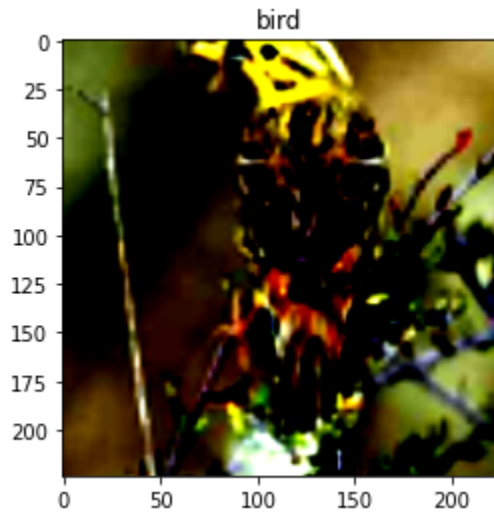


### Assignment: 3

- Import required libraries
- Write device agnostic code for check device it is GPU or CPU
- Load pretrained ResNet18 on Imagenet from pytorch.
- My roll no is M22CS061 (odd) data set is STL10
- Make data loader of train and test with 32 batch size
- Visualize the data



- Write the train and test loop for the model
- Take cross entropy as loss function and use torch metrics as accuracy function

## RMSprop:

Hyper parameter:

```
lr_rate = [0.1,0.01] # learning rate
alpha = [0.85,0.95] # smoothing constant
momentum = [0.88,0.99] # momentum factor
eps = [1e-5,1e-7] # term added to the denominator to improve
numerical stability
```

current exp | total: 1 | 16

Training with --- lr rate: 0.1, alpha: 0.85, momentum: 0.88, eps: 1e-05

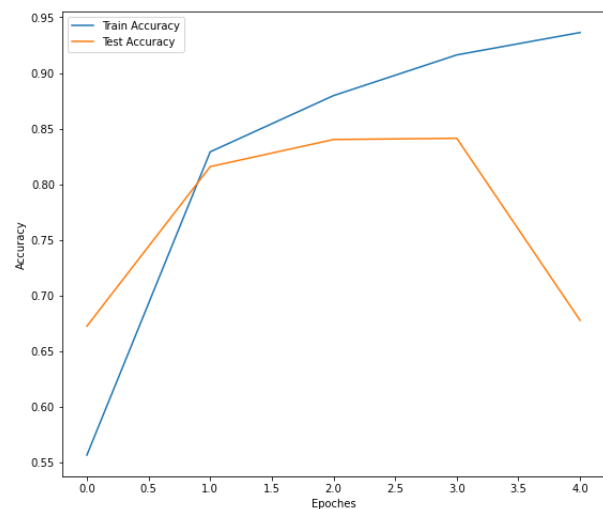
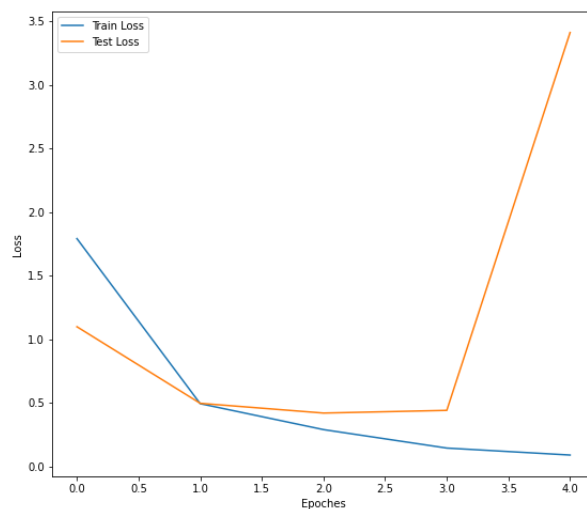
Epoch: 1 Train Loss: 1.7906 | Test Loss: 1.0975 | Train Accuray: 0.5566 | Test Accuracy: 0.6725

Epoch: 2 Train Loss: 0.4922 | Test Loss: 0.4953 | Train Accuray: 0.8291 | Test Accuracy: 0.8158

Epoch: 3 Train Loss: 0.2885 | Test Loss: 0.4186 | Train Accuray: 0.8796 | Test Accuracy: 0.8402

Epoch: 4 Train Loss: 0.1433 | Test Loss: 0.4398 | Train Accuray: 0.9162 | Test Accuracy: 0.8413

Epoch: 5 Train Loss: 0.0884 | Test Loss: 3.4110 | Train Accuray: 0.9363 | Test Accuracy: 0.6776



current exp | total: 2 | 16

Training with --- lr rate: 0.1, alpha: 0.85, momentum: 0.88, eps: 1e-07

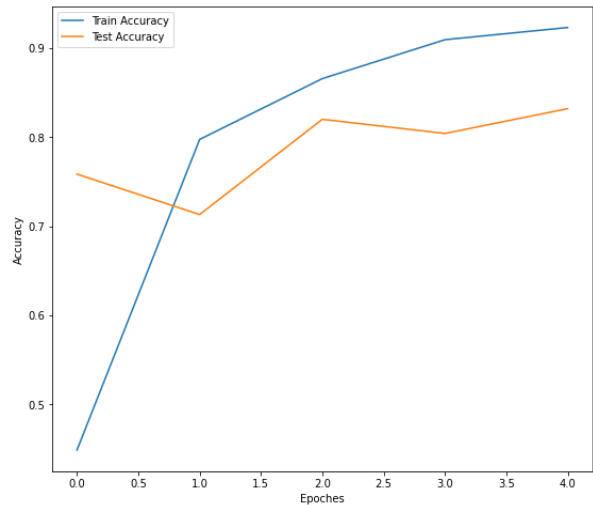
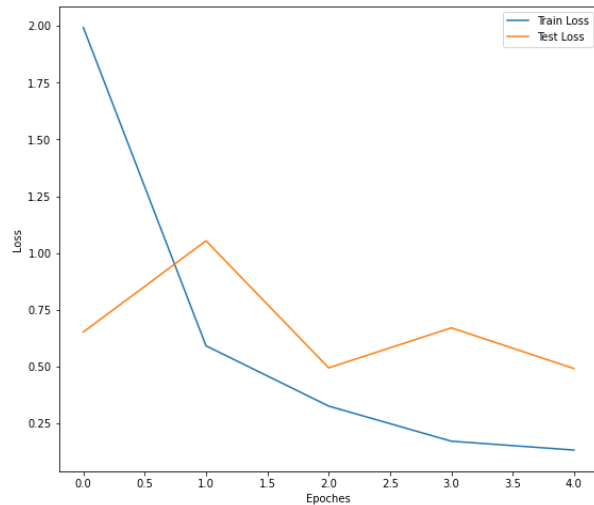
Epoch: 1 Train Loss: 1.9924 | Test Loss: 0.6528 | Train Accuray: 0.4488 | Test Accuracy: 0.7585

Epoch: 2 Train Loss: 0.5919 | Test Loss: 1.0538 | Train Accuray: 0.7974 | Test Accuracy: 0.7131

Epoch: 3 Train Loss: 0.3266 | Test Loss: 0.4948 | Train Accuray: 0.8657 | Test Accuracy: 0.8200

Epoch: 4 Train Loss: 0.1720 | Test Loss: 0.6708 | Train Accuray: 0.9093 | Test Accuracy: 0.8041

Epoch: 5 Train Loss: 0.1330 | Test Loss: 0.4917 | Train Accuray: 0.9230 | Test Accuracy: 0.8319



current exp | total: 3 | 16

Training with --- lr rate: 0.1, alpha: 0.85, momentum: 0.99, eps: 1e-05

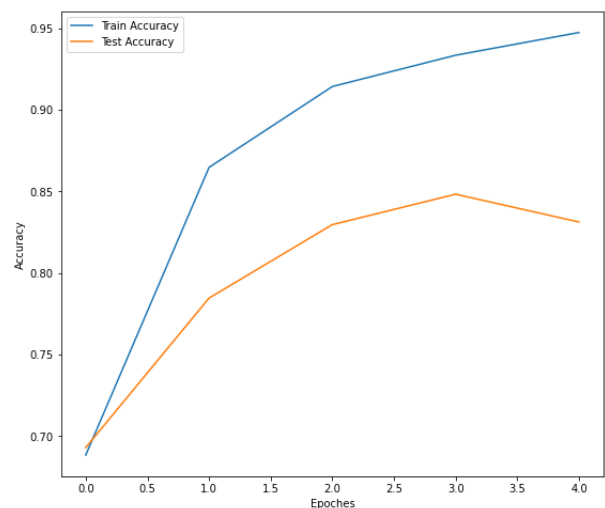
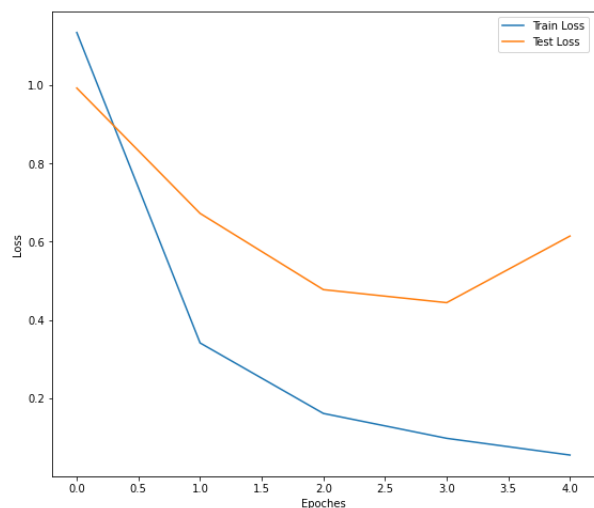
Epoch: 1 Train Loss: 1.1350 | Test Loss: 0.9930 | Train Accuray: 0.6885 | Test Accuracy: 0.6931

Epoch: 2 Train Loss: 0.3412 | Test Loss: 0.6725 | Train Accuray: 0.8648 | Test Accuracy: 0.7846

Epoch: 3 Train Loss: 0.1610 | Test Loss: 0.4775 | Train Accuray: 0.9143 | Test Accuracy: 0.8297

Epoch: 4 Train Loss: 0.0973 | Test Loss: 0.4442 | Train Accuray: 0.9335 | Test Accuracy: 0.8483

Epoch: 5 Train Loss: 0.0546 | Test Loss: 0.6146 | Train Accuray: 0.9474 | Test Accuracy: 0.8313



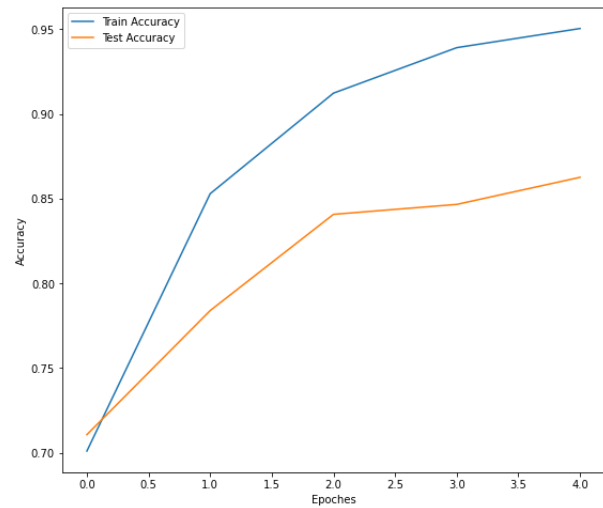
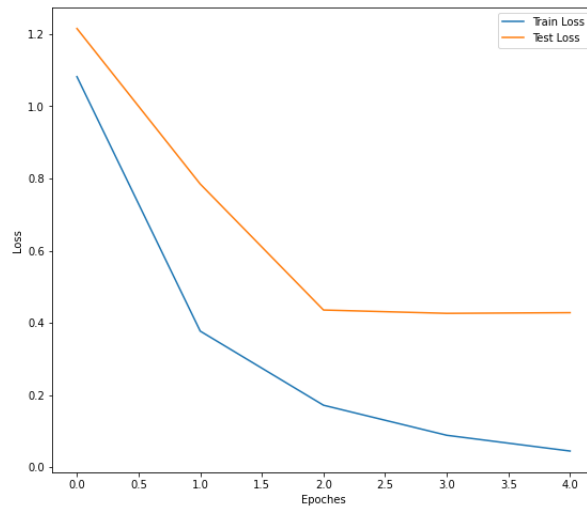
current exp | total: 4 | 16

Training with --- lr rate: 0.1, alpha: 0.85, momentum: 0.99, eps: 1e-07

Epoch: 1 Train Loss: 1.0820 | Test Loss: 1.2154 | Train Accuray: 0.7011 | Test Accuracy: 0.7108

Epoch: 2 Train Loss: 0.3772 | Test Loss: 0.7847 | Train Accuray: 0.8530 | Test Accuracy: 0.7840

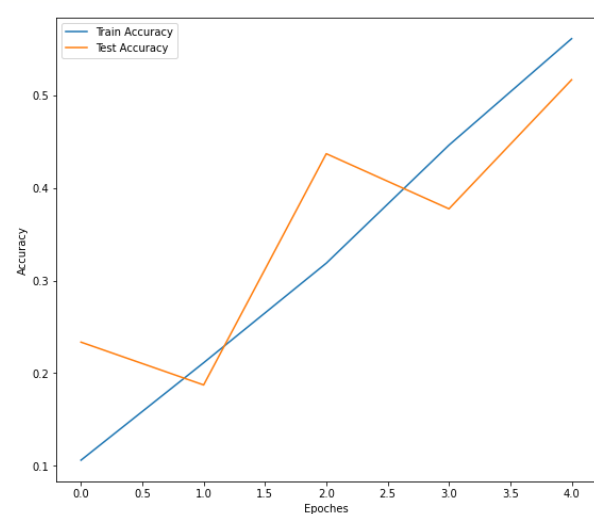
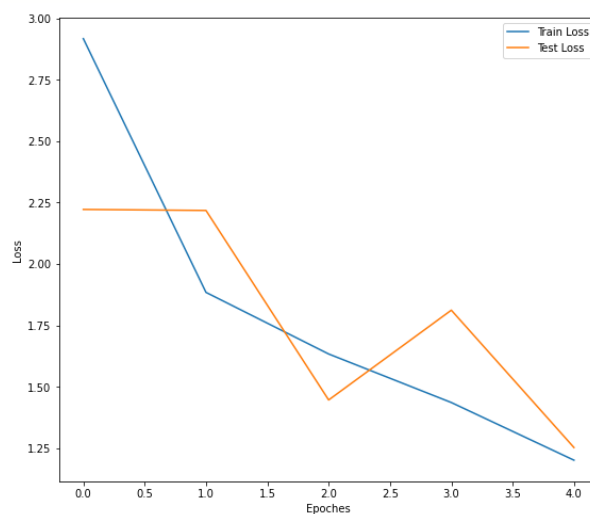
Epoch: 3 Train Loss: 0.1718 | Test Loss: 0.4356 | Train Accuray: 0.9123 | Test Accuracy: 0.8408  
 Epoch: 4 Train Loss: 0.0886 | Test Loss: 0.4263 | Train Accuray: 0.9392 | Test Accuracy: 0.8467  
 Epoch: 5 Train Loss: 0.0449 | Test Loss: 0.4282 | Train Accuray: 0.9505 | Test Accuracy: 0.8627



current exp | total: 5 | 16

Training with --- lr rate: 0.1, alpha: 0.95, momentum: 0.88, eps: 1e-05

Epoch: 1 Train Loss: 2.9176 | Test Loss: 2.2220 | Train Accuray: 0.1058 | Test Accuracy: 0.2334  
 Epoch: 2 Train Loss: 1.8841 | Test Loss: 2.2178 | Train Accuray: 0.2111 | Test Accuracy: 0.1871  
 Epoch: 3 Train Loss: 1.6332 | Test Loss: 1.4459 | Train Accuray: 0.3188 | Test Accuracy: 0.4371  
 Epoch: 4 Train Loss: 1.4355 | Test Loss: 1.8116 | Train Accuray: 0.4463 | Test Accuracy: 0.3775  
 Epoch: 5 Train Loss: 1.2005 | Test Loss: 1.2521 | Train Accuray: 0.5614 | Test Accuracy: 0.5170



current exp | total: 6 | 16

Training with --- lr rate: 0.1, alpha: 0.95, momentum: 0.88, eps: 1e-07

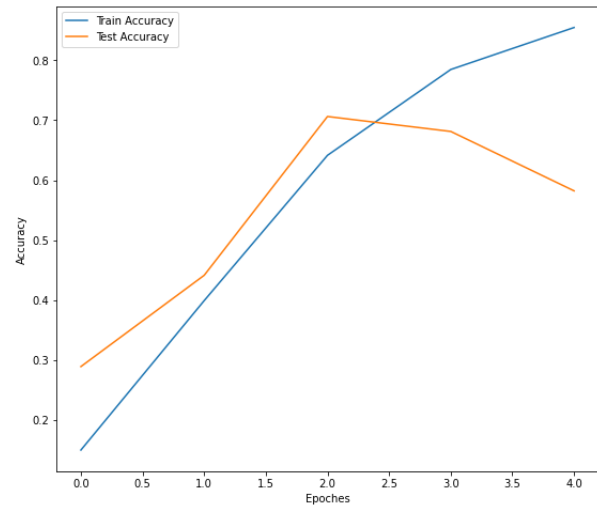
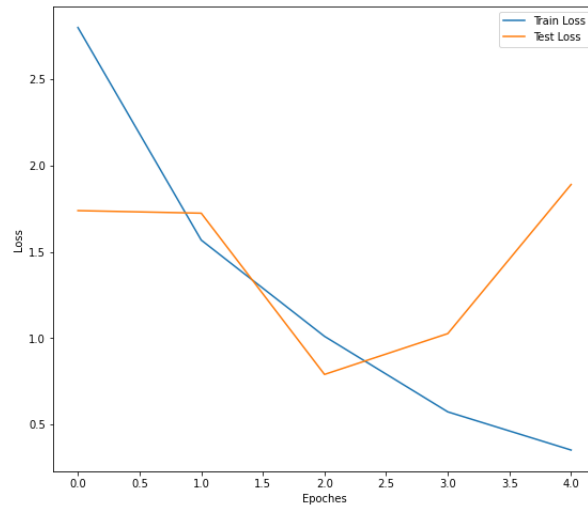
Epoch: 1 Train Loss: 2.7997 | Test Loss: 1.7391 | Train Accuray: 0.1502 | Test Accuracy: 0.2894

Epoch: 2 Train Loss: 1.5685 | Test Loss: 1.7242 | Train Accuray: 0.3993 | Test Accuracy: 0.4416

Epoch: 3 Train Loss: 1.0108 | Test Loss: 0.7903 | Train Accuray: 0.6416 | Test Accuracy: 0.7063

Epoch: 4 Train Loss: 0.5734 | Test Loss: 1.0268 | Train Accuray: 0.7847 | Test Accuracy: 0.6814

Epoch: 5 Train Loss: 0.3522 | Test Loss: 1.8904 | Train Accuray: 0.8547 | Test Accuracy: 0.5824



current exp | total: 7 | 16

Training with --- lr rate: 0.1, alpha: 0.95, momentum: 0.99, eps: 1e-05

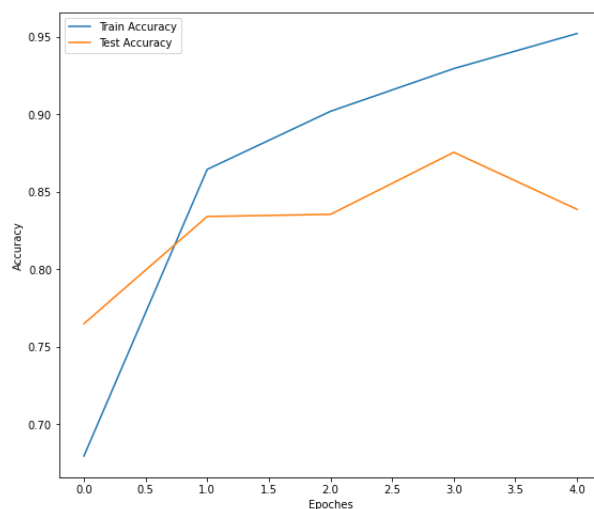
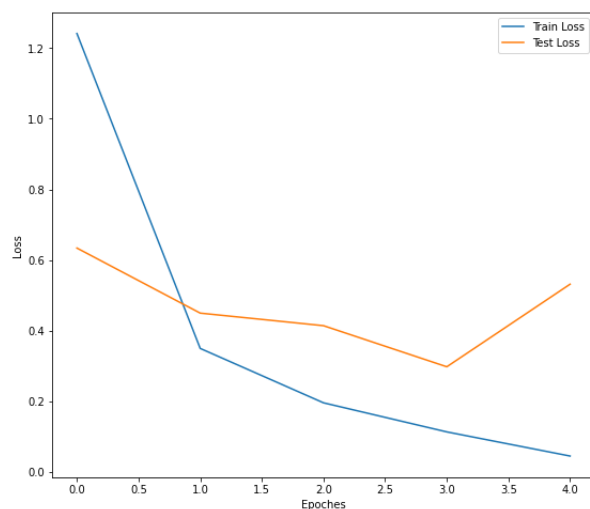
Epoch: 1 Train Loss: 1.2413 | Test Loss: 0.6339 | Train Accuray: 0.6796 | Test Accuracy: 0.7650

Epoch: 2 Train Loss: 0.3498 | Test Loss: 0.4497 | Train Accuray: 0.8646 | Test Accuracy: 0.8342

Epoch: 3 Train Loss: 0.1958 | Test Loss: 0.4141 | Train Accuray: 0.9021 | Test Accuracy: 0.8356

Epoch: 4 Train Loss: 0.1134 | Test Loss: 0.2978 | Train Accuray: 0.9297 | Test Accuracy: 0.8756

Epoch: 5 Train Loss: 0.0451 | Test Loss: 0.5316 | Train Accuray: 0.9523 | Test Accuracy: 0.8388



current exp | total: 8 | 16

Training with --- lr rate: 0.1, alpha: 0.95, momentum: 0.99, eps: 1e-07

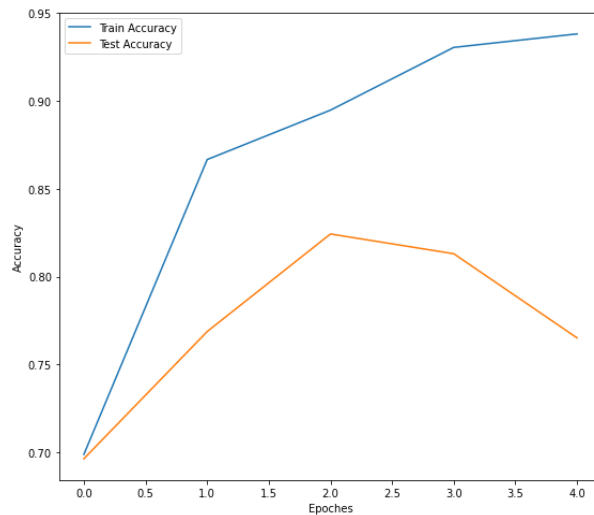
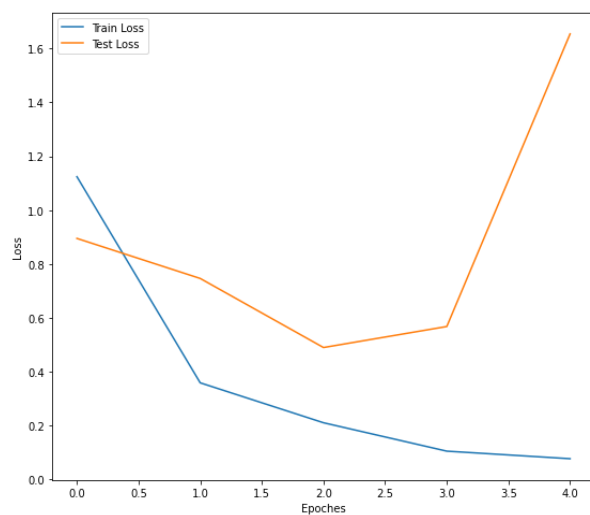
Epoch: 1 Train Loss: 1.1240 | Test Loss: 0.8949 | Train Accuray: 0.6988 | Test Accuracy: 0.6964

Epoch: 2 Train Loss: 0.3586 | Test Loss: 0.7462 | Train Accuray: 0.8666 | Test Accuracy: 0.7687

Epoch: 3 Train Loss: 0.2104 | Test Loss: 0.4896 | Train Accuray: 0.8947 | Test Accuracy: 0.8243

Epoch: 4 Train Loss: 0.1049 | Test Loss: 0.5677 | Train Accuray: 0.9305 | Test Accuracy: 0.8130

Epoch: 5 Train Loss: 0.0768 | Test Loss: 1.6543 | Train Accuray: 0.9381 | Test Accuracy: 0.7651



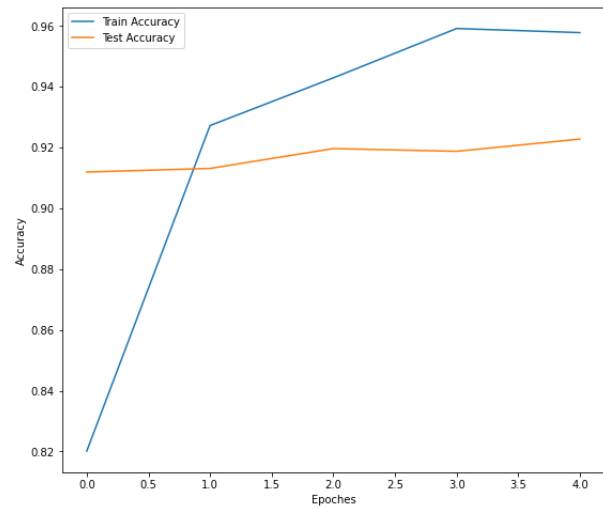
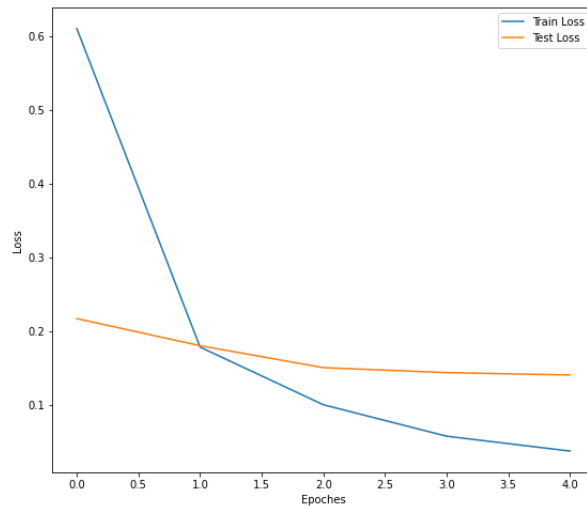
current exp | total: 9 | 16

Training with --- lr rate: 0.01, alpha: 0.85, momentum: 0.88, eps: 1e-05

Epoch: 1 Train Loss: 0.6108 | Test Loss: 0.2175 | Train Accuray: 0.8201 | Test Accuracy: 0.9119

Epoch: 2 Train Loss: 0.1789 | Test Loss: 0.1807 | Train Accuray: 0.9272 | Test Accuracy: 0.9131

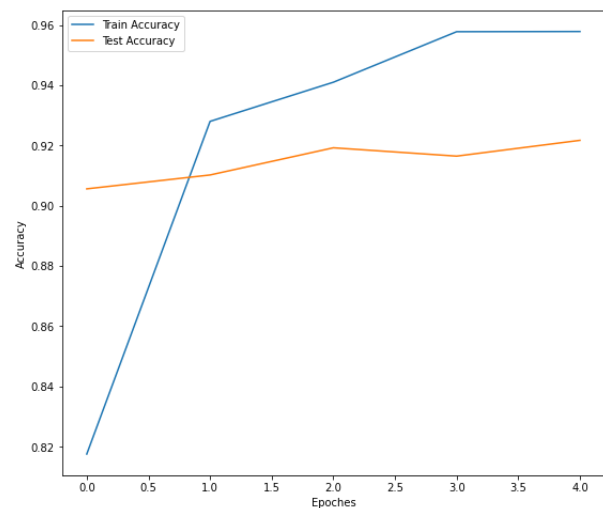
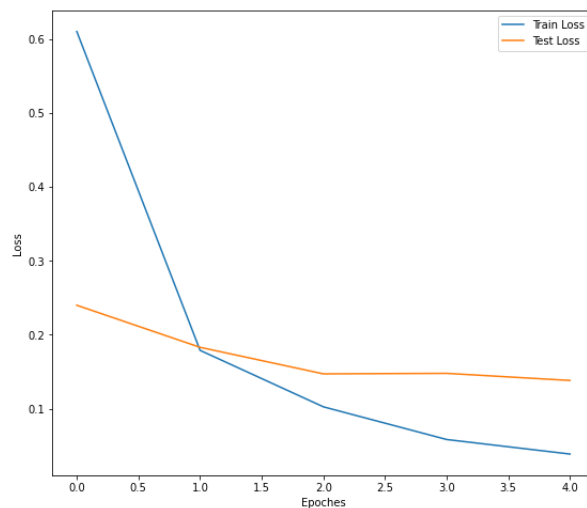
Epoch: 3 Train Loss: 0.1007 | Test Loss: 0.1510 | Train Accuray: 0.9429 | Test Accuracy: 0.9197  
Epoch: 4 Train Loss: 0.0580 | Test Loss: 0.1443 | Train Accuray: 0.9592 | Test Accuracy: 0.9188  
Epoch: 5 Train Loss: 0.0379 | Test Loss: 0.1410 | Train Accuray: 0.9578 | Test Accuracy: 0.9228



current exp | total: 10 | 16

Training with --- lr rate: 0.01, alpha: 0.85, momentum: 0.88, eps: 1e-07

Epoch: 1 Train Loss: 0.6103 | Test Loss: 0.2399 | Train Accuray: 0.8176 | Test Accuracy: 0.9056  
Epoch: 2 Train Loss: 0.1789 | Test Loss: 0.1830 | Train Accuray: 0.9280 | Test Accuracy: 0.9102  
Epoch: 3 Train Loss: 0.1025 | Test Loss: 0.1471 | Train Accuray: 0.9410 | Test Accuracy: 0.9192  
Epoch: 4 Train Loss: 0.0582 | Test Loss: 0.1478 | Train Accuray: 0.9578 | Test Accuracy: 0.9165  
Epoch: 5 Train Loss: 0.0386 | Test Loss: 0.1381 | Train Accuray: 0.9578 | Test Accuracy: 0.9217



current exp | total: 11 | 16

Training with --- lr rate: 0.01, alpha: 0.85, momentum: 0.99, eps: 1e-05

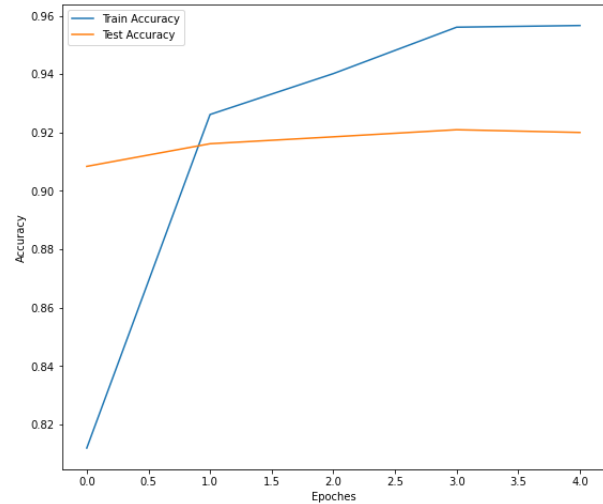
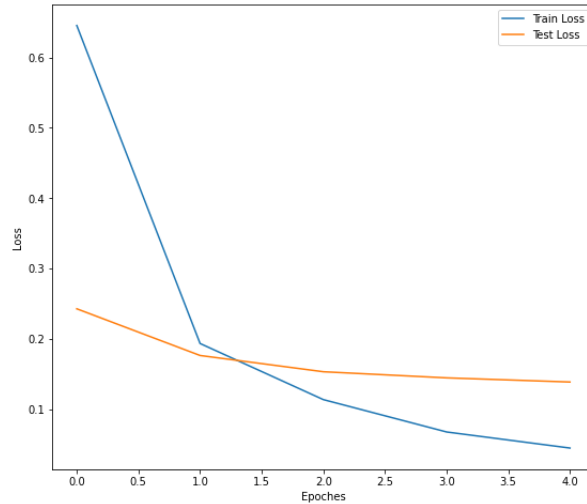
Epoch: 1 Train Loss: 0.6455 | Test Loss: 0.2428 | Train Accuray: 0.8119 | Test Accuracy: 0.9084

Epoch: 2 Train Loss: 0.1935 | Test Loss: 0.1765 | Train Accuray: 0.9262 | Test Accuracy: 0.9162

Epoch: 3 Train Loss: 0.1137 | Test Loss: 0.1533 | Train Accuray: 0.9402 | Test Accuracy: 0.9185

Epoch: 4 Train Loss: 0.0677 | Test Loss: 0.1446 | Train Accuray: 0.9561 | Test Accuracy: 0.9210

Epoch: 5 Train Loss: 0.0449 | Test Loss: 0.1388 | Train Accuray: 0.9567 | Test Accuracy: 0.9200



current exp | total: 12 | 16

Training with --- lr rate: 0.01, alpha: 0.85, momentum: 0.99, eps: 1e-07

Epoch: 1 Train Loss: 0.6460 | Test Loss: 0.2386 | Train Accuray: 0.8140 | Test Accuracy: 0.9090

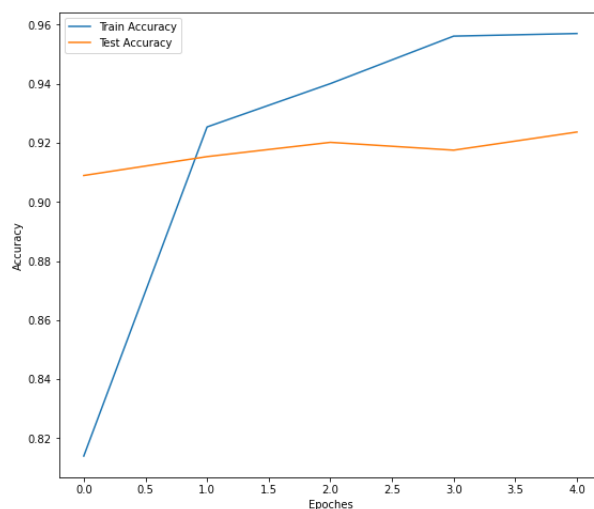
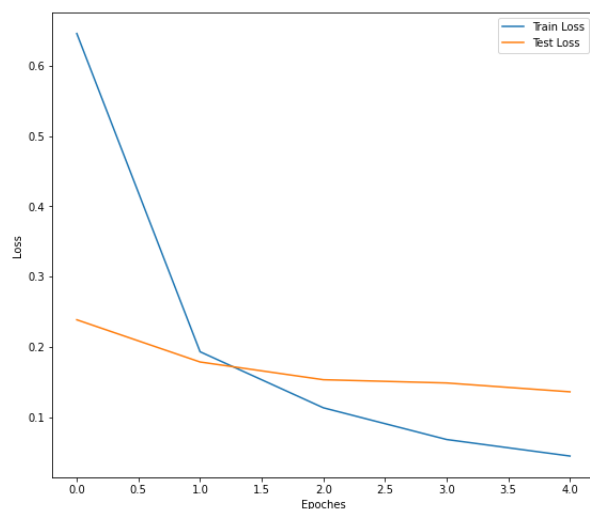
Epoch: 2 Train Loss: 0.1931 | Test Loss: 0.1785 | Train Accuray: 0.9254 | Test Accuracy: 0.9154

Epoch: 3 Train Loss: 0.1133 | Test Loss: 0.1533 | Train Accuray: 0.9401 | Test Accuracy: 0.9202

Epoch: 4 Train Loss: 0.0681 | Test Loss: 0.1486 | Train Accuray: 0.9561 | Test Accuracy: 0.9175

Epoch: 5 Train Loss: 0.0446 | Test Loss: 0.1360 | Train Accuray: 0.9570 | Test Accuracy: 0.9237





current exp | total: 13 | 16

Training with --- lr rate: 0.01, alpha: 0.95, momentum: 0.88, eps: 1e-05

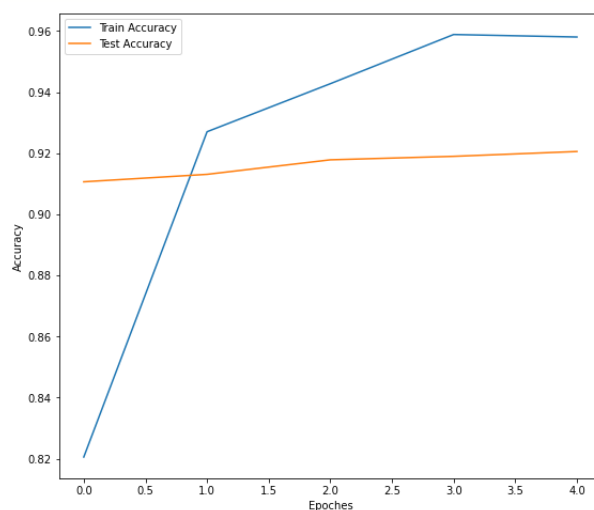
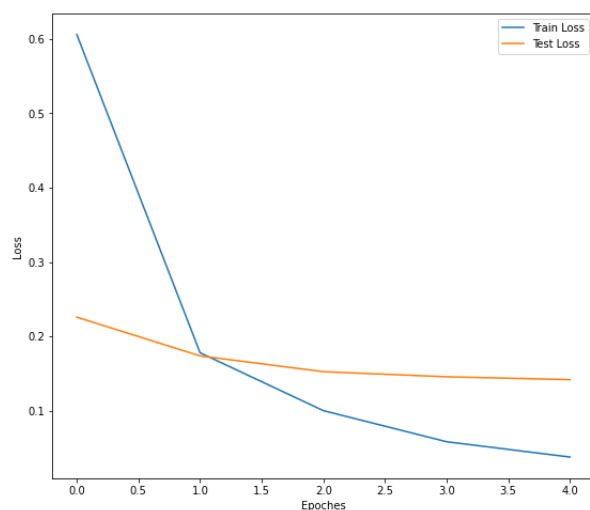
Epoch: 1 Train Loss: 0.6061 | Test Loss: 0.2259 | Train Accuray: 0.8206 | Test Accuracy: 0.9107

Epoch: 2 Train Loss: 0.1779 | Test Loss: 0.1737 | Train Accuray: 0.9270 | Test Accuracy: 0.9131

Epoch: 3 Train Loss: 0.1001 | Test Loss: 0.1525 | Train Accuray: 0.9428 | Test Accuracy: 0.9179

Epoch: 4 Train Loss: 0.0582 | Test Loss: 0.1456 | Train Accuray: 0.9589 | Test Accuracy: 0.9190

Epoch: 5 Train Loss: 0.0377 | Test Loss: 0.1418 | Train Accuray: 0.9580 | Test Accuracy: 0.9206



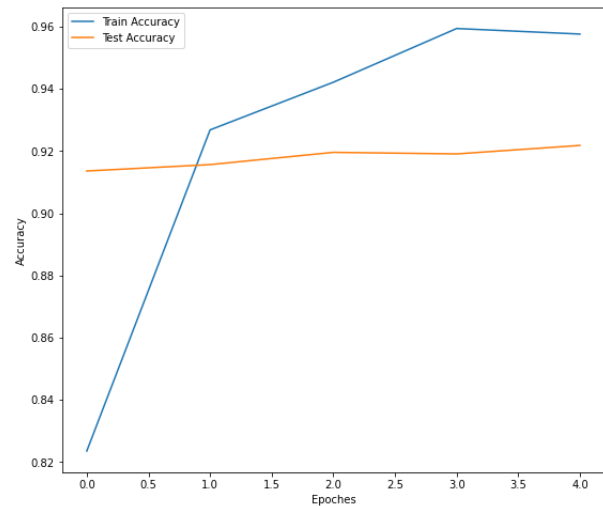
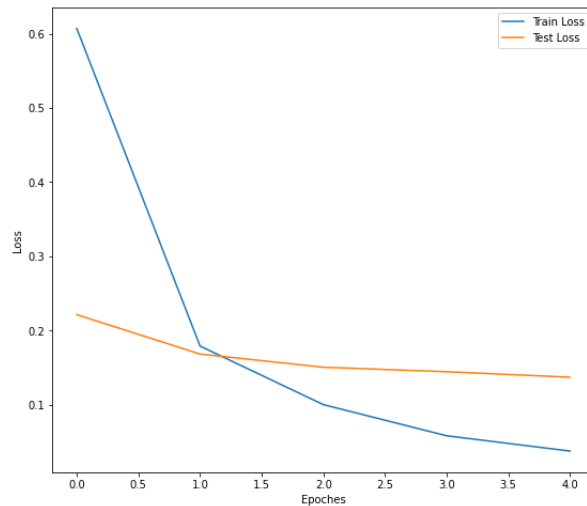
current exp | total: 14 | 16

Training with --- lr rate: 0.01, alpha: 0.95, momentum: 0.88, eps: 1e-07

Epoch: 1 Train Loss: 0.6072 | Test Loss: 0.2214 | Train Accuray: 0.8235 | Test Accuracy: 0.9136

Epoch: 2 Train Loss: 0.1790 | Test Loss: 0.1683 | Train Accuray: 0.9268 | Test Accuracy: 0.9156

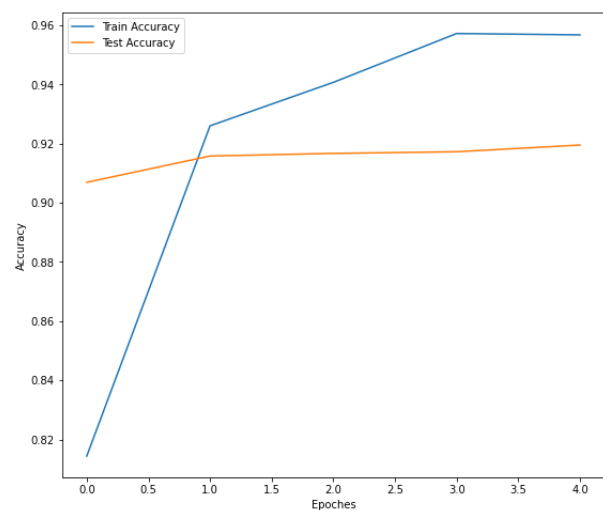
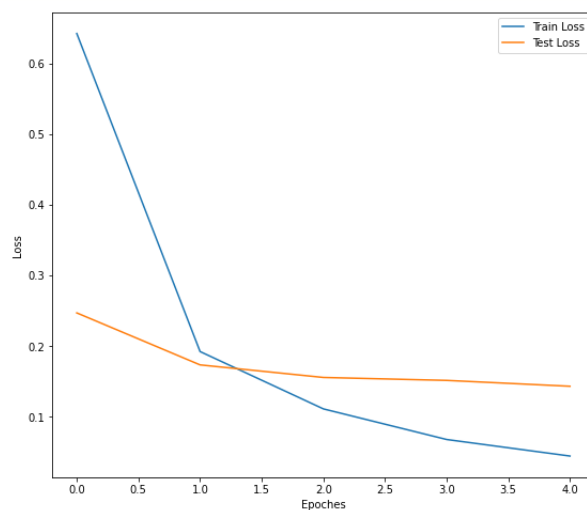
Epoch: 3 Train Loss: 0.1001 | Test Loss: 0.1505 | Train Accuray: 0.9421 | Test Accuracy: 0.9196  
Epoch: 4 Train Loss: 0.0581 | Test Loss: 0.1445 | Train Accuray: 0.9594 | Test Accuracy: 0.9191  
Epoch: 5 Train Loss: 0.0375 | Test Loss: 0.1371 | Train Accuray: 0.9576 | Test Accuracy: 0.9218



current exp | total: 15 | 16

Training with --- lr rate: 0.01, alpha: 0.95, momentum: 0.99, eps: 1e-05

Epoch: 1 Train Loss: 0.6422 | Test Loss: 0.2471 | Train Accuray: 0.8144 | Test Accuracy: 0.9069  
Epoch: 2 Train Loss: 0.1925 | Test Loss: 0.1736 | Train Accuray: 0.9260 | Test Accuracy: 0.9158  
Epoch: 3 Train Loss: 0.1114 | Test Loss: 0.1558 | Train Accuray: 0.9407 | Test Accuracy: 0.9167  
Epoch: 4 Train Loss: 0.0681 | Test Loss: 0.1517 | Train Accuray: 0.9572 | Test Accuracy: 0.9173  
Epoch: 5 Train Loss: 0.0447 | Test Loss: 0.1434 | Train Accuray: 0.9568 | Test Accuracy: 0.9195



current exp | total: 16 | 16

Training with --- lr rate: 0.01, alpha: 0.95, momentum: 0.99, eps: 1e-07

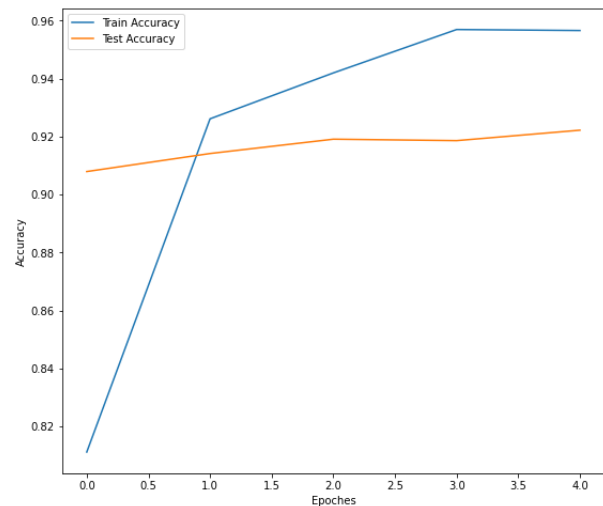
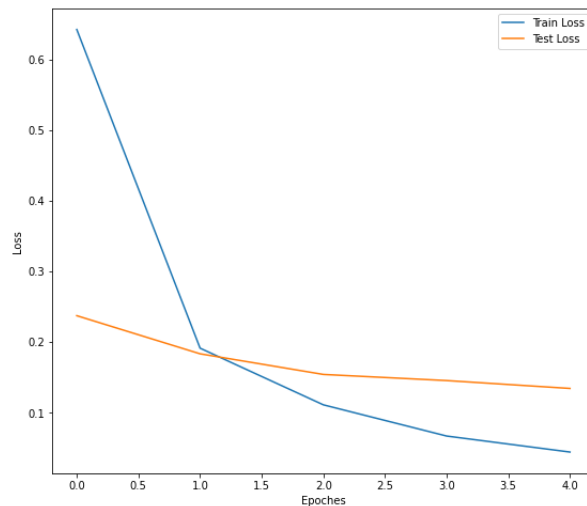
Epoch: 1 Train Loss: 0.6429 | Test Loss: 0.2375 | Train Accuray: 0.8112 | Test Accuracy: 0.9080

Epoch: 2 Train Loss: 0.1914 | Test Loss: 0.1835 | Train Accuray: 0.9262 | Test Accuracy: 0.9142

Epoch: 3 Train Loss: 0.1111 | Test Loss: 0.1542 | Train Accuray: 0.9420 | Test Accuracy: 0.9191

Epoch: 4 Train Loss: 0.0669 | Test Loss: 0.1455 | Train Accuray: 0.9569 | Test Accuracy: 0.9186

Epoch: 5 Train Loss: 0.0443 | Test Loss: 0.1344 | Train Accuray: 0.9566 | Test Accuracy: 0.9222



## Best Hyper parameter in RMSprop:

Training with --- lr rate: 0.01, alpha: 0.85, momentum: 0.99, eps: 1e-07

Epoch: 1 Train Loss: 0.6460 | Test Loss: 0.2386 | Train Accuray: 0.8140 | Test Accuracy: 0.9090

Epoch: 2 Train Loss: 0.1931 | Test Loss: 0.1785 | Train Accuray: 0.9254 | Test Accuracy: 0.9154

Epoch: 3 Train Loss: 0.1133 | Test Loss: 0.1533 | Train Accuray: 0.9401 | Test Accuracy: 0.9202

Epoch: 4 Train Loss: 0.0681 | Test Loss: 0.1486 | Train Accuray: 0.9561 | Test Accuracy: 0.9175

Epoch: 5 Train Loss: 0.0446 | Test Loss: 0.1360 | Train Accuray: 0.9570 | Test Accuracy: 0.9237

## Adam

Hyper parameter:

```
lr_rate = [0.001,0.0001] # learning rate
betas=[(0.85, 0.8585),(0.95, 0.9595)] # coefficients used for
computing running averages of gradient and its square
eps = [1e-5,1e-7] # term added to the denominator to improve
numerical stability
weight_decay = [0.001,0.0005] # weight decay (L2 penalty)
```

current exp | total: 1 | 16

Training with --- lr rate: 0.001, betas: (0.85, 0.8585), eps: 1e-05, weight decay: 0.001

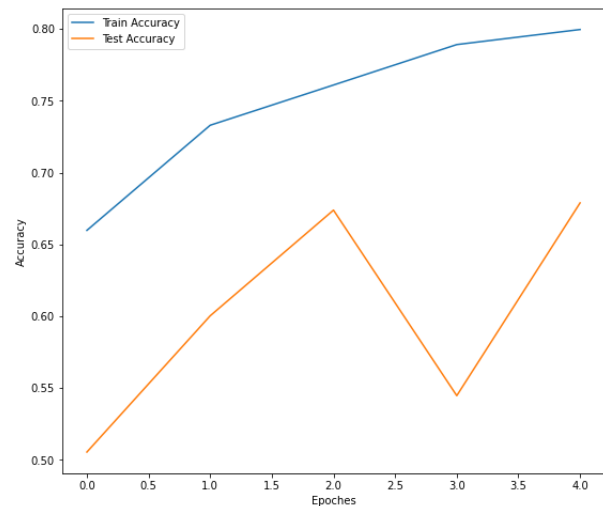
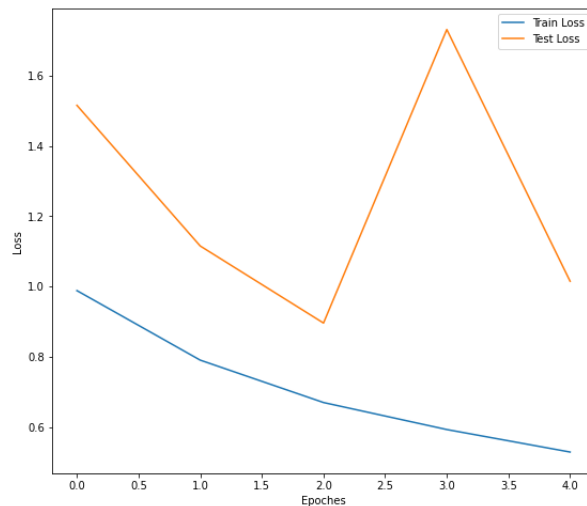
Epoch: 1 Train Loss: 0.9884 | Test Loss: 1.5154 | Train Accuray: 0.6597 | Test Accuracy: 0.5054

Epoch: 2 Train Loss: 0.7906 | Test Loss: 1.1153 | Train Accuray: 0.7329 | Test Accuracy: 0.6002

Epoch: 3 Train Loss: 0.6700 | Test Loss: 0.8961 | Train Accuray: 0.7609 | Test Accuracy: 0.6738

Epoch: 4 Train Loss: 0.5932 | Test Loss: 1.7310 | Train Accuray: 0.7891 | Test Accuracy: 0.5446

Epoch: 5 Train Loss: 0.5291 | Test Loss: 1.0150 | Train Accuray: 0.7996 | Test Accuracy: 0.6789



current exp | total: 2 | 16

Training with --- lr rate: 0.001, betas: (0.85, 0.8585), eps: 1e-05, weight decay: 0.0005

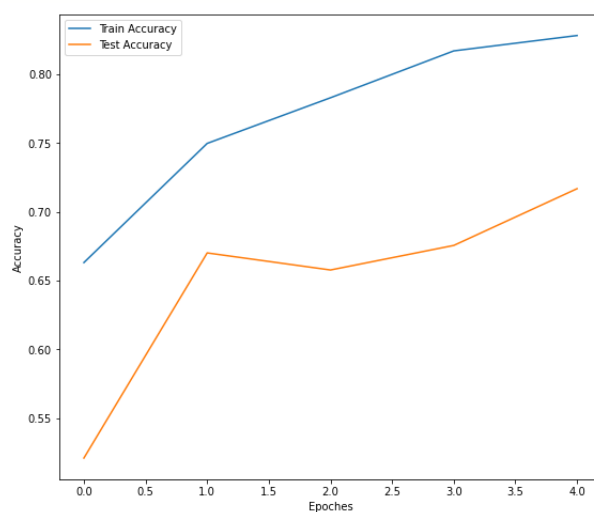
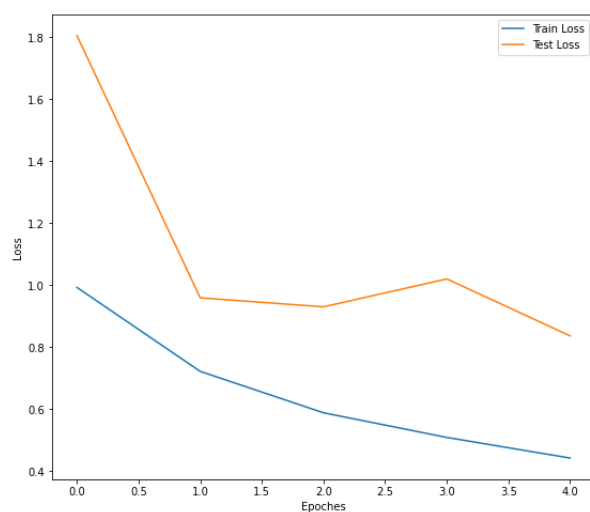
Epoch: 1 Train Loss: 0.9931 | Test Loss: 1.8059 | Train Accuray: 0.6632 | Test Accuracy: 0.5209

Epoch: 2 Train Loss: 0.7223 | Test Loss: 0.9595 | Train Accuray: 0.7498 | Test Accuracy: 0.6702

Epoch: 3 Train Loss: 0.5887 | Test Loss: 0.9306 | Train Accuray: 0.7831 | Test Accuracy: 0.6578

Epoch: 4 Train Loss: 0.5091 | Test Loss: 1.0205 | Train Accuray: 0.8172 | Test Accuracy: 0.6756

Epoch: 5 Train Loss: 0.4426 | Test Loss: 0.8368 | Train Accuray: 0.8283 | Test Accuracy: 0.7169



current exp | total: 3 | 16

Training with --- lr rate: 0.001, betas: (0.85, 0.8585), eps: 1e-07, weight decay: 0.001

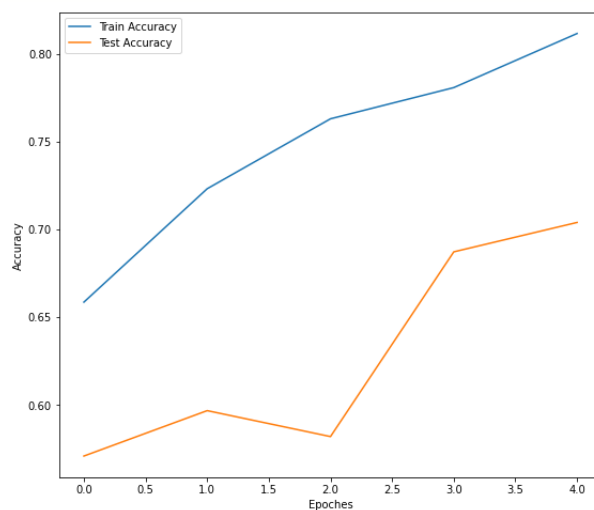
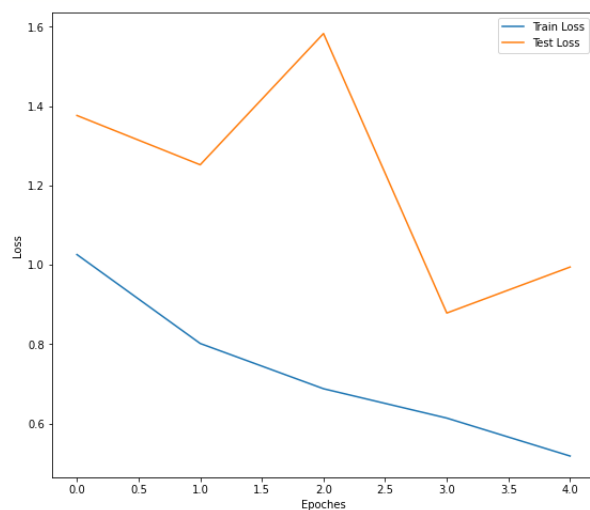
Epoch: 1 Train Loss: 1.0258 | Test Loss: 1.3763 | Train Accuray: 0.6586 | Test Accuracy: 0.5710

Epoch: 2 Train Loss: 0.8016 | Test Loss: 1.2520 | Train Accuray: 0.7232 | Test Accuracy: 0.5968

Epoch: 3 Train Loss: 0.6875 | Test Loss: 1.5829 | Train Accuray: 0.7631 | Test Accuracy: 0.5821

Epoch: 4 Train Loss: 0.6135 | Test Loss: 0.8783 | Train Accuray: 0.7809 | Test Accuracy: 0.6873

Epoch: 5 Train Loss: 0.5178 | Test Loss: 0.9943 | Train Accuray: 0.8117 | Test Accuracy: 0.7040

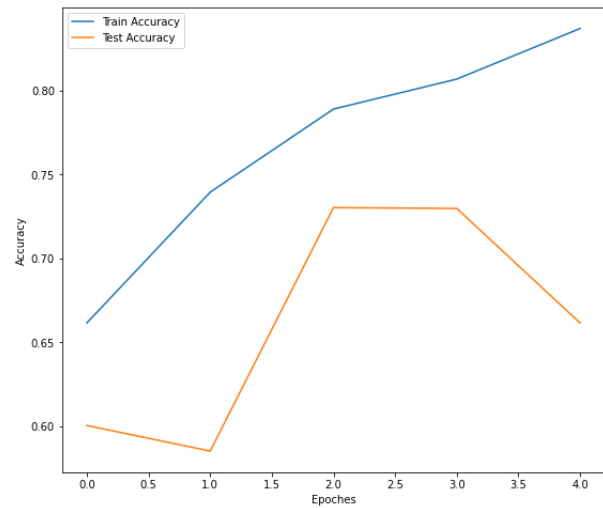
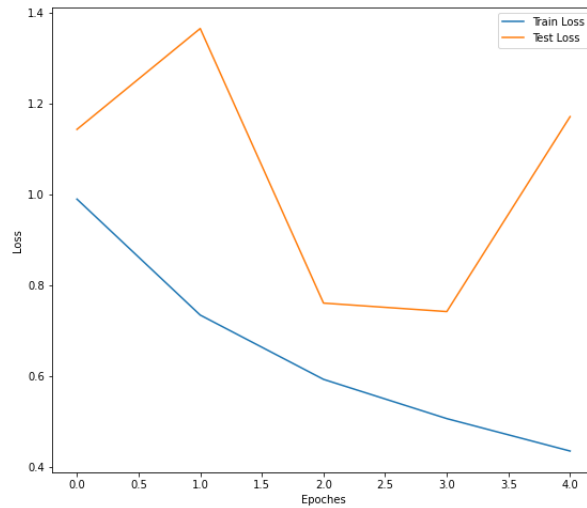


current exp | total: 4 | 16

Training with --- lr rate: 0.001, betas: (0.85, 0.8585), eps: 1e-07, weight decay: 0.0005

Epoch: 1 Train Loss: 0.9891 | Test Loss: 1.1424 | Train Accuray: 0.6616 | Test Accuracy: 0.6005

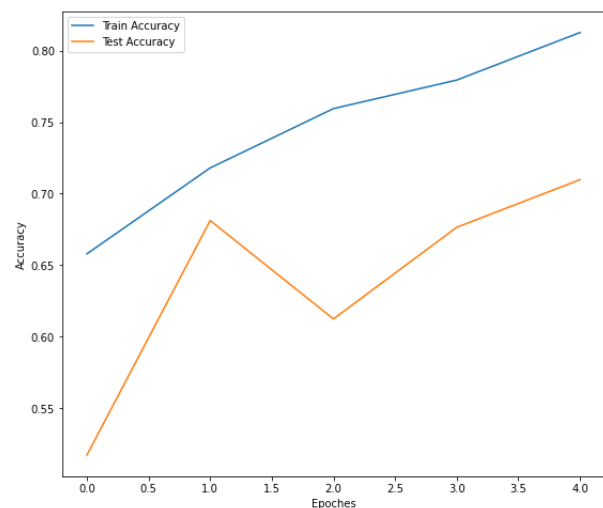
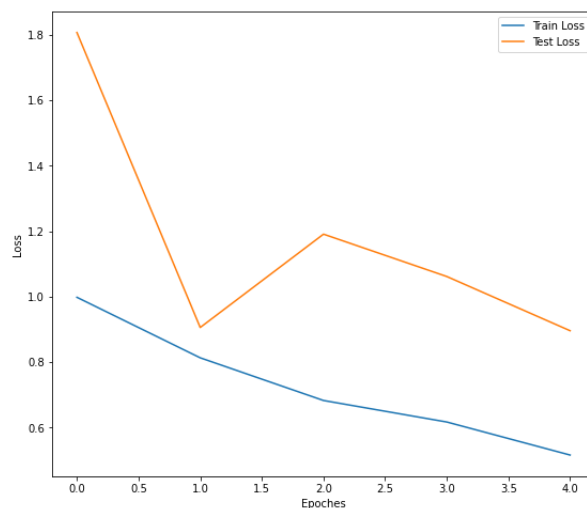
Epoch: 2 Train Loss: 0.7340 | Test Loss: 1.3643 | Train Accuray: 0.7395 | Test Accuracy: 0.5853  
 Epoch: 3 Train Loss: 0.5926 | Test Loss: 0.7604 | Train Accuray: 0.7890 | Test Accuracy: 0.7303  
 Epoch: 4 Train Loss: 0.5063 | Test Loss: 0.7417 | Train Accuray: 0.8069 | Test Accuracy: 0.7298  
 Epoch: 5 Train Loss: 0.4349 | Test Loss: 1.1705 | Train Accuray: 0.8370 | Test Accuracy: 0.6616



current exp | total: 5 | 16

Training with --- lr rate: 0.001, betas: (0.95, 0.9595), eps: 1e-05, weight decay: 0.001

Epoch: 1 Train Loss: 0.9982 | Test Loss: 1.8071 | Train Accuray: 0.6579 | Test Accuracy: 0.5173  
 Epoch: 2 Train Loss: 0.8133 | Test Loss: 0.9059 | Train Accuray: 0.7180 | Test Accuracy: 0.6812  
 Epoch: 3 Train Loss: 0.6829 | Test Loss: 1.1911 | Train Accuray: 0.7594 | Test Accuracy: 0.6124  
 Epoch: 4 Train Loss: 0.6171 | Test Loss: 1.0617 | Train Accuray: 0.7794 | Test Accuracy: 0.6765  
 Epoch: 5 Train Loss: 0.5162 | Test Loss: 0.8960 | Train Accuray: 0.8126 | Test Accuracy: 0.7098



current exp | total: 6 | 16

Training with --- lr rate: 0.001, betas: (0.95, 0.9595), eps: 1e-05, weight decay: 0.0005

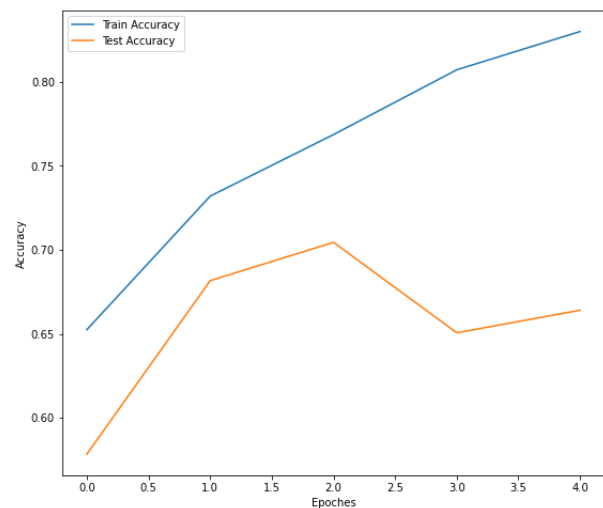
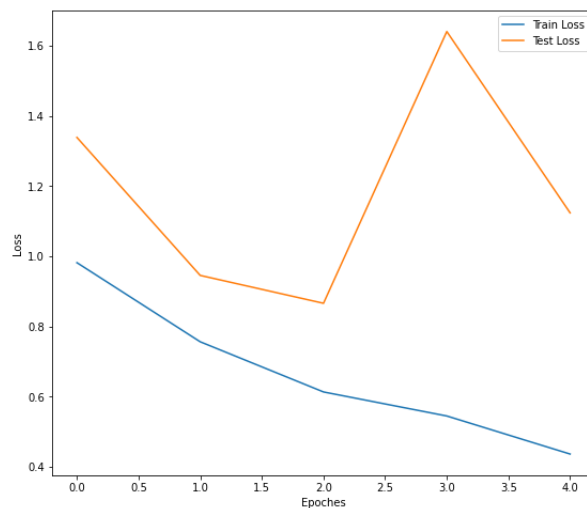
Epoch: 1 Train Loss: 0.9819 | Test Loss: 1.3389 | Train Accuray: 0.6525 | Test Accuracy: 0.5785

Epoch: 2 Train Loss: 0.7563 | Test Loss: 0.9456 | Train Accuray: 0.7320 | Test Accuracy: 0.6817

Epoch: 3 Train Loss: 0.6133 | Test Loss: 0.8661 | Train Accuray: 0.7686 | Test Accuracy: 0.7045

Epoch: 4 Train Loss: 0.5448 | Test Loss: 1.6408 | Train Accuray: 0.8072 | Test Accuracy: 0.6506

Epoch: 5 Train Loss: 0.4363 | Test Loss: 1.1239 | Train Accuray: 0.8300 | Test Accuracy: 0.6641



current exp | total: 7 | 16

Training with --- lr rate: 0.001, betas: (0.95, 0.9595), eps: 1e-07, weight decay: 0.001

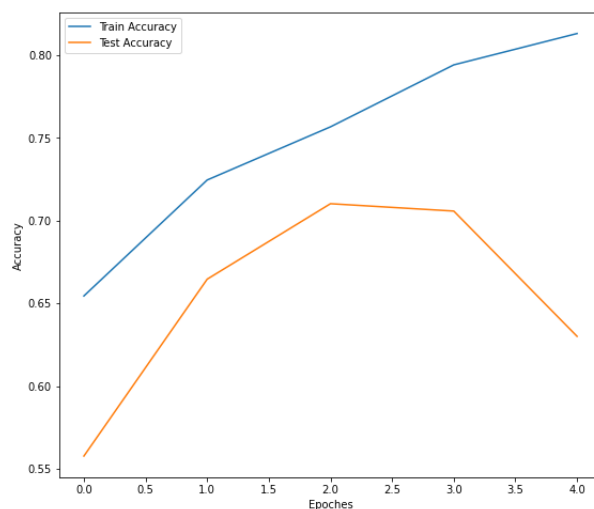
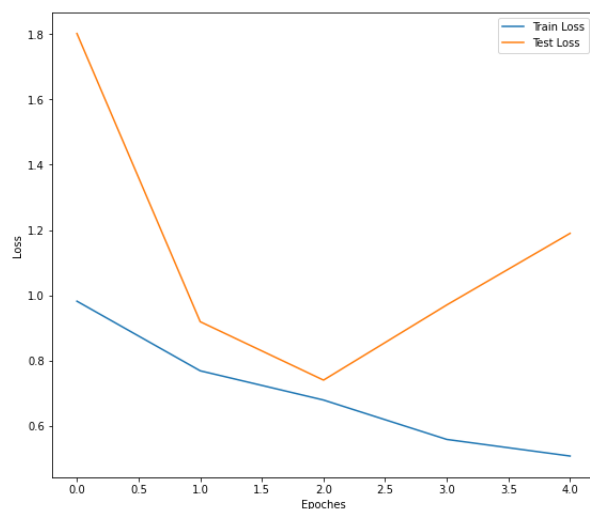
Epoch: 1 Train Loss: 0.9824 | Test Loss: 1.8018 | Train Accuray: 0.6545 | Test Accuracy: 0.5578

Epoch: 2 Train Loss: 0.7693 | Test Loss: 0.9196 | Train Accuray: 0.7246 | Test Accuracy: 0.6646

Epoch: 3 Train Loss: 0.6798 | Test Loss: 0.7408 | Train Accuray: 0.7567 | Test Accuracy: 0.7102

Epoch: 4 Train Loss: 0.5592 | Test Loss: 0.9710 | Train Accuray: 0.7941 | Test Accuracy: 0.7058

Epoch: 5 Train Loss: 0.5083 | Test Loss: 1.1901 | Train Accuray: 0.8131 | Test Accuracy: 0.6301



current exp | total: 8 | 16

Training with --- lr rate: 0.001, betas: (0.95, 0.9595), eps: 1e-07, weight decay: 0.0005

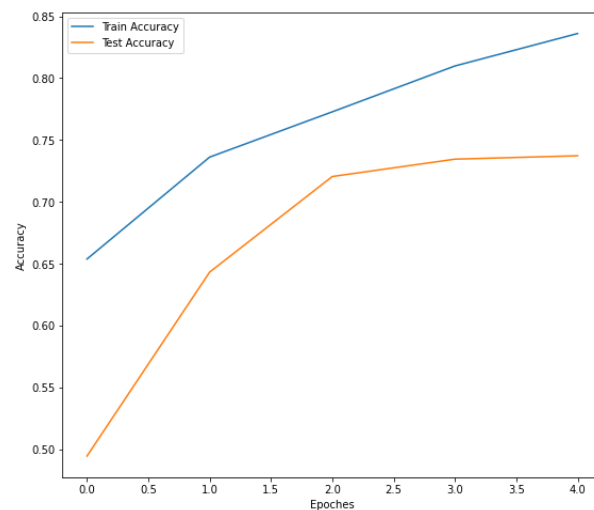
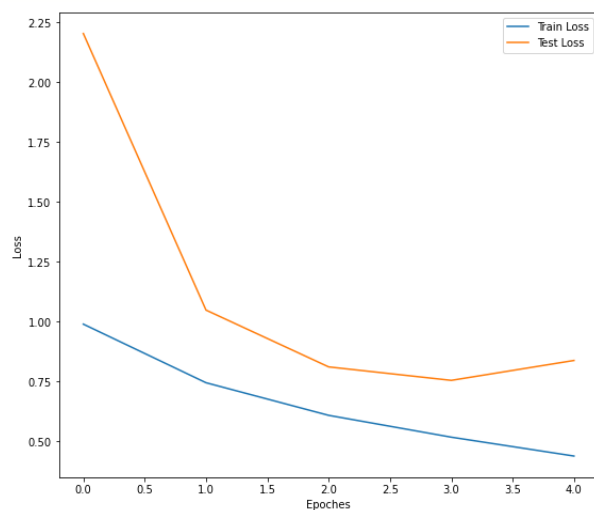
Epoch: 1 Train Loss: 0.9897 | Test Loss: 2.2028 | Train Accuray: 0.6538 | Test Accuracy: 0.4945

Epoch: 2 Train Loss: 0.7452 | Test Loss: 1.0483 | Train Accuray: 0.7362 | Test Accuracy: 0.6432

Epoch: 3 Train Loss: 0.6090 | Test Loss: 0.8112 | Train Accuray: 0.7728 | Test Accuracy: 0.7205

Epoch: 4 Train Loss: 0.5178 | Test Loss: 0.7550 | Train Accuray: 0.8099 | Test Accuracy: 0.7345

Epoch: 5 Train Loss: 0.4391 | Test Loss: 0.8380 | Train Accuray: 0.8361 | Test Accuracy: 0.7373



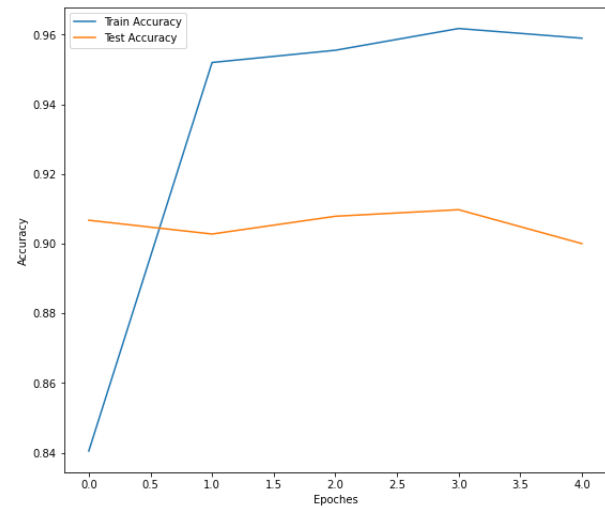
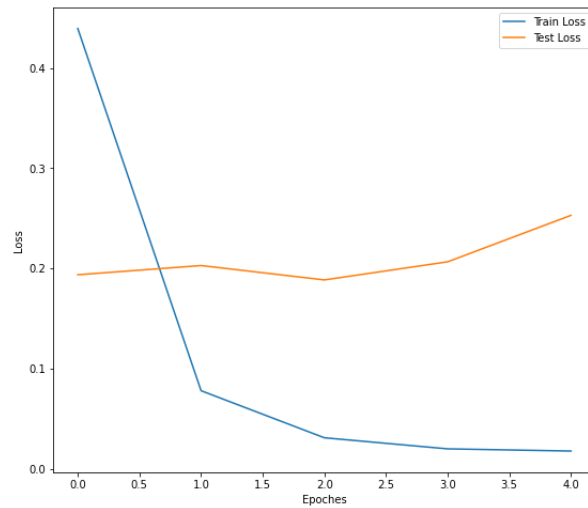
current exp | total: 9 | 16

Training with --- lr rate: 0.0001, betas: (0.85, 0.8585), eps: 1e-05, weight decay: 0.001

Epoch: 1 Train Loss: 0.4394 | Test Loss: 0.1936 | Train Accuray: 0.8405 | Test Accuracy: 0.9067



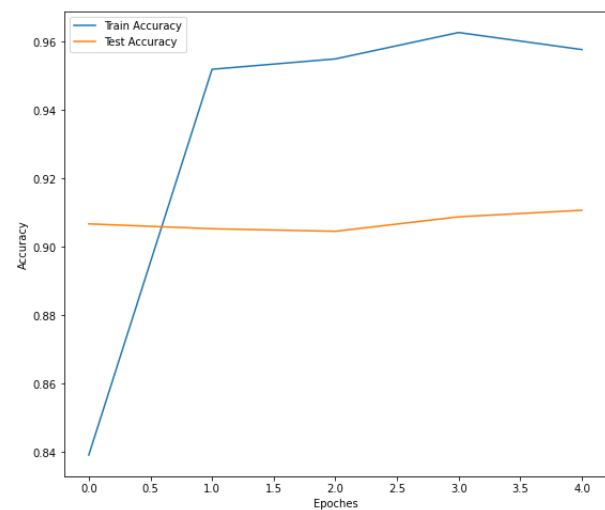
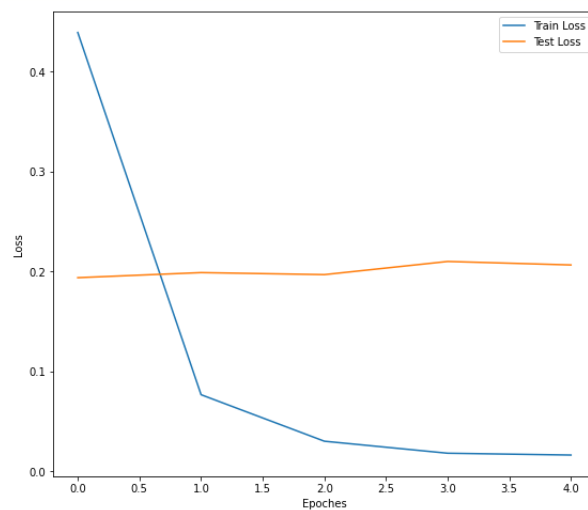
Epoch: 2 Train Loss: 0.0779 | Test Loss: 0.2028 | Train Accuray: 0.9520 | Test Accuracy: 0.9027  
 Epoch: 3 Train Loss: 0.0309 | Test Loss: 0.1885 | Train Accuray: 0.9555 | Test Accuracy: 0.9078  
 Epoch: 4 Train Loss: 0.0199 | Test Loss: 0.2065 | Train Accuray: 0.9617 | Test Accuracy: 0.9097  
 Epoch: 5 Train Loss: 0.0177 | Test Loss: 0.2529 | Train Accuray: 0.9590 | Test Accuracy: 0.9000



current exp | total: 10 | 16

Training with --- lr rate: 0.0001, betas: (0.85, 0.8585), eps: 1e-05, weight decay: 0.0005

Epoch: 1 Train Loss: 0.4392 | Test Loss: 0.1939 | Train Accuray: 0.8392 | Test Accuracy: 0.9068  
 Epoch: 2 Train Loss: 0.0767 | Test Loss: 0.1989 | Train Accuray: 0.9519 | Test Accuracy: 0.9053  
 Epoch: 3 Train Loss: 0.0302 | Test Loss: 0.1969 | Train Accuray: 0.9550 | Test Accuracy: 0.9046  
 Epoch: 4 Train Loss: 0.0182 | Test Loss: 0.2101 | Train Accuray: 0.9627 | Test Accuracy: 0.9088  
 Epoch: 5 Train Loss: 0.0163 | Test Loss: 0.2066 | Train Accuray: 0.9577 | Test Accuracy: 0.9107



current exp | total: 11 | 16

Training with --- lr rate: 0.0001, betas: (0.85, 0.8585), eps: 1e-07, weight decay: 0.001

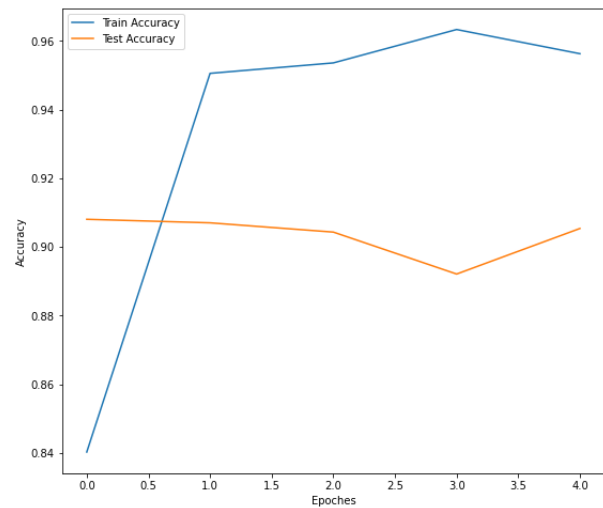
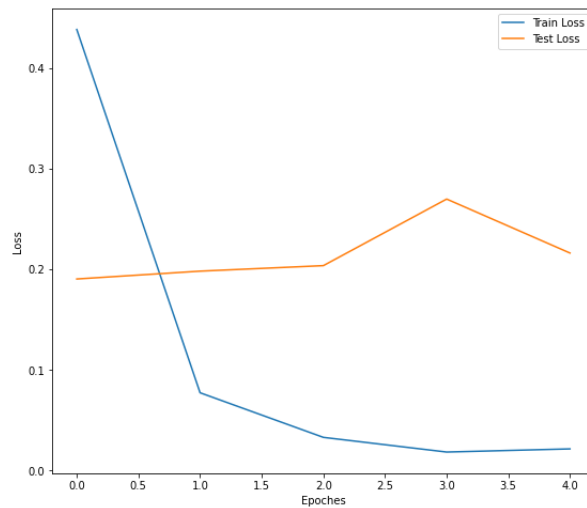
Epoch: 1 Train Loss: 0.4380 | Test Loss: 0.1903 | Train Accuray: 0.8402 | Test Accuracy: 0.9080

Epoch: 2 Train Loss: 0.0774 | Test Loss: 0.1981 | Train Accuray: 0.9506 | Test Accuracy: 0.9070

Epoch: 3 Train Loss: 0.0331 | Test Loss: 0.2036 | Train Accuray: 0.9536 | Test Accuracy: 0.9043

Epoch: 4 Train Loss: 0.0185 | Test Loss: 0.2697 | Train Accuray: 0.9633 | Test Accuracy: 0.8921

Epoch: 5 Train Loss: 0.0216 | Test Loss: 0.2161 | Train Accuray: 0.9563 | Test Accuracy: 0.9054



current exp | total: 12 | 16

Training with --- lr rate: 0.0001, betas: (0.85, 0.8585), eps: 1e-07, weight decay: 0.0005

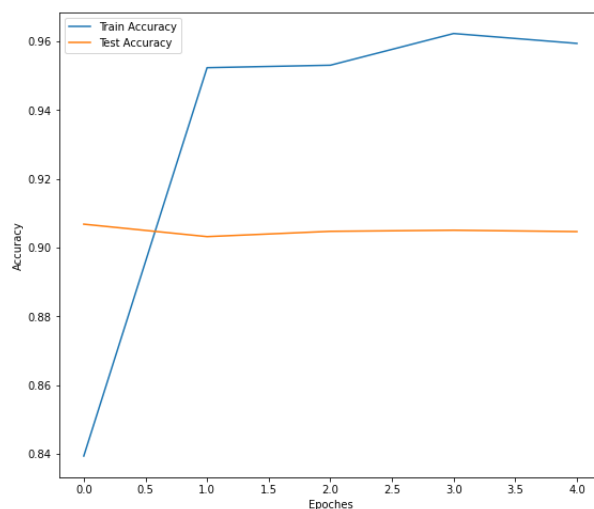
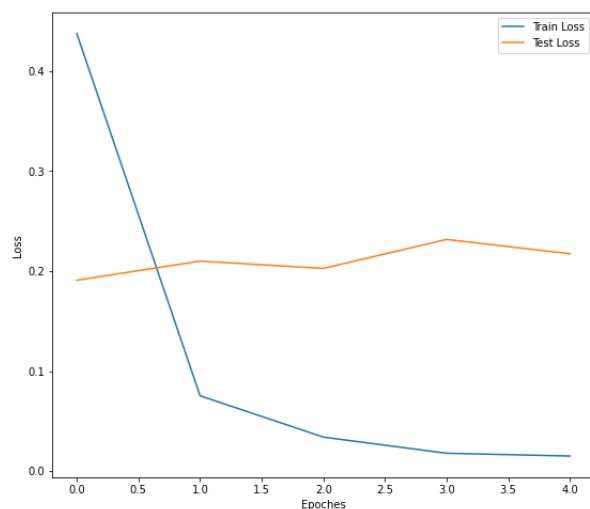
Epoch: 1 Train Loss: 0.4377 | Test Loss: 0.1909 | Train Accuray: 0.8394 | Test Accuracy: 0.9069

Epoch: 2 Train Loss: 0.0753 | Test Loss: 0.2100 | Train Accuray: 0.9524 | Test Accuracy: 0.9032

Epoch: 3 Train Loss: 0.0340 | Test Loss: 0.2027 | Train Accuray: 0.9531 | Test Accuracy: 0.9048

Epoch: 4 Train Loss: 0.0178 | Test Loss: 0.2317 | Train Accuray: 0.9623 | Test Accuracy: 0.9051

Epoch: 5 Train Loss: 0.0150 | Test Loss: 0.2174 | Train Accuray: 0.9594 | Test Accuracy: 0.9047



current exp | total: 13 | 16

Training with --- lr rate: 0.0001, betas: (0.95, 0.9595), eps: 1e-05, weight decay: 0.001

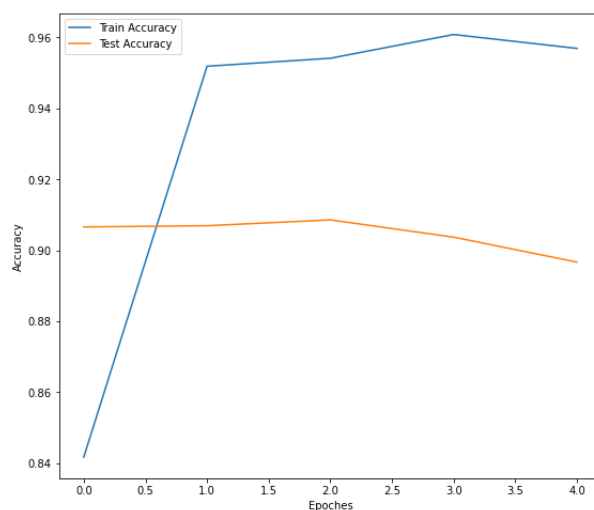
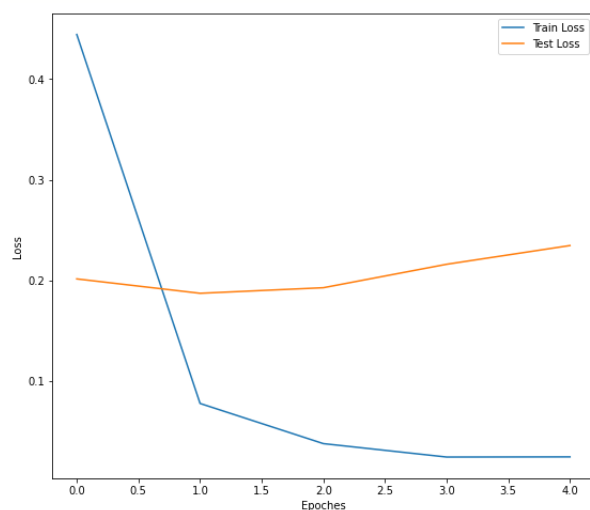
Epoch: 1 Train Loss: 0.4441 | Test Loss: 0.2015 | Train Accuray: 0.8418 | Test Accuracy: 0.9066

Epoch: 2 Train Loss: 0.0778 | Test Loss: 0.1872 | Train Accuray: 0.9519 | Test Accuracy: 0.9070

Epoch: 3 Train Loss: 0.0379 | Test Loss: 0.1927 | Train Accuray: 0.9541 | Test Accuracy: 0.9086

Epoch: 4 Train Loss: 0.0246 | Test Loss: 0.2160 | Train Accuray: 0.9608 | Test Accuracy: 0.9037

Epoch: 5 Train Loss: 0.0247 | Test Loss: 0.2346 | Train Accuray: 0.9569 | Test Accuracy: 0.8967



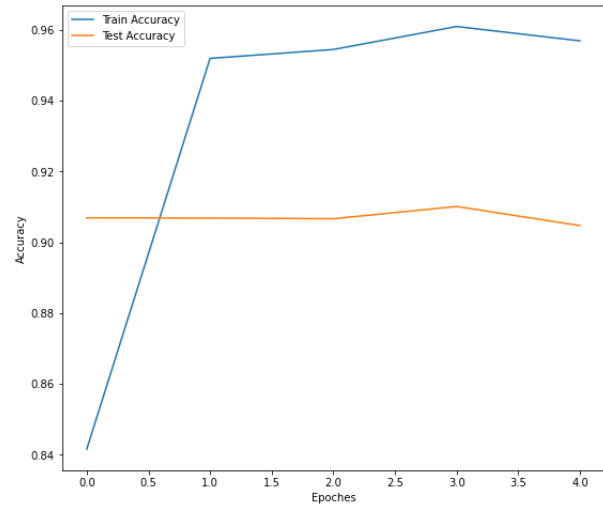
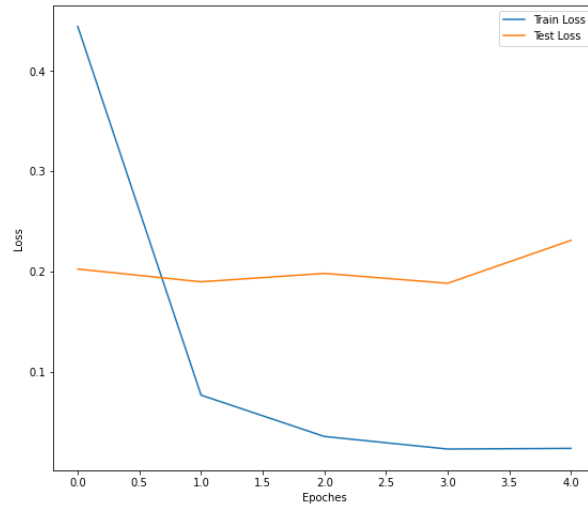
current exp | total: 14 | 16

Training with --- lr rate: 0.0001, betas: (0.95, 0.9595), eps: 1e-05, weight decay: 0.0005

Epoch: 1 Train Loss: 0.4443 | Test Loss: 0.2025 | Train Accuray: 0.8416 | Test Accuracy: 0.9069

Epoch: 2 Train Loss: 0.0768 | Test Loss: 0.1898 | Train Accuray: 0.9519 | Test Accuracy: 0.9068

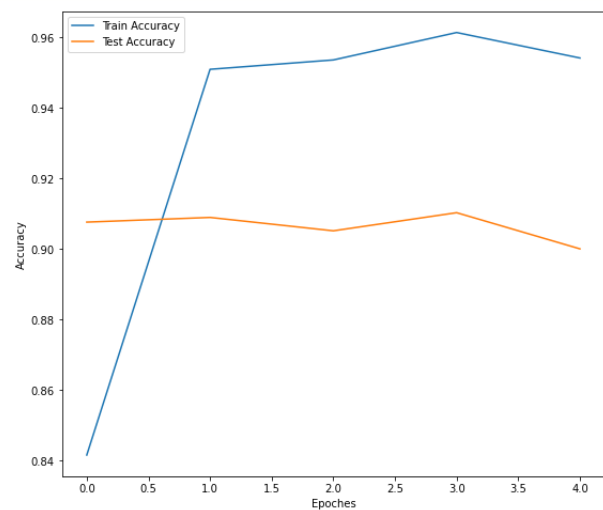
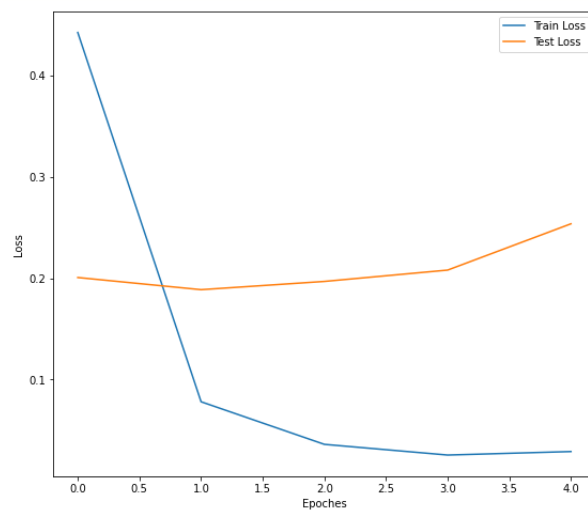
Epoch: 3 Train Loss: 0.0356 | Test Loss: 0.1982 | Train Accuray: 0.9544 | Test Accuracy: 0.9067  
Epoch: 4 Train Loss: 0.0231 | Test Loss: 0.1883 | Train Accuray: 0.9609 | Test Accuracy: 0.9101  
Epoch: 5 Train Loss: 0.0237 | Test Loss: 0.2311 | Train Accuray: 0.9569 | Test Accuracy: 0.9047



current exp | total: 15 | 16

Training with --- lr rate: 0.0001, betas: (0.95, 0.9595), eps: 1e-07, weight decay: 0.001

Epoch: 1 Train Loss: 0.4425 | Test Loss: 0.2007 | Train Accuray: 0.8416 | Test Accuracy: 0.9077  
Epoch: 2 Train Loss: 0.0781 | Test Loss: 0.1887 | Train Accuray: 0.9510 | Test Accuracy: 0.9090  
Epoch: 3 Train Loss: 0.0361 | Test Loss: 0.1969 | Train Accuray: 0.9537 | Test Accuracy: 0.9052  
Epoch: 4 Train Loss: 0.0255 | Test Loss: 0.2081 | Train Accuray: 0.9614 | Test Accuracy: 0.9103  
Epoch: 5 Train Loss: 0.0290 | Test Loss: 0.2537 | Train Accuray: 0.9542 | Test Accuracy: 0.9001



current exp | total: 16 | 16

Training with --- lr rate: 0.0001, betas: (0.95, 0.9595), eps: 1e-07, weight decay: 0.0005

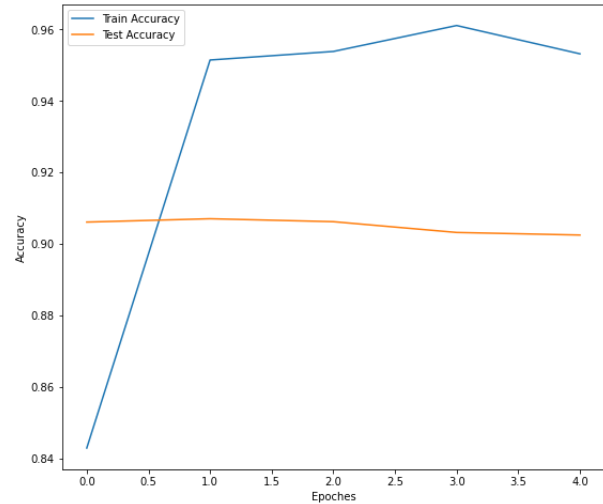
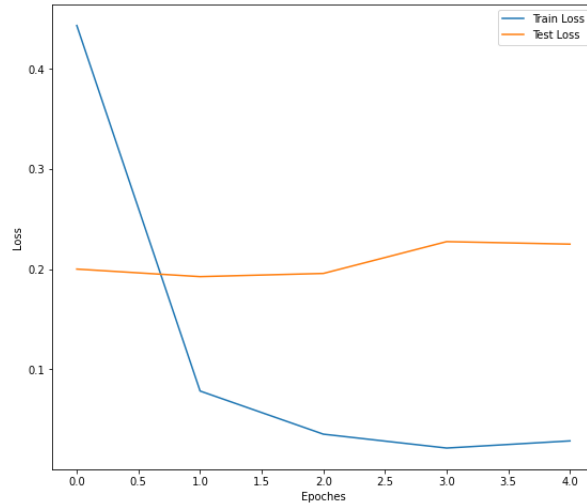
Epoch: 1 Train Loss: 0.4434 | Test Loss: 0.2001 | Train Accuray: 0.8429 | Test Accuracy: 0.9061

Epoch: 2 Train Loss: 0.0783 | Test Loss: 0.1926 | Train Accuray: 0.9514 | Test Accuracy: 0.9070

Epoch: 3 Train Loss: 0.0352 | Test Loss: 0.1958 | Train Accuray: 0.9538 | Test Accuracy: 0.9062

Epoch: 4 Train Loss: 0.0214 | Test Loss: 0.2276 | Train Accuray: 0.9611 | Test Accuracy: 0.9032

Epoch: 5 Train Loss: 0.0285 | Test Loss: 0.2251 | Train Accuray: 0.9532 | Test Accuracy: 0.9025



### Best Hyper parameter for Adam:

Training with --- lr rate: 0.0001, betas: (0.85, 0.8585), eps: 1e-05, weight decay: 0.0005

Epoch: 1 Train Loss: 0.4392 | Test Loss: 0.1939 | Train Accuray: 0.8392 | Test Accuracy: 0.9068

Epoch: 2 Train Loss: 0.0767 | Test Loss: 0.1989 | Train Accuray: 0.9519 | Test Accuracy: 0.9053

Epoch: 3 Train Loss: 0.0302 | Test Loss: 0.1969 | Train Accuray: 0.9550 | Test Accuracy: 0.9046

Epoch: 4 Train Loss: 0.0182 | Test Loss: 0.2101 | Train Accuray: 0.9627 | Test Accuracy: 0.9088

Epoch: 5 Train Loss: 0.0163 | Test Loss: 0.2066 | Train Accuray: 0.9577 | Test Accuracy: 0.9107

## AdaDelta:

Hyperparameter:

```
lr_rate = [0.01, 0.001] # learning rate
rho = [0.75, 0.85] # coefficient used for computing a running average
of squared gradients
eps = [1e-5, 1e-7] # term added to the denominator to improve
numerical stability
weight_decay = [0.001, 0.0001] # weight decay (L2 penalty)
```

current exp | total: 1 | 16

Training with --- lr rate: 0.01, rho: 0.75, eps: 1e-05, weight decay: 0.001

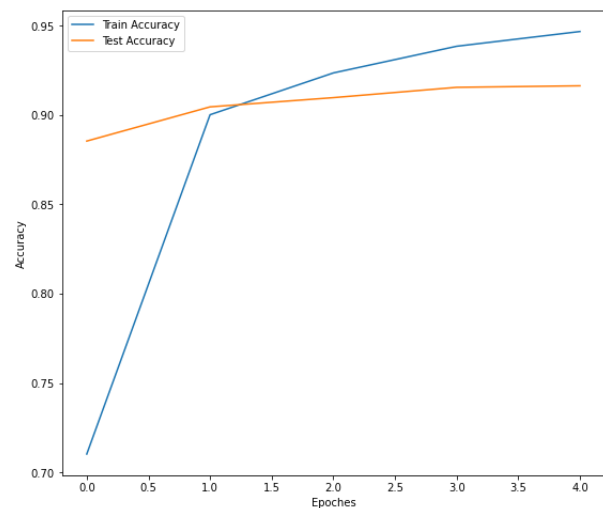
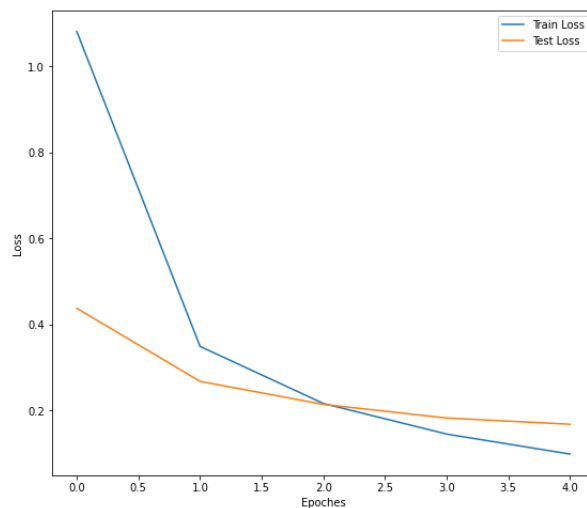
Epoch: 1 Train Loss: 1.0812 | Test Loss: 0.4375 | Train Accuray: 0.7103 | Test Accuracy: 0.8855

Epoch: 2 Train Loss: 0.3490 | Test Loss: 0.2676 | Train Accuray: 0.9002 | Test Accuracy: 0.9046

Epoch: 3 Train Loss: 0.2162 | Test Loss: 0.2141 | Train Accuray: 0.9236 | Test Accuracy: 0.9098

Epoch: 4 Train Loss: 0.1450 | Test Loss: 0.1824 | Train Accuray: 0.9385 | Test Accuracy: 0.9155

Epoch: 5 Train Loss: 0.0986 | Test Loss: 0.1679 | Train Accuray: 0.9468 | Test Accuracy: 0.9164



current exp | total: 2 | 16

Training with --- lr rate: 0.01, rho: 0.75, eps: 1e-05, weight decay: 0.0001

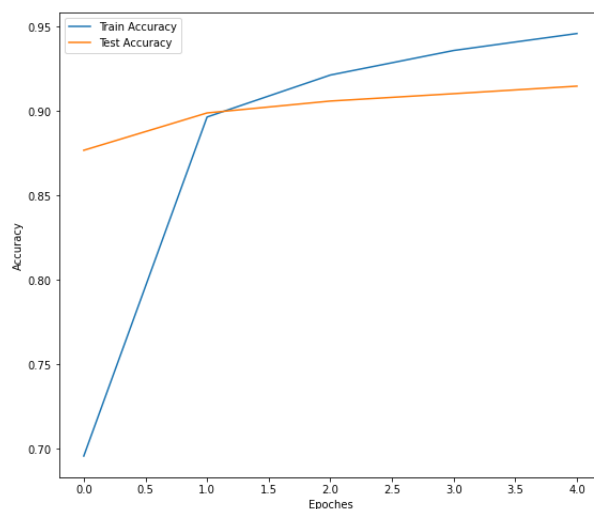
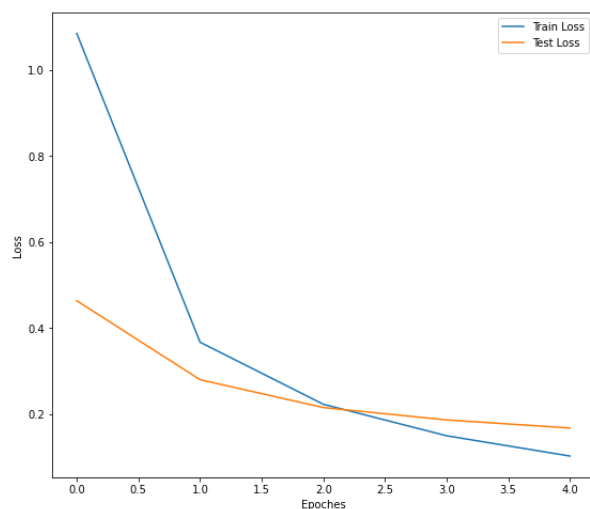
Epoch: 1 Train Loss: 1.0854 | Test Loss: 0.4638 | Train Accuray: 0.6958 | Test Accuracy: 0.8768

Epoch: 2 Train Loss: 0.3673 | Test Loss: 0.2801 | Train Accuray: 0.8965 | Test Accuracy: 0.8989

Epoch: 3 Train Loss: 0.2230 | Test Loss: 0.2154 | Train Accuray: 0.9213 | Test Accuracy: 0.9059

Epoch: 4 Train Loss: 0.1497 | Test Loss: 0.1866 | Train Accuray: 0.9359 | Test Accuracy: 0.9103

Epoch: 5 Train Loss: 0.1026 | Test Loss: 0.1678 | Train Accuray: 0.9459 | Test Accuracy: 0.9148



current exp | total: 3 | 16

Training with --- lr rate: 0.01, rho: 0.75, eps: 1e-07, weight decay: 0.001

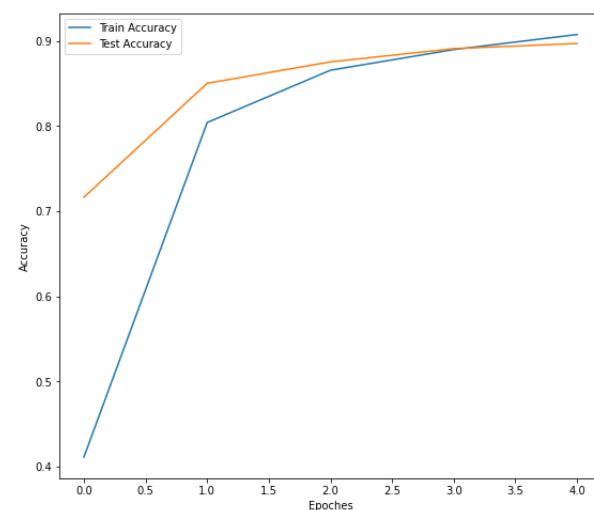
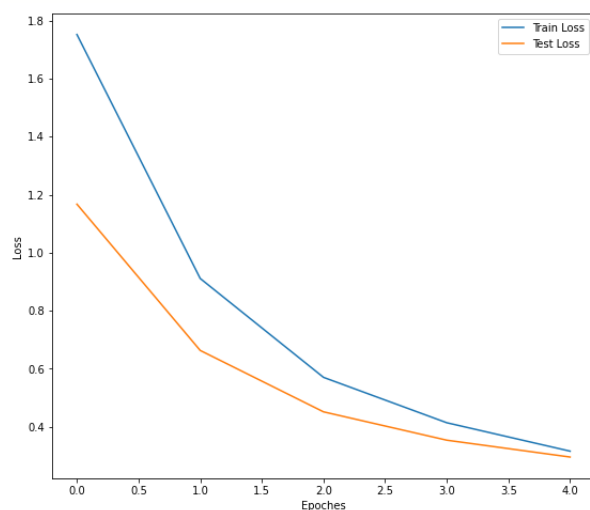
Epoch: 1 Train Loss: 1.7516 | Test Loss: 1.1672 | Train Accuray: 0.4112 | Test Accuracy: 0.7162

Epoch: 2 Train Loss: 0.9112 | Test Loss: 0.6633 | Train Accuray: 0.8040 | Test Accuracy: 0.8501

Epoch: 3 Train Loss: 0.5705 | Test Loss: 0.4518 | Train Accuray: 0.8654 | Test Accuracy: 0.8752

Epoch: 4 Train Loss: 0.4142 | Test Loss: 0.3541 | Train Accuray: 0.8897 | Test Accuracy: 0.8908

Epoch: 5 Train Loss: 0.3163 | Test Loss: 0.2960 | Train Accuray: 0.9073 | Test Accuracy: 0.8968



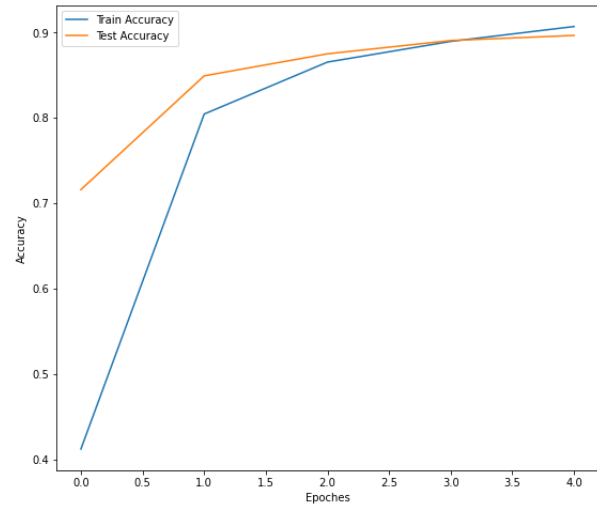
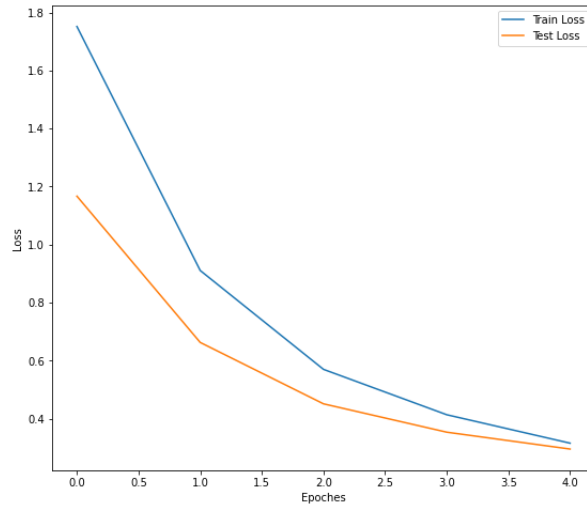
current exp | total: 4 | 16

Training with --- lr rate: 0.01, rho: 0.75, eps: 1e-07, weight decay: 0.0001

Epoch: 1 Train Loss: 1.7516 | Test Loss: 1.1671 | Train Accuray: 0.4120 | Test Accuracy: 0.7160

Epoch: 2 Train Loss: 0.9111 | Test Loss: 0.6632 | Train Accuray: 0.8046 | Test Accuracy: 0.8493

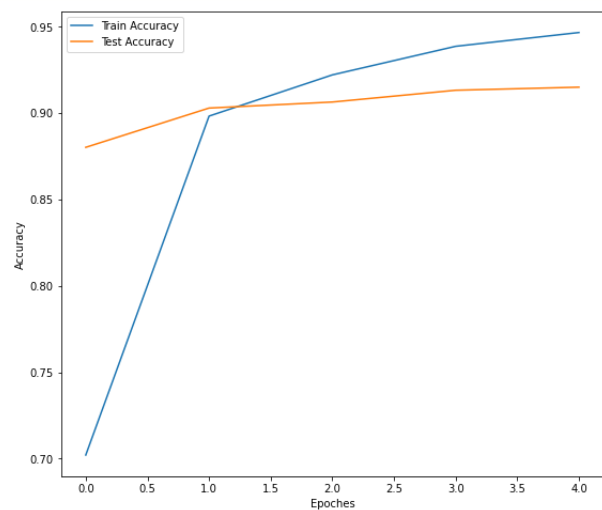
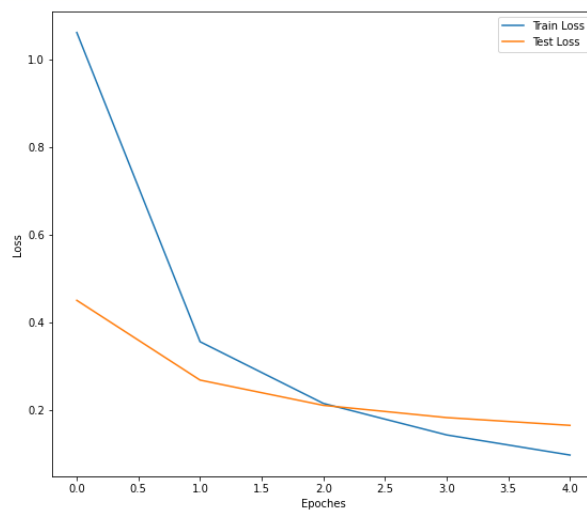
Epoch: 3 Train Loss: 0.5705 | Test Loss: 0.4517 | Train Accuray: 0.8654 | Test Accuracy: 0.8751  
Epoch: 4 Train Loss: 0.4141 | Test Loss: 0.3540 | Train Accuray: 0.8897 | Test Accuracy: 0.8907  
Epoch: 5 Train Loss: 0.3162 | Test Loss: 0.2960 | Train Accuray: 0.9071 | Test Accuracy: 0.8967



current exp | total: 5 | 16

Training with --- lr rate: 0.01, rho: 0.85, eps: 1e-05, weight decay: 0.001

Epoch: 1 Train Loss: 1.0622 | Test Loss: 0.4509 | Train Accuray: 0.7021 | Test Accuracy: 0.8802  
Epoch: 2 Train Loss: 0.3564 | Test Loss: 0.2688 | Train Accuray: 0.8983 | Test Accuracy: 0.9030  
Epoch: 3 Train Loss: 0.2156 | Test Loss: 0.2112 | Train Accuray: 0.9222 | Test Accuracy: 0.9064  
Epoch: 4 Train Loss: 0.1437 | Test Loss: 0.1832 | Train Accuray: 0.9387 | Test Accuracy: 0.9133  
Epoch: 5 Train Loss: 0.0977 | Test Loss: 0.1655 | Train Accuray: 0.9467 | Test Accuracy: 0.9150





current exp | total: 6 | 16

Training with --- lr rate: 0.01, rho: 0.85, eps: 1e-05, weight decay: 0.0001

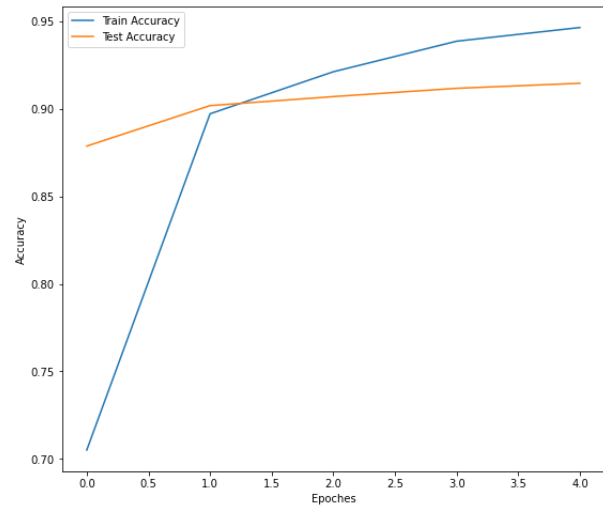
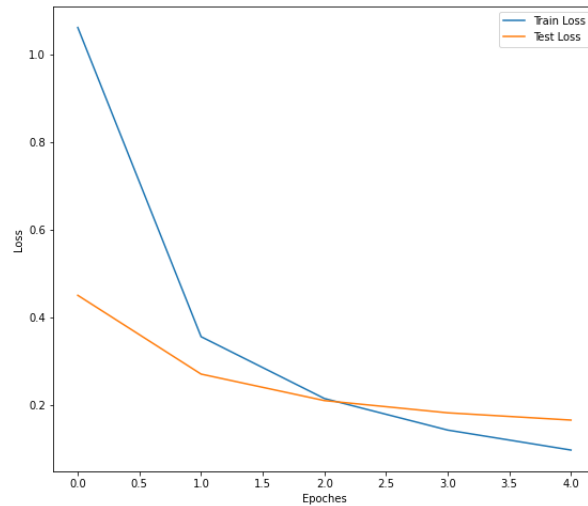
Epoch: 1 Train Loss: 1.0620 | Test Loss: 0.4508 | Train Accuray: 0.7050 | Test Accuracy: 0.8787

Epoch: 2 Train Loss: 0.3564 | Test Loss: 0.2710 | Train Accuray: 0.8972 | Test Accuracy: 0.9019

Epoch: 3 Train Loss: 0.2153 | Test Loss: 0.2106 | Train Accuray: 0.9212 | Test Accuracy: 0.9070

Epoch: 4 Train Loss: 0.1433 | Test Loss: 0.1827 | Train Accuray: 0.9387 | Test Accuracy: 0.9117

Epoch: 5 Train Loss: 0.0977 | Test Loss: 0.1661 | Train Accuray: 0.9465 | Test Accuracy: 0.9146



current exp | total: 7 | 16

Training with --- lr rate: 0.01, rho: 0.85, eps: 1e-07, weight decay: 0.001

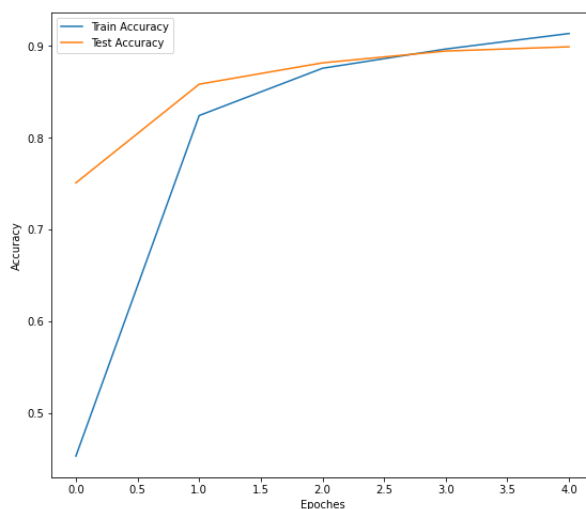
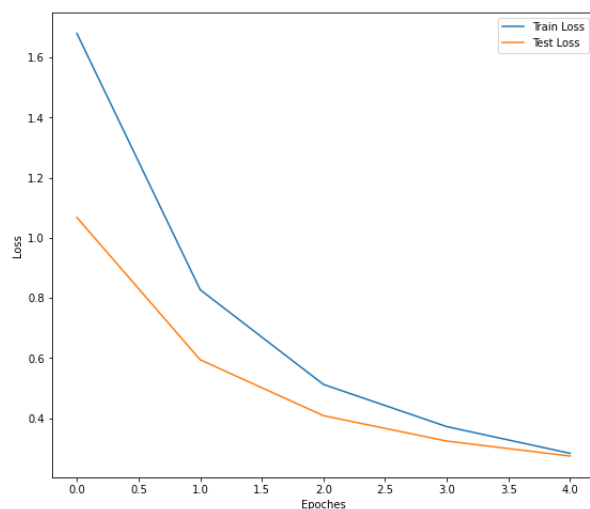
Epoch: 1 Train Loss: 1.6798 | Test Loss: 1.0677 | Train Accuray: 0.4528 | Test Accuracy: 0.7509

Epoch: 2 Train Loss: 0.8274 | Test Loss: 0.5944 | Train Accuray: 0.8243 | Test Accuracy: 0.8585

Epoch: 3 Train Loss: 0.5123 | Test Loss: 0.4084 | Train Accuray: 0.8758 | Test Accuracy: 0.8817

Epoch: 4 Train Loss: 0.3720 | Test Loss: 0.3240 | Train Accuray: 0.8968 | Test Accuracy: 0.8946

Epoch: 5 Train Loss: 0.2832 | Test Loss: 0.2742 | Train Accuray: 0.9137 | Test Accuracy: 0.8993



current exp | total: 8 | 16

Training with --- lr rate: 0.01, rho: 0.85, eps: 1e-07, weight decay: 0.0001

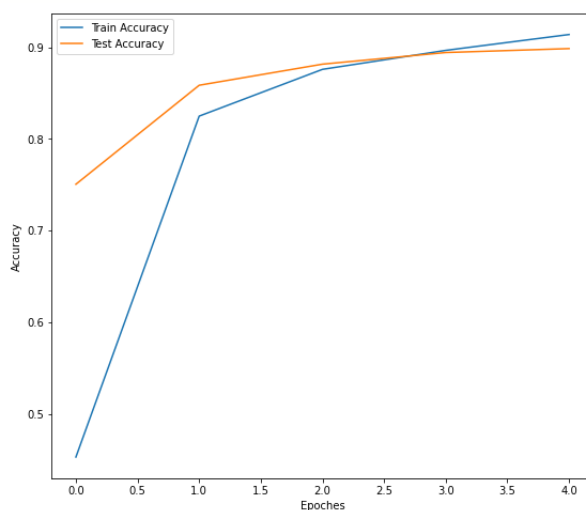
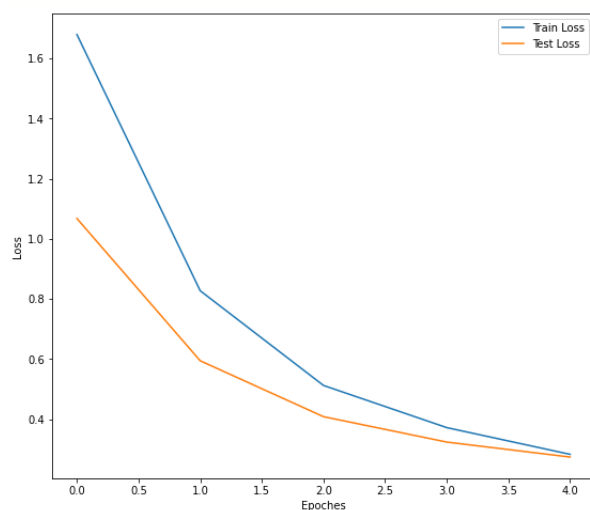
Epoch: 1 Train Loss: 1.6797 | Test Loss: 1.0678 | Train Accuray: 0.4528 | Test Accuracy: 0.7506

Epoch: 2 Train Loss: 0.8273 | Test Loss: 0.5944 | Train Accuray: 0.8250 | Test Accuracy: 0.8587

Epoch: 3 Train Loss: 0.5123 | Test Loss: 0.4084 | Train Accuray: 0.8760 | Test Accuracy: 0.8817

Epoch: 4 Train Loss: 0.3720 | Test Loss: 0.3239 | Train Accuray: 0.8967 | Test Accuracy: 0.8944

Epoch: 5 Train Loss: 0.2831 | Test Loss: 0.2741 | Train Accuray: 0.9140 | Test Accuracy: 0.8987



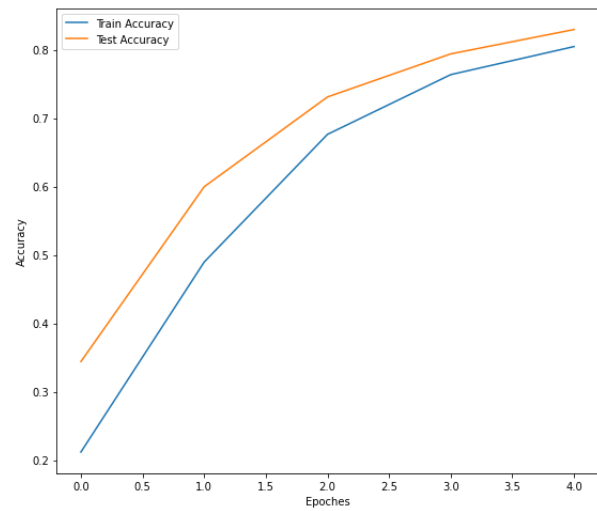
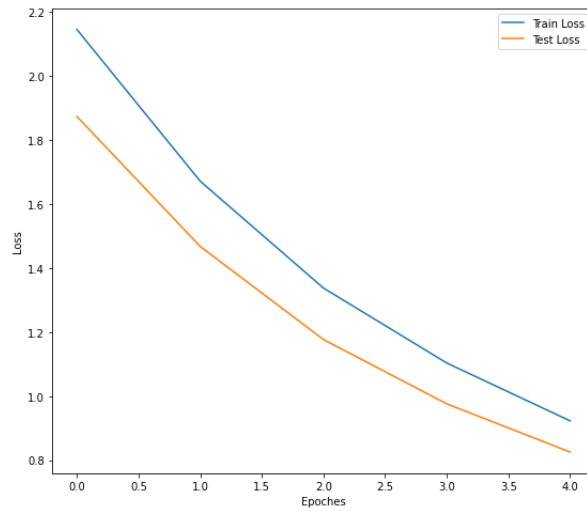
current exp | total: 9 | 16

Training with --- lr rate: 0.001, rho: 0.75, eps: 1e-05, weight decay: 0.001

Epoch: 1 Train Loss: 2.1457 | Test Loss: 1.8740 | Train Accuray: 0.2118 | Test Accuracy: 0.3441

Epoch: 2 Train Loss: 1.6718 | Test Loss: 1.4678 | Train Accuray: 0.4897 | Test Accuracy: 0.5998

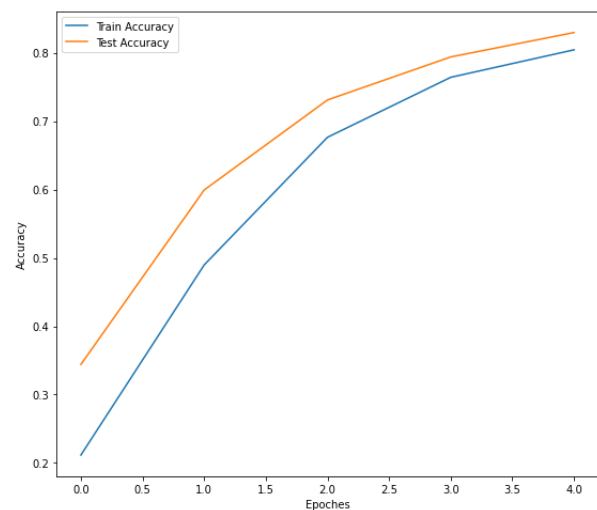
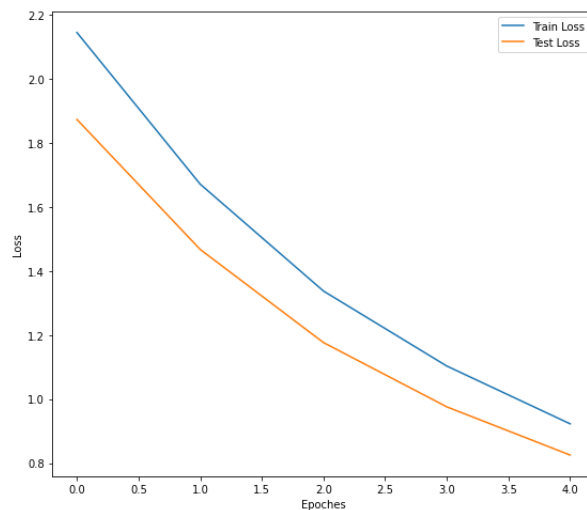
Epoch: 3 Train Loss: 1.3378 | Test Loss: 1.1768 | Train Accuray: 0.6764 | Test Accuracy: 0.7311  
Epoch: 4 Train Loss: 1.1035 | Test Loss: 0.9761 | Train Accuray: 0.7638 | Test Accuracy: 0.7941  
Epoch: 5 Train Loss: 0.9230 | Test Loss: 0.8254 | Train Accuray: 0.8048 | Test Accuracy: 0.8297



current exp | total: 10 | 16

Training with --- lr rate: 0.001, rho: 0.75, eps: 1e-05, weight decay: 0.0001

Epoch: 1 Train Loss: 2.1457 | Test Loss: 1.8740 | Train Accuray: 0.2115 | Test Accuracy: 0.3441  
Epoch: 2 Train Loss: 1.6718 | Test Loss: 1.4678 | Train Accuray: 0.4897 | Test Accuracy: 0.5994  
Epoch: 3 Train Loss: 1.3377 | Test Loss: 1.1767 | Train Accuray: 0.6765 | Test Accuracy: 0.7311  
Epoch: 4 Train Loss: 1.1034 | Test Loss: 0.9759 | Train Accuray: 0.7642 | Test Accuracy: 0.7940  
Epoch: 5 Train Loss: 0.9229 | Test Loss: 0.8253 | Train Accuray: 0.8044 | Test Accuracy: 0.8297



current exp | total: 11 | 16

Training with --- lr rate: 0.001, rho: 0.75, eps: 1e-07, weight decay: 0.001

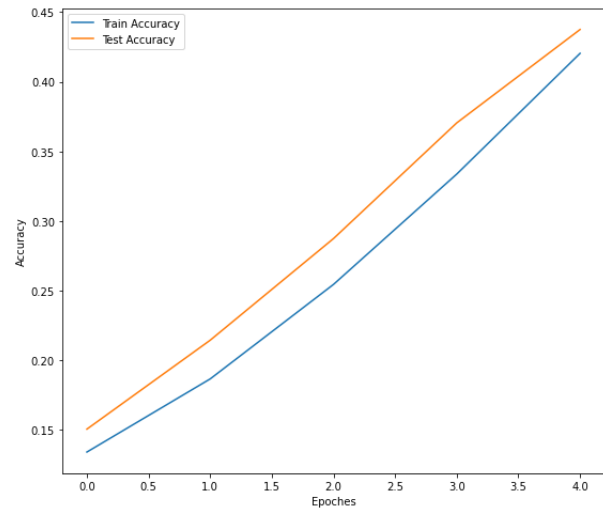
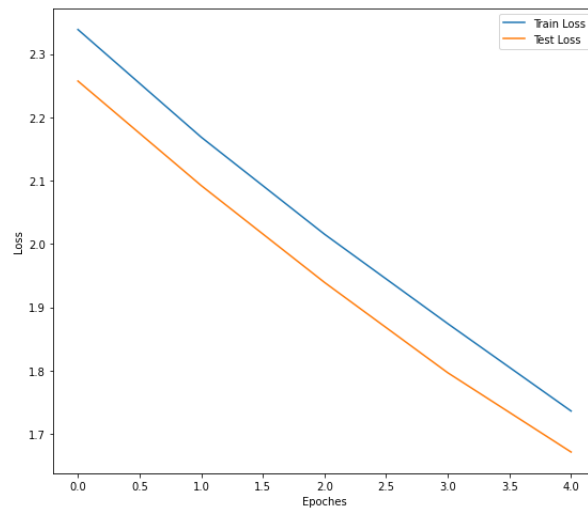
Epoch: 1 Train Loss: 2.3387 | Test Loss: 2.2574 | Train Accuray: 0.1342 | Test Accuracy: 0.1507

Epoch: 2 Train Loss: 2.1688 | Test Loss: 2.0924 | Train Accuray: 0.1867 | Test Accuracy: 0.2145

Epoch: 3 Train Loss: 2.0156 | Test Loss: 1.9396 | Train Accuray: 0.2546 | Test Accuracy: 0.2875

Epoch: 4 Train Loss: 1.8745 | Test Loss: 1.7970 | Train Accuray: 0.3338 | Test Accuracy: 0.3706

Epoch: 5 Train Loss: 1.7366 | Test Loss: 1.6719 | Train Accuray: 0.4205 | Test Accuracy: 0.4376



current exp | total: 12 | 16

Training with --- lr rate: 0.001, rho: 0.75, eps: 1e-07, weight decay: 0.0001

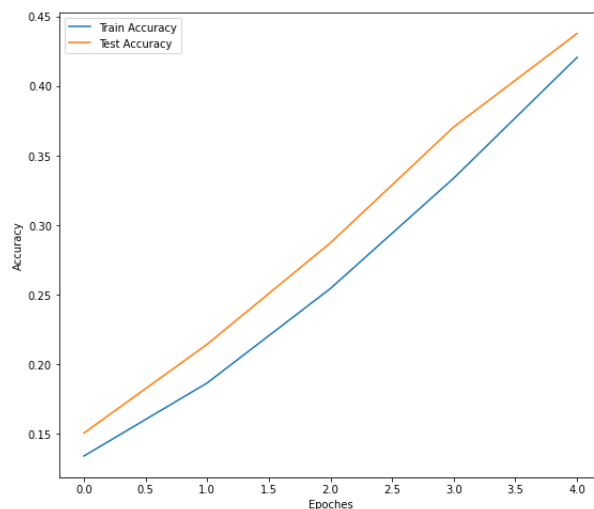
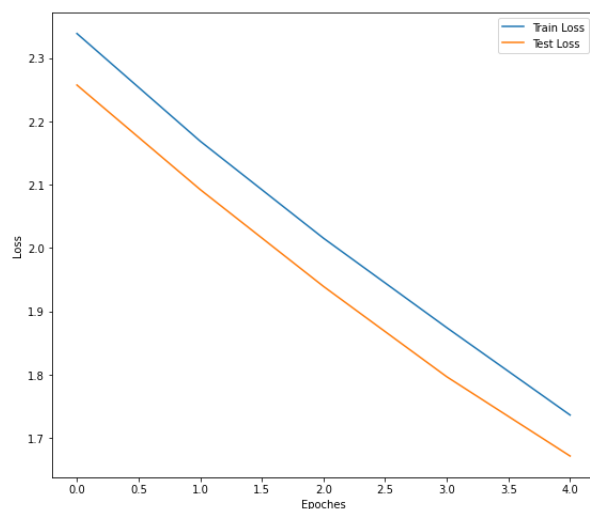
Epoch: 1 Train Loss: 2.3387 | Test Loss: 2.2574 | Train Accuray: 0.1342 | Test Accuracy: 0.1507

Epoch: 2 Train Loss: 2.1688 | Test Loss: 2.0924 | Train Accuray: 0.1867 | Test Accuracy: 0.2145

Epoch: 3 Train Loss: 2.0156 | Test Loss: 1.9396 | Train Accuray: 0.2546 | Test Accuracy: 0.2873

Epoch: 4 Train Loss: 1.8744 | Test Loss: 1.7969 | Train Accuray: 0.3338 | Test Accuracy: 0.3706

Epoch: 5 Train Loss: 1.7366 | Test Loss: 1.6718 | Train Accuray: 0.4205 | Test Accuracy: 0.4376



current exp | total: 13 | 16

Training with --- lr rate: 0.001, rho: 0.85, eps: 1e-05, weight decay: 0.001

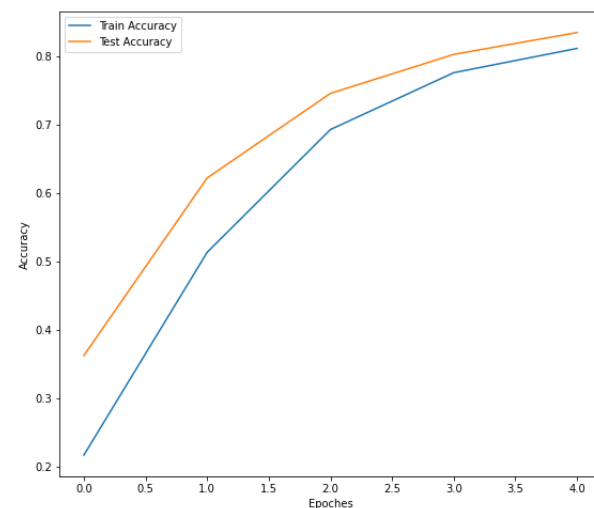
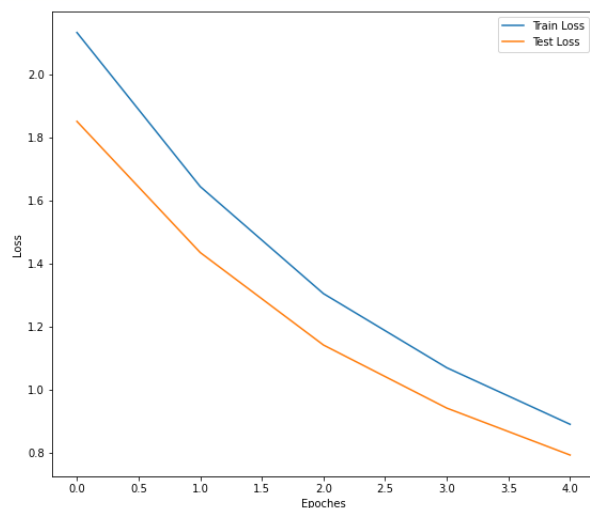
Epoch: 1 Train Loss: 2.1330 | Test Loss: 1.8513 | Train Accuray: 0.2167 | Test Accuracy: 0.3623

Epoch: 2 Train Loss: 1.6446 | Test Loss: 1.4355 | Train Accuray: 0.5133 | Test Accuracy: 0.6219

Epoch: 3 Train Loss: 1.3051 | Test Loss: 1.1421 | Train Accuray: 0.6928 | Test Accuracy: 0.7456

Epoch: 4 Train Loss: 1.0702 | Test Loss: 0.9422 | Train Accuray: 0.7759 | Test Accuracy: 0.8026

Epoch: 5 Train Loss: 0.8908 | Test Loss: 0.7934 | Train Accuray: 0.8113 | Test Accuracy: 0.8346



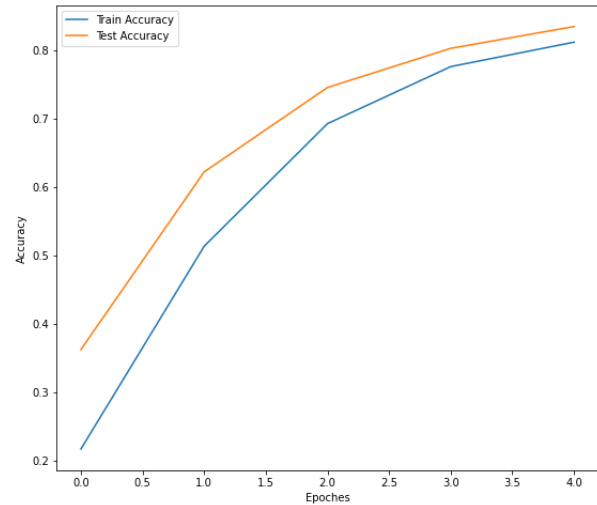
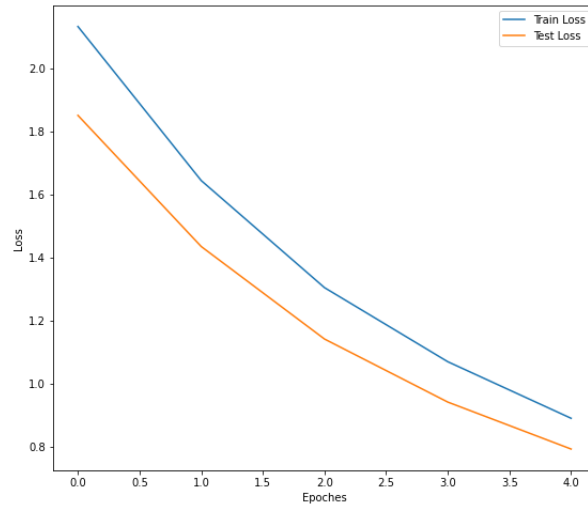
current exp | total: 14 | 16

Training with --- lr rate: 0.001, rho: 0.85, eps: 1e-05, weight decay: 0.0001

Epoch: 1 Train Loss: 2.1330 | Test Loss: 1.8513 | Train Accuray: 0.2168 | Test Accuracy: 0.3623

Epoch: 2 Train Loss: 1.6446 | Test Loss: 1.4354 | Train Accuray: 0.5134 | Test Accuracy: 0.6222

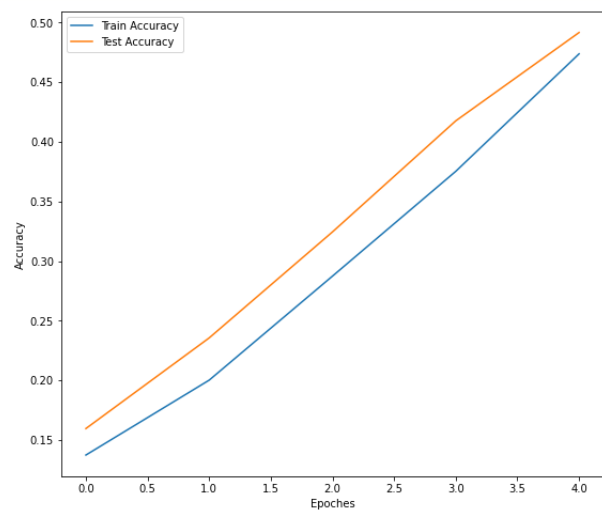
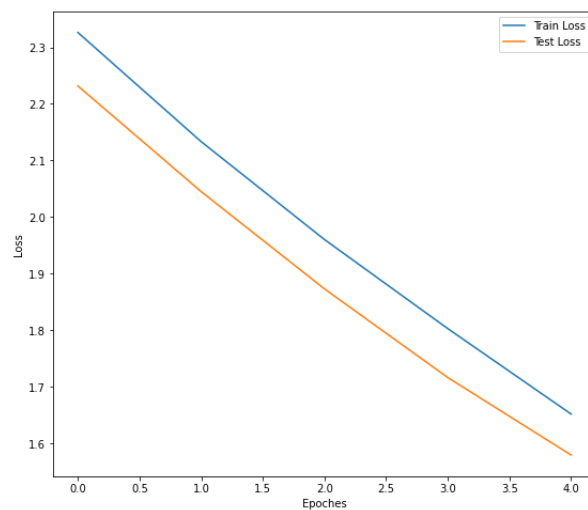
Epoch: 3 Train Loss: 1.3050 | Test Loss: 1.1420 | Train Accuray: 0.6927 | Test Accuracy: 0.7455  
Epoch: 4 Train Loss: 1.0701 | Test Loss: 0.9421 | Train Accuray: 0.7761 | Test Accuracy: 0.8028  
Epoch: 5 Train Loss: 0.8907 | Test Loss: 0.7932 | Train Accuray: 0.8118 | Test Accuracy: 0.8347



current exp | total: 15 | 16

Training with --- lr rate: 0.001, rho: 0.85, eps: 1e-07, weight decay: 0.001

Epoch: 1 Train Loss: 2.3261 | Test Loss: 2.2317 | Train Accuray: 0.1374 | Test Accuracy: 0.1596  
Epoch: 2 Train Loss: 2.1333 | Test Loss: 2.0451 | Train Accuray: 0.2002 | Test Accuracy: 0.2356  
Epoch: 3 Train Loss: 1.9605 | Test Loss: 1.8733 | Train Accuray: 0.2874 | Test Accuracy: 0.3244  
Epoch: 4 Train Loss: 1.8032 | Test Loss: 1.7167 | Train Accuray: 0.3752 | Test Accuracy: 0.4175  
Epoch: 5 Train Loss: 1.6523 | Test Loss: 1.5799 | Train Accuray: 0.4737 | Test Accuracy: 0.4916



current exp | total: 16 | 16

Training with --- lr rate: 0.001, rho: 0.85, eps: 1e-07, weight decay: 0.0001

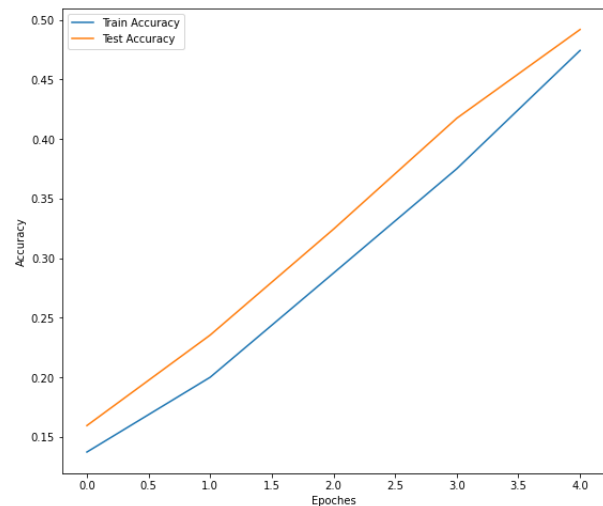
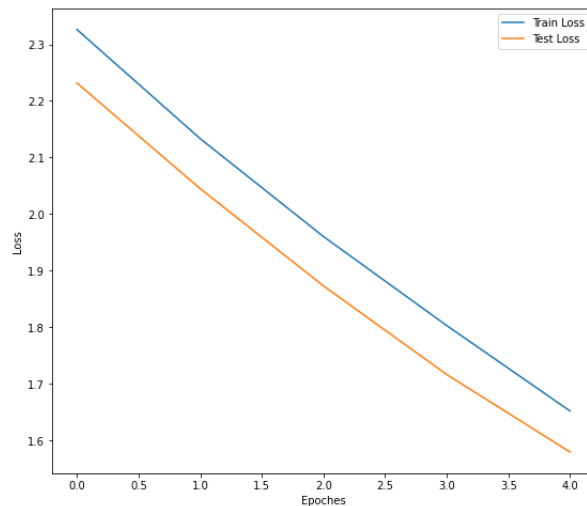
Epoch: 1 Train Loss: 2.3261 | Test Loss: 2.2317 | Train Accuray: 0.1374 | Test Accuracy: 0.1596

Epoch: 2 Train Loss: 2.1333 | Test Loss: 2.0450 | Train Accuray: 0.2002 | Test Accuracy: 0.2356

Epoch: 3 Train Loss: 1.9604 | Test Loss: 1.8733 | Train Accuray: 0.2876 | Test Accuracy: 0.3244

Epoch: 4 Train Loss: 1.8031 | Test Loss: 1.7167 | Train Accuray: 0.3751 | Test Accuracy: 0.4175

Epoch: 5 Train Loss: 1.6523 | Test Loss: 1.5799 | Train Accuray: 0.4744 | Test Accuracy: 0.4920



### Best Hyper parameter in AdaDelta:

Training with --- lr rate: 0.01, rho: 0.75, eps: 1e-05, weight decay: 0.001

Epoch: 1 Train Loss: 1.0812 | Test Loss: 0.4375 | Train Accuray: 0.7103 | Test Accuracy: 0.8855

Epoch: 2 Train Loss: 0.3490 | Test Loss: 0.2676 | Train Accuray: 0.9002 | Test Accuracy: 0.9046

Epoch: 3 Train Loss: 0.2162 | Test Loss: 0.2141 | Train Accuray: 0.9236 | Test Accuracy: 0.9098

Epoch: 4 Train Loss: 0.1450 | Test Loss: 0.1824 | Train Accuray: 0.9385 | Test Accuracy: 0.9155

Epoch: 5 Train Loss: 0.0986 | Test Loss: 0.1679 | Train Accuray: 0.9468 | Test Accuracy: 0.9164