Train 1:

Hyperparameters:

Layer size: 7

# Hidden layers: 1

Hidden layer size: 7

Hidden activation function: relu

Output layer size: 1

Output activation function: sigmoid

Optimizer: adam

Loss function: binary\_crossentropy

Batch size: 5

Epochs: 50

Training size: 7000 packets

Testing size: 3000 packets

Each list of input variables corresponds to one packet.

Input variables:

* Num occurrences of source MAC address.
* Num occurrences of destination MAC address.
* Difference between the above 2.
* Num occurrences of source IP address.
* Num occurrences of destination IP address.
* Difference between the above 2.
* Difference between timestamp of current packet, and previous packet

Results:

Training accuracy: 99.76%

Training loss: 0.009

Test Confusion matrix:

[ 2814, 72]

[ 0, 114]

Accuracy: 97.6%

Precision: 61.3%

Sensitivity: 100%

Specificity: 97.5%

Total (want this to be as close to 200% as possible): 197.5%

Train 2:

Same Hyperparameters and input variables as Train 1.

Results:

Training accuracy: 99.8%

Training loss: 0.0057

Test Confusion matrix:

[ 2483, 403]

[ 0, 114]

Accuracy: 86.7%

Precision:

Sensitivity:

Specificity:

Total (want this to be as close to 200% as possible):

Train 3:

Introduced dropout.

Dropout: 0.2

Same hyperparameters and input variables as Train 1.

Results:

Training accuracy: 97.6%

Training loss: 0.0652

Test Confusion matrix:

[ 2873, 13]

[ 0, 114]

Accuracy: 99.6%

Precision: 89.8%

Sensitivity: 100%

Specificity: 99.5%

Total (want this to be as close to 200% as possible): 199.5%

Trained on Wednesday\_00600\_20170705055056.pcap, the model was able to obtain a 99% success-rate when predicting DDoS attacks on 50 other pcap files.

When trained on 600-650:

Accuracy: 99.7%

Precision: 94.3%

Sensitivity: 100%

Specificity: 99.6%

Total: 199.7%

When tested on 650-700:

Accuracy: 46.5%

Precision: n/a

Sensitivity: 0

Specificity: 100%

Total: 100%

Train 4:

Hyperparameters are the same as Train 1.

Input variables:

Results:

Training accuracy: 96.84%

Training loss: 0.0779

Test Confusion matrix on 600-609

[ 25416, 328]

[ 1368, 2888]

Accuracy: 94.3%

Precision: 89.8%

Sensitivity: 67.9%

Specificity: 98.7%

Total (want this to be as close to 200% as possible): 166.5%

Test confusion matrix on 610-619:

[ 27800, 142]

[ 437, 1621]

Accuracy: 98.1%

Precision: 91.9%

Sensitivity: 78.8%

Specificity: 99.5%

Total (want this to be as close to 200% as possible): 178.2%

Test confusion matrix on 620-649:

[ 81886, 668]

[ 4005, 3441]

Accuracy: 94.8%

Precision: 83.7%

Sensitivity: 46.2%

Specificity: 99.2%

Total (want this to be as close to 200% as possible): 145%