Phuc Tran

Prof. Yang

HW2 Report

From the augmentation, we see that the test accuracy decreases with further augmentations in each tech. This is predicted because, in our class, we learned that when we train with more data augmentations, the original distribution of the training dataset which we have calculated from the original dataset will no longer best describe the distribution of the augmented dataset. With more augmentations, the validation accuracy increases until we reach Tech 3 where we overfit to a training distribution that does not represent the testing distribution. As a result, the validation accuracy significantly decreases compared to Tech 0, 1, and 2. Symmetrically, we see the same with the validation loss except we want to aim for a smaller validation loss. From our class, we see that the standard augmentation is a Random Horizontal Flip and a Random Resized Crop like Tech1, which seems to create a larger training dataset and maintain a similar distribution to the testing distribution. I have attached an appendix below that contains both the augmentation results and the adversarial training results.

Appendix

adversarial_training.pt output:

Total benign train accuracy: tensor(63.8829, device='cuda:0')

Total adversarial train accuracy: tensor(37.5540, device='cuda:0')

Total benign train loss: 479.931948363781

Total adversarial train loss: 692.8941502571106

Total benign test accuracy: 73.98

Total adversarial test Accuracy: 39.88

Total benign test loss: 93.61700230836868

Total adversarial test loss: 160.9192897081375

augmentation output:

Tech 0:

Epoch 1/30/50

Validation Accuracy: 0.188 / 3.585 / 3.554

Validation Loss: 12.096 / 1.156 / 1.27

Test Accuracy: 0.9296875

Tech 1:

Epoch 1/30/50

Validation Accuracy: 0.281 / 3.746 / 3.648

Validation Loss: 12.142 / 0.839 / 0.769

Test Accuracy: 0.8828125

Tech 2:

Epoch 1/30/50

Validation Accuracy: 0.344 / 3.648 / 3.523

Validation Loss: 11.941 / 1.246 / 1.461

Test Accuracy: 0.8739583492

Tech 3:

Epoch 1/30/50

Validation Accuracy: 0.067 / 2.921 / 3.242

Validation Loss: 12.436 / 3.625 / 2.53

Test Accuracy: 0.84375