

```
C:\ProgramData\Anaconda3\python.exe C:/Users/rpi08/M/MT/MTP_AD/mainCodes/
allPre_FinalTest_CV/finalTest_Evaluation.py
C:\ProgramData\Anaconda3\lib\site-packages\requests\__init__.py:91:
RequestsDependencyWarning: urllib3 (1.26.2) or chardet (3.0.4) doesn't match a
supported version!
  RequestsDependencyWarning)
Main Start running time: 210504_221145, *****
```

Name of corresponding python code file: finalTest_Evaluation

doScaleAfterSplit= True approach.

shiftNumber: 2, windowLength: 2
makeNoiseByJitter: False

Number of Rows Aucual yXRolled_Transformed :
Total: 14520
Anomalies(positives): 89 (0.61% of total)

baseFileName of output Folders and Plots name: finalTest_Evaluation

Shape of Actual npTrain dataset: (14520, 60)
Shape of Actual npFinalTest dataset: (3630, 60)

Number of Actual npTrain labelled 0: 14431
Number of Actual npTrain labelled 1: 89

Number of Actual npFinalTest labelled 0: 3596
Number of Actual npFinalTest labelled 1: 34

Start running time : 210504_221147 , -----:

Shape of Actual yXtrainRolled After Rolling: (28856, 60)

Shape of Actual yXfinalTestShifted dataset: (3595, 60)
Shape of Actual yXfinalTestRolled After Rolling: (7188, 60)

Start Creating new folder finalTest run: 210504_221148

Start running time Data Augmentation: 210504_221148
,+++++

2021-05-04 22:11:48.210848: I tensorflow/core/platform/cpu_feature_guard.cc:
142] Your CPU supports instructions that this TensorFlow binary was not

compiled to use: AVX AVX2
2021-05-04 22:11:48.214403: I tensorflow/core/common_runtime/process_util.cc:147] Creating new thread pool with default inter op setting: 2. Tune using inter_op_parallelism_threads for best performance.

Hyperparameters of Data Augmentation model:
epochs: 1000, batch: 5, lr: 0.001, FitShuffle: True

Data Augmentation model.summary():

Model: "sequential"

Layer (type)	Output Shape	Param #
dense (Dense)	(None, 236)	28084
dense_1 (Dense)	(None, 188)	44556
dense_2 (Dense)	(None, 153)	28917
dense_3 (Dense)	(None, 118)	18172

Total params: 119,729

Trainable params: 119,729

Non-trainable params: 0

None

Data Augmentation MSE Label 1==> mean: 0.000634, min: 0.00022, max: 0.001826

Data Augmentation MSE Label 1==> mean: 0.000422, min: 3.2e-05, max: 0.001573

Data Augmentation MSE Label 1==> mean: 0.000552, min: 8e-06, max: 0.003826

Data Augmentation MSE Label 1==> mean: 0.000875, min: 2e-06, max: 0.008459

Data Augmentation MSE Label 1==> mean: 0.001391, min: 0.0, max: 0.016087

Data Augmentation MSE Label 1==> mean: 0.001925, min: 0.0, max: 0.017263

Data Augmentation MSE Label 1==> mean: 0.002419, min: 0.0, max: 0.016966

Data Augmentation MSE Label 1==> mean: 0.003257, min: 0.0, max: 0.02692

Data Augmentation MSE Label 1==> mean: 0.003862, min: 0.0, max: 0.035516

Data Augmentation MSE Label 1==> mean: 0.003838, min: 0.0, max: 0.030996

Data Augmentation MSE Label 1==> mean: 0.003145, min: 0.0, max: 0.02691

Data Augmentation MSE Label 1==> mean: 0.003362, min: 0.0, max: 0.038015

Data Augmentation MSE Label 1==> mean: 0.003726, min: 0.0, max: 0.039637

Data Augmentation MSE Label 1==> mean: 0.003359, min: 0.0, max: 0.029118

MSE All generated Augmented data:

mean: 0.00234

min: 1.9e-05

max: 0.020937

End running time Data Augmentation: 210504_221300
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Shape of data after Transform ToOneRow to give finalTest Model:

xtrain: (15646, 118), ytrain: (15646,)

xfinalTest: (3594, 118), yfinalTest: (3594,)

Number of final label 0 in yXtrain: 14341

Number of final label 1 in yXtrain_Before_AddingAugedData: 87

Number of final label 1 in yXtrain_After_AddingAugedData: 1305

Hyperparameters of finalTest Model:
epochs: 500, batch: 32, lr: 0.0001, flagSeed: True, FitShuffle: True

finalTest Model.summary():

Model: "sequential"

Layer (type)	Output Shape	Param #
dense (Dense)	(None, 236)	28084
dense_1 (Dense)	(None, 188)	44556
dense_2 (Dense)	(None, 36)	6804
dense_3 (Dense)	(None, 1)	37
Total params: 79,481		
Trainable params: 79,481		
Non-trainable params: 0		
None		

```

finalTest Model config:
{'name': 'sequential', 'layers': [{'class_name': 'Dense', 'config': {'name': 'dense', 'trainable': True, 'batch_input_shape': (None, 118), 'dtype': 'float32', 'units': 236, 'activation': 'tanh', 'use_bias': True, 'kernel_initializer': {'class_name': 'GlorotUniform', 'config': {'seed': None}}, 'bias_initializer': {'class_name': 'Zeros', 'config': {}}, 'kernel_regularizer': None, 'bias_regularizer': None, 'activity_regularizer': None, 'kernel_constraint': None, 'bias_constraint': None}, {'class_name': 'Dense', 'config': {'name': 'dense_1', 'trainable': True, 'dtype': 'float32', 'units': 188, 'activation': 'tanh', 'use_bias': True, 'kernel_initializer': {'class_name': 'GlorotUniform', 'config': {'seed': None}}, 'bias_initializer': {'class_name': 'Zeros', 'config': {}}, 'kernel_regularizer': None, 'bias_regularizer': None, 'activity_regularizer': None, 'kernel_constraint': None, 'bias_constraint': None}, {'class_name': 'L1L2', 'config': {'l1': 0.0, 'l2': 0.014999999664723873}}, {'class_name': 'Dense', 'config': {'name': 'dense_2', 'trainable': True, 'dtype': 'float32', 'units': 36, 'activation': 'tanh', 'use_bias': True, 'kernel_initializer': {'class_name': 'GlorotUniform', 'config': {'seed': None}}, 'bias_initializer': {'class_name': 'Zeros', 'config': {}}, 'kernel_regularizer': {'class_name': 'L1L2', 'config': {'l1': 0.0, 'l2': 0.014999999664723873}}, 'bias_regularizer': None, 'activity_regularizer': None, 'bias_constraint': None, 'kernel_constraint': None}, {'class_name': 'Dense', 'config': {'name': 'dense_3', 'trainable': True, 'dtype': 'float32', 'units': 1, 'activation': 'sigmoid', 'use_bias': True, 'kernel_initializer': {'class_name': 'GlorotUniform', 'config': {'seed

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' : None}}, 'bias_initializer': {'class_name': 'Zeros', 'config': {}}, '
kernel_regularizer': None, 'bias_regularizer': None, 'activity_regularizer':
None, 'kernel_constraint': None, 'bias_constraint': None}}]]
```

Train on 15646 samples

Epoch 1/500

```
15646/15646 [=====] - 3s 196us/sample - loss: 2.8909
- accuracy: 0.9301
```

Epoch 2/500

```
15646/15646 [=====] - 2s 132us/sample - loss: 1.1539
- accuracy: 0.9455
```

Epoch 3/500

```
15646/15646 [=====] - 2s 148us/sample - loss: 0.5020
- accuracy: 0.9516
```

Epoch 4/500

```
15646/15646 [=====] - 2s 140us/sample - loss: 0.2778
- accuracy: 0.9550
```

Epoch 5/500

```
15646/15646 [=====] - 2s 145us/sample - loss: 0.2026
- accuracy: 0.9576
```

Epoch 6/500

```
15646/15646 [=====] - 2s 140us/sample - loss: 0.1759
- accuracy: 0.9585
```

Epoch 7/500


```
15646/15646 [=====] - 2s 136us/sample - loss: 0.1653
- accuracy: 0.9592
Epoch 8/500
15646/15646 [=====] - 2s 146us/sample - loss: 0.1590
- accuracy: 0.9602
Epoch 9/500
15646/15646 [=====] - 2s 138us/sample - loss: 0.1551
- accuracy: 0.9604
Epoch 10/500
15646/15646 [=====] - 2s 142us/sample - loss: 0.1531
- accuracy: 0.9611
Epoch 11/500
15646/15646 [=====] - 2s 147us/sample - loss: 0.1502
- accuracy: 0.9609
Epoch 12/500
15646/15646 [=====] - 2s 140us/sample - loss: 0.1480
- accuracy: 0.9617
Epoch 13/500
15646/15646 [=====] - 2s 145us/sample - loss: 0.1460
- accuracy: 0.9610
Epoch 14/500
15646/15646 [=====] - 2s 144us/sample - loss: 0.1444
- accuracy: 0.9620
Epoch 15/500
15646/15646 [=====] - 2s 144us/sample - loss: 0.1426
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- accuracy: 0.9623
Epoch 16/500
15646/15646 [=====] - 2s 147us/sample - loss: 0.1410
- accuracy: 0.9625
Epoch 17/500
15646/15646 [=====] - 2s 136us/sample - loss: 0.1392
- accuracy: 0.9637
Epoch 18/500
15646/15646 [=====] - 2s 147us/sample - loss: 0.1384
- accuracy: 0.9627
Epoch 19/500
15646/15646 [=====] - 2s 145us/sample - loss: 0.1378
- accuracy: 0.9631
Epoch 20/500
15646/15646 [=====] - 2s 142us/sample - loss: 0.1361
- accuracy: 0.9634
Epoch 21/500
15646/15646 [=====] - 2s 150us/sample - loss: 0.1353
- accuracy: 0.9640
Epoch 22/500
15646/15646 [=====] - 2s 143us/sample - loss: 0.1335
- accuracy: 0.9642
Epoch 23/500
15646/15646 [=====] - 2s 146us/sample - loss: 0.1332
- accuracy: 0.9641
```

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Epoch 24/500
15646/15646 [=====] - 2s 143us/sample - loss: 0.1320
- accuracy: 0.9640
Epoch 25/500
15646/15646 [=====] - 2s 141us/sample - loss: 0.1305
- accuracy: 0.9652
Epoch 26/500
15646/15646 [=====] - 2s 146us/sample - loss: 0.1297
- accuracy: 0.9652
Epoch 27/500
15646/15646 [=====] - 2s 143us/sample - loss: 0.1290
- accuracy: 0.9657
Epoch 28/500
15646/15646 [=====] - 2s 143us/sample - loss: 0.1279
- accuracy: 0.9652
Epoch 29/500
15646/15646 [=====] - 2s 146us/sample - loss: 0.1268
- accuracy: 0.9654
Epoch 30/500
15646/15646 [=====] - 2s 141us/sample - loss: 0.1266
- accuracy: 0.9660
Epoch 31/500
15646/15646 [=====] - 2s 149us/sample - loss: 0.1248
- accuracy: 0.9666
Epoch 32/500
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15646/15646 [=====] - 2s 143us/sample - loss: 0.1235
- accuracy: 0.9673
Epoch 33/500
15646/15646 [=====] - 2s 155us/sample - loss: 0.1240
- accuracy: 0.9667
Epoch 34/500
15646/15646 [=====] - 2s 143us/sample - loss: 0.1219
- accuracy: 0.9678
Epoch 35/500
15646/15646 [=====] - 2s 146us/sample - loss: 0.1212
- accuracy: 0.9677
Epoch 36/500
15646/15646 [=====] - 2s 153us/sample - loss: 0.1207
- accuracy: 0.9674
Epoch 37/500
15646/15646 [=====] - 3s 175us/sample - loss: 0.1195
- accuracy: 0.9694
Epoch 38/500
15646/15646 [=====] - 3s 197us/sample - loss: 0.1184
- accuracy: 0.9684
Epoch 39/500
15646/15646 [=====] - 3s 175us/sample - loss: 0.1177
- accuracy: 0.9691
Epoch 40/500
15646/15646 [=====] - 3s 170us/sample - loss: 0.1165
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- accuracy: 0.9701
Epoch 41/500
15646/15646 [=====] - 3s 165us/sample - loss: 0.1152
- accuracy: 0.9707
Epoch 42/500
15646/15646 [=====] - 3s 172us/sample - loss: 0.1149
- accuracy: 0.9699
Epoch 43/500
15646/15646 [=====] - 2s 158us/sample - loss: 0.1139
- accuracy: 0.9706
Epoch 44/500
15646/15646 [=====] - 3s 172us/sample - loss: 0.1135
- accuracy: 0.9712
Epoch 45/500
15646/15646 [=====] - 2s 160us/sample - loss: 0.1121
- accuracy: 0.9711
Epoch 46/500
15646/15646 [=====] - 2s 154us/sample - loss: 0.1107
- accuracy: 0.9707
Epoch 47/500
15646/15646 [=====] - 3s 166us/sample - loss: 0.1105
- accuracy: 0.9716
Epoch 48/500
15646/15646 [=====] - 2s 154us/sample - loss: 0.1098
- accuracy: 0.9721
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Epoch 49/500
15646/15646 [=====] - 3s 167us/sample - loss: 0.1084
- accuracy: 0.9725
Epoch 50/500
15646/15646 [=====] - 3s 165us/sample - loss: 0.1076
- accuracy: 0.9719
Epoch 51/500
15646/15646 [=====] - 3s 164us/sample - loss: 0.1067
- accuracy: 0.9733
Epoch 52/500
15646/15646 [=====] - 2s 152us/sample - loss: 0.1065
- accuracy: 0.9743
Epoch 53/500
15646/15646 [=====] - 2s 157us/sample - loss: 0.1053
- accuracy: 0.9739
Epoch 54/500
15646/15646 [=====] - 2s 144us/sample - loss: 0.1043
- accuracy: 0.9755
Epoch 55/500
15646/15646 [=====] - 2s 159us/sample - loss: 0.1034
- accuracy: 0.9749
Epoch 56/500
15646/15646 [=====] - 2s 158us/sample - loss: 0.1031
- accuracy: 0.9754
Epoch 57/500
```

```
15646/15646 [=====] - 2s 156us/sample - loss: 0.1016
- accuracy: 0.9752
Epoch 58/500
15646/15646 [=====] - 3s 191us/sample - loss: 0.1012
- accuracy: 0.9756
Epoch 59/500
15646/15646 [=====] - 2s 152us/sample - loss: 0.1000
- accuracy: 0.9764
Epoch 60/500
15646/15646 [=====] - 3s 174us/sample - loss: 0.0998
- accuracy: 0.9764
Epoch 61/500
15646/15646 [=====] - 3s 164us/sample - loss: 0.0987
- accuracy: 0.9769
Epoch 62/500
15646/15646 [=====] - 3s 167us/sample - loss: 0.0984
- accuracy: 0.9772
Epoch 63/500
15646/15646 [=====] - 2s 152us/sample - loss: 0.0973
- accuracy: 0.9783
Epoch 64/500
15646/15646 [=====] - 2s 153us/sample - loss: 0.0970
- accuracy: 0.9774
Epoch 65/500
15646/15646 [=====] - 3s 165us/sample - loss: 0.0959
```

```
- accuracy: 0.9779
Epoch 66/500
15646/15646 [=====] - 3s 176us/sample - loss: 0.0954
- accuracy: 0.9784
Epoch 67/500
15646/15646 [=====] - 3s 162us/sample - loss: 0.0947
- accuracy: 0.9787
Epoch 68/500
15646/15646 [=====] - 2s 148us/sample - loss: 0.0938
- accuracy: 0.9792
Epoch 69/500
15646/15646 [=====] - 3s 161us/sample - loss: 0.0935
- accuracy: 0.9794
Epoch 70/500
15646/15646 [=====] - 3s 163us/sample - loss: 0.0922
- accuracy: 0.9788
Epoch 71/500
15646/15646 [=====] - 3s 166us/sample - loss: 0.0923
- accuracy: 0.9803
Epoch 72/500
15646/15646 [=====] - 3s 183us/sample - loss: 0.0912
- accuracy: 0.9792
Epoch 73/500
15646/15646 [=====] - 2s 156us/sample - loss: 0.0908
- accuracy: 0.9804
```



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Epoch 74/500
15646/15646 [=====] - 2s 144us/sample - loss: 0.0904
- accuracy: 0.9802
Epoch 75/500
15646/15646 [=====] - 2s 157us/sample - loss: 0.0903
- accuracy: 0.9811
Epoch 76/500
15646/15646 [=====] - 3s 165us/sample - loss: 0.0891
- accuracy: 0.9804
Epoch 77/500
15646/15646 [=====] - 2s 153us/sample - loss: 0.0899
- accuracy: 0.9801
Epoch 78/500
15646/15646 [=====] - 3s 160us/sample - loss: 0.0887
- accuracy: 0.9804
Epoch 79/500
15646/15646 [=====] - 2s 148us/sample - loss: 0.0873
- accuracy: 0.9815
Epoch 80/500
15646/15646 [=====] - 3s 163us/sample - loss: 0.0865
- accuracy: 0.9818
Epoch 81/500
15646/15646 [=====] - 2s 152us/sample - loss: 0.0862
- accuracy: 0.9816
Epoch 82/500
```

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15646/15646 [=====] - 2s 153us/sample - loss: 0.0851
- accuracy: 0.9822
Epoch 83/500
15646/15646 [=====] - 2s 146us/sample - loss: 0.0855
- accuracy: 0.9815
Epoch 84/500
15646/15646 [=====] - 2s 152us/sample - loss: 0.0851
- accuracy: 0.9820
Epoch 85/500
15646/15646 [=====] - 3s 164us/sample - loss: 0.0838
- accuracy: 0.9827
Epoch 86/500
15646/15646 [=====] - 2s 147us/sample - loss: 0.0838
- accuracy: 0.9831
Epoch 87/500
15646/15646 [=====] - 3s 160us/sample - loss: 0.0833
- accuracy: 0.9828
Epoch 88/500
15646/15646 [=====] - 3s 162us/sample - loss: 0.0834
- accuracy: 0.9826
Epoch 89/500
15646/15646 [=====] - 3s 161us/sample - loss: 0.0823
- accuracy: 0.9830
Epoch 90/500
15646/15646 [=====] - 3s 167us/sample - loss: 0.0821
```

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- accuracy: 0.9827
Epoch 91/500
15646/15646 [=====] - 3s 161us/sample - loss: 0.0819
- accuracy: 0.9827
Epoch 92/500
15646/15646 [=====] - 3s 173us/sample - loss: 0.0808
- accuracy: 0.9831
Epoch 93/500
15646/15646 [=====] - 2s 152us/sample - loss: 0.0799
- accuracy: 0.9838
Epoch 94/500
15646/15646 [=====] - 2s 158us/sample - loss: 0.0794
- accuracy: 0.9841
Epoch 95/500
15646/15646 [=====] - 3s 166us/sample - loss: 0.0799
- accuracy: 0.9836
Epoch 96/500
15646/15646 [=====] - 3s 173us/sample - loss: 0.0791
- accuracy: 0.9837
Epoch 97/500
15646/15646 [=====] - 3s 165us/sample - loss: 0.0788
- accuracy: 0.9838
Epoch 98/500
15646/15646 [=====] - 3s 177us/sample - loss: 0.0792
- accuracy: 0.9844
```

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Epoch 99/500
15646/15646 [=====] - 2s 137us/sample - loss: 0.0782
- accuracy: 0.9837
Epoch 100/500
15646/15646 [=====] - 3s 165us/sample - loss: 0.0774
- accuracy: 0.9847
Epoch 101/500
15646/15646 [=====] - 2s 147us/sample - loss: 0.0770
- accuracy: 0.9841
Epoch 102/500
15646/15646 [=====] - 2s 137us/sample - loss: 0.0765
- accuracy: 0.9843
Epoch 103/500
15646/15646 [=====] - 3s 166us/sample - loss: 0.0766
- accuracy: 0.9845
Epoch 104/500
15646/15646 [=====] - 3s 168us/sample - loss: 0.0754
- accuracy: 0.9850
Epoch 105/500
15646/15646 [=====] - 2s 154us/sample - loss: 0.0757
- accuracy: 0.9844
Epoch 106/500
15646/15646 [=====] - 2s 150us/sample - loss: 0.0761
- accuracy: 0.9850
Epoch 107/500
```

```
15646/15646 [=====] - 2s 153us/sample - loss: 0.0751
- accuracy: 0.9845
Epoch 108/500
15646/15646 [=====] - 3s 164us/sample - loss: 0.0749
- accuracy: 0.9853
Epoch 109/500
15646/15646 [=====] - 3s 171us/sample - loss: 0.0751
- accuracy: 0.9847
Epoch 110/500
15646/15646 [=====] - 3s 161us/sample - loss: 0.0737
- accuracy: 0.9854
Epoch 111/500
15646/15646 [=====] - 3s 162us/sample - loss: 0.0739
- accuracy: 0.9851
Epoch 112/500
15646/15646 [=====] - 2s 160us/sample - loss: 0.0734
- accuracy: 0.9854
Epoch 113/500
15646/15646 [=====] - 3s 161us/sample - loss: 0.0736
- accuracy: 0.9856
Epoch 114/500
15646/15646 [=====] - 3s 165us/sample - loss: 0.0728
- accuracy: 0.9856
Epoch 115/500
15646/15646 [=====] - 3s 162us/sample - loss: 0.0725
```

```
- accuracy: 0.9859
Epoch 116/500
15646/15646 [=====] - 2s 156us/sample - loss: 0.0717
- accuracy: 0.9865
Epoch 117/500
15646/15646 [=====] - 3s 161us/sample - loss: 0.0719
- accuracy: 0.9859
Epoch 118/500
15646/15646 [=====] - 3s 161us/sample - loss: 0.0719
- accuracy: 0.9856
Epoch 119/500
15646/15646 [=====] - 2s 152us/sample - loss: 0.0706
- accuracy: 0.9865
Epoch 120/500
15646/15646 [=====] - 2s 152us/sample - loss: 0.0705
- accuracy: 0.9865
Epoch 121/500
15646/15646 [=====] - 2s 158us/sample - loss: 0.0709
- accuracy: 0.9868
Epoch 122/500
15646/15646 [=====] - 2s 153us/sample - loss: 0.0702
- accuracy: 0.9866
Epoch 123/500
15646/15646 [=====] - 3s 166us/sample - loss: 0.0694
- accuracy: 0.9861
```

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Epoch 124/500
15646/15646 [=====] - 3s 168us/sample - loss: 0.0692
- accuracy: 0.9865
Epoch 125/500
15646/15646 [=====] - 2s 146us/sample - loss: 0.0705
- accuracy: 0.9866
Epoch 126/500
15646/15646 [=====] - 2s 154us/sample - loss: 0.0689
- accuracy: 0.9866
Epoch 127/500
15646/15646 [=====] - 2s 140us/sample - loss: 0.0685
- accuracy: 0.9868
Epoch 128/500
15646/15646 [=====] - 3s 160us/sample - loss: 0.0687
- accuracy: 0.9864
Epoch 129/500
15646/15646 [=====] - 2s 148us/sample - loss: 0.0680
- accuracy: 0.9867
Epoch 130/500
15646/15646 [=====] - 2s 144us/sample - loss: 0.0692
- accuracy: 0.9866
Epoch 131/500
15646/15646 [=====] - 3s 167us/sample - loss: 0.0677
- accuracy: 0.9869
Epoch 132/500
```

```
15646/15646 [=====] - 3s 162us/sample - loss: 0.0671
- accuracy: 0.9871
Epoch 133/500
15646/15646 [=====] - 2s 152us/sample - loss: 0.0671
- accuracy: 0.9865
Epoch 134/500
15646/15646 [=====] - 2s 142us/sample - loss: 0.0675
- accuracy: 0.9874
Epoch 135/500
15646/15646 [=====] - 3s 182us/sample - loss: 0.0667
- accuracy: 0.9874
Epoch 136/500
15646/15646 [=====] - 2s 153us/sample - loss: 0.0657
- accuracy: 0.9876
Epoch 137/500
15646/15646 [=====] - 3s 178us/sample - loss: 0.0663
- accuracy: 0.9872
Epoch 138/500
15646/15646 [=====] - 3s 169us/sample - loss: 0.0660
- accuracy: 0.9873
Epoch 139/500
15646/15646 [=====] - 2s 154us/sample - loss: 0.0663
- accuracy: 0.9870
Epoch 140/500
15646/15646 [=====] - 2s 150us/sample - loss: 0.0656
```



```
- accuracy: 0.9875
Epoch 141/500
15646/15646 [=====] - 3s 165us/sample - loss: 0.0646
- accuracy: 0.9878
Epoch 142/500
15646/15646 [=====] - 3s 161us/sample - loss: 0.0646
- accuracy: 0.9872
Epoch 143/500
15646/15646 [=====] - 2s 146us/sample - loss: 0.0644
- accuracy: 0.9884
Epoch 144/500
15646/15646 [=====] - 3s 165us/sample - loss: 0.0649
- accuracy: 0.9873
Epoch 145/500
15646/15646 [=====] - 2s 156us/sample - loss: 0.0648
- accuracy: 0.9877
Epoch 146/500
15646/15646 [=====] - 3s 164us/sample - loss: 0.0644
- accuracy: 0.9879
Epoch 147/500
15646/15646 [=====] - 2s 155us/sample - loss: 0.0642
- accuracy: 0.9878
Epoch 148/500
15646/15646 [=====] - 3s 161us/sample - loss: 0.0632
- accuracy: 0.9880
```

```
Epoch 149/500
15646/15646 [=====] - 2s 148us/sample - loss: 0.0634
- accuracy: 0.9881
Epoch 150/500
15646/15646 [=====] - 3s 161us/sample - loss: 0.0634
- accuracy: 0.9883
Epoch 151/500
15646/15646 [=====] - 3s 163us/sample - loss: 0.0634
- accuracy: 0.9878
Epoch 152/500
15646/15646 [=====] - 3s 161us/sample - loss: 0.0624
- accuracy: 0.9882
Epoch 153/500
15646/15646 [=====] - 3s 166us/sample - loss: 0.0625
- accuracy: 0.9880
Epoch 154/500
15646/15646 [=====] - 2s 149us/sample - loss: 0.0622
- accuracy: 0.9885
Epoch 155/500
15646/15646 [=====] - 3s 167us/sample - loss: 0.0613
- accuracy: 0.9887
Epoch 156/500
15646/15646 [=====] - 3s 161us/sample - loss: 0.0618
- accuracy: 0.9887
Epoch 157/500
```

```
15646/15646 [=====] - 3s 169us/sample - loss: 0.0624
- accuracy: 0.9890
Epoch 158/500
15646/15646 [=====] - 2s 153us/sample - loss: 0.0616
- accuracy: 0.9886
Epoch 159/500
15646/15646 [=====] - 2s 157us/sample - loss: 0.0609
- accuracy: 0.9884
Epoch 160/500
15646/15646 [=====] - 3s 170us/sample - loss: 0.0618
- accuracy: 0.9882
Epoch 161/500
15646/15646 [=====] - 3s 165us/sample - loss: 0.0606
- accuracy: 0.9888
Epoch 162/500
15646/15646 [=====] - 2s 156us/sample - loss: 0.0605
- accuracy: 0.9889
Epoch 163/500
15646/15646 [=====] - 2s 152us/sample - loss: 0.0607
- accuracy: 0.9890
Epoch 164/500
15646/15646 [=====] - 2s 147us/sample - loss: 0.0605
- accuracy: 0.9885
Epoch 165/500
15646/15646 [=====] - 3s 166us/sample - loss: 0.0594
```

```
- accuracy: 0.9893
Epoch 166/500
15646/15646 [=====] - 2s 157us/sample - loss: 0.0601
- accuracy: 0.9890
Epoch 167/500
15646/15646 [=====] - 3s 162us/sample - loss: 0.0600
- accuracy: 0.9889
Epoch 168/500
15646/15646 [=====] - 2s 157us/sample - loss: 0.0603
- accuracy: 0.9891
Epoch 169/500
15646/15646 [=====] - 2s 152us/sample - loss: 0.0594
- accuracy: 0.9891
Epoch 170/500
15646/15646 [=====] - 3s 162us/sample - loss: 0.0595
- accuracy: 0.9890
Epoch 171/500
15646/15646 [=====] - 3s 160us/sample - loss: 0.0588
- accuracy: 0.9893
Epoch 172/500
15646/15646 [=====] - 2s 141us/sample - loss: 0.0593
- accuracy: 0.9892
Epoch 173/500
15646/15646 [=====] - 3s 168us/sample - loss: 0.0592
- accuracy: 0.9889
```

```
Epoch 174/500
15646/15646 [=====] - 2s 158us/sample - loss: 0.0596
- accuracy: 0.9891
Epoch 175/500
15646/15646 [=====] - 3s 172us/sample - loss: 0.0588
- accuracy: 0.9893
Epoch 176/500
15646/15646 [=====] - 3s 167us/sample - loss: 0.0578
- accuracy: 0.9893
Epoch 177/500
15646/15646 [=====] - 3s 172us/sample - loss: 0.0580
- accuracy: 0.9895
Epoch 178/500
15646/15646 [=====] - 2s 148us/sample - loss: 0.0582
- accuracy: 0.9895
Epoch 179/500
15646/15646 [=====] - 2s 142us/sample - loss: 0.0577
- accuracy: 0.9895
Epoch 180/500
15646/15646 [=====] - 3s 168us/sample - loss: 0.0581
- accuracy: 0.9892
Epoch 181/500
15646/15646 [=====] - 2s 155us/sample - loss: 0.0576
- accuracy: 0.9893
Epoch 182/500
```

```
15646/15646 [=====] - 3s 175us/sample - loss: 0.0577
- accuracy: 0.9891
Epoch 183/500
15646/15646 [=====] - 2s 144us/sample - loss: 0.0568
- accuracy: 0.9896
Epoch 184/500
15646/15646 [=====] - 3s 163us/sample - loss: 0.0568
- accuracy: 0.9895
Epoch 185/500
15646/15646 [=====] - 2s 152us/sample - loss: 0.0568
- accuracy: 0.9898
Epoch 186/500
15646/15646 [=====] - 2s 156us/sample - loss: 0.0563
- accuracy: 0.9896
Epoch 187/500
15646/15646 [=====] - 2s 154us/sample - loss: 0.0565
- accuracy: 0.9898
Epoch 188/500
15646/15646 [=====] - 2s 159us/sample - loss: 0.0563
- accuracy: 0.9898
Epoch 189/500
15646/15646 [=====] - 3s 167us/sample - loss: 0.0556
- accuracy: 0.9902
Epoch 190/500
15646/15646 [=====] - 2s 150us/sample - loss: 0.0560
```

```
- accuracy: 0.9895
Epoch 191/500
15646/15646 [=====] - 3s 162us/sample - loss: 0.0558
- accuracy: 0.9897
Epoch 192/500
15646/15646 [=====] - 3s 168us/sample - loss: 0.0561
- accuracy: 0.9898
Epoch 193/500
15646/15646 [=====] - 2s 146us/sample - loss: 0.0558
- accuracy: 0.9896
Epoch 194/500
15646/15646 [=====] - 3s 160us/sample - loss: 0.0552
- accuracy: 0.9903
Epoch 195/500
15646/15646 [=====] - 2s 153us/sample - loss: 0.0551
- accuracy: 0.9895
Epoch 196/500
15646/15646 [=====] - 3s 169us/sample - loss: 0.0546
- accuracy: 0.9899
Epoch 197/500
15646/15646 [=====] - 3s 160us/sample - loss: 0.0556
- accuracy: 0.9899
Epoch 198/500
15646/15646 [=====] - 3s 174us/sample - loss: 0.0551
- accuracy: 0.9897
```

```
Epoch 199/500
15646/15646 [=====] - 3s 161us/sample - loss: 0.0554
- accuracy: 0.9898
Epoch 200/500
15646/15646 [=====] - 3s 169us/sample - loss: 0.0541
- accuracy: 0.9902
Epoch 201/500
15646/15646 [=====] - 3s 164us/sample - loss: 0.0548
- accuracy: 0.9899
Epoch 202/500
15646/15646 [=====] - 2s 159us/sample - loss: 0.0543
- accuracy: 0.9901
Epoch 203/500
15646/15646 [=====] - 2s 145us/sample - loss: 0.0534
- accuracy: 0.9902
Epoch 204/500
15646/15646 [=====] - 3s 170us/sample - loss: 0.0539
- accuracy: 0.9902
Epoch 205/500
15646/15646 [=====] - 3s 166us/sample - loss: 0.0541
- accuracy: 0.9902
Epoch 206/500
15646/15646 [=====] - 3s 165us/sample - loss: 0.0529
- accuracy: 0.9906
Epoch 207/500
```



```
15646/15646 [=====] - 3s 170us/sample - loss: 0.0531
- accuracy: 0.9903
Epoch 208/500
15646/15646 [=====] - 2s 149us/sample - loss: 0.0532
- accuracy: 0.9900
Epoch 209/500
15646/15646 [=====] - 2s 157us/sample - loss: 0.0534
- accuracy: 0.9901
Epoch 210/500
15646/15646 [=====] - 2s 157us/sample - loss: 0.0533
- accuracy: 0.9903
Epoch 211/500
15646/15646 [=====] - 3s 164us/sample - loss: 0.0531
- accuracy: 0.9903
Epoch 212/500
15646/15646 [=====] - 3s 171us/sample - loss: 0.0532
- accuracy: 0.9905
Epoch 213/500
15646/15646 [=====] - 2s 150us/sample - loss: 0.0528
- accuracy: 0.9903
Epoch 214/500
15646/15646 [=====] - 2s 150us/sample - loss: 0.0528
- accuracy: 0.9901
Epoch 215/500
15646/15646 [=====] - 2s 152us/sample - loss: 0.0524
```

```
- accuracy: 0.9907
Epoch 216/500
15646/15646 [=====] - 3s 168us/sample - loss: 0.0518
- accuracy: 0.9910
Epoch 217/500
15646/15646 [=====] - 2s 158us/sample - loss: 0.0520
- accuracy: 0.9904
Epoch 218/500
15646/15646 [=====] - 3s 181us/sample - loss: 0.0525
- accuracy: 0.9905
Epoch 219/500
15646/15646 [=====] - 2s 151us/sample - loss: 0.0516
- accuracy: 0.9907
Epoch 220/500
15646/15646 [=====] - 3s 164us/sample - loss: 0.0519
- accuracy: 0.9906
Epoch 221/500
15646/15646 [=====] - 2s 152us/sample - loss: 0.0513
- accuracy: 0.9904
Epoch 222/500
15646/15646 [=====] - 3s 168us/sample - loss: 0.0516
- accuracy: 0.9907
Epoch 223/500
15646/15646 [=====] - 3s 163us/sample - loss: 0.0517
- accuracy: 0.9906
```

```
Epoch 224/500
15646/15646 [=====] - 3s 173us/sample - loss: 0.0508
- accuracy: 0.9906
Epoch 225/500
15646/15646 [=====] - 2s 137us/sample - loss: 0.0517
- accuracy: 0.9910
Epoch 226/500
15646/15646 [=====] - 2s 160us/sample - loss: 0.0510
- accuracy: 0.9905
Epoch 227/500
15646/15646 [=====] - 2s 154us/sample - loss: 0.0505
- accuracy: 0.9914
Epoch 228/500
15646/15646 [=====] - 2s 145us/sample - loss: 0.0504
- accuracy: 0.9910
Epoch 229/500
15646/15646 [=====] - 3s 166us/sample - loss: 0.0505
- accuracy: 0.9912
Epoch 230/500
15646/15646 [=====] - 3s 160us/sample - loss: 0.0506
- accuracy: 0.9909
Epoch 231/500
15646/15646 [=====] - 2s 156us/sample - loss: 0.0511
- accuracy: 0.9904
Epoch 232/500
```

```
15646/15646 [=====] - 2s 154us/sample - loss: 0.0498
- accuracy: 0.9916
Epoch 233/500
15646/15646 [=====] - 2s 150us/sample - loss: 0.0498
- accuracy: 0.9911
Epoch 234/500
15646/15646 [=====] - 3s 164us/sample - loss: 0.0506
- accuracy: 0.9909
Epoch 235/500
15646/15646 [=====] - 2s 160us/sample - loss: 0.0495
- accuracy: 0.9912
Epoch 236/500
15646/15646 [=====] - 3s 176us/sample - loss: 0.0494
- accuracy: 0.9914
Epoch 237/500
15646/15646 [=====] - 2s 152us/sample - loss: 0.0497
- accuracy: 0.9911
Epoch 238/500
15646/15646 [=====] - 3s 170us/sample - loss: 0.0499
- accuracy: 0.9909
Epoch 239/500
15646/15646 [=====] - 2s 150us/sample - loss: 0.0500
- accuracy: 0.9909
Epoch 240/500
15646/15646 [=====] - 3s 167us/sample - loss: 0.0493
```

```
- accuracy: 0.9914
Epoch 241/500
15646/15646 [=====] - 3s 162us/sample - loss: 0.0490
- accuracy: 0.9912
Epoch 242/500
15646/15646 [=====] - 3s 160us/sample - loss: 0.0483
- accuracy: 0.9912
Epoch 243/500
15646/15646 [=====] - 2s 153us/sample - loss: 0.0495
- accuracy: 0.9911
Epoch 244/500
15646/15646 [=====] - 2s 145us/sample - loss: 0.0490
- accuracy: 0.9906
Epoch 245/500
15646/15646 [=====] - 3s 176us/sample - loss: 0.0485
- accuracy: 0.9913
Epoch 246/500
15646/15646 [=====] - 2s 158us/sample - loss: 0.0483
- accuracy: 0.9914
Epoch 247/500
15646/15646 [=====] - 3s 170us/sample - loss: 0.0488
- accuracy: 0.9911
Epoch 248/500
15646/15646 [=====] - 3s 163us/sample - loss: 0.0484
- accuracy: 0.9914
```

```
Epoch 249/500
15646/15646 [=====] - 3s 162us/sample - loss: 0.0491
- accuracy: 0.9912
Epoch 250/500
15646/15646 [=====] - 2s 155us/sample - loss: 0.0481
- accuracy: 0.9915
Epoch 251/500
15646/15646 [=====] - 2s 147us/sample - loss: 0.0485
- accuracy: 0.9910
Epoch 252/500
15646/15646 [=====] - 3s 165us/sample - loss: 0.0479
- accuracy: 0.9915
Epoch 253/500
15646/15646 [=====] - 2s 156us/sample - loss: 0.0478
- accuracy: 0.9913
Epoch 254/500
15646/15646 [=====] - 3s 173us/sample - loss: 0.0481
- accuracy: 0.9915
Epoch 255/500
15646/15646 [=====] - 2s 159us/sample - loss: 0.0482
- accuracy: 0.9915
Epoch 256/500
15646/15646 [=====] - 2s 155us/sample - loss: 0.0481
- accuracy: 0.9916
Epoch 257/500
```

```
15646/15646 [=====] - 2s 143us/sample - loss: 0.0473
- accuracy: 0.9912
Epoch 258/500
15646/15646 [=====] - 3s 162us/sample - loss: 0.0479
- accuracy: 0.9912
Epoch 259/500
15646/15646 [=====] - 2s 158us/sample - loss: 0.0471
- accuracy: 0.9918
Epoch 260/500
15646/15646 [=====] - 3s 160us/sample - loss: 0.0471
- accuracy: 0.9918
Epoch 261/500
15646/15646 [=====] - 2s 157us/sample - loss: 0.0478
- accuracy: 0.9912
Epoch 262/500
15646/15646 [=====] - 2s 155us/sample - loss: 0.0467
- accuracy: 0.9919
Epoch 263/500
15646/15646 [=====] - 3s 172us/sample - loss: 0.0472
- accuracy: 0.9914
Epoch 264/500
15646/15646 [=====] - 3s 160us/sample - loss: 0.0464
- accuracy: 0.9914
Epoch 265/500
15646/15646 [=====] - 2s 155us/sample - loss: 0.0466
```

```
- accuracy: 0.9917
Epoch 266/500
15646/15646 [=====] - 2s 156us/sample - loss: 0.0473
- accuracy: 0.9914
Epoch 267/500
15646/15646 [=====] - 2s 151us/sample - loss: 0.0463
- accuracy: 0.9919
Epoch 268/500
15646/15646 [=====] - 2s 146us/sample - loss: 0.0468
- accuracy: 0.9915
Epoch 269/500
15646/15646 [=====] - 2s 156us/sample - loss: 0.0462
- accuracy: 0.9921
Epoch 270/500
15646/15646 [=====] - 3s 165us/sample - loss: 0.0466
- accuracy: 0.9917
Epoch 271/500
15646/15646 [=====] - 2s 151us/sample - loss: 0.0459
- accuracy: 0.9923
Epoch 272/500
15646/15646 [=====] - 3s 171us/sample - loss: 0.0458
- accuracy: 0.9919
Epoch 273/500
15646/15646 [=====] - 2s 156us/sample - loss: 0.0461
- accuracy: 0.9912
```



```
Epoch 274/500
15646/15646 [=====] - 3s 160us/sample - loss: 0.0456
- accuracy: 0.9919
Epoch 275/500
15646/15646 [=====] - 2s 156us/sample - loss: 0.0462
- accuracy: 0.9920
Epoch 276/500
15646/15646 [=====] - 3s 168us/sample - loss: 0.0456
- accuracy: 0.9918
Epoch 277/500
15646/15646 [=====] - 2s 157us/sample - loss: 0.0451
- accuracy: 0.9923
Epoch 278/500
15646/15646 [=====] - 2s 157us/sample - loss: 0.0460
- accuracy: 0.9914
Epoch 279/500
15646/15646 [=====] - 2s 159us/sample - loss: 0.0452
- accuracy: 0.9919
Epoch 280/500
15646/15646 [=====] - 3s 162us/sample - loss: 0.0455
- accuracy: 0.9919
Epoch 281/500
15646/15646 [=====] - 3s 169us/sample - loss: 0.0459
- accuracy: 0.9916
Epoch 282/500
```

```
15646/15646 [=====] - 2s 158us/sample - loss: 0.0454
- accuracy: 0.9920
Epoch 283/500
15646/15646 [=====] - 2s 154us/sample - loss: 0.0448
- accuracy: 0.9918
Epoch 284/500
15646/15646 [=====] - 3s 165us/sample - loss: 0.0449
- accuracy: 0.9921
Epoch 285/500
15646/15646 [=====] - 2s 152us/sample - loss: 0.0448
- accuracy: 0.9923
Epoch 286/500
15646/15646 [=====] - 3s 166us/sample - loss: 0.0450
- accuracy: 0.9921
Epoch 287/500
15646/15646 [=====] - 3s 161us/sample - loss: 0.0449
- accuracy: 0.9923
Epoch 288/500
15646/15646 [=====] - 3s 167us/sample - loss: 0.0449
- accuracy: 0.9916
Epoch 289/500
15646/15646 [=====] - 3s 161us/sample - loss: 0.0447
- accuracy: 0.9921
Epoch 290/500
15646/15646 [=====] - 3s 163us/sample - loss: 0.0444
```

```
- accuracy: 0.9922
Epoch 291/500
15646/15646 [=====] - 2s 153us/sample - loss: 0.0444
- accuracy: 0.9921
Epoch 292/500
15646/15646 [=====] - 2s 154us/sample - loss: 0.0452
- accuracy: 0.9917
Epoch 293/500
15646/15646 [=====] - 3s 161us/sample - loss: 0.0444
- accuracy: 0.9921
Epoch 294/500
15646/15646 [=====] - 3s 164us/sample - loss: 0.0439
- accuracy: 0.9926
Epoch 295/500
15646/15646 [=====] - 3s 167us/sample - loss: 0.0440
- accuracy: 0.9923
Epoch 296/500
15646/15646 [=====] - 3s 162us/sample - loss: 0.0441
- accuracy: 0.9925
Epoch 297/500
15646/15646 [=====] - 2s 154us/sample - loss: 0.0439
- accuracy: 0.9922
Epoch 298/500
15646/15646 [=====] - 2s 147us/sample - loss: 0.0432
- accuracy: 0.9921
```

```
Epoch 299/500
15646/15646 [=====] - 2s 158us/sample - loss: 0.0441
- accuracy: 0.9920
Epoch 300/500
15646/15646 [=====] - 3s 162us/sample - loss: 0.0435
- accuracy: 0.9917
Epoch 301/500
15646/15646 [=====] - 2s 122us/sample - loss: 0.0435
- accuracy: 0.9923
Epoch 302/500
15646/15646 [=====] - 2s 126us/sample - loss: 0.0432
- accuracy: 0.9923
Epoch 303/500
15646/15646 [=====] - 2s 141us/sample - loss: 0.0435
- accuracy: 0.9914
Epoch 304/500
15646/15646 [=====] - 3s 164us/sample - loss: 0.0436
- accuracy: 0.9924
Epoch 305/500
15646/15646 [=====] - 2s 150us/sample - loss: 0.0430
- accuracy: 0.9922
Epoch 306/500
15646/15646 [=====] - 2s 159us/sample - loss: 0.0426
- accuracy: 0.9926
Epoch 307/500
```

```
15646/15646 [=====] - 3s 164us/sample - loss: 0.0435
- accuracy: 0.9924
Epoch 308/500
15646/15646 [=====] - 2s 146us/sample - loss: 0.0429
- accuracy: 0.9928
Epoch 309/500
15646/15646 [=====] - 2s 147us/sample - loss: 0.0429
- accuracy: 0.9922
Epoch 310/500
15646/15646 [=====] - 2s 155us/sample - loss: 0.0429
- accuracy: 0.9925
Epoch 311/500
15646/15646 [=====] - 2s 152us/sample - loss: 0.0434
- accuracy: 0.9921
Epoch 312/500
15646/15646 [=====] - 2s 146us/sample - loss: 0.0422
- accuracy: 0.9925
Epoch 313/500
15646/15646 [=====] - 3s 160us/sample - loss: 0.0431
- accuracy: 0.9923
Epoch 314/500
15646/15646 [=====] - 2s 159us/sample - loss: 0.0426
- accuracy: 0.9925
Epoch 315/500
15646/15646 [=====] - 2s 154us/sample - loss: 0.0425
```

```
- accuracy: 0.9926
Epoch 316/500
15646/15646 [=====] - 3s 167us/sample - loss: 0.0422
- accuracy: 0.9926
Epoch 317/500
15646/15646 [=====] - 2s 143us/sample - loss: 0.0427
- accuracy: 0.9923
Epoch 318/500
15646/15646 [=====] - 2s 154us/sample - loss: 0.0422
- accuracy: 0.9926
Epoch 319/500
15646/15646 [=====] - 2s 157us/sample - loss: 0.0422
- accuracy: 0.9927
Epoch 320/500
15646/15646 [=====] - 2s 157us/sample - loss: 0.0419
- accuracy: 0.9925
Epoch 321/500
15646/15646 [=====] - 2s 148us/sample - loss: 0.0420
- accuracy: 0.9925
Epoch 322/500
15646/15646 [=====] - 2s 154us/sample - loss: 0.0416
- accuracy: 0.9928
Epoch 323/500
15646/15646 [=====] - 3s 168us/sample - loss: 0.0421
- accuracy: 0.9925
```

```
Epoch 324/500
15646/15646 [=====] - 2s 142us/sample - loss: 0.0416
- accuracy: 0.9923
Epoch 325/500
15646/15646 [=====] - 2s 140us/sample - loss: 0.0421
- accuracy: 0.9926
Epoch 326/500
15646/15646 [=====] - 2s 138us/sample - loss: 0.0416
- accuracy: 0.9926
Epoch 327/500
15646/15646 [=====] - 2s 154us/sample - loss: 0.0415
- accuracy: 0.9925
Epoch 328/500
15646/15646 [=====] - 2s 156us/sample - loss: 0.0417
- accuracy: 0.9926
Epoch 329/500
15646/15646 [=====] - 2s 153us/sample - loss: 0.0421
- accuracy: 0.9925
Epoch 330/500
15646/15646 [=====] - 3s 176us/sample - loss: 0.0417
- accuracy: 0.9925
Epoch 331/500
15646/15646 [=====] - 2s 158us/sample - loss: 0.0412
- accuracy: 0.9928
Epoch 332/500
```

```
15646/15646 [=====] - 3s 163us/sample - loss: 0.0408
- accuracy: 0.9930
Epoch 333/500
15646/15646 [=====] - 2s 159us/sample - loss: 0.0418
- accuracy: 0.9926
Epoch 334/500
15646/15646 [=====] - 2s 154us/sample - loss: 0.0413
- accuracy: 0.9927
Epoch 335/500
15646/15646 [=====] - 3s 161us/sample - loss: 0.0411
- accuracy: 0.9932
Epoch 336/500
15646/15646 [=====] - 3s 175us/sample - loss: 0.0407
- accuracy: 0.9930
Epoch 337/500
15646/15646 [=====] - 3s 169us/sample - loss: 0.0412
- accuracy: 0.9928
Epoch 338/500
15646/15646 [=====] - 2s 159us/sample - loss: 0.0413
- accuracy: 0.9928
Epoch 339/500
15646/15646 [=====] - 3s 165us/sample - loss: 0.0408
- accuracy: 0.9928
Epoch 340/500
15646/15646 [=====] - 2s 158us/sample - loss: 0.0400
```



```
- accuracy: 0.9928
Epoch 341/500
15646/15646 [=====] - 2s 156us/sample - loss: 0.0418
- accuracy: 0.9926
Epoch 342/500
15646/15646 [=====] - 3s 161us/sample - loss: 0.0406
- accuracy: 0.9929
Epoch 343/500
15646/15646 [=====] - 3s 162us/sample - loss: 0.0408
- accuracy: 0.9930
Epoch 344/500
15646/15646 [=====] - 3s 160us/sample - loss: 0.0402
- accuracy: 0.9930
Epoch 345/500
15646/15646 [=====] - 2s 155us/sample - loss: 0.0402
- accuracy: 0.9932
Epoch 346/500
15646/15646 [=====] - 3s 160us/sample - loss: 0.0397
- accuracy: 0.9932
Epoch 347/500
15646/15646 [=====] - 2s 154us/sample - loss: 0.0401
- accuracy: 0.9930
Epoch 348/500
15646/15646 [=====] - 3s 165us/sample - loss: 0.0407
- accuracy: 0.9932
```

```
Epoch 349/500
15646/15646 [=====] - 3s 163us/sample - loss: 0.0402
- accuracy: 0.9933
Epoch 350/500
15646/15646 [=====] - 2s 148us/sample - loss: 0.0397
- accuracy: 0.9930
Epoch 351/500
15646/15646 [=====] - 3s 170us/sample - loss: 0.0402
- accuracy: 0.9932
Epoch 352/500
15646/15646 [=====] - 2s 155us/sample - loss: 0.0392
- accuracy: 0.9932
Epoch 353/500
15646/15646 [=====] - 3s 168us/sample - loss: 0.0402
- accuracy: 0.9930
Epoch 354/500
15646/15646 [=====] - 2s 143us/sample - loss: 0.0397
- accuracy: 0.9929
Epoch 355/500
15646/15646 [=====] - 2s 156us/sample - loss: 0.0394
- accuracy: 0.9930
Epoch 356/500
15646/15646 [=====] - 2s 154us/sample - loss: 0.0396
- accuracy: 0.9932
Epoch 357/500
```

```
15646/15646 [=====] - 2s 159us/sample - loss: 0.0401
- accuracy: 0.9926
Epoch 358/500
15646/15646 [=====] - 2s 157us/sample - loss: 0.0392
- accuracy: 0.9928
Epoch 359/500
15646/15646 [=====] - 3s 167us/sample - loss: 0.0399
- accuracy: 0.9928
Epoch 360/500
15646/15646 [=====] - 2s 158us/sample - loss: 0.0392
- accuracy: 0.9932
Epoch 361/500
15646/15646 [=====] - 3s 162us/sample - loss: 0.0392
- accuracy: 0.9929
Epoch 362/500
15646/15646 [=====] - 2s 152us/sample - loss: 0.0394
- accuracy: 0.9928
Epoch 363/500
15646/15646 [=====] - 2s 154us/sample - loss: 0.0395
- accuracy: 0.9929
Epoch 364/500
15646/15646 [=====] - 2s 154us/sample - loss: 0.0388
- accuracy: 0.9930
Epoch 365/500
15646/15646 [=====] - 2s 146us/sample - loss: 0.0388
```

```
- accuracy: 0.9935
Epoch 366/500
15646/15646 [=====] - 3s 167us/sample - loss: 0.0393
- accuracy: 0.9928
Epoch 367/500
15646/15646 [=====] - 3s 164us/sample - loss: 0.0397
- accuracy: 0.9927
Epoch 368/500
15646/15646 [=====] - 3s 160us/sample - loss: 0.0387
- accuracy: 0.9934
Epoch 369/500
15646/15646 [=====] - 2s 157us/sample - loss: 0.0381
- accuracy: 0.9932
Epoch 370/500
15646/15646 [=====] - 2s 150us/sample - loss: 0.0386
- accuracy: 0.9933
Epoch 371/500
15646/15646 [=====] - 3s 163us/sample - loss: 0.0392
- accuracy: 0.9932
Epoch 372/500
15646/15646 [=====] - 3s 160us/sample - loss: 0.0391
- accuracy: 0.9932
Epoch 373/500
15646/15646 [=====] - 3s 176us/sample - loss: 0.0384
- accuracy: 0.9930
```

```
Epoch 374/500
15646/15646 [=====] - 2s 149us/sample - loss: 0.0390
- accuracy: 0.9932
Epoch 375/500
15646/15646 [=====] - 3s 160us/sample - loss: 0.0391
- accuracy: 0.9930
Epoch 376/500
15646/15646 [=====] - 3s 163us/sample - loss: 0.0383
- accuracy: 0.9935
Epoch 377/500
15646/15646 [=====] - 3s 160us/sample - loss: 0.0384
- accuracy: 0.9931
Epoch 378/500
15646/15646 [=====] - 2s 157us/sample - loss: 0.0389
- accuracy: 0.9928
Epoch 379/500
15646/15646 [=====] - 2s 136us/sample - loss: 0.0383
- accuracy: 0.9927
Epoch 380/500
15646/15646 [=====] - 2s 128us/sample - loss: 0.0380
- accuracy: 0.9937
Epoch 381/500
15646/15646 [=====] - 2s 132us/sample - loss: 0.0393
- accuracy: 0.9930
Epoch 382/500
```

```
15646/15646 [=====] - 3s 166us/sample - loss: 0.0382
- accuracy: 0.9930
Epoch 383/500
15646/15646 [=====] - 2s 160us/sample - loss: 0.0382
- accuracy: 0.9932
Epoch 384/500
15646/15646 [=====] - 2s 153us/sample - loss: 0.0379
- accuracy: 0.9931
Epoch 385/500
15646/15646 [=====] - 2s 151us/sample - loss: 0.0380
- accuracy: 0.9932
Epoch 386/500
15646/15646 [=====] - 3s 160us/sample - loss: 0.0379
- accuracy: 0.9931
Epoch 387/500
15646/15646 [=====] - 3s 170us/sample - loss: 0.0379
- accuracy: 0.9932
Epoch 388/500
15646/15646 [=====] - 3s 167us/sample - loss: 0.0377
- accuracy: 0.9933
Epoch 389/500
15646/15646 [=====] - 3s 166us/sample - loss: 0.0381
- accuracy: 0.9934
Epoch 390/500
15646/15646 [=====] - 2s 159us/sample - loss: 0.0375
```

```
- accuracy: 0.9934
Epoch 391/500
15646/15646 [=====] - 2s 151us/sample - loss: 0.0377
- accuracy: 0.9932
Epoch 392/500
15646/15646 [=====] - 3s 165us/sample - loss: 0.0380
- accuracy: 0.9930
Epoch 393/500
15646/15646 [=====] - 3s 164us/sample - loss: 0.0375
- accuracy: 0.9930
Epoch 394/500
15646/15646 [=====] - 3s 167us/sample - loss: 0.0380
- accuracy: 0.9934
Epoch 395/500
15646/15646 [=====] - 2s 156us/sample - loss: 0.0370
- accuracy: 0.9935
Epoch 396/500
15646/15646 [=====] - 2s 156us/sample - loss: 0.0371
- accuracy: 0.9932
Epoch 397/500
15646/15646 [=====] - 2s 138us/sample - loss: 0.0376
- accuracy: 0.9932
Epoch 398/500
15646/15646 [=====] - 3s 167us/sample - loss: 0.0378
- accuracy: 0.9931
```

```
Epoch 399/500
15646/15646 [=====] - 3s 171us/sample - loss: 0.0372
- accuracy: 0.9934
Epoch 400/500
15646/15646 [=====] - 3s 163us/sample - loss: 0.0377
- accuracy: 0.9928
Epoch 401/500
15646/15646 [=====] - 3s 167us/sample - loss: 0.0369
- accuracy: 0.9935
Epoch 402/500
15646/15646 [=====] - 2s 150us/sample - loss: 0.0377
- accuracy: 0.9930
Epoch 403/500
15646/15646 [=====] - 3s 161us/sample - loss: 0.0375
- accuracy: 0.9932
Epoch 404/500
15646/15646 [=====] - 3s 160us/sample - loss: 0.0372
- accuracy: 0.9935
Epoch 405/500
15646/15646 [=====] - 2s 160us/sample - loss: 0.0369
- accuracy: 0.9935
Epoch 406/500
15646/15646 [=====] - 3s 164us/sample - loss: 0.0370
- accuracy: 0.9935
Epoch 407/500
```



```
15646/15646 [=====] - 3s 170us/sample - loss: 0.0367
- accuracy: 0.9932
Epoch 408/500
15646/15646 [=====] - 2s 155us/sample - loss: 0.0371
- accuracy: 0.9936
Epoch 409/500
15646/15646 [=====] - 2s 157us/sample - loss: 0.0363
- accuracy: 0.9938
Epoch 410/500
15646/15646 [=====] - 3s 164us/sample - loss: 0.0371
- accuracy: 0.9933
Epoch 411/500
15646/15646 [=====] - 3s 163us/sample - loss: 0.0362
- accuracy: 0.9935
Epoch 412/500
15646/15646 [=====] - 3s 173us/sample - loss: 0.0376
- accuracy: 0.9930
Epoch 413/500
15646/15646 [=====] - 3s 163us/sample - loss: 0.0370
- accuracy: 0.9934
Epoch 414/500
15646/15646 [=====] - 3s 173us/sample - loss: 0.0363
- accuracy: 0.9933
Epoch 415/500
15646/15646 [=====] - 3s 165us/sample - loss: 0.0367
```

```
- accuracy: 0.9935
Epoch 416/500
15646/15646 [=====] - 3s 173us/sample - loss: 0.0355
- accuracy: 0.9940
Epoch 417/500
15646/15646 [=====] - 2s 154us/sample - loss: 0.0367
- accuracy: 0.9931
Epoch 418/500
15646/15646 [=====] - 2s 140us/sample - loss: 0.0363
- accuracy: 0.9934
Epoch 419/500
15646/15646 [=====] - 3s 167us/sample - loss: 0.0363
- accuracy: 0.9936
Epoch 420/500
15646/15646 [=====] - 3s 166us/sample - loss: 0.0370
- accuracy: 0.9931
Epoch 421/500
15646/15646 [=====] - 3s 172us/sample - loss: 0.0364
- accuracy: 0.9935
Epoch 422/500
15646/15646 [=====] - 2s 158us/sample - loss: 0.0354
- accuracy: 0.9937
Epoch 423/500
15646/15646 [=====] - 2s 157us/sample - loss: 0.0355
- accuracy: 0.9939
```

```
Epoch 424/500
15646/15646 [=====] - 2s 150us/sample - loss: 0.0351
- accuracy: 0.9938
Epoch 425/500
15646/15646 [=====] - 3s 170us/sample - loss: 0.0369
- accuracy: 0.9931
Epoch 426/500
15646/15646 [=====] - 2s 159us/sample - loss: 0.0358
- accuracy: 0.9939
Epoch 427/500
15646/15646 [=====] - 3s 164us/sample - loss: 0.0355
- accuracy: 0.9936
Epoch 428/500
15646/15646 [=====] - 3s 163us/sample - loss: 0.0359
- accuracy: 0.9940
Epoch 429/500
15646/15646 [=====] - 2s 156us/sample - loss: 0.0358
- accuracy: 0.9934
Epoch 430/500
15646/15646 [=====] - 3s 197us/sample - loss: 0.0359
- accuracy: 0.9935
Epoch 431/500
15646/15646 [=====] - 2s 153us/sample - loss: 0.0357
- accuracy: 0.9933
Epoch 432/500
```

```
15646/15646 [=====] - 2s 159us/sample - loss: 0.0357
- accuracy: 0.9935
Epoch 433/500
15646/15646 [=====] - 3s 191us/sample - loss: 0.0354
- accuracy: 0.9933
Epoch 434/500
15646/15646 [=====] - 3s 195us/sample - loss: 0.0352
- accuracy: 0.9939
Epoch 435/500
15646/15646 [=====] - 3s 164us/sample - loss: 0.0356
- accuracy: 0.9939
Epoch 436/500
15646/15646 [=====] - 2s 154us/sample - loss: 0.0354
- accuracy: 0.9937
Epoch 437/500
15646/15646 [=====] - 2s 146us/sample - loss: 0.0352
- accuracy: 0.9939
Epoch 438/500
15646/15646 [=====] - 3s 206us/sample - loss: 0.0350
- accuracy: 0.9934
Epoch 439/500
15646/15646 [=====] - 2s 152us/sample - loss: 0.0352
- accuracy: 0.9938
Epoch 440/500
15646/15646 [=====] - 2s 148us/sample - loss: 0.0347
```

```
- accuracy: 0.9937
Epoch 441/500
15646/15646 [=====] - 2s 146us/sample - loss: 0.0356
- accuracy: 0.9936
Epoch 442/500
15646/15646 [=====] - 2s 144us/sample - loss: 0.0350
- accuracy: 0.9940
Epoch 443/500
15646/15646 [=====] - 2s 154us/sample - loss: 0.0356
- accuracy: 0.9938
Epoch 444/500
15646/15646 [=====] - 2s 142us/sample - loss: 0.0348
- accuracy: 0.9941
Epoch 445/500
15646/15646 [=====] - 2s 147us/sample - loss: 0.0352
- accuracy: 0.9934
Epoch 446/500
15646/15646 [=====] - 2s 146us/sample - loss: 0.0351
- accuracy: 0.9937
Epoch 447/500
15646/15646 [=====] - 2s 144us/sample - loss: 0.0350
- accuracy: 0.9937
Epoch 448/500
15646/15646 [=====] - 2s 150us/sample - loss: 0.0346
- accuracy: 0.9941
```

```
Epoch 449/500
15646/15646 [=====] - 2s 141us/sample - loss: 0.0349
- accuracy: 0.9940
Epoch 450/500
15646/15646 [=====] - 2s 147us/sample - loss: 0.0349
- accuracy: 0.9937
Epoch 451/500
15646/15646 [=====] - 2s 142us/sample - loss: 0.0347
- accuracy: 0.9941
Epoch 452/500
15646/15646 [=====] - 2s 143us/sample - loss: 0.0348
- accuracy: 0.9935
Epoch 453/500
15646/15646 [=====] - 3s 164us/sample - loss: 0.0349
- accuracy: 0.9937
Epoch 454/500
15646/15646 [=====] - 2s 158us/sample - loss: 0.0343
- accuracy: 0.9943
Epoch 455/500
15646/15646 [=====] - 2s 149us/sample - loss: 0.0347
- accuracy: 0.9942
Epoch 456/500
15646/15646 [=====] - 2s 146us/sample - loss: 0.0353
- accuracy: 0.9934
Epoch 457/500
```

```
15646/15646 [=====] - 2s 146us/sample - loss: 0.0339
- accuracy: 0.9940
Epoch 458/500
15646/15646 [=====] - 2s 154us/sample - loss: 0.0344
- accuracy: 0.9942
Epoch 459/500
15646/15646 [=====] - 2s 151us/sample - loss: 0.0343
- accuracy: 0.9937
Epoch 460/500
15646/15646 [=====] - 3s 167us/sample - loss: 0.0347
- accuracy: 0.9938
Epoch 461/500
15646/15646 [=====] - 2s 141us/sample - loss: 0.0342
- accuracy: 0.9940
Epoch 462/500
15646/15646 [=====] - 2s 149us/sample - loss: 0.0344
- accuracy: 0.9935
Epoch 463/500
15646/15646 [=====] - 2s 146us/sample - loss: 0.0342
- accuracy: 0.9939
Epoch 464/500
15646/15646 [=====] - 2s 141us/sample - loss: 0.0346
- accuracy: 0.9938
Epoch 465/500
15646/15646 [=====] - 2s 157us/sample - loss: 0.0347
```

```
- accuracy: 0.9940
Epoch 466/500
15646/15646 [=====] - 2s 143us/sample - loss: 0.0340
- accuracy: 0.9936
Epoch 467/500
15646/15646 [=====] - 2s 146us/sample - loss: 0.0333
- accuracy: 0.9940
Epoch 468/500
15646/15646 [=====] - 2s 148us/sample - loss: 0.0339
- accuracy: 0.9942
Epoch 469/500
15646/15646 [=====] - 2s 143us/sample - loss: 0.0346
- accuracy: 0.9939
Epoch 470/500
15646/15646 [=====] - 2s 152us/sample - loss: 0.0340
- accuracy: 0.9938
Epoch 471/500
15646/15646 [=====] - 2s 142us/sample - loss: 0.0351
- accuracy: 0.9934
Epoch 472/500
15646/15646 [=====] - 2s 148us/sample - loss: 0.0338
- accuracy: 0.9939
Epoch 473/500
15646/15646 [=====] - 2s 146us/sample - loss: 0.0339
- accuracy: 0.9941
```



```
Epoch 474/500
15646/15646 [=====] - 2s 144us/sample - loss: 0.0335
- accuracy: 0.9939
Epoch 475/500
15646/15646 [=====] - 2s 152us/sample - loss: 0.0335
- accuracy: 0.9939
Epoch 476/500
15646/15646 [=====] - 2s 142us/sample - loss: 0.0339
- accuracy: 0.9938
Epoch 477/500
15646/15646 [=====] - 2s 151us/sample - loss: 0.0341
- accuracy: 0.9942
Epoch 478/500
15646/15646 [=====] - 2s 147us/sample - loss: 0.0338
- accuracy: 0.9940
Epoch 479/500
15646/15646 [=====] - 2s 149us/sample - loss: 0.0333
- accuracy: 0.9942
Epoch 480/500
15646/15646 [=====] - 2s 148us/sample - loss: 0.0336
- accuracy: 0.9939
Epoch 481/500
15646/15646 [=====] - 2s 143us/sample - loss: 0.0336
- accuracy: 0.9941
Epoch 482/500
```

```
15646/15646 [=====] - 2s 146us/sample - loss: 0.0332
- accuracy: 0.9937
Epoch 483/500
15646/15646 [=====] - 2s 146us/sample - loss: 0.0334
- accuracy: 0.9942
Epoch 484/500
15646/15646 [=====] - 2s 146us/sample - loss: 0.0339
- accuracy: 0.9940
Epoch 485/500
15646/15646 [=====] - 2s 149us/sample - loss: 0.0333
- accuracy: 0.9939
Epoch 486/500
15646/15646 [=====] - 2s 143us/sample - loss: 0.0328
- accuracy: 0.9935
Epoch 487/500
15646/15646 [=====] - 2s 149us/sample - loss: 0.0334
- accuracy: 0.9941
Epoch 488/500
15646/15646 [=====] - 2s 146us/sample - loss: 0.0327
- accuracy: 0.9943
Epoch 489/500
15646/15646 [=====] - 2s 145us/sample - loss: 0.0336
- accuracy: 0.9938
Epoch 490/500
15646/15646 [=====] - 2s 159us/sample - loss: 0.0335
```

```
- accuracy: 0.9943
Epoch 491/500
15646/15646 [=====] - 2s 149us/sample - loss: 0.0332
- accuracy: 0.9937
Epoch 492/500
15646/15646 [=====] - 2s 149us/sample - loss: 0.0328
- accuracy: 0.9944
Epoch 493/500
15646/15646 [=====] - 2s 150us/sample - loss: 0.0328
- accuracy: 0.9942
Epoch 494/500
15646/15646 [=====] - 3s 165us/sample - loss: 0.0336
- accuracy: 0.9940
Epoch 495/500
15646/15646 [=====] - 3s 162us/sample - loss: 0.0328
- accuracy: 0.9944
Epoch 496/500
15646/15646 [=====] - 2s 156us/sample - loss: 0.0328
- accuracy: 0.9942
Epoch 497/500
15646/15646 [=====] - 2s 154us/sample - loss: 0.0332
- accuracy: 0.9941
Epoch 498/500
15646/15646 [=====] - 2s 142us/sample - loss: 0.0330
- accuracy: 0.9941
```


classification_report FinalTest:				
	precision	recall	f1-score	support
Normal 0	0.99	0.73	0.84	3562
Anomaly 1	0.02	0.47	0.03	32
accuracy				
macro avg	0.50	0.60	0.72	3594
weighted avg	0.98	0.72	0.83	3594

confusion_matrix FinalTest:
True Negatives: 2589
False Positives: 973
False Negatives: 17
True Positives: 15

Average threshold_rt Final Test: 0.51
Average precision_rt Final Test: 0.02
Average recall_rt Final Test: 0.44

End running time FinalTest Evaluation: 210504_223337
, *****

Process finished with exit code 0