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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: 210506_221110, *****
```

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 : 210506_221111 , -----:

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: 210506_221111

Start running time Data Augmentation With DTW Approach: 210506_221111
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| | | | | | |
|-------------------|-----|------------|-----------------|-----------|---------------|
| Data Augmentation | MSE | Label 1==> | mean: 0.02688, | min: 0.0, | max: 0.231174 |
| Data Augmentation | MSE | Label 1==> | mean: 0.025968, | min: 0.0, | max: 0.149839 |
| Data Augmentation | MSE | Label 1==> | mean: 0.021041, | min: 0.0, | max: 0.125017 |
| Data Augmentation | MSE | Label 1==> | mean: 0.020895, | min: 0.0, | max: 0.145342 |
| Data Augmentation | MSE | Label 1==> | mean: 0.025508, | min: 0.0, | max: 0.19671 |
| Data Augmentation | MSE | Label 1==> | mean: 0.025597, | min: 0.0, | max: 0.235535 |
| Data Augmentation | MSE | Label 1==> | mean: 0.020735, | min: 0.0, | max: 0.156493 |
| Data Augmentation | MSE | Label 1==> | mean: 0.024179, | min: 0.0, | max: 0.144024 |
| Data Augmentation | MSE | Label 1==> | mean: 0.023446, | min: 0.0, | max: 0.114035 |
| Data Augmentation | MSE | Label 1==> | mean: 0.024865, | min: 0.0, | max: 0.126684 |
| Data Augmentation | MSE | Label 1==> | mean: 0.021639, | min: 0.0, | max: 0.185299 |
| Data Augmentation | MSE | Label 1==> | mean: 0.022208, | min: 0.0, | max: 0.1378 |
| Data Augmentation | MSE | Label 1==> | mean: 0.019023, | min: 0.0, | max: 0.111952 |

Data Augmentation MSE Label 1==> mean: 0.022815, min: 0.0, max: 0.171605

Generated this amount: 1218 ,Synthetic data With DTW Approach

MSE All generated Augmented data:

mean: 0.0232

min: 0.0

max: 0.159394

End running time Data Augmentation With DTW Approach: 210506_221112
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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

2021-05-06 22:11:12.941822: I tensorflow/core/platform/cpu_feature_guard.cc:142] Your CPU supports instructions that this TensorFlow binary was not compiled to use: AVX AVX2
2021-05-06 22:11:12.944541: 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.

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': {'class_name': 'L1L2', 'config': {'l1': 0.0, 'l2': 0.01499999964723873}}, 'bias_regularizer': None, 'activity_regularizer': None, 'kernel_constraint': None, 'bias_constraint': None}, {'class_name': 'Dense', 'config': {'name': 'dense_2', 'trainable': True, 'dtype': 'float32', 'units': 36, 'activation': 'tanh', 'use_bias': True, 'kernel_initializer': {'class_name': 'GlorotUniform
```

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' , 'config': {'seed': None}}, 'bias_initializer': {'class_name': 'Zeros', '
config': {}}, 'kernel_regularizer': {'class_name': 'L1L2', 'config': {'l1': 0.
0, 'l2': 0.01499999664723873}}, 'bias_regularizer': None, '
activity_regularizer': None, 'kernel_constraint': None, 'bias_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
': 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 197us/sample - loss: 3.0312

- accuracy: 0.9156

Epoch 2/500

15646/15646 [=====] - 2s 130us/sample - loss: 1.3461

- accuracy: 0.9177

Epoch 3/500

15646/15646 [=====] - 2s 121us/sample - loss: 0.6705

- accuracy: 0.9183

Epoch 4/500

15646/15646 [=====] - 2s 116us/sample - loss: 0.4185

- accuracy: 0.9186

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Epoch 5/500
15646/15646 [=====] - 2s 123us/sample - loss: 0.3265
- accuracy: 0.9187
Epoch 6/500
15646/15646 [=====] - 2s 124us/sample - loss: 0.2919
- accuracy: 0.9185
Epoch 7/500
15646/15646 [=====] - 2s 112us/sample - loss: 0.2781
- accuracy: 0.9186
Epoch 8/500
15646/15646 [=====] - 2s 124us/sample - loss: 0.2712
- accuracy: 0.9188
Epoch 9/500
15646/15646 [=====] - 2s 137us/sample - loss: 0.2673
- accuracy: 0.9186
Epoch 10/500
15646/15646 [=====] - 2s 112us/sample - loss: 0.2656
- accuracy: 0.9190
Epoch 11/500
15646/15646 [=====] - 2s 116us/sample - loss: 0.2637
- accuracy: 0.9186
Epoch 12/500
15646/15646 [=====] - 2s 113us/sample - loss: 0.2621
- accuracy: 0.9189
Epoch 13/500
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15646/15646 [=====] - 2s 114us/sample - loss: 0.2609
- accuracy: 0.9191
Epoch 14/500
15646/15646 [=====] - 2s 112us/sample - loss: 0.2597
- accuracy: 0.9195
Epoch 15/500
15646/15646 [=====] - 2s 114us/sample - loss: 0.2584
- accuracy: 0.9191
Epoch 16/500
15646/15646 [=====] - 2s 116us/sample - loss: 0.2572
- accuracy: 0.9193
Epoch 17/500
15646/15646 [=====] - 2s 121us/sample - loss: 0.2565
- accuracy: 0.9198
Epoch 18/500
15646/15646 [=====] - 2s 134us/sample - loss: 0.2556
- accuracy: 0.9195
Epoch 19/500
15646/15646 [=====] - 2s 125us/sample - loss: 0.2550
- accuracy: 0.9196
Epoch 20/500
15646/15646 [=====] - 2s 117us/sample - loss: 0.2541
- accuracy: 0.9198
Epoch 21/500
15646/15646 [=====] - 2s 115us/sample - loss: 0.2537
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- accuracy: 0.9203
Epoch 22/500
15646/15646 [=====] - 2s 129us/sample - loss: 0.2527
- accuracy: 0.9193
Epoch 23/500
15646/15646 [=====] - 3s 162us/sample - loss: 0.2513
- accuracy: 0.9197
Epoch 24/500
15646/15646 [=====] - 3s 184us/sample - loss: 0.2511
- accuracy: 0.9200
Epoch 25/500
15646/15646 [=====] - 2s 144us/sample - loss: 0.2498
- accuracy: 0.9208
Epoch 26/500
15646/15646 [=====] - 2s 159us/sample - loss: 0.2489
- accuracy: 0.9206
Epoch 27/500
15646/15646 [=====] - 2s 128us/sample - loss: 0.2479
- accuracy: 0.9206
Epoch 28/500
15646/15646 [=====] - 2s 125us/sample - loss: 0.2475
- accuracy: 0.9212
Epoch 29/500
15646/15646 [=====] - 2s 126us/sample - loss: 0.2462
- accuracy: 0.9207
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Epoch 30/500
15646/15646 [=====] - 2s 115us/sample - loss: 0.2451
- accuracy: 0.9211
Epoch 31/500
15646/15646 [=====] - 2s 114us/sample - loss: 0.2443
- accuracy: 0.9215
Epoch 32/500
15646/15646 [=====] - 2s 114us/sample - loss: 0.2431
- accuracy: 0.9216
Epoch 33/500
15646/15646 [=====] - 2s 120us/sample - loss: 0.2438
- accuracy: 0.9211
Epoch 34/500
15646/15646 [=====] - 2s 113us/sample - loss: 0.2416
- accuracy: 0.9217
Epoch 35/500
15646/15646 [=====] - 2s 116us/sample - loss: 0.2409
- accuracy: 0.9216
Epoch 36/500
15646/15646 [=====] - 2s 126us/sample - loss: 0.2403
- accuracy: 0.9221
Epoch 37/500
15646/15646 [=====] - 2s 111us/sample - loss: 0.2392
- accuracy: 0.9223
Epoch 38/500
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15646/15646 [=====] - 2s 122us/sample - loss: 0.2374
- accuracy: 0.9225
Epoch 39/500
15646/15646 [=====] - 2s 124us/sample - loss: 0.2367
- accuracy: 0.9219
Epoch 40/500
15646/15646 [=====] - 2s 110us/sample - loss: 0.2348
- accuracy: 0.9230
Epoch 41/500
15646/15646 [=====] - 2s 121us/sample - loss: 0.2343
- accuracy: 0.9224
Epoch 42/500
15646/15646 [=====] - 2s 119us/sample - loss: 0.2328
- accuracy: 0.9234
Epoch 43/500
15646/15646 [=====] - 2s 113us/sample - loss: 0.2329
- accuracy: 0.9230
Epoch 44/500
15646/15646 [=====] - 2s 119us/sample - loss: 0.2317
- accuracy: 0.9235
Epoch 45/500
15646/15646 [=====] - 2s 127us/sample - loss: 0.2297
- accuracy: 0.9232
Epoch 46/500
15646/15646 [=====] - 2s 112us/sample - loss: 0.2285
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- accuracy: 0.9234
Epoch 47/500
15646/15646 [=====] - 2s 114us/sample - loss: 0.2284
- accuracy: 0.9227
Epoch 48/500
15646/15646 [=====] - 2s 123us/sample - loss: 0.2273
- accuracy: 0.9235
Epoch 49/500
15646/15646 [=====] - 2s 117us/sample - loss: 0.2256
- accuracy: 0.9237
Epoch 50/500
15646/15646 [=====] - 2s 123us/sample - loss: 0.2241
- accuracy: 0.9242
Epoch 51/500
15646/15646 [=====] - 2s 122us/sample - loss: 0.2233
- accuracy: 0.9239
Epoch 52/500
15646/15646 [=====] - 2s 117us/sample - loss: 0.2231
- accuracy: 0.9243
Epoch 53/500
15646/15646 [=====] - 2s 117us/sample - loss: 0.2217
- accuracy: 0.9248
Epoch 54/500
15646/15646 [=====] - 2s 114us/sample - loss: 0.2216
- accuracy: 0.9241
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Epoch 55/500
15646/15646 [=====] - 2s 120us/sample - loss: 0.2200
- accuracy: 0.9248
Epoch 56/500
15646/15646 [=====] - 2s 125us/sample - loss: 0.2188
- accuracy: 0.9256
Epoch 57/500
15646/15646 [=====] - 2s 115us/sample - loss: 0.2178
- accuracy: 0.9248
Epoch 58/500
15646/15646 [=====] - 2s 123us/sample - loss: 0.2172
- accuracy: 0.9250
Epoch 59/500
15646/15646 [=====] - 2s 112us/sample - loss: 0.2162
- accuracy: 0.9271
Epoch 60/500
15646/15646 [=====] - 2s 114us/sample - loss: 0.2149
- accuracy: 0.9265
Epoch 61/500
15646/15646 [=====] - 2s 122us/sample - loss: 0.2141
- accuracy: 0.9264
Epoch 62/500
15646/15646 [=====] - 2s 112us/sample - loss: 0.2136
- accuracy: 0.9247
Epoch 63/500
```

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15646/15646 [=====] - 2s 112us/sample - loss: 0.2123
- accuracy: 0.9266
Epoch 64/500
15646/15646 [=====] - 2s 119us/sample - loss: 0.2115
- accuracy: 0.9274
Epoch 65/500
15646/15646 [=====] - 2s 106us/sample - loss: 0.2103
- accuracy: 0.9276
Epoch 66/500
15646/15646 [=====] - 2s 117us/sample - loss: 0.2099
- accuracy: 0.9270
Epoch 67/500
15646/15646 [=====] - 2s 121us/sample - loss: 0.2078
- accuracy: 0.9283
Epoch 68/500
15646/15646 [=====] - 2s 113us/sample - loss: 0.2080
- accuracy: 0.9279
Epoch 69/500
15646/15646 [=====] - 2s 115us/sample - loss: 0.2075
- accuracy: 0.9299
Epoch 70/500
15646/15646 [=====] - 2s 129us/sample - loss: 0.2056
- accuracy: 0.9296
Epoch 71/500
15646/15646 [=====] - 2s 119us/sample - loss: 0.2054
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- accuracy: 0.9290
Epoch 72/500
15646/15646 [=====] - 2s 115us/sample - loss: 0.2033
- accuracy: 0.9294
Epoch 73/500
15646/15646 [=====] - 2s 117us/sample - loss: 0.2036
- accuracy: 0.9284
Epoch 74/500
15646/15646 [=====] - 2s 116us/sample - loss: 0.2021
- accuracy: 0.9301
Epoch 75/500
15646/15646 [=====] - 2s 116us/sample - loss: 0.2018
- accuracy: 0.9298
Epoch 76/500
15646/15646 [=====] - 2s 110us/sample - loss: 0.2001
- accuracy: 0.9305
Epoch 77/500
15646/15646 [=====] - 2s 126us/sample - loss: 0.1999
- accuracy: 0.9302
Epoch 78/500
15646/15646 [=====] - 2s 116us/sample - loss: 0.1988
- accuracy: 0.9317
Epoch 79/500
15646/15646 [=====] - 2s 112us/sample - loss: 0.1971
- accuracy: 0.9303
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Epoch 80/500
15646/15646 [=====] - 2s 120us/sample - loss: 0.1967
- accuracy: 0.9319
Epoch 81/500
15646/15646 [=====] - 2s 120us/sample - loss: 0.1954
- accuracy: 0.9316
Epoch 82/500
15646/15646 [=====] - 2s 116us/sample - loss: 0.1945
- accuracy: 0.9329
Epoch 83/500
15646/15646 [=====] - 2s 121us/sample - loss: 0.1948
- accuracy: 0.9319
Epoch 84/500
15646/15646 [=====] - 2s 117us/sample - loss: 0.1927
- accuracy: 0.9328
Epoch 85/500
15646/15646 [=====] - 2s 130us/sample - loss: 0.1921
- accuracy: 0.9326
Epoch 86/500
15646/15646 [=====] - 3s 166us/sample - loss: 0.1910
- accuracy: 0.9347
Epoch 87/500
15646/15646 [=====] - 2s 130us/sample - loss: 0.1912
- accuracy: 0.9336
Epoch 88/500
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15646/15646 [=====] - 2s 122us/sample - loss: 0.1895
- accuracy: 0.9344
Epoch 89/500
15646/15646 [=====] - 2s 154us/sample - loss: 0.1885
- accuracy: 0.9360
Epoch 90/500
15646/15646 [=====] - 2s 148us/sample - loss: 0.1877
- accuracy: 0.9357
Epoch 91/500
15646/15646 [=====] - 2s 128us/sample - loss: 0.1871
- accuracy: 0.9356
Epoch 92/500
15646/15646 [=====] - 2s 124us/sample - loss: 0.1864
- accuracy: 0.9353
Epoch 93/500
15646/15646 [=====] - 2s 125us/sample - loss: 0.1844
- accuracy: 0.9370
Epoch 94/500
15646/15646 [=====] - 2s 123us/sample - loss: 0.1837
- accuracy: 0.9366
Epoch 95/500
15646/15646 [=====] - 2s 118us/sample - loss: 0.1833
- accuracy: 0.9376
Epoch 96/500
15646/15646 [=====] - 2s 125us/sample - loss: 0.1825
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- accuracy: 0.9367
Epoch 97/500
15646/15646 [=====] - 2s 122us/sample - loss: 0.1815
- accuracy: 0.9368
Epoch 98/500
15646/15646 [=====] - 2s 117us/sample - loss: 0.1806
- accuracy: 0.9379
Epoch 99/500
15646/15646 [=====] - 2s 116us/sample - loss: 0.1809
- accuracy: 0.9386
Epoch 100/500
15646/15646 [=====] - 2s 118us/sample - loss: 0.1786
- accuracy: 0.9397
Epoch 101/500
15646/15646 [=====] - 2s 120us/sample - loss: 0.1776
- accuracy: 0.9402
Epoch 102/500
15646/15646 [=====] - 2s 117us/sample - loss: 0.1768
- accuracy: 0.9400
Epoch 103/500
15646/15646 [=====] - 2s 114us/sample - loss: 0.1757
- accuracy: 0.9413
Epoch 104/500
15646/15646 [=====] - 2s 120us/sample - loss: 0.1745
- accuracy: 0.9406
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Epoch 105/500
15646/15646 [=====] - 2s 118us/sample - loss: 0.1757
- accuracy: 0.9395
Epoch 106/500
15646/15646 [=====] - 2s 113us/sample - loss: 0.1739
- accuracy: 0.9407
Epoch 107/500
15646/15646 [=====] - 2s 119us/sample - loss: 0.1741
- accuracy: 0.9410
Epoch 108/500
15646/15646 [=====] - 2s 118us/sample - loss: 0.1719
- accuracy: 0.9416
Epoch 109/500
15646/15646 [=====] - 2s 112us/sample - loss: 0.1715
- accuracy: 0.9428
Epoch 110/500
15646/15646 [=====] - 2s 120us/sample - loss: 0.1704
- accuracy: 0.9451
Epoch 111/500
15646/15646 [=====] - 2s 114us/sample - loss: 0.1696
- accuracy: 0.9427
Epoch 112/500
15646/15646 [=====] - 2s 111us/sample - loss: 0.1685
- accuracy: 0.9442
Epoch 113/500
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15646/15646 [=====] - 2s 120us/sample - loss: 0.1674
- accuracy: 0.9440
Epoch 114/500
15646/15646 [=====] - 2s 115us/sample - loss: 0.1678
- accuracy: 0.9437
Epoch 115/500
15646/15646 [=====] - 2s 113us/sample - loss: 0.1669
- accuracy: 0.9442
Epoch 116/500
15646/15646 [=====] - 2s 119us/sample - loss: 0.1656
- accuracy: 0.9452
Epoch 117/500
15646/15646 [=====] - 2s 113us/sample - loss: 0.1643
- accuracy: 0.9460
Epoch 118/500
15646/15646 [=====] - 2s 116us/sample - loss: 0.1644
- accuracy: 0.9453
Epoch 119/500
15646/15646 [=====] - 2s 117us/sample - loss: 0.1630
- accuracy: 0.9464
Epoch 120/500
15646/15646 [=====] - 2s 117us/sample - loss: 0.1626
- accuracy: 0.9466
Epoch 121/500
15646/15646 [=====] - 2s 117us/sample - loss: 0.1619
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- accuracy: 0.9465
Epoch 122/500
15646/15646 [=====] - 2s 114us/sample - loss: 0.1618
- accuracy: 0.9463
Epoch 123/500
15646/15646 [=====] - 2s 120us/sample - loss: 0.1608
- accuracy: 0.9482
Epoch 124/500
15646/15646 [=====] - 2s 116us/sample - loss: 0.1594
- accuracy: 0.9468
Epoch 125/500
15646/15646 [=====] - 2s 111us/sample - loss: 0.1601
- accuracy: 0.9474
Epoch 126/500
15646/15646 [=====] - 2s 119us/sample - loss: 0.1579
- accuracy: 0.9479
Epoch 127/500
15646/15646 [=====] - 2s 115us/sample - loss: 0.1574
- accuracy: 0.9480
Epoch 128/500
15646/15646 [=====] - 2s 111us/sample - loss: 0.1571
- accuracy: 0.9494
Epoch 129/500
15646/15646 [=====] - 2s 119us/sample - loss: 0.1561
- accuracy: 0.9502
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Epoch 130/500
15646/15646 [=====] - 2s 115us/sample - loss: 0.1559
- accuracy: 0.9496
Epoch 131/500
15646/15646 [=====] - 2s 111us/sample - loss: 0.1549
- accuracy: 0.9498
Epoch 132/500
15646/15646 [=====] - 2s 119us/sample - loss: 0.1555
- accuracy: 0.9501
Epoch 133/500
15646/15646 [=====] - 2s 114us/sample - loss: 0.1528
- accuracy: 0.9503
Epoch 134/500
15646/15646 [=====] - 2s 112us/sample - loss: 0.1534
- accuracy: 0.9501
Epoch 135/500
15646/15646 [=====] - 2s 114us/sample - loss: 0.1525
- accuracy: 0.9511
Epoch 136/500
15646/15646 [=====] - 2s 115us/sample - loss: 0.1527
- accuracy: 0.9509
Epoch 137/500
15646/15646 [=====] - 2s 113us/sample - loss: 0.1505
- accuracy: 0.9518
Epoch 138/500
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15646/15646 [=====] - 2s 110us/sample - loss: 0.1506
- accuracy: 0.9524
Epoch 139/500
15646/15646 [=====] - 2s 120us/sample - loss: 0.1504
- accuracy: 0.9514
Epoch 140/500
15646/15646 [=====] - 2s 115us/sample - loss: 0.1487
- accuracy: 0.9525
Epoch 141/500
15646/15646 [=====] - 2s 113us/sample - loss: 0.1483
- accuracy: 0.9538
Epoch 142/500
15646/15646 [=====] - 2s 119us/sample - loss: 0.1474
- accuracy: 0.9533
Epoch 143/500
15646/15646 [=====] - 2s 111us/sample - loss: 0.1463
- accuracy: 0.9530
Epoch 144/500
15646/15646 [=====] - 2s 110us/sample - loss: 0.1465
- accuracy: 0.9526
Epoch 145/500
15646/15646 [=====] - 2s 120us/sample - loss: 0.1473
- accuracy: 0.9544
Epoch 146/500
15646/15646 [=====] - 2s 118us/sample - loss: 0.1451
```



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- accuracy: 0.9553
Epoch 147/500
15646/15646 [=====] - 2s 107us/sample - loss: 0.1441
- accuracy: 0.9543
Epoch 148/500
15646/15646 [=====] - 2s 115us/sample - loss: 0.1431
- accuracy: 0.9549
Epoch 149/500
15646/15646 [=====] - 2s 115us/sample - loss: 0.1439
- accuracy: 0.9553
Epoch 150/500
15646/15646 [=====] - 2s 116us/sample - loss: 0.1428
- accuracy: 0.9553
Epoch 151/500
15646/15646 [=====] - 2s 113us/sample - loss: 0.1422
- accuracy: 0.9550
Epoch 152/500
15646/15646 [=====] - 2s 117us/sample - loss: 0.1415
- accuracy: 0.9564
Epoch 153/500
15646/15646 [=====] - 2s 117us/sample - loss: 0.1414
- accuracy: 0.9566
Epoch 154/500
15646/15646 [=====] - 2s 112us/sample - loss: 0.1405
- accuracy: 0.9572
```

```
Epoch 155/500
15646/15646 [=====] - 2s 120us/sample - loss: 0.1391
- accuracy: 0.9567
Epoch 156/500
15646/15646 [=====] - 2s 112us/sample - loss: 0.1391
- accuracy: 0.9571
Epoch 157/500
15646/15646 [=====] - 2s 107us/sample - loss: 0.1386
- accuracy: 0.9563
Epoch 158/500
15646/15646 [=====] - 2s 122us/sample - loss: 0.1376
- accuracy: 0.9573
Epoch 159/500
15646/15646 [=====] - 2s 118us/sample - loss: 0.1383
- accuracy: 0.9569
Epoch 160/500
15646/15646 [=====] - 2s 112us/sample - loss: 0.1377
- accuracy: 0.9586
Epoch 161/500
15646/15646 [=====] - 2s 118us/sample - loss: 0.1364
- accuracy: 0.9597
Epoch 162/500
15646/15646 [=====] - 2s 117us/sample - loss: 0.1357
- accuracy: 0.9592
Epoch 163/500
```

```
15646/15646 [=====] - 2s 111us/sample - loss: 0.1358
- accuracy: 0.9578
Epoch 164/500
15646/15646 [=====] - 2s 117us/sample - loss: 0.1346
- accuracy: 0.9595
Epoch 165/500
15646/15646 [=====] - 2s 119us/sample - loss: 0.1336
- accuracy: 0.9594
Epoch 166/500
15646/15646 [=====] - 2s 113us/sample - loss: 0.1341
- accuracy: 0.9608
Epoch 167/500
15646/15646 [=====] - 2s 112us/sample - loss: 0.1320
- accuracy: 0.9601
Epoch 168/500
15646/15646 [=====] - 2s 121us/sample - loss: 0.1330
- accuracy: 0.9600
Epoch 169/500
15646/15646 [=====] - 2s 113us/sample - loss: 0.1320
- accuracy: 0.9603
Epoch 170/500
15646/15646 [=====] - 2s 112us/sample - loss: 0.1315
- accuracy: 0.9625
Epoch 171/500
15646/15646 [=====] - 2s 121us/sample - loss: 0.1311
```

```
- accuracy: 0.9606
Epoch 172/500
15646/15646 [=====] - 2s 115us/sample - loss: 0.1302
- accuracy: 0.9602
Epoch 173/500
15646/15646 [=====] - 2s 111us/sample - loss: 0.1295
- accuracy: 0.9605
Epoch 174/500
15646/15646 [=====] - 2s 119us/sample - loss: 0.1287
- accuracy: 0.9619
Epoch 175/500
15646/15646 [=====] - 2s 113us/sample - loss: 0.1300
- accuracy: 0.9613
Epoch 176/500
15646/15646 [=====] - 2s 112us/sample - loss: 0.1271
- accuracy: 0.9635
Epoch 177/500
15646/15646 [=====] - 2s 119us/sample - loss: 0.1274
- accuracy: 0.9619
Epoch 178/500
15646/15646 [=====] - 2s 115us/sample - loss: 0.1267
- accuracy: 0.9626
Epoch 179/500
15646/15646 [=====] - 2s 113us/sample - loss: 0.1264
- accuracy: 0.9630
```

```
Epoch 180/500
15646/15646 [=====] - 2s 119us/sample - loss: 0.1268
- accuracy: 0.9635
Epoch 181/500
15646/15646 [=====] - 2s 119us/sample - loss: 0.1243
- accuracy: 0.9641
Epoch 182/500
15646/15646 [=====] - 2s 115us/sample - loss: 0.1250
- accuracy: 0.9649
Epoch 183/500
15646/15646 [=====] - 2s 117us/sample - loss: 0.1234
- accuracy: 0.9664
Epoch 184/500
15646/15646 [=====] - 2s 123us/sample - loss: 0.1231
- accuracy: 0.9653
Epoch 185/500
15646/15646 [=====] - 2s 119us/sample - loss: 0.1230
- accuracy: 0.9651
Epoch 186/500
15646/15646 [=====] - 2s 112us/sample - loss: 0.1240
- accuracy: 0.9629
Epoch 187/500
15646/15646 [=====] - 2s 122us/sample - loss: 0.1227
- accuracy: 0.9640
Epoch 188/500
```

```
15646/15646 [=====] - 2s 112us/sample - loss: 0.1225
- accuracy: 0.9657
Epoch 189/500
15646/15646 [=====] - 2s 112us/sample - loss: 0.1215
- accuracy: 0.9663
Epoch 190/500
15646/15646 [=====] - 2s 122us/sample - loss: 0.1221
- accuracy: 0.9658
Epoch 191/500
15646/15646 [=====] - 2s 120us/sample - loss: 0.1205
- accuracy: 0.9659
Epoch 192/500
15646/15646 [=====] - 2s 114us/sample - loss: 0.1202
- accuracy: 0.9659
Epoch 193/500
15646/15646 [=====] - 2s 119us/sample - loss: 0.1198
- accuracy: 0.9660
Epoch 194/500
15646/15646 [=====] - 2s 113us/sample - loss: 0.1195
- accuracy: 0.9661
Epoch 195/500
15646/15646 [=====] - 2s 112us/sample - loss: 0.1191
- accuracy: 0.9669
Epoch 196/500
15646/15646 [=====] - 2s 116us/sample - loss: 0.1187
```

```
- accuracy: 0.9675
Epoch 197/500
15646/15646 [=====] - 2s 117us/sample - loss: 0.1180
- accuracy: 0.9677
Epoch 198/500
15646/15646 [=====] - 2s 110us/sample - loss: 0.1167
- accuracy: 0.9677
Epoch 199/500
15646/15646 [=====] - 2s 119us/sample - loss: 0.1184
- accuracy: 0.9666
Epoch 200/500
15646/15646 [=====] - 2s 116us/sample - loss: 0.1159
- accuracy: 0.9686
Epoch 201/500
15646/15646 [=====] - 2s 110us/sample - loss: 0.1165
- accuracy: 0.9671
Epoch 202/500
15646/15646 [=====] - 2s 110us/sample - loss: 0.1155
- accuracy: 0.9673
Epoch 203/500
15646/15646 [=====] - 2s 127us/sample - loss: 0.1168
- accuracy: 0.9671
Epoch 204/500
15646/15646 [=====] - 2s 113us/sample - loss: 0.1144
- accuracy: 0.9681
```

```
Epoch 205/500
15646/15646 [=====] - 2s 111us/sample - loss: 0.1156
- accuracy: 0.9683
Epoch 206/500
15646/15646 [=====] - 2s 119us/sample - loss: 0.1137
- accuracy: 0.9694
Epoch 207/500
15646/15646 [=====] - 2s 114us/sample - loss: 0.1147
- accuracy: 0.9690
Epoch 208/500
15646/15646 [=====] - 2s 112us/sample - loss: 0.1136
- accuracy: 0.9689
Epoch 209/500
15646/15646 [=====] - 2s 123us/sample - loss: 0.1136
- accuracy: 0.9685
Epoch 210/500
15646/15646 [=====] - 2s 113us/sample - loss: 0.1125
- accuracy: 0.9686
Epoch 211/500
15646/15646 [=====] - 2s 110us/sample - loss: 0.1115
- accuracy: 0.9693
Epoch 212/500
15646/15646 [=====] - 2s 121us/sample - loss: 0.1122
- accuracy: 0.9698
Epoch 213/500
```



```
15646/15646 [=====] - 2s 119us/sample - loss: 0.1117
- accuracy: 0.9695
Epoch 214/500
15646/15646 [=====] - 2s 113us/sample - loss: 0.1105
- accuracy: 0.9705
Epoch 215/500
15646/15646 [=====] - 2s 117us/sample - loss: 0.1107
- accuracy: 0.9694
Epoch 216/500
15646/15646 [=====] - 2s 118us/sample - loss: 0.1104
- accuracy: 0.9707
Epoch 217/500
15646/15646 [=====] - 2s 110us/sample - loss: 0.1090
- accuracy: 0.9707
Epoch 218/500
15646/15646 [=====] - 2s 115us/sample - loss: 0.1086
- accuracy: 0.9716
Epoch 219/500
15646/15646 [=====] - 2s 124us/sample - loss: 0.1088
- accuracy: 0.9713
Epoch 220/500
15646/15646 [=====] - 2s 113us/sample - loss: 0.1082
- accuracy: 0.9716
Epoch 221/500
15646/15646 [=====] - 2s 112us/sample - loss: 0.1081
```

```
- accuracy: 0.9712
Epoch 222/500
15646/15646 [=====] - 2s 127us/sample - loss: 0.1092
- accuracy: 0.9706
Epoch 223/500
15646/15646 [=====] - 2s 113us/sample - loss: 0.1072
- accuracy: 0.9708
Epoch 224/500
15646/15646 [=====] - 2s 113us/sample - loss: 0.1077
- accuracy: 0.9710
Epoch 225/500
15646/15646 [=====] - 2s 124us/sample - loss: 0.1066
- accuracy: 0.9728
Epoch 226/500
15646/15646 [=====] - 2s 113us/sample - loss: 0.1056
- accuracy: 0.9716
Epoch 227/500
15646/15646 [=====] - 2s 110us/sample - loss: 0.1058
- accuracy: 0.9716
Epoch 228/500
15646/15646 [=====] - 2s 127us/sample - loss: 0.1061
- accuracy: 0.9715
Epoch 229/500
15646/15646 [=====] - 2s 125us/sample - loss: 0.1056
- accuracy: 0.9728
```

```
Epoch 230/500
15646/15646 [=====] - 2s 120us/sample - loss: 0.1058
- accuracy: 0.9723
Epoch 231/500
15646/15646 [=====] - 2s 125us/sample - loss: 0.1037
- accuracy: 0.9739
Epoch 232/500
15646/15646 [=====] - 2s 119us/sample - loss: 0.1042
- accuracy: 0.9723
Epoch 233/500
15646/15646 [=====] - 2s 114us/sample - loss: 0.1044
- accuracy: 0.9728
Epoch 234/500
15646/15646 [=====] - 2s 124us/sample - loss: 0.1040
- accuracy: 0.9728
Epoch 235/500
15646/15646 [=====] - 2s 117us/sample - loss: 0.1042
- accuracy: 0.9730
Epoch 236/500
15646/15646 [=====] - 2s 115us/sample - loss: 0.1035
- accuracy: 0.9731
Epoch 237/500
15646/15646 [=====] - 2s 125us/sample - loss: 0.1032
- accuracy: 0.9733
Epoch 238/500
```

```
15646/15646 [=====] - 2s 119us/sample - loss: 0.1032
- accuracy: 0.9726
Epoch 239/500
15646/15646 [=====] - 2s 118us/sample - loss: 0.1022
- accuracy: 0.9726
Epoch 240/500
15646/15646 [=====] - 2s 121us/sample - loss: 0.1021
- accuracy: 0.9727
Epoch 241/500
15646/15646 [=====] - 2s 120us/sample - loss: 0.1022
- accuracy: 0.9739
Epoch 242/500
15646/15646 [=====] - 2s 116us/sample - loss: 0.1018
- accuracy: 0.9739
Epoch 243/500
15646/15646 [=====] - 2s 117us/sample - loss: 0.1022
- accuracy: 0.9725
Epoch 244/500
15646/15646 [=====] - 2s 122us/sample - loss: 0.1025
- accuracy: 0.9732
Epoch 245/500
15646/15646 [=====] - 2s 105us/sample - loss: 0.1006
- accuracy: 0.9731
Epoch 246/500
15646/15646 [=====] - 2s 109us/sample - loss: 0.0995
```

```
- accuracy: 0.9747
Epoch 247/500
15646/15646 [=====] - 2s 125us/sample - loss: 0.1005
- accuracy: 0.9737
Epoch 248/500
15646/15646 [=====] - 2s 109us/sample - loss: 0.0990
- accuracy: 0.9748
Epoch 249/500
15646/15646 [=====] - 2s 113us/sample - loss: 0.0985
- accuracy: 0.9745
Epoch 250/500
15646/15646 [=====] - 2s 124us/sample - loss: 0.0981
- accuracy: 0.9736
Epoch 251/500
15646/15646 [=====] - 2s 113us/sample - loss: 0.0993
- accuracy: 0.9748
Epoch 252/500
15646/15646 [=====] - 2s 117us/sample - loss: 0.0980
- accuracy: 0.9767
Epoch 253/500
15646/15646 [=====] - 2s 126us/sample - loss: 0.0973
- accuracy: 0.9757
Epoch 254/500
15646/15646 [=====] - 2s 122us/sample - loss: 0.0966
- accuracy: 0.9757
```

```
Epoch 255/500
15646/15646 [=====] - 2s 117us/sample - loss: 0.0964
- accuracy: 0.9762
Epoch 256/500
15646/15646 [=====] - 2s 125us/sample - loss: 0.0978
- accuracy: 0.9753
Epoch 257/500
15646/15646 [=====] - 2s 122us/sample - loss: 0.0961
- accuracy: 0.9768
Epoch 258/500
15646/15646 [=====] - 2s 120us/sample - loss: 0.0962
- accuracy: 0.9759
Epoch 259/500
15646/15646 [=====] - 2s 122us/sample - loss: 0.0953
- accuracy: 0.9772
Epoch 260/500
15646/15646 [=====] - 2s 115us/sample - loss: 0.0966
- accuracy: 0.9752
Epoch 261/500
15646/15646 [=====] - 2s 113us/sample - loss: 0.0953
- accuracy: 0.9758
Epoch 262/500
15646/15646 [=====] - 2s 121us/sample - loss: 0.0945
- accuracy: 0.9760
Epoch 263/500
```

```
15646/15646 [=====] - 2s 120us/sample - loss: 0.0965
- accuracy: 0.9760
Epoch 264/500
15646/15646 [=====] - 2s 115us/sample - loss: 0.0932
- accuracy: 0.9771
Epoch 265/500
15646/15646 [=====] - 2s 116us/sample - loss: 0.0956
- accuracy: 0.9764
Epoch 266/500
15646/15646 [=====] - 2s 122us/sample - loss: 0.0939
- accuracy: 0.9781
Epoch 267/500
15646/15646 [=====] - 2s 114us/sample - loss: 0.0946
- accuracy: 0.9760
Epoch 268/500
15646/15646 [=====] - 2s 112us/sample - loss: 0.0932
- accuracy: 0.9770
Epoch 269/500
15646/15646 [=====] - 2s 123us/sample - loss: 0.0939
- accuracy: 0.9765
Epoch 270/500
15646/15646 [=====] - 2s 111us/sample - loss: 0.0930
- accuracy: 0.9769
Epoch 271/500
15646/15646 [=====] - 2s 111us/sample - loss: 0.0935
```

```
- accuracy: 0.9762
Epoch 272/500
15646/15646 [=====] - 2s 125us/sample - loss: 0.0930
- accuracy: 0.9765
Epoch 273/500
15646/15646 [=====] - 2s 113us/sample - loss: 0.0914
- accuracy: 0.9779
Epoch 274/500
15646/15646 [=====] - 2s 109us/sample - loss: 0.0919
- accuracy: 0.9779
Epoch 275/500
15646/15646 [=====] - 2s 123us/sample - loss: 0.0921
- accuracy: 0.9767
Epoch 276/500
15646/15646 [=====] - 2s 110us/sample - loss: 0.0917
- accuracy: 0.9765
Epoch 277/500
15646/15646 [=====] - 2s 112us/sample - loss: 0.0906
- accuracy: 0.9785
Epoch 278/500
15646/15646 [=====] - 2s 122us/sample - loss: 0.0899
- accuracy: 0.9796
Epoch 279/500
15646/15646 [=====] - 2s 116us/sample - loss: 0.0928
- accuracy: 0.9774
```



```
Epoch 280/500
15646/15646 [=====] - 2s 112us/sample - loss: 0.0902
- accuracy: 0.9776
Epoch 281/500
15646/15646 [=====] - 2s 116us/sample - loss: 0.0897
- accuracy: 0.9780
Epoch 282/500
15646/15646 [=====] - 2s 122us/sample - loss: 0.0888
- accuracy: 0.9778
Epoch 283/500
15646/15646 [=====] - 2s 110us/sample - loss: 0.0899
- accuracy: 0.9776
Epoch 284/500
15646/15646 [=====] - 2s 111us/sample - loss: 0.0881
- accuracy: 0.9789
Epoch 285/500
15646/15646 [=====] - 2s 128us/sample - loss: 0.0883
- accuracy: 0.9796
Epoch 286/500
15646/15646 [=====] - 2s 109us/sample - loss: 0.0895
- accuracy: 0.9781
Epoch 287/500
15646/15646 [=====] - 2s 112us/sample - loss: 0.0890
- accuracy: 0.9790
Epoch 288/500
```

```
15646/15646 [=====] - 2s 126us/sample - loss: 0.0887
- accuracy: 0.9785
Epoch 289/500
15646/15646 [=====] - 2s 109us/sample - loss: 0.0884
- accuracy: 0.9787
Epoch 290/500
15646/15646 [=====] - 2s 116us/sample - loss: 0.0886
- accuracy: 0.9784
Epoch 291/500
15646/15646 [=====] - 2s 123us/sample - loss: 0.0887
- accuracy: 0.9783
Epoch 292/500
15646/15646 [=====] - 2s 110us/sample - loss: 0.0879
- accuracy: 0.9784
Epoch 293/500
15646/15646 [=====] - 2s 111us/sample - loss: 0.0875
- accuracy: 0.9780
Epoch 294/500
15646/15646 [=====] - 2s 124us/sample - loss: 0.0882
- accuracy: 0.9787
Epoch 295/500
15646/15646 [=====] - 2s 112us/sample - loss: 0.0868
- accuracy: 0.9788
Epoch 296/500
15646/15646 [=====] - 2s 115us/sample - loss: 0.0859
```

```
- accuracy: 0.9802
Epoch 297/500
15646/15646 [=====] - 2s 116us/sample - loss: 0.0860
- accuracy: 0.9797
Epoch 298/500
15646/15646 [=====] - 2s 121us/sample - loss: 0.0863
- accuracy: 0.9784
Epoch 299/500
15646/15646 [=====] - 2s 111us/sample - loss: 0.0858
- accuracy: 0.9794
Epoch 300/500
15646/15646 [=====] - 2s 108us/sample - loss: 0.0861
- accuracy: 0.9792
Epoch 301/500
15646/15646 [=====] - 2s 126us/sample - loss: 0.0854
- accuracy: 0.9792
Epoch 302/500
15646/15646 [=====] - 2s 110us/sample - loss: 0.0871
- accuracy: 0.9790
Epoch 303/500
15646/15646 [=====] - 2s 112us/sample - loss: 0.0869
- accuracy: 0.9792
Epoch 304/500
15646/15646 [=====] - 2s 126us/sample - loss: 0.0844
- accuracy: 0.9803
```

```
Epoch 305/500
15646/15646 [=====] - 2s 110us/sample - loss: 0.0840
- accuracy: 0.9803
Epoch 306/500
15646/15646 [=====] - 2s 111us/sample - loss: 0.0851
- accuracy: 0.9794
Epoch 307/500
15646/15646 [=====] - 2s 125us/sample - loss: 0.0855
- accuracy: 0.9783
Epoch 308/500
15646/15646 [=====] - 2s 113us/sample - loss: 0.0831
- accuracy: 0.9807
Epoch 309/500
15646/15646 [=====] - 2s 110us/sample - loss: 0.0849
- accuracy: 0.9799
Epoch 310/500
15646/15646 [=====] - 2s 123us/sample - loss: 0.0839
- accuracy: 0.9800
Epoch 311/500
15646/15646 [=====] - 2s 115us/sample - loss: 0.0841
- accuracy: 0.9809
Epoch 312/500
15646/15646 [=====] - 2s 111us/sample - loss: 0.0837
- accuracy: 0.9801
Epoch 313/500
```

```
15646/15646 [=====] - 2s 117us/sample - loss: 0.0838
- accuracy: 0.9794
Epoch 314/500
15646/15646 [=====] - 2s 116us/sample - loss: 0.0816
- accuracy: 0.9818
Epoch 315/500
15646/15646 [=====] - 2s 110us/sample - loss: 0.0827
- accuracy: 0.9809
Epoch 316/500
15646/15646 [=====] - 2s 112us/sample - loss: 0.0825
- accuracy: 0.9806
Epoch 317/500
15646/15646 [=====] - 2s 120us/sample - loss: 0.0830
- accuracy: 0.9804
Epoch 318/500
15646/15646 [=====] - 2s 111us/sample - loss: 0.0833
- accuracy: 0.9795
Epoch 319/500
15646/15646 [=====] - 2s 111us/sample - loss: 0.0820
- accuracy: 0.9801
Epoch 320/500
15646/15646 [=====] - 2s 125us/sample - loss: 0.0831
- accuracy: 0.9804
Epoch 321/500
15646/15646 [=====] - 2s 107us/sample - loss: 0.0802
```

```
- accuracy: 0.9818
Epoch 322/500
15646/15646 [=====] - 2s 111us/sample - loss: 0.0811
- accuracy: 0.9810
Epoch 323/500
15646/15646 [=====] - 2s 129us/sample - loss: 0.0819
- accuracy: 0.9809
Epoch 324/500
15646/15646 [=====] - 2s 113us/sample - loss: 0.0803
- accuracy: 0.9808
Epoch 325/500
15646/15646 [=====] - 2s 111us/sample - loss: 0.0812
- accuracy: 0.9806
Epoch 326/500
15646/15646 [=====] - 2s 121us/sample - loss: 0.0812
- accuracy: 0.9808
Epoch 327/500
15646/15646 [=====] - 2s 113us/sample - loss: 0.0812
- accuracy: 0.9804
Epoch 328/500
15646/15646 [=====] - 2s 111us/sample - loss: 0.0806
- accuracy: 0.9824
Epoch 329/500
15646/15646 [=====] - 2s 115us/sample - loss: 0.0803
- accuracy: 0.9805
```

```
Epoch 330/500
15646/15646 [=====] - 2s 121us/sample - loss: 0.0793
- accuracy: 0.9819
Epoch 331/500
15646/15646 [=====] - 2s 111us/sample - loss: 0.0790
- accuracy: 0.9822
Epoch 332/500
15646/15646 [=====] - 2s 116us/sample - loss: 0.0808
- accuracy: 0.9809
Epoch 333/500
15646/15646 [=====] - 2s 119us/sample - loss: 0.0789
- accuracy: 0.9822
Epoch 334/500
15646/15646 [=====] - 2s 109us/sample - loss: 0.0786
- accuracy: 0.9817
Epoch 335/500
15646/15646 [=====] - 2s 111us/sample - loss: 0.0791
- accuracy: 0.9826
Epoch 336/500
15646/15646 [=====] - 2s 121us/sample - loss: 0.0782
- accuracy: 0.9826
Epoch 337/500
15646/15646 [=====] - 2s 110us/sample - loss: 0.0787
- accuracy: 0.9807
Epoch 338/500
```

```
15646/15646 [=====] - 2s 113us/sample - loss: 0.0792
- accuracy: 0.9818
Epoch 339/500
15646/15646 [=====] - 2s 121us/sample - loss: 0.0786
- accuracy: 0.9818
Epoch 340/500
15646/15646 [=====] - 2s 115us/sample - loss: 0.0790
- accuracy: 0.9811
Epoch 341/500
15646/15646 [=====] - 2s 112us/sample - loss: 0.0776
- accuracy: 0.9817
Epoch 342/500
15646/15646 [=====] - 2s 117us/sample - loss: 0.0772
- accuracy: 0.9827
Epoch 343/500
15646/15646 [=====] - 2s 117us/sample - loss: 0.0776
- accuracy: 0.9821
Epoch 344/500
15646/15646 [=====] - 2s 111us/sample - loss: 0.0775
- accuracy: 0.9829
Epoch 345/500
15646/15646 [=====] - 2s 116us/sample - loss: 0.0775
- accuracy: 0.9820
Epoch 346/500
15646/15646 [=====] - 2s 122us/sample - loss: 0.0766
```



```
- accuracy: 0.9822
Epoch 347/500
15646/15646 [=====] - 2s 111us/sample - loss: 0.0771
- accuracy: 0.9829
Epoch 348/500
15646/15646 [=====] - 2s 116us/sample - loss: 0.0764
- accuracy: 0.9831
Epoch 349/500
15646/15646 [=====] - 2s 121us/sample - loss: 0.0772
- accuracy: 0.9819
Epoch 350/500
15646/15646 [=====] - 2s 117us/sample - loss: 0.0769
- accuracy: 0.9814
Epoch 351/500
15646/15646 [=====] - 2s 116us/sample - loss: 0.0761
- accuracy: 0.9828
Epoch 352/500
15646/15646 [=====] - 2s 123us/sample - loss: 0.0746
- accuracy: 0.9827
Epoch 353/500
15646/15646 [=====] - 2s 113us/sample - loss: 0.0770
- accuracy: 0.9813
Epoch 354/500
15646/15646 [=====] - 2s 112us/sample - loss: 0.0764
- accuracy: 0.9829
```

```
Epoch 355/500
15646/15646 [=====] - 2s 125us/sample - loss: 0.0758
- accuracy: 0.9816
Epoch 356/500
15646/15646 [=====] - 2s 115us/sample - loss: 0.0752
- accuracy: 0.9825
Epoch 357/500
15646/15646 [=====] - 2s 112us/sample - loss: 0.0756
- accuracy: 0.9829
Epoch 358/500
15646/15646 [=====] - 2s 123us/sample - loss: 0.0740
- accuracy: 0.9841
Epoch 359/500
15646/15646 [=====] - 2s 113us/sample - loss: 0.0746
- accuracy: 0.9826
Epoch 360/500
15646/15646 [=====] - 2s 111us/sample - loss: 0.0747
- accuracy: 0.9827
Epoch 361/500
15646/15646 [=====] - 2s 119us/sample - loss: 0.0739
- accuracy: 0.9846
Epoch 362/500
15646/15646 [=====] - 2s 118us/sample - loss: 0.0749
- accuracy: 0.9825
Epoch 363/500
```

```
15646/15646 [=====] - 2s 113us/sample - loss: 0.0738
- accuracy: 0.9839
Epoch 364/500
15646/15646 [=====] - 2s 115us/sample - loss: 0.0737
- accuracy: 0.9831
Epoch 365/500
15646/15646 [=====] - 2s 124us/sample - loss: 0.0745
- accuracy: 0.9824
Epoch 366/500
15646/15646 [=====] - 2s 112us/sample - loss: 0.0738
- accuracy: 0.9828
Epoch 367/500
15646/15646 [=====] - 2s 117us/sample - loss: 0.0742
- accuracy: 0.9833
Epoch 368/500
15646/15646 [=====] - 2s 120us/sample - loss: 0.0744
- accuracy: 0.9823
Epoch 369/500
15646/15646 [=====] - 2s 112us/sample - loss: 0.0732
- accuracy: 0.9834
Epoch 370/500
15646/15646 [=====] - 2s 115us/sample - loss: 0.0730
- accuracy: 0.9827
Epoch 371/500
15646/15646 [=====] - 2s 117us/sample - loss: 0.0731
```

```
- accuracy: 0.9837
Epoch 372/500
15646/15646 [=====] - 2s 110us/sample - loss: 0.0727
- accuracy: 0.9833
Epoch 373/500
15646/15646 [=====] - 2s 113us/sample - loss: 0.0723
- accuracy: 0.9836
Epoch 374/500
15646/15646 [=====] - 2s 124us/sample - loss: 0.0729
- accuracy: 0.9831
Epoch 375/500
15646/15646 [=====] - 2s 112us/sample - loss: 0.0735
- accuracy: 0.9821
Epoch 376/500
15646/15646 [=====] - 2s 112us/sample - loss: 0.0712
- accuracy: 0.9842
Epoch 377/500
15646/15646 [=====] - 2s 122us/sample - loss: 0.0719
- accuracy: 0.9832
Epoch 378/500
15646/15646 [=====] - 2s 116us/sample - loss: 0.0709
- accuracy: 0.9836
Epoch 379/500
15646/15646 [=====] - 1s 90us/sample - loss: 0.0701
- accuracy: 0.9850
```

```
Epoch 380/500
15646/15646 [=====] - 1s 91us/sample - loss: 0.0704
- accuracy: 0.9848
Epoch 381/500
15646/15646 [=====] - 1s 96us/sample - loss: 0.0717
- accuracy: 0.9836
Epoch 382/500
15646/15646 [=====] - 2s 109us/sample - loss: 0.0710
- accuracy: 0.9838
Epoch 383/500
15646/15646 [=====] - 2s 110us/sample - loss: 0.0720
- accuracy: 0.9837
Epoch 384/500
15646/15646 [=====] - 2s 122us/sample - loss: 0.0699
- accuracy: 0.9842
Epoch 385/500
15646/15646 [=====] - 2s 116us/sample - loss: 0.0699
- accuracy: 0.9843
Epoch 386/500
15646/15646 [=====] - 2s 109us/sample - loss: 0.0715
- accuracy: 0.9836
Epoch 387/500
15646/15646 [=====] - 2s 117us/sample - loss: 0.0717
- accuracy: 0.9840
Epoch 388/500
```

```
15646/15646 [=====] - 2s 140us/sample - loss: 0.0711
- accuracy: 0.9839
Epoch 389/500
15646/15646 [=====] - 2s 116us/sample - loss: 0.0709
- accuracy: 0.9838
Epoch 390/500
15646/15646 [=====] - 2s 122us/sample - loss: 0.0693
- accuracy: 0.9844
Epoch 391/500
15646/15646 [=====] - 2s 122us/sample - loss: 0.0703
- accuracy: 0.9832
Epoch 392/500
15646/15646 [=====] - 2s 110us/sample - loss: 0.0700
- accuracy: 0.9845
Epoch 393/500
15646/15646 [=====] - 2s 117us/sample - loss: 0.0696
- accuracy: 0.9838
Epoch 394/500
15646/15646 [=====] - 2s 121us/sample - loss: 0.0692
- accuracy: 0.9846
Epoch 395/500
15646/15646 [=====] - 2s 112us/sample - loss: 0.0689
- accuracy: 0.9859
Epoch 396/500
15646/15646 [=====] - 2s 120us/sample - loss: 0.0683
```

```
- accuracy: 0.9854
Epoch 397/500
15646/15646 [=====] - 2s 123us/sample - loss: 0.0687
- accuracy: 0.9852
Epoch 398/500
15646/15646 [=====] - 2s 113us/sample - loss: 0.0692
- accuracy: 0.9838
Epoch 399/500
15646/15646 [=====] - 2s 118us/sample - loss: 0.0686
- accuracy: 0.9848
Epoch 400/500
15646/15646 [=====] - 2s 123us/sample - loss: 0.0689
- accuracy: 0.9842
Epoch 401/500
15646/15646 [=====] - 2s 111us/sample - loss: 0.0684
- accuracy: 0.9851
Epoch 402/500
15646/15646 [=====] - 2s 115us/sample - loss: 0.0679
- accuracy: 0.9846
Epoch 403/500
15646/15646 [=====] - 2s 123us/sample - loss: 0.0688
- accuracy: 0.9852
Epoch 404/500
15646/15646 [=====] - 2s 108us/sample - loss: 0.0670
- accuracy: 0.9857
```

```
Epoch 405/500
15646/15646 [=====] - 2s 116us/sample - loss: 0.0670
- accuracy: 0.9859
Epoch 406/500
15646/15646 [=====] - 2s 119us/sample - loss: 0.0666
- accuracy: 0.9848
Epoch 407/500
15646/15646 [=====] - 2s 118us/sample - loss: 0.0673
- accuracy: 0.9850
Epoch 408/500
15646/15646 [=====] - 2s 114us/sample - loss: 0.0686
- accuracy: 0.9840
Epoch 409/500
15646/15646 [=====] - 2s 117us/sample - loss: 0.0678
- accuracy: 0.9856
Epoch 410/500
15646/15646 [=====] - 2s 121us/sample - loss: 0.0651
- accuracy: 0.9861
Epoch 411/500
15646/15646 [=====] - 2s 111us/sample - loss: 0.0657
- accuracy: 0.9861
Epoch 412/500
15646/15646 [=====] - 2s 119us/sample - loss: 0.0673
- accuracy: 0.9845
Epoch 413/500
```



```
15646/15646 [=====] - 2s 123us/sample - loss: 0.0674
- accuracy: 0.9855
Epoch 414/500
15646/15646 [=====] - 2s 109us/sample - loss: 0.0671
- accuracy: 0.9856
Epoch 415/500
15646/15646 [=====] - 2s 118us/sample - loss: 0.0674
- accuracy: 0.9852
Epoch 416/500
15646/15646 [=====] - 2s 121us/sample - loss: 0.0653
- accuracy: 0.9857
Epoch 417/500
15646/15646 [=====] - 2s 109us/sample - loss: 0.0654
- accuracy: 0.9856
Epoch 418/500
15646/15646 [=====] - 2s 118us/sample - loss: 0.0654
- accuracy: 0.9864
Epoch 419/500
15646/15646 [=====] - 2s 121us/sample - loss: 0.0654
- accuracy: 0.9861
Epoch 420/500
15646/15646 [=====] - 2s 111us/sample - loss: 0.0660
- accuracy: 0.9852
Epoch 421/500
15646/15646 [=====] - 2s 119us/sample - loss: 0.0652
```

```
- accuracy: 0.9856
Epoch 422/500
15646/15646 [=====] - 2s 121us/sample - loss: 0.0658
- accuracy: 0.9854
Epoch 423/500
15646/15646 [=====] - 2s 116us/sample - loss: 0.0647
- accuracy: 0.9859
Epoch 424/500
15646/15646 [=====] - 2s 118us/sample - loss: 0.0650
- accuracy: 0.9854
Epoch 425/500
15646/15646 [=====] - 2s 121us/sample - loss: 0.0656
- accuracy: 0.9852
Epoch 426/500
15646/15646 [=====] - 2s 114us/sample - loss: 0.0647
- accuracy: 0.9859
Epoch 427/500
15646/15646 [=====] - 2s 115us/sample - loss: 0.0644
- accuracy: 0.9863
Epoch 428/500
15646/15646 [=====] - 2s 115us/sample - loss: 0.0641
- accuracy: 0.9870
Epoch 429/500
15646/15646 [=====] - 2s 124us/sample - loss: 0.0641
- accuracy: 0.9862
```

```
Epoch 430/500
15646/15646 [=====] - 2s 112us/sample - loss: 0.0644
- accuracy: 0.9862
Epoch 431/500
15646/15646 [=====] - 2s 117us/sample - loss: 0.0633
- accuracy: 0.9866
Epoch 432/500
15646/15646 [=====] - 2s 121us/sample - loss: 0.0650
- accuracy: 0.9861
Epoch 433/500
15646/15646 [=====] - 2s 114us/sample - loss: 0.0650
- accuracy: 0.9856
Epoch 434/500
15646/15646 [=====] - 2s 117us/sample - loss: 0.0641
- accuracy: 0.9860
Epoch 435/500
15646/15646 [=====] - 2s 121us/sample - loss: 0.0644
- accuracy: 0.9852
Epoch 436/500
15646/15646 [=====] - 2s 111us/sample - loss: 0.0635
- accuracy: 0.9869
Epoch 437/500
15646/15646 [=====] - 2s 114us/sample - loss: 0.0631
- accuracy: 0.9855
Epoch 438/500
```

```
15646/15646 [=====] - 2s 121us/sample - loss: 0.0641
- accuracy: 0.9857
Epoch 439/500
15646/15646 [=====] - 2s 112us/sample - loss: 0.0627
- accuracy: 0.9860
Epoch 440/500
15646/15646 [=====] - 2s 113us/sample - loss: 0.0617
- accuracy: 0.9871
Epoch 441/500
15646/15646 [=====] - 2s 119us/sample - loss: 0.0635
- accuracy: 0.9852
Epoch 442/500
15646/15646 [=====] - 2s 114us/sample - loss: 0.0619
- accuracy: 0.9873
Epoch 443/500
15646/15646 [=====] - 2s 114us/sample - loss: 0.0627
- accuracy: 0.9854
Epoch 444/500
15646/15646 [=====] - 2s 116us/sample - loss: 0.0629
- accuracy: 0.9850
Epoch 445/500
15646/15646 [=====] - 2s 117us/sample - loss: 0.0618
- accuracy: 0.9867
Epoch 446/500
15646/15646 [=====] - 2s 115us/sample - loss: 0.0617
```

```
- accuracy: 0.9871
Epoch 447/500
15646/15646 [=====] - 2s 116us/sample - loss: 0.0624
- accuracy: 0.9860
Epoch 448/500
15646/15646 [=====] - 2s 121us/sample - loss: 0.0614
- accuracy: 0.9867
Epoch 449/500
15646/15646 [=====] - 2s 114us/sample - loss: 0.0616
- accuracy: 0.9875
Epoch 450/500
15646/15646 [=====] - 2s 114us/sample - loss: 0.0630
- accuracy: 0.9861
Epoch 451/500
15646/15646 [=====] - 2s 118us/sample - loss: 0.0608
- accuracy: 0.9872
Epoch 452/500
15646/15646 [=====] - 2s 112us/sample - loss: 0.0621
- accuracy: 0.9869
Epoch 453/500
15646/15646 [=====] - 2s 117us/sample - loss: 0.0617
- accuracy: 0.9869
Epoch 454/500
15646/15646 [=====] - 2s 121us/sample - loss: 0.0638
- accuracy: 0.9859
```

```
Epoch 455/500
15646/15646 [=====] - 2s 109us/sample - loss: 0.0606
- accuracy: 0.9870
Epoch 456/500
15646/15646 [=====] - 2s 116us/sample - loss: 0.0616
- accuracy: 0.9870
Epoch 457/500
15646/15646 [=====] - 2s 121us/sample - loss: 0.0601
- accuracy: 0.9873
Epoch 458/500
15646/15646 [=====] - 2s 113us/sample - loss: 0.0603
- accuracy: 0.9875
Epoch 459/500
15646/15646 [=====] - 2s 118us/sample - loss: 0.0609
- accuracy: 0.9866
Epoch 460/500
15646/15646 [=====] - 2s 115us/sample - loss: 0.0619
- accuracy: 0.9872
Epoch 461/500
15646/15646 [=====] - 2s 115us/sample - loss: 0.0618
- accuracy: 0.9866
Epoch 462/500
15646/15646 [=====] - 2s 119us/sample - loss: 0.0609
- accuracy: 0.9876
Epoch 463/500
```

```
15646/15646 [=====] - 2s 115us/sample - loss: 0.0606
- accuracy: 0.9864
Epoch 464/500
15646/15646 [=====] - 2s 120us/sample - loss: 0.0591
- accuracy: 0.9877
Epoch 465/500
15646/15646 [=====] - 2s 115us/sample - loss: 0.0609
- accuracy: 0.9874
Epoch 466/500
15646/15646 [=====] - 2s 112us/sample - loss: 0.0592
- accuracy: 0.9879
Epoch 467/500
15646/15646 [=====] - 2s 121us/sample - loss: 0.0611
- accuracy: 0.9870
Epoch 468/500
15646/15646 [=====] - 2s 111us/sample - loss: 0.0594
- accuracy: 0.9877
Epoch 469/500
15646/15646 [=====] - 2s 115us/sample - loss: 0.0607
- accuracy: 0.9873
Epoch 470/500
15646/15646 [=====] - 2s 120us/sample - loss: 0.0595
- accuracy: 0.9868
Epoch 471/500
15646/15646 [=====] - 2s 111us/sample - loss: 0.0601
```

```
- accuracy: 0.9869
Epoch 472/500
15646/15646 [=====] - 2s 115us/sample - loss: 0.0591
- accuracy: 0.9879
Epoch 473/500
15646/15646 [=====] - 2s 123us/sample - loss: 0.0594
- accuracy: 0.9880
Epoch 474/500
15646/15646 [=====] - 2s 113us/sample - loss: 0.0592
- accuracy: 0.9877
Epoch 475/500
15646/15646 [=====] - 2s 117us/sample - loss: 0.0589
- accuracy: 0.9868
Epoch 476/500
15646/15646 [=====] - 2s 117us/sample - loss: 0.0579
- accuracy: 0.9882
Epoch 477/500
15646/15646 [=====] - 2s 120us/sample - loss: 0.0587
- accuracy: 0.9873
Epoch 478/500
15646/15646 [=====] - 2s 117us/sample - loss: 0.0602
- accuracy: 0.9875
Epoch 479/500
15646/15646 [=====] - 2s 114us/sample - loss: 0.0584
- accuracy: 0.9873
```



```
Epoch 480/500
15646/15646 [=====] - 2s 117us/sample - loss: 0.0576
- accuracy: 0.9887
Epoch 481/500
15646/15646 [=====] - 2s 115us/sample - loss: 0.0590
- accuracy: 0.9876
Epoch 482/500
15646/15646 [=====] - 2s 114us/sample - loss: 0.0581
- accuracy: 0.9885
Epoch 483/500
15646/15646 [=====] - 2s 124us/sample - loss: 0.0594
- accuracy: 0.9880
Epoch 484/500
15646/15646 [=====] - 2s 115us/sample - loss: 0.0590
- accuracy: 0.9874
Epoch 485/500
15646/15646 [=====] - 2s 112us/sample - loss: 0.0588
- accuracy: 0.9877
Epoch 486/500
15646/15646 [=====] - 2s 122us/sample - loss: 0.0576
- accuracy: 0.9878
Epoch 487/500
15646/15646 [=====] - 2s 114us/sample - loss: 0.0571
- accuracy: 0.9896
Epoch 488/500
```

```
15646/15646 [=====] - 2s 115us/sample - loss: 0.0568
- accuracy: 0.9886
Epoch 489/500
15646/15646 [=====] - 2s 122us/sample - loss: 0.0583
- accuracy: 0.9879
Epoch 490/500
15646/15646 [=====] - 2s 117us/sample - loss: 0.0584
- accuracy: 0.9870
Epoch 491/500
15646/15646 [=====] - 2s 116us/sample - loss: 0.0572
- accuracy: 0.9884
Epoch 492/500
15646/15646 [=====] - 2s 120us/sample - loss: 0.0575
- accuracy: 0.9873
Epoch 493/500
15646/15646 [=====] - 2s 114us/sample - loss: 0.0572
- accuracy: 0.9886
Epoch 494/500
15646/15646 [=====] - 2s 116us/sample - loss: 0.0566
- accuracy: 0.9888
Epoch 495/500
15646/15646 [=====] - 2s 121us/sample - loss: 0.0567
- accuracy: 0.9891
Epoch 496/500
15646/15646 [=====] - 2s 114us/sample - loss: 0.0565
```


thresholdNum: 0.5

Average of train loss: 0.1304
Average of yPredProbability: 0.0121

| classification_report FinalTest: | | | |
|----------------------------------|-----------|--------|------------------|
| | precision | recall | f1-score support |
| Normal 0 | 0.99 | 0.99 | 0.99 3562 |
| Anomaly 1 | 0.07 | 0.06 | 0.07 32 |
| accuracy | | | |
| macro avg | 0.53 | 0.53 | 0.98 3594 |
| weighted avg | 0.98 | 0.98 | 0.53 3594 |
| | | | 0.98 3594 |

confusion_matrix FinalTest:
True Negatives: 3535
False Positives: 27
False Negatives: 30
True Positives: 2

File - finalTest_Evaluation

Average threshold_rt Final Test: 0.15
Average precision_rt Final Test: 0.03
Average recall_rt Final Test: 0.12

End running time FinalTest Evaluation: 210506_222634
, *****.

Process finished with exit code 0