File "C:\Users\renat\Anaconda3\envs\NeuronENv2Python36\lib\site-packages\imblearn\utils\\_\_init\_\_.py", line 7, in <module>

from .\_validation import check\_neighbors\_object

File "C:\Users\renat\Anaconda3\envs\NeuronENv2Python36\lib\site-packages\imblearn\utils\\_validation.py", line 15, in <module>

from sklearn.neighbors.\_base import KNeighborsMixin

File "C:\Users\renat\Anaconda3\envs\NeuronENv2Python36\lib\site-packages\sklearn\neighbors\\_\_init\_\_.py", line 17, in <module>

from .\_nca import NeighborhoodComponentsAnalysis

File "C:\Users\renat\Anaconda3\envs\NeuronENv2Python36\lib\site-packages\sklearn\neighbors\\_nca.py", line 22, in <module>

from ..decomposition import PCA

File "C:\Users\renat\Anaconda3\envs\NeuronENv2Python36\lib\site-packages\sklearn\decomposition\\_\_init\_\_.py", line 12, in <module>

from .\_sparse\_pca import SparsePCA, MiniBatchSparsePCA

File "C:\Users\renat\Anaconda3\envs\NeuronENv2Python36\lib\site-packages\sklearn\decomposition\\_sparse\_pca.py", line 10, in <module>

from ..linear\_model import ridge\_regression

File "C:\Users\renat\Anaconda3\envs\NeuronENv2Python36\lib\site-packages\sklearn\linear\_model\\_\_init\_\_.py", line 9, in <module>

from .\_base import LinearRegression

File "C:\Users\renat\Anaconda3\envs\NeuronENv2Python36\lib\site-packages\sklearn\linear\_model\\_base.py", line 37, in <module>

from ..utils.\_seq\_dataset import ArrayDataset32, CSRDataset32

File "sklearn\utils\\_seq\_dataset.pyx", line 1, in init sklearn.utils.\_seq\_dataset

File "<frozen importlib.\_bootstrap>", line 419, in parent

KeyboardInterrupt

runfile('C:/Users/renat/Desktop/Deep-Channel-master/Deep-Channel-master/deepchannel\_train.py', wdir='C:/Users/renat/Desktop/Deep-Channel-master/Deep-Channel-master')

training set = 79872

test set = 19968

total length = 99840

training set= 182016

test set = 45312

total length 227328

C:\Users\renat\Anaconda3\envs\NeuronENv2Python36\lib\site-packages\tensorflow\python\keras\optimizer\_v2\optimizer\_v2.py:375: UserWarning: The `lr` argument is deprecated, use `learning\_rate` instead.

"The `lr` argument is deprecated, use `learning\_rate` instead.")

Epoch 1/15

708/711 [============================>.] - ETA: 0s - loss: 0.2175 - accuracy: 0.9206 - precision: 0.9293 - recall: 0.9119 - f1\_score: 0.9206 C:\Users\renat\Anaconda3\envs\NeuronENv2Python36\lib\site-packages\tensorflow\python\keras\metrics.py:257: UserWarning: Metric F1Score implements a `reset\_states()` method; rename it to `reset\_state()` (without the final "s"). The name `reset\_states()` has been deprecated to improve API consistency.

'consistency.' % (self.\_\_class\_\_.\_\_name\_\_,))

711/711 [==============================] - 16s 20ms/step - loss: 0.2171 - accuracy: 0.9208 - precision: 0.9294 - recall: 0.9121 - f1\_score: 0.9208 - val\_loss: 0.9781 - val\_accuracy: 0.6234 - val\_precision: 0.6237 - val\_recall: 0.6221 - val\_f1\_score: 0.6234

Epoch 2/15

711/711 [==============================] - 14s 20ms/step - loss: 0.1441 - accuracy: 0.9461 - precision: 0.9462 - recall: 0.9460 - f1\_score: 0.9461 - val\_loss: 0.1168 - val\_accuracy: 0.9524 - val\_precision: 0.9525 - val\_recall: 0.9524 - val\_f1\_score: 0.9524

Epoch 3/15

711/711 [==============================] - 14s 20ms/step - loss: 0.1345 - accuracy: 0.9500 - precision: 0.9501 - recall: 0.9499 - f1\_score: 0.9500 - val\_loss: 0.1327 - val\_accuracy: 0.9481 - val\_precision: 0.9481 - val\_recall: 0.9481 - val\_f1\_score: 0.9481

Epoch 4/15

711/711 [==============================] - 15s 21ms/step - loss: 0.1276 - accuracy: 0.9525 - precision: 0.9525 - recall: 0.9524 - f1\_score: 0.9525 - val\_loss: 0.1345 - val\_accuracy: 0.9480 - val\_precision: 0.9480 - val\_recall: 0.9480 - val\_f1\_score: 0.9480

Epoch 5/15

711/711 [==============================] - 15s 22ms/step - loss: 0.1235 - accuracy: 0.9543 - precision: 0.9544 - recall: 0.9542 - f1\_score: 0.9543 - val\_loss: 0.1571 - val\_accuracy: 0.9438 - val\_precision: 0.9438 - val\_recall: 0.9437 - val\_f1\_score: 0.9438

Epoch 6/15

711/711 [==============================] - 15s 22ms/step - loss: 0.1194 - accuracy: 0.9556 - precision: 0.9557 - recall: 0.9556 - f1\_score: 0.9556 - val\_loss: 0.1423 - val\_accuracy: 0.9463 - val\_precision: 0.9463 - val\_recall: 0.9463 - val\_f1\_score: 0.9463

Epoch 7/15

711/711 [==============================] - 15s 21ms/step - loss: 0.1171 - accuracy: 0.9566 - precision: 0.9567 - recall: 0.9566 - f1\_score: 0.9566 - val\_loss: 0.1685 - val\_accuracy: 0.9388 - val\_precision: 0.9388 - val\_recall: 0.9387 - val\_f1\_score: 0.9388

Epoch 8/15

711/711 [==============================] - 16s 22ms/step - loss: 0.1137 - accuracy: 0.9582 - precision: 0.9583 - recall: 0.9582 - f1\_score: 0.9582 - val\_loss: 0.1816 - val\_accuracy: 0.9346 - val\_precision: 0.9346 - val\_recall: 0.9346 - val\_f1\_score: 0.9346

Epoch 9/15

711/711 [==============================] - 15s 22ms/step - loss: 0.1115 - accuracy: 0.9593 - precision: 0.9594 - recall: 0.9593 - f1\_score: 0.9593 - val\_loss: 0.1337 - val\_accuracy: 0.9519 - val\_precision: 0.9519 - val\_recall: 0.9518 - val\_f1\_score: 0.9519

Epoch 10/15

711/711 [==============================] - 15s 22ms/step - loss: 0.1120 - accuracy: 0.9581 - precision: 0.9582 - recall: 0.9581 - f1\_score: 0.9581 - val\_loss: 0.0771 - val\_accuracy: 0.9701 - val\_precision: 0.9701 - val\_recall: 0.9701 - val\_f1\_score: 0.9701

Epoch 11/15

711/711 [==============================] - 15s 22ms/step - loss: 0.1044 - accuracy: 0.9615 - precision: 0.9616 - recall: 0.9615 - f1\_score: 0.9615 - val\_loss: 0.0761 - val\_accuracy: 0.9704 - val\_precision: 0.9705 - val\_recall: 0.9704 - val\_f1\_score: 0.9704

Epoch 12/15

711/711 [==============================] - 16s 22ms/step - loss: 0.1042 - accuracy: 0.9616 - precision: 0.9617 - recall: 0.9616 - f1\_score: 0.9616 - val\_loss: 0.0766 - val\_accuracy: 0.9702 - val\_precision: 0.9702 - val\_recall: 0.9702 - val\_f1\_score: 0.9702

Epoch 13/15

711/711 [==============================] - 24s 34ms/step - loss: 0.1041 - accuracy: 0.9618 - precision: 0.9619 - recall: 0.9618 - f1\_score: 0.9618 - val\_loss: 0.0762 - val\_accuracy: 0.9703 - val\_precision: 0.9703 - val\_recall: 0.9702 - val\_f1\_score: 0.9703

Epoch 14/15

711/711 [==============================] - 23s 32ms/step - loss: 0.1041 - accuracy: 0.9619 - precision: 0.9620 - recall: 0.9619 - f1\_score: 0.9619 - val\_loss: 0.0768 - val\_accuracy: 0.9701 - val\_precision: 0.9701 - val\_recall: 0.9700 - val\_f1\_score: 0.9701

Epoch 15/15

711/711 [==============================] - 15s 22ms/step - loss: 0.1042 - accuracy: 0.9616 - precision: 0.9617 - recall: 0.9615 - f1\_score: 0.9616 - val\_loss: 0.0753 - val\_accuracy: 0.9704 - val\_precision: 0.9704 - val\_recall: 0.9704 - val\_f1\_score: 0.9704

runfile('C:/Users/renat/Desktop/Deep-Channel-master/Deep-Channel-master/predictor3.py', wdir='C:/Users/renat/Desktop/Deep-Channel-master/Deep-Channel-master')

Reloaded modules: tmpm3ythl0f, tmp3b70xk2c, tmpqz22vv40, tmpfied6f2o

5.0

Model: "sequential"

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Layer (type) Output Shape Param #

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time\_distributed (TimeDistri (None, None, 1, 64) 128

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time\_distributed\_1 (TimeDist (None, None, 1, 64) 0

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time\_distributed\_2 (TimeDist (None, None, 64) 0

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lstm (LSTM) (None, None, 256) 328704

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batch\_normalization (BatchNo (None, None, 256) 1024

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dropout (Dropout) (None, None, 256) 0

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lstm\_1 (LSTM) (None, None, 256) 525312

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batch\_normalization\_1 (Batch (None, None, 256) 1024

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dropout\_1 (Dropout) (None, None, 256) 0

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lstm\_2 (LSTM) (None, 256) 525312

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batch\_normalization\_2 (Batch (None, 256) 1024

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dropout\_2 (Dropout) (None, 256) 0

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dense (Dense) (None, 6) 1542

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activation (Activation) (None, 6) 0

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Total params: 1,384,070

Trainable params: 1,382,534

Non-trainable params: 1,536

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391/391 [==============================] - 2s 5ms/step

[5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5]

[5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5]

outfinaltest747\_SKM.csv

outfinaltest747.csv

classification report of DC:

precision recall f1-score support

0 0.94 0.96 0.95 256

1 0.97 0.95 0.96 2996

2 0.96 0.97 0.97 12784

3 0.97 0.97 0.97 30043

4 0.95 0.98 0.97 36770

5 0.99 0.93 0.96 17150

accuracy 0.97 99999

macro avg 0.97 0.96 0.96 99999

weighted avg 0.97 0.97 0.97 99999

classification report of QuB SKM:

precision recall f1-score support

0 1.00 0.57 0.72 256

1 0.95 0.81 0.88 2996

2 0.95 0.92 0.93 12784

3 0.96 0.96 0.96 30043

4 0.96 0.98 0.97 36770

5 0.98 0.98 0.98 17150

accuracy 0.96 99999

macro avg 0.97 0.87 0.91 99999

weighted avg 0.96 0.96 0.96 99999

classification report of QuB half-amp:

precision recall f1-score support

0 1.00 0.88 0.93 256

1 0.98 0.90 0.94 2996

2 0.97 0.93 0.95 12784

3 0.96 0.96 0.96 30043

4 0.96 0.97 0.97 36770

5 0.95 0.99 0.97 17150

accuracy 0.96 99999

macro avg 0.97 0.94 0.95 99999

weighted avg 0.96 0.96 0.96 99999

runfile('C:/Users/renat/Desktop/Deep-Channel-master/Deep-Channel-master/deepchannel\_train.py', wdir='C:/Users/renat/Desktop/Deep-Channel-master/Deep-Channel-master')

training set = 79872

test set = 19968

total length = 99840

training set= 138752

test set = 34816

total length 173568

C:\Users\renat\Anaconda3\envs\NeuronENv2Python36\lib\site-packages\tensorflow\python\keras\optimizer\_v2\optimizer\_v2.py:375: UserWarning: The `lr` argument is deprecated, use `learning\_rate` instead.

"The `lr` argument is deprecated, use `learning\_rate` instead.")

Epoch 1/15

542/542 [==============================] - ETA: 0s - loss: 0.1098 - accuracy: 0.9605 - precision\_1: 0.9650 - recall\_1: 0.9562 - f1\_score: 0.9605 C:\Users\renat\Anaconda3\envs\NeuronENv2Python36\lib\site-packages\tensorflow\python\keras\metrics.py:257: UserWarning: Metric F1Score implements a `reset\_states()` method; rename it to `reset\_state()` (without the final "s"). The name `reset\_states()` has been deprecated to improve API consistency.

'consistency.' % (self.\_\_class\_\_.\_\_name\_\_,))

542/542 [==============================] - 12s 19ms/step - loss: 0.1098 - accuracy: 0.9605 - precision\_1: 0.9650 - recall\_1: 0.9562 - f1\_score: 0.9605 - val\_loss: 1.4901 - val\_accuracy: 0.4476 - val\_precision\_1: 0.4385 - val\_recall\_1: 0.4141 - val\_f1\_score: 0.4476

Epoch 2/15

542/542 [==============================] - 10s 19ms/step - loss: 0.0813 - accuracy: 0.9704 - precision\_1: 0.9704 - recall\_1: 0.9703 - f1\_score: 0.9704 - val\_loss: 0.0646 - val\_accuracy: 0.9754 - val\_precision\_1: 0.9755 - val\_recall\_1: 0.9754 - val\_f1\_score: 0.9754

Epoch 3/15

542/542 [==============================] - 11s 20ms/step - loss: 0.0795 - accuracy: 0.9712 - precision\_1: 0.9712 - recall\_1: 0.9711 - f1\_score: 0.9712 - val\_loss: 0.0644 - val\_accuracy: 0.9759 - val\_precision\_1: 0.9759 - val\_recall\_1: 0.9759 - val\_f1\_score: 0.9759

Epoch 4/15

542/542 [==============================] - 11s 21ms/step - loss: 0.0773 - accuracy: 0.9717 - precision\_1: 0.9718 - recall\_1: 0.9716 - f1\_score: 0.9717 - val\_loss: 0.0603 - val\_accuracy: 0.9774 - val\_precision\_1: 0.9774 - val\_recall\_1: 0.9774 - val\_f1\_score: 0.9774

Epoch 5/15

542/542 [==============================] - 11s 21ms/step - loss: 0.0764 - accuracy: 0.9724 - precision\_1: 0.9724 - recall\_1: 0.9724 - f1\_score: 0.9724 - val\_loss: 0.0575 - val\_accuracy: 0.9786 - val\_precision\_1: 0.9786 - val\_recall\_1: 0.9786 - val\_f1\_score: 0.9786

Epoch 6/15

542/542 [==============================] - 11s 20ms/step - loss: 0.0764 - accuracy: 0.9721 - precision\_1: 0.9722 - recall\_1: 0.9721 - f1\_score: 0.9721 - val\_loss: 0.0595 - val\_accuracy: 0.9778 - val\_precision\_1: 0.9779 - val\_recall\_1: 0.9778 - val\_f1\_score: 0.9778

Epoch 7/15

542/542 [==============================] - 12s 21ms/step - loss: 0.0756 - accuracy: 0.9725 - precision\_1: 0.9725 - recall\_1: 0.9724 - f1\_score: 0.9725 - val\_loss: 0.0646 - val\_accuracy: 0.9754 - val\_precision\_1: 0.9754 - val\_recall\_1: 0.9754 - val\_f1\_score: 0.9754

Epoch 8/15

542/542 [==============================] - 11s 21ms/step - loss: 0.0749 - accuracy: 0.9729 - precision\_1: 0.9729 - recall\_1: 0.9728 - f1\_score: 0.9729 - val\_loss: 0.0613 - val\_accuracy: 0.9769 - val\_precision\_1: 0.9769 - val\_recall\_1: 0.9768 - val\_f1\_score: 0.9769

Epoch 9/15

542/542 [==============================] - 11s 21ms/step - loss: 0.0751 - accuracy: 0.9727 - precision\_1: 0.9728 - recall\_1: 0.9727 - f1\_score: 0.9727 - val\_loss: 0.0701 - val\_accuracy: 0.9737 - val\_precision\_1: 0.9737 - val\_recall\_1: 0.9736 - val\_f1\_score: 0.9737

Epoch 10/15

542/542 [==============================] - 11s 21ms/step - loss: 0.0740 - accuracy: 0.9729 - precision\_1: 0.9729 - recall\_1: 0.9729 - f1\_score: 0.9729 - val\_loss: 0.0577 - val\_accuracy: 0.9786 - val\_precision\_1: 0.9787 - val\_recall\_1: 0.9786 - val\_f1\_score: 0.9786

Epoch 11/15

542/542 [==============================] - 11s 21ms/step - loss: 0.0736 - accuracy: 0.9734 - precision\_1: 0.9735 - recall\_1: 0.9734 - f1\_score: 0.9734 - val\_loss: 0.0578 - val\_accuracy: 0.9789 - val\_precision\_1: 0.9789 - val\_recall\_1: 0.9789 - val\_f1\_score: 0.9789

Epoch 12/15

542/542 [==============================] - 11s 21ms/step - loss: 0.0724 - accuracy: 0.9735 - precision\_1: 0.9736 - recall\_1: 0.9734 - f1\_score: 0.9735 - val\_loss: 0.0579 - val\_accuracy: 0.9788 - val\_precision\_1: 0.9788 - val\_recall\_1: 0.9787 - val\_f1\_score: 0.9788

Epoch 13/15

542/542 [==============================] - 11s 21ms/step - loss: 0.0735 - accuracy: 0.9728 - precision\_1: 0.9728 - recall\_1: 0.9728 - f1\_score: 0.9728 - val\_loss: 0.0580 - val\_accuracy: 0.9786 - val\_precision\_1: 0.9786 - val\_recall\_1: 0.9786 - val\_f1\_score: 0.9786

Epoch 14/15

542/542 [==============================] - 11s 21ms/step - loss: 0.0727 - accuracy: 0.9733 - precision\_1: 0.9733 - recall\_1: 0.9733 - f1\_score: 0.9733 - val\_loss: 0.0579 - val\_accuracy: 0.9787 - val\_precision\_1: 0.9787 - val\_recall\_1: 0.9787 - val\_f1\_score: 0.9787

Epoch 15/15

542/542 [==============================] - 11s 21ms/step - loss: 0.0727 - accuracy: 0.9738 - precision\_1: 0.9738 - recall\_1: 0.9738 - f1\_score: 0.9738 - val\_loss: 0.0580 - val\_accuracy: 0.9786 - val\_precision\_1: 0.9786 - val\_recall\_1: 0.9786 - val\_f1\_score: 0.9786

runfile('C:/Users/renat/Desktop/Deep-Channel-master/Deep-Channel-master/predictor3.py', wdir='C:/Users/renat/Desktop/Deep-Channel-master/Deep-Channel-master')

5.0

Model: "sequential\_1"

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Layer (type) Output Shape Param #

=================================================================

time\_distributed\_3 (TimeDist (None, None, 1, 64) 128

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time\_distributed\_4 (TimeDist (None, None, 1, 64) 0

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time\_distributed\_5 (TimeDist (None, None, 64) 0

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lstm\_3 (LSTM) (None, None, 256) 328704

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batch\_normalization\_3 (Batch (None, None, 256) 1024

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dropout\_3 (Dropout) (None, None, 256) 0

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lstm\_4 (LSTM) (None, None, 256) 525312

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batch\_normalization\_4 (Batch (None, None, 256) 1024

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

dropout\_4 (Dropout) (None, None, 256) 0

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lstm\_5 (LSTM) (None, 256) 525312

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batch\_normalization\_5 (Batch (None, 256) 1024

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dropout\_5 (Dropout) (None, 256) 0

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dense\_1 (Dense) (None, 4) 1028

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activation\_1 (Activation) (None, 4) 0

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Total params: 1,383,556

Trainable params: 1,382,020

Non-trainable params: 1,536

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391/391 [==============================] - 2s 6ms/step

[5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5]

[3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3]

outfinaltest747\_SKM.csv

outfinaltest747.csv

classification report of DC:

precision recall f1-score support

0 0.19 1.00 0.32 256

1 0.13 0.64 0.22 2996

2 0.01 0.03 0.01 12784

3 0.00 0.00 0.00 30043

4 0.00 0.00 0.00 36770

5 0.00 0.00 0.00 17150

accuracy 0.03 99999

macro avg 0.06 0.28 0.09 99999

weighted avg 0.01 0.03 0.01 99999

classification report of QuB SKM:

precision recall f1-score support

0 1.00 0.57 0.72 256

1 0.95 0.81 0.88 2996

2 0.95 0.92 0.93 12784

3 0.96 0.96 0.96 30043

4 0.96 0.98 0.97 36770

5 0.98 0.98 0.98 17150

accuracy 0.96 99999

macro avg 0.97 0.87 0.91 99999

weighted avg 0.96 0.96 0.96 99999

classification report of QuB half-amp:

C:\Users\renat\Anaconda3\envs\NeuronENv2Python36\lib\site-packages\sklearn\metrics\\_classification.py:1248: UndefinedMetricWarning: Precision and F-score are ill-defined and being set to 0.0 in labels with no predicted samples. Use `zero\_division` parameter to control this behavior.

\_warn\_prf(average, modifier, msg\_start, len(result))

C:\Users\renat\Anaconda3\envs\NeuronENv2Python36\lib\site-packages\sklearn\metrics\\_classification.py:1248: UndefinedMetricWarning: Precision and F-score are ill-defined and being set to 0.0 in labels with no predicted samples. Use `zero\_division` parameter to control this behavior.

\_warn\_prf(average, modifier, msg\_start, len(result))

C:\Users\renat\Anaconda3\envs\NeuronENv2Python36\lib\site-packages\sklearn\metrics\\_classification.py:1248: UndefinedMetricWarning: Precision and F-score are ill-defined and being set to 0.0 in labels with no predicted samples. Use `zero\_division` parameter to control this behavior.

\_warn\_prf(average, modifier, msg\_start, len(result))

precision recall f1-score support

0 1.00 0.88 0.93 256

1 0.98 0.90 0.94 2996

2 0.97 0.93 0.95 12784

3 0.96 0.96 0.96 30043

4 0.96 0.97 0.97 36770

5 0.95 0.99 0.97 17150

accuracy 0.96 99999

macro avg 0.97 0.94 0.95 99999

weighted avg 0.96 0.96 0.96 99999

runfile('C:/Users/renat/Desktop/Deep-Channel-master/Deep-Channel-master/deepchannel\_train.py', wdir='C:/Users/renat/Desktop/Deep-Channel-master/Deep-Channel-master')

training set = 79872

test set = 19968

total length = 99840

training set= 138752

test set = 34816

total length 173568

C:\Users\renat\Anaconda3\envs\NeuronENv2Python36\lib\site-packages\tensorflow\python\keras\optimizer\_v2\optimizer\_v2.py:375: UserWarning: The `lr` argument is deprecated, use `learning\_rate` instead.

"The `lr` argument is deprecated, use `learning\_rate` instead.")

Epoch 1/50

540/542 [============================>.] - ETA: 0s - loss: 0.1134 - accuracy: 0.9600 - precision\_2: 0.9655 - recall\_2: 0.9539 - f1\_score: 0.9600 C:\Users\renat\Anaconda3\envs\NeuronENv2Python36\lib\site-packages\tensorflow\python\keras\metrics.py:257: UserWarning: Metric F1Score implements a `reset\_states()` method; rename it to `reset\_state()` (without the final "s"). The name `reset\_states()` has been deprecated to improve API consistency.

'consistency.' % (self.\_\_class\_\_.\_\_name\_\_,))

542/542 [==============================] - 13s 20ms/step - loss: 0.1135 - accuracy: 0.9599 - precision\_2: 0.9654 - recall\_2: 0.9539 - f1\_score: 0.9599 - val\_loss: 1.4258 - val\_accuracy: 0.4917 - val\_precision\_2: 0.4880 - val\_recall\_2: 0.4802 - val\_f1\_score: 0.4917

Epoch 2/50

542/542 [==============================] - 11s 21ms/step - loss: 0.0822 - accuracy: 0.9697 - precision\_2: 0.9699 - recall\_2: 0.9696 - f1\_score: 0.9697 - val\_loss: 0.0570 - val\_accuracy: 0.9800 - val\_precision\_2: 0.9800 - val\_recall\_2: 0.9799 - val\_f1\_score: 0.9800

Epoch 3/50

542/542 [==============================] - 12s 21ms/step - loss: 0.0794 - accuracy: 0.9706 - precision\_2: 0.9707 - recall\_2: 0.9705 - f1\_score: 0.9706 - val\_loss: 0.0599 - val\_accuracy: 0.9782 - val\_precision\_2: 0.9782 - val\_recall\_2: 0.9782 - val\_f1\_score: 0.9782

Epoch 4/50

542/542 [==============================] - 12s 21ms/step - loss: 0.0779 - accuracy: 0.9706 - precision\_2: 0.9707 - recall\_2: 0.9705 - f1\_score: 0.9706 - val\_loss: 0.0637 - val\_accuracy: 0.9776 - val\_precision\_2: 0.9776 - val\_recall\_2: 0.9776 - val\_f1\_score: 0.9776

Epoch 5/50

542/542 [==============================] - 12s 21ms/step - loss: 0.0770 - accuracy: 0.9714 - precision\_2: 0.9715 - recall\_2: 0.9714 - f1\_score: 0.9714 - val\_loss: 0.0645 - val\_accuracy: 0.9766 - val\_precision\_2: 0.9766 - val\_recall\_2: 0.9765 - val\_f1\_score: 0.9766

Epoch 6/50

542/542 [==============================] - 12s 23ms/step - loss: 0.0764 - accuracy: 0.9717 - precision\_2: 0.9718 - recall\_2: 0.9717 - f1\_score: 0.9717 - val\_loss: 0.0657 - val\_accuracy: 0.9763 - val\_precision\_2: 0.9764 - val\_recall\_2: 0.9763 - val\_f1\_score: 0.9763

Epoch 7/50

542/542 [==============================] - 12s 23ms/step - loss: 0.0758 - accuracy: 0.9720 - precision\_2: 0.9720 - recall\_2: 0.9719 - f1\_score: 0.9720 - val\_loss: 0.0783 - val\_accuracy: 0.9702 - val\_precision\_2: 0.9702 - val\_recall\_2: 0.9701 - val\_f1\_score: 0.9702

Epoch 8/50

542/542 [==============================] - 12s 23ms/step - loss: 0.0752 - accuracy: 0.9725 - precision\_2: 0.9725 - recall\_2: 0.9724 - f1\_score: 0.9725 - val\_loss: 0.0781 - val\_accuracy: 0.9696 - val\_precision\_2: 0.9696 - val\_recall\_2: 0.9696 - val\_f1\_score: 0.9696

Epoch 9/50

542/542 [==============================] - 12s 22ms/step - loss: 0.0745 - accuracy: 0.9726 - precision\_2: 0.9726 - recall\_2: 0.9725 - f1\_score: 0.9726 - val\_loss: 0.0708 - val\_accuracy: 0.9725 - val\_precision\_2: 0.9725 - val\_recall\_2: 0.9725 - val\_f1\_score: 0.9725

Epoch 10/50

542/542 [==============================] - 12s 23ms/step - loss: 0.0734 - accuracy: 0.9730 - precision\_2: 0.9730 - recall\_2: 0.9730 - f1\_score: 0.9730 - val\_loss: 0.0615 - val\_accuracy: 0.9781 - val\_precision\_2: 0.9781 - val\_recall\_2: 0.9781 - val\_f1\_score: 0.9781

Epoch 11/50

542/542 [==============================] - 12s 22ms/step - loss: 0.0732 - accuracy: 0.9728 - precision\_2: 0.9729 - recall\_2: 0.9728 - f1\_score: 0.9728 - val\_loss: 0.0611 - val\_accuracy: 0.9783 - val\_precision\_2: 0.9784 - val\_recall\_2: 0.9783 - val\_f1\_score: 0.9783

Epoch 12/50

542/542 [==============================] - 12s 23ms/step - loss: 0.0735 - accuracy: 0.9731 - precision\_2: 0.9732 - recall\_2: 0.9731 - f1\_score: 0.9731 - val\_loss: 0.0610 - val\_accuracy: 0.9785 - val\_precision\_2: 0.9785 - val\_recall\_2: 0.9785 - val\_f1\_score: 0.9785

Epoch 13/50

542/542 [==============================] - 13s 23ms/step - loss: 0.0732 - accuracy: 0.9730 - precision\_2: 0.9730 - recall\_2: 0.9729 - f1\_score: 0.9730 - val\_loss: 0.0609 - val\_accuracy: 0.9785 - val\_precision\_2: 0.9785 - val\_recall\_2: 0.9785 - val\_f1\_score: 0.9785

Epoch 14/50

542/542 [==============================] - 13s 24ms/step - loss: 0.0729 - accuracy: 0.9730 - precision\_2: 0.9731 - recall\_2: 0.9730 - f1\_score: 0.9730 - val\_loss: 0.0608 - val\_accuracy: 0.9783 - val\_precision\_2: 0.9783 - val\_recall\_2: 0.9783 - val\_f1\_score: 0.9783

Epoch 15/50

542/542 [==============================] - 13s 24ms/step - loss: 0.0728 - accuracy: 0.9729 - precision\_2: 0.9729 - recall\_2: 0.9729 - f1\_score: 0.9729 - val\_loss: 0.0607 - val\_accuracy: 0.9783 - val\_precision\_2: 0.9783 - val\_recall\_2: 0.9783 - val\_f1\_score: 0.9783

Epoch 16/50

542/542 [==============================] - 13s 24ms/step - loss: 0.0726 - accuracy: 0.9733 - precision\_2: 0.9733 - recall\_2: 0.9732 - f1\_score: 0.9733 - val\_loss: 0.0606 - val\_accuracy: 0.9784 - val\_precision\_2: 0.9785 - val\_recall\_2: 0.9784 - val\_f1\_score: 0.9784

Epoch 17/50

542/542 [==============================] - 13s 24ms/step - loss: 0.0732 - accuracy: 0.9731 - precision\_2: 0.9732 - recall\_2: 0.9730 - f1\_score: 0.9731 - val\_loss: 0.0609 - val\_accuracy: 0.9783 - val\_precision\_2: 0.9784 - val\_recall\_2: 0.9783 - val\_f1\_score: 0.9783

Epoch 18/50

542/542 [==============================] - 13s 23ms/step - loss: 0.0727 - accuracy: 0.9725 - precision\_2: 0.9726 - recall\_2: 0.9725 - f1\_score: 0.9725 - val\_loss: 0.0609 - val\_accuracy: 0.9782 - val\_precision\_2: 0.9783 - val\_recall\_2: 0.9782 - val\_f1\_score: 0.9782

Epoch 19/50

542/542 [==============================] - 13s 24ms/step - loss: 0.0721 - accuracy: 0.9732 - precision\_2: 0.9733 - recall\_2: 0.9732 - f1\_score: 0.9732 - val\_loss: 0.0611 - val\_accuracy: 0.9782 - val\_precision\_2: 0.9782 - val\_recall\_2: 0.9782 - val\_f1\_score: 0.9782

Epoch 20/50

542/542 [==============================] - 13s 24ms/step - loss: 0.0728 - accuracy: 0.9731 - precision\_2: 0.9731 - recall\_2: 0.9731 - f1\_score: 0.9731 - val\_loss: 0.0609 - val\_accuracy: 0.9785 - val\_precision\_2: 0.9786 - val\_recall\_2: 0.9785 - val\_f1\_score: 0.9785

Epoch 21/50

542/542 [==============================] - 13s 24ms/step - loss: 0.0729 - accuracy: 0.9731 - precision\_2: 0.9731 - recall\_2: 0.9731 - f1\_score: 0.9731 - val\_loss: 0.0609 - val\_accuracy: 0.9785 - val\_precision\_2: 0.9785 - val\_recall\_2: 0.9784 - val\_f1\_score: 0.9785

Epoch 22/50

542/542 [==============================] - 13s 24ms/step - loss: 0.0729 - accuracy: 0.9732 - precision\_2: 0.9732 - recall\_2: 0.9731 - f1\_score: 0.9732 - val\_loss: 0.0610 - val\_accuracy: 0.9785 - val\_precision\_2: 0.9785 - val\_recall\_2: 0.9784 - val\_f1\_score: 0.9785

Epoch 23/50

542/542 [==============================] - 13s 24ms/step - loss: 0.0725 - accuracy: 0.9734 - precision\_2: 0.9735 - recall\_2: 0.9734 - f1\_score: 0.9734 - val\_loss: 0.0610 - val\_accuracy: 0.9785 - val\_precision\_2: 0.9785 - val\_recall\_2: 0.9785 - val\_f1\_score: 0.9785

Epoch 24/50

542/542 [==============================] - 13s 24ms/step - loss: 0.0735 - accuracy: 0.9731 - precision\_2: 0.9731 - recall\_2: 0.9730 - f1\_score: 0.9731 - val\_loss: 0.0611 - val\_accuracy: 0.9784 - val\_precision\_2: 0.9784 - val\_recall\_2: 0.9784 - val\_f1\_score: 0.9784

Epoch 25/50

542/542 [==============================] - 13s 24ms/step - loss: 0.0729 - accuracy: 0.9734 - precision\_2: 0.9735 - recall\_2: 0.9734 - f1\_score: 0.9734 - val\_loss: 0.0610 - val\_accuracy: 0.9785 - val\_precision\_2: 0.9785 - val\_recall\_2: 0.9785 - val\_f1\_score: 0.9785

Epoch 26/50

542/542 [==============================] - 14s 25ms/step - loss: 0.0729 - accuracy: 0.9729 - precision\_2: 0.9730 - recall\_2: 0.9729 - f1\_score: 0.9729 - val\_loss: 0.0609 - val\_accuracy: 0.9785 - val\_precision\_2: 0.9785 - val\_recall\_2: 0.9785 - val\_f1\_score: 0.9785

Epoch 27/50

542/542 [==============================] - 13s 24ms/step - loss: 0.0728 - accuracy: 0.9728 - precision\_2: 0.9729 - recall\_2: 0.9728 - f1\_score: 0.9728 - val\_loss: 0.0611 - val\_accuracy: 0.9784 - val\_precision\_2: 0.9784 - val\_recall\_2: 0.9784 - val\_f1\_score: 0.9784

Epoch 28/50

542/542 [==============================] - 13s 24ms/step - loss: 0.0731 - accuracy: 0.9729 - precision\_2: 0.9730 - recall\_2: 0.9729 - f1\_score: 0.9729 - val\_loss: 0.0609 - val\_accuracy: 0.9785 - val\_precision\_2: 0.9785 - val\_recall\_2: 0.9785 - val\_f1\_score: 0.9785

Epoch 29/50

542/542 [==============================] - 13s 24ms/step - loss: 0.0727 - accuracy: 0.9733 - precision\_2: 0.9733 - recall\_2: 0.9732 - f1\_score: 0.9733 - val\_loss: 0.0609 - val\_accuracy: 0.9785 - val\_precision\_2: 0.9786 - val\_recall\_2: 0.9785 - val\_f1\_score: 0.9785

Epoch 30/50

542/542 [==============================] - 13s 24ms/step - loss: 0.0726 - accuracy: 0.9728 - precision\_2: 0.9728 - recall\_2: 0.9727 - f1\_score: 0.9728 - val\_loss: 0.0610 - val\_accuracy: 0.9785 - val\_precision\_2: 0.9785 - val\_recall\_2: 0.9785 - val\_f1\_score: 0.9785

Epoch 31/50

542/542 [==============================] - 13s 24ms/step - loss: 0.0726 - accuracy: 0.9731 - precision\_2: 0.9731 - recall\_2: 0.9730 - f1\_score: 0.9731 - val\_loss: 0.0609 - val\_accuracy: 0.9785 - val\_precision\_2: 0.9785 - val\_recall\_2: 0.9785 - val\_f1\_score: 0.9785

Epoch 32/50

542/542 [==============================] - 13s 24ms/step - loss: 0.0723 - accuracy: 0.9733 - precision\_2: 0.9734 - recall\_2: 0.9733 - f1\_score: 0.9733 - val\_loss: 0.0609 - val\_accuracy: 0.9785 - val\_precision\_2: 0.9785 - val\_recall\_2: 0.9785 - val\_f1\_score: 0.9785

Epoch 33/50

542/542 [==============================] - 14s 25ms/step - loss: 0.0728 - accuracy: 0.9733 - precision\_2: 0.9734 - recall\_2: 0.9733 - f1\_score: 0.9733 - val\_loss: 0.0611 - val\_accuracy: 0.9785 - val\_precision\_2: 0.9785 - val\_recall\_2: 0.9784 - val\_f1\_score: 0.9785

Epoch 34/50

542/542 [==============================] - 13s 24ms/step - loss: 0.0724 - accuracy: 0.9733 - precision\_2: 0.9734 - recall\_2: 0.9733 - f1\_score: 0.9733 - val\_loss: 0.0610 - val\_accuracy: 0.9785 - val\_precision\_2: 0.9785 - val\_recall\_2: 0.9785 - val\_f1\_score: 0.9785

Epoch 35/50

542/542 [==============================] - 13s 24ms/step - loss: 0.0728 - accuracy: 0.9734 - precision\_2: 0.9735 - recall\_2: 0.9733 - f1\_score: 0.9734 - val\_loss: 0.0610 - val\_accuracy: 0.9785 - val\_precision\_2: 0.9785 - val\_recall\_2: 0.9785 - val\_f1\_score: 0.9785

Epoch 36/50

542/542 [==============================] - 13s 24ms/step - loss: 0.0726 - accuracy: 0.9728 - precision\_2: 0.9729 - recall\_2: 0.9728 - f1\_score: 0.9728 - val\_loss: 0.0610 - val\_accuracy: 0.9786 - val\_precision\_2: 0.9786 - val\_recall\_2: 0.9786 - val\_f1\_score: 0.9786

Epoch 37/50

542/542 [==============================] - 13s 24ms/step - loss: 0.0730 - accuracy: 0.9731 - precision\_2: 0.9732 - recall\_2: 0.9730 - f1\_score: 0.9731 - val\_loss: 0.0610 - val\_accuracy: 0.9784 - val\_precision\_2: 0.9784 - val\_recall\_2: 0.9784 - val\_f1\_score: 0.9784

Epoch 38/50

542/542 [==============================] - 13s 24ms/step - loss: 0.0736 - accuracy: 0.9731 - precision\_2: 0.9731 - recall\_2: 0.9730 - f1\_score: 0.9731 - val\_loss: 0.0610 - val\_accuracy: 0.9784 - val\_precision\_2: 0.9785 - val\_recall\_2: 0.9784 - val\_f1\_score: 0.9784

Epoch 39/50

542/542 [==============================] - 13s 24ms/step - loss: 0.0725 - accuracy: 0.9731 - precision\_2: 0.9732 - recall\_2: 0.9731 - f1\_score: 0.9731 - val\_loss: 0.0608 - val\_accuracy: 0.9785 - val\_precision\_2: 0.9785 - val\_recall\_2: 0.9785 - val\_f1\_score: 0.9785

Epoch 40/50

542/542 [==============================] - 13s 24ms/step - loss: 0.0730 - accuracy: 0.9733 - precision\_2: 0.9733 - recall\_2: 0.9732 - f1\_score: 0.9733 - val\_loss: 0.0610 - val\_accuracy: 0.9785 - val\_precision\_2: 0.9785 - val\_recall\_2: 0.9785 - val\_f1\_score: 0.9785

Epoch 41/50

542/542 [==============================] - 13s 24ms/step - loss: 0.0727 - accuracy: 0.9733 - precision\_2: 0.9734 - recall\_2: 0.9733 - f1\_score: 0.9733 - val\_loss: 0.0609 - val\_accuracy: 0.9785 - val\_precision\_2: 0.9785 - val\_recall\_2: 0.9785 - val\_f1\_score: 0.9785

Epoch 42/50

542/542 [==============================] - 13s 24ms/step - loss: 0.0730 - accuracy: 0.9729 - precision\_2: 0.9729 - recall\_2: 0.9729 - f1\_score: 0.9729 - val\_loss: 0.0610 - val\_accuracy: 0.9786 - val\_precision\_2: 0.9786 - val\_recall\_2: 0.9785 - val\_f1\_score: 0.9786

Epoch 43/50

542/542 [==============================] - 13s 24ms/step - loss: 0.0730 - accuracy: 0.9729 - precision\_2: 0.9730 - recall\_2: 0.9728 - f1\_score: 0.9729 - val\_loss: 0.0610 - val\_accuracy: 0.9785 - val\_precision\_2: 0.9785 - val\_recall\_2: 0.9785 - val\_f1\_score: 0.9785

Epoch 44/50

542/542 [==============================] - 13s 24ms/step - loss: 0.0731 - accuracy: 0.9729 - precision\_2: 0.9729 - recall\_2: 0.9728 - f1\_score: 0.9729 - val\_loss: 0.0610 - val\_accuracy: 0.9785 - val\_precision\_2: 0.9785 - val\_recall\_2: 0.9785 - val\_f1\_score: 0.9785

Epoch 45/50

542/542 [==============================] - 13s 24ms/step - loss: 0.0728 - accuracy: 0.9729 - precision\_2: 0.9729 - recall\_2: 0.9728 - f1\_score: 0.9729 - val\_loss: 0.0608 - val\_accuracy: 0.9786 - val\_precision\_2: 0.9786 - val\_recall\_2: 0.9786 - val\_f1\_score: 0.9786

Epoch 46/50

542/542 [==============================] - 13s 24ms/step - loss: 0.0733 - accuracy: 0.9728 - precision\_2: 0.9728 - recall\_2: 0.9727 - f1\_score: 0.9728 - val\_loss: 0.0609 - val\_accuracy: 0.9785 - val\_precision\_2: 0.9786 - val\_recall\_2: 0.9785 - val\_f1\_score: 0.9785

Epoch 47/50

542/542 [==============================] - 21s 39ms/step - loss: 0.0720 - accuracy: 0.9733 - precision\_2: 0.9733 - recall\_2: 0.9732 - f1\_score: 0.9733 - val\_loss: 0.0609 - val\_accuracy: 0.9786 - val\_precision\_2: 0.9786 - val\_recall\_2: 0.9786 - val\_f1\_score: 0.9786

Epoch 48/50

542/542 [==============================] - 25s 46ms/step - loss: 0.0728 - accuracy: 0.9729 - precision\_2: 0.9729 - recall\_2: 0.9728 - f1\_score: 0.9729 - val\_loss: 0.0609 - val\_accuracy: 0.9786 - val\_precision\_2: 0.9786 - val\_recall\_2: 0.9785 - val\_f1\_score: 0.9786

Epoch 49/50

542/542 [==============================] - 20s 36ms/step - loss: 0.0737 - accuracy: 0.9729 - precision\_2: 0.9730 - recall\_2: 0.9729 - f1\_score: 0.9729 - val\_loss: 0.0609 - val\_accuracy: 0.9785 - val\_precision\_2: 0.9785 - val\_recall\_2: 0.9785 - val\_f1\_score: 0.9785

Epoch 50/50

542/542 [==============================] - 17s 32ms/step - loss: 0.0729 - accuracy: 0.9731 - precision\_2: 0.9732 - recall\_2: 0.9731 - f1\_score: 0.9731 - val\_loss: 0.0610 - val\_accuracy: 0.9785 - val\_precision\_2: 0.9785 - val\_recall\_2: 0.9784 - val\_f1\_score: 0.9785

runfile('C:/Users/renat/Desktop/Deep-Channel-master/Deep-Channel-master/predictor3.py', wdir='C:/Users/renat/Desktop/Deep-Channel-master/Deep-Channel-master')

5.0

Model: "sequential\_2"

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Layer (type) Output Shape Param #

=================================================================

time\_distributed\_6 (TimeDist (None, None, 1, 64) 128

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time\_distributed\_7 (TimeDist (None, None, 1, 64) 0

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time\_distributed\_8 (TimeDist (None, None, 64) 0

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lstm\_6 (LSTM) (None, None, 256) 328704

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batch\_normalization\_6 (Batch (None, None, 256) 1024

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dropout\_6 (Dropout) (None, None, 256) 0

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lstm\_7 (LSTM) (None, None, 256) 525312

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batch\_normalization\_7 (Batch (None, None, 256) 1024

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dropout\_7 (Dropout) (None, None, 256) 0

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lstm\_8 (LSTM) (None, 256) 525312

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batch\_normalization\_8 (Batch (None, 256) 1024

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dropout\_8 (Dropout) (None, 256) 0

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dense\_2 (Dense) (None, 4) 1028

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activation\_2 (Activation) (None, 4) 0

=================================================================

Total params: 1,383,556

Trainable params: 1,382,020

Non-trainable params: 1,536

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391/391 [==============================] - 2s 5ms/step

[5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5]

[3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3]

outfinaltest747\_SKM.csv

outfinaltest747.csv

classification report of DC:

precision recall f1-score support

0 0.21 1.00 0.35 256

1 0.14 0.68 0.23 2996

2 0.01 0.03 0.01 12784

3 0.00 0.00 0.00 30043

4 0.00 0.00 0.00 36770

5 0.00 0.00 0.00 17150

accuracy 0.03 99999

macro avg 0.06 0.29 0.10 99999

weighted avg 0.01 0.03 0.01 99999

classification report of QuB SKM:

precision recall f1-score support

0 1.00 0.57 0.72 256

1 0.95 0.81 0.88 2996

2 0.95 0.92 0.93 12784

3 0.96 0.96 0.96 30043

4 0.96 0.98 0.97 36770

5 0.98 0.98 0.98 17150

accuracy 0.96 99999

macro avg 0.97 0.87 0.91 99999

weighted avg 0.96 0.96 0.96 99999

classification report of QuB half-amp:

C:\Users\renat\Anaconda3\envs\NeuronENv2Python36\lib\site-packages\sklearn\metrics\\_classification.py:1248: UndefinedMetricWarning: Precision and F-score are ill-defined and being set to 0.0 in labels with no predicted samples. Use `zero\_division` parameter to control this behavior.

\_warn\_prf(average, modifier, msg\_start, len(result))

C:\Users\renat\Anaconda3\envs\NeuronENv2Python36\lib\site-packages\sklearn\metrics\\_classification.py:1248: UndefinedMetricWarning: Precision and F-score are ill-defined and being set to 0.0 in labels with no predicted samples. Use `zero\_division` parameter to control this behavior.

\_warn\_prf(average, modifier, msg\_start, len(result))

C:\Users\renat\Anaconda3\envs\NeuronENv2Python36\lib\site-packages\sklearn\metrics\\_classification.py:1248: UndefinedMetricWarning: Precision and F-score are ill-defined and being set to 0.0 in labels with no predicted samples. Use `zero\_division` parameter to control this behavior.

\_warn\_prf(average, modifier, msg\_start, len(result))

precision recall f1-score support

0 1.00 0.88 0.93 256

1 0.98 0.90 0.94 2996

2 0.97 0.93 0.95 12784

3 0.96 0.96 0.96 30043

4 0.96 0.97 0.97 36770

5 0.95 0.99 0.97 17150

accuracy 0.96 99999

macro avg 0.97 0.94 0.95 99999

weighted avg 0.96 0.96 0.96 99999