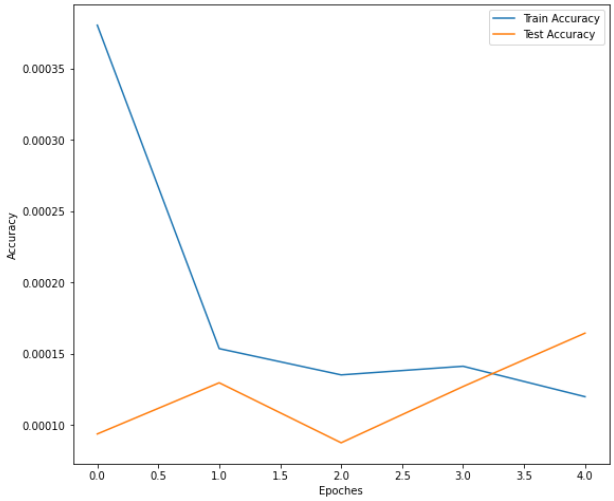




Central Loss:

```
Epoch: 1   Train Loss: 202.8013 | Test Loss: 202.2077 | Train Accuray:
0.0004 | Test Accuracy: 0.0001
Epoch: 2   Train Loss: 200.9506 | Test Loss: 203.7187 | Train Accuray:
0.0002 | Test Accuracy: 0.0001
Epoch: 3   Train Loss: 200.9510 | Test Loss: 201.9545 | Train Accuray:
0.0001 | Test Accuracy: 0.0001
Epoch: 4   Train Loss: 201.0740 | Test Loss: 201.9410 | Train Accuray:
0.0001 | Test Accuracy: 0.0001
Epoch: 5   Train Loss: 201.0635 | Test Loss: 204.0206 | Train Accuray:
0.0001 | Test Accuracy: 0.0002
```





Reference:

https://medium.com/@Skpd/triplet-loss-on-imagenet-dataset-a2b29b8c2952

https://www.kaggle.com/code/hirotaka0122/triplet-loss-with-pytorch/notebook

Pytorch official documentation