Assignment 4 – Neural Networks

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Part B:

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1 )   moving van : 1065
2 )   fox squirrel, eastern fox squirrel, Sciurus niger : 627
3 )   sorrel : 331
4 )   container ship, containership, container vessel : 285
5 )   English foxhound : 259
6 )   milk can : 232
7 )   Japanese spaniel : 224
8 )   thresher, thrasher, threshing machine : 224
9 )   Dandie Dinmont, Dandie Dinmont terrier : 220
10 )  chain saw, chainsaw : 171
```

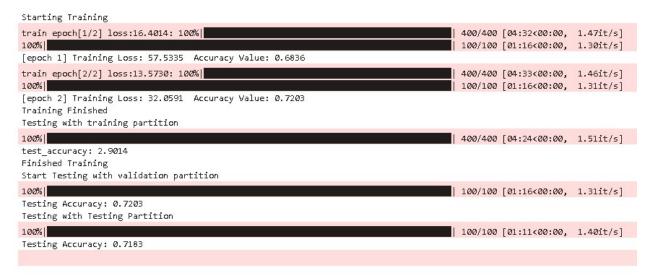| AlexNet CIFAR-10	CCCV	CSC	DDDDT	EF	FESS	JS	MC	MV	SO	TTTM
AM	0	0	0	0	1	0	0	0	0	0
AP	0	0	0	0	0	0	0	1	0	0
B	0	0	0	0	0	0	0	0	1	0
C	1	0	0	0	0	0	0	0	0	0
DG	0	0	0	0	0	0	1	0	0	0
DR	0	0	0	1	0	0	0	0	0	0
FG	0	0	0	0	0	1	0	0	0	0
H	0	0	0	0	0	0	0	0	0	1
S	0	0	1	0	0	0	0	0	0	0
T	0	1	0	0	0	0	0	0	0	0

*NOTE: All the names are acronyms using the first letters

Part C:

```
Starting Training
Train epoch[1/2] loss:0.7377: 100%|███████████████████████| 400/400 [04:22<00:00,  1.52it/s]
100%|███████████████████████████████████████████████████| 100/100 [01:12<00:00,  1.38it/s]
[epoch 1] training loss: 0.8946  value accuracy: 0.7297
Train epoch[2/2] loss:0.6900: 100%|███████████████████████| 400/400 [04:17<00:00,  1.55it/s]
100%|███████████████████████████████████████████████████| 100/100 [01:13<00:00,  1.37it/s]
[epoch 2] training loss: 0.7141  value accuracy: 0.7449
Training Finished
Starting to test with train partition
100%|███████████████████████████████████████████████████| 400/400 [04:13<00:00,  1.58it/s]
Testing accuracy: 3.0364
Start Testing with valadation partition
100%|███████████████████████████████████████████████████| 100/100 [01:12<00:00,  1.37it/s]
Testing Accuracy: 0.7449
Testing with Test Partition
100%|███████████████████████████████████████████████████| 100/100 [01:08<00:00,  1.46it/s]
testing accuracy: 0.7454
```

Part D:

```
Starting Training
train epoch[1/2] loss:16.4014: 100%|██████████████████████| 400/400 [04:32<00:00,  1.47it/s]
100%|███████████████████████████████████████████████████| 100/100 [01:16<00:00,  1.30it/s]
[epoch 1] Training Loss: 57.5335  Accuracy Value: 0.6836
train epoch[2/2] loss:13.5730: 100%|██████████████████████| 400/400 [04:33<00:00,  1.46it/s]
100%|███████████████████████████████████████████████████| 100/100 [01:16<00:00,  1.31it/s]
[epoch 2] Training Loss: 32.0591  Accuracy Value: 0.7203
Training Finished
Testing with training partition
100%|███████████████████████████████████████████████████| 400/400 [04:24<00:00,  1.51it/s]
test_accuracy: 2.9014
Finished Training
Start Testing with validation partition
100%|███████████████████████████████████████████████████| 100/100 [01:16<00:00,  1.31it/s]
Testing Accuracy: 0.7203
Testing with Testing Partition
100%|███████████████████████████████████████████████████| 100/100 [01:11<00:00,  1.40it/s]
Testing Accuracy: 0.7183
```

- Classifiers were trained using 2 epochs
- Training loss for fc7 layer was higher, but accuracy was still similar
- Testing with the training partition for the CIFAR-10 data resulted in the fc6 layer having higher accuracy
- Testing with validation and testing with test partition also had higher accuracy in fc6 layer, concluding fc6 classifier is more accurate.
- Possibly since it minimizes gradient loss