KNN

/home/huunoi/anaconda3/bin/python /home/huunoi/Projects/research/papers/SOM-KNN-IoT\_AD/main\_script.py

2022-08-03 19:07:04.021771: I tensorflow/core/util/util.cc:169] oneDNN custom operations are on. You may see slightly different numerical results due to floating-point round-off errors from different computation orders. To turn them off, set the environment variable `TF\_ENABLE\_ONEDNN\_OPTS=0`.

2022-08-03 19:07:04.035025: W tensorflow/stream\_executor/platform/default/dso\_loader.cc:64] Could not load dynamic library 'libcudart.so.11.0'; dlerror: libcudart.so.11.0: cannot open shared object file: No such file or directory

2022-08-03 19:07:04.035043: I tensorflow/stream\_executor/cuda/cudart\_stub.cc:29] Ignore above cudart dlerror if you do not have a GPU set up on your machine.

/home/huunoi/Projects/research/data/nbaiot

34683

(34683, 115) (34683,)

(69366, 115) (69366,)

(109860, 115) (109860,)

(210495, 115) (210495,)

(147346, 115) (147346,)

--------------Training and testing in the same device----------------

(69366, 115) (69366,)

------------Scale data-----------------

(69366, 115) (69366,)

X\_train\_scaled

[[ 3.29612709e-03 1.21268756e-01 0.00000000e+00 ... 9.73875109e-18

5.68714750e-30 1.94359005e-13]

[ 3.29612709e-03 1.16513119e-01 0.00000000e+00 ... 1.74196825e-17

-5.33030687e-34 0.00000000e+00]

[ 6.58594153e-03 1.21268756e-01 1.06290987e-17 ... 9.73875109e-18

1.68012462e-33 5.75224125e-17]

...

[ 3.29612758e-03 7.13345701e-02 1.54319329e-09 ... 4.85741148e-18

-1.04821934e-33 -7.19848165e-17]

[ 9.85861840e-03 1.21268756e-01 2.12581974e-17 ... 8.70984127e-18

-3.30077580e-36 0.00000000e+00]

[ 1.31838629e-02 1.21268756e-01 1.06290987e-17 ... 2.31624350e-16

1.06308770e-27 1.49859300e-12]]

---------Normalize data--------------

(69366, 115) (69366,)

--------------------Train SOM on normalized data--------------

---------------------------------Train SOM-------------------------------------

Number of feature: 115

The default values of som\_x and som\_y are None

Hyper-parameters optimization process. The algorithm used is rand.

Best: {'learning\_rate': 2.316053924782619, 'sigma': 7.583590140830046, 'x': 46.8493647032021}

---------SOM has been turned!-----------

Starting SOM Weights init

/home/huunoi/Projects/research/papers/SOM-KNN-IoT\_AD/utils/minisom.py:370: ComplexWarning: Casting complex values to real discards the imaginary part

self.\_weights[i, j] = c1 \* pc[pc\_order[0]] + c2 \* pc[pc\_order[1]]

Perform SOM (turned) train random

0.5

Total train time: 111.21019625663757

Shape: (109860, 115) (109860,)

----------------------Test is starting----------------------

Scale data

Shape: (109860, 115) (109860,)

Normalize data

Shape: (109860, 115) (109860,)

Testing

----------------------------------------------------------------------

SOM classification

precision recall f1-score support

1 0.986 0.997 0.991 14865

2 0.999 0.998 0.999 94995

accuracy 0.998 109860

macro avg 0.993 0.997 0.995 109860

weighted avg 0.998 0.998 0.998 109860

AUC score: 9.972801478903055e-01

-----------Testing SOM done!-------------

----------------------Test Done----------------------

Process finished with exit code 0

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RANDOM FOREST

/home/huunoi/anaconda3/bin/python /snap/pycharm-professional/297/plugins/python/helpers/pydev/pydevd.py --multiprocess --qt-support=auto --client 127.0.0.1 --port 46289 --file /home/huunoi/Projects/research/papers/SOM-KNN-IoT\_AD/main\_script.py

Connected to pydev debugger (build 222.3345.131)

2022-08-01 21:22:38.978457: I tensorflow/core/util/util.cc:169] oneDNN custom operations are on. You may see slightly different numerical results due to floating-point round-off errors from different computation orders. To turn them off, set the environment variable `TF\_ENABLE\_ONEDNN\_OPTS=0`.

2022-08-01 21:22:38.990948: W tensorflow/stream\_executor/platform/default/dso\_loader.cc:64] Could not load dynamic library 'libcudart.so.11.0'; dlerror: libcudart.so.11.0: cannot open shared object file: No such file or directory

2022-08-01 21:22:38.990960: I tensorflow/stream\_executor/cuda/cudart\_stub.cc:29] Ignore above cudart dlerror if you do not have a GPU set up on your machine.

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--------------Training and testing in the same device----------------

(69366, 115) (69366,)

------------Scale data-----------------

(69366, 115) (69366,)

X\_train\_scaled

[[ 3.29612709e-03 1.21268756e-01 0.00000000e+00 ... 9.73875109e-18

5.68714750e-30 1.94359005e-13]

[ 3.29612709e-03 1.16513119e-01 0.00000000e+00 ... 1.74196825e-17

-5.33030687e-34 0.00000000e+00]

[ 6.58594153e-03 1.21268756e-01 1.06290987e-17 ... 9.73875109e-18

1.68012462e-33 5.75224125e-17]

...

[ 3.29612758e-03 7.13345701e-02 1.54319329e-09 ... 4.85741148e-18

-1.04821934e-33 -7.19848165e-17]

[ 9.85861840e-03 1.21268756e-01 2.12581974e-17 ... 8.70984127e-18

-3.30077580e-36 0.00000000e+00]

[ 1.31838629e-02 1.21268756e-01 1.06290987e-17 ... 2.31624350e-16

1.06308770e-27 1.49859300e-12]]

---------Normalize data--------------

(69366, 115) (69366,)

--------------------Train SOM on normalized data--------------

---------------------------------Train SOM-------------------------------------

Number of feature: 115

The default values of som\_x and som\_y are None

Hyper-parameters optimization process. The algorithm used is rand.

Best: {'learning\_rate': 1.2522787377761757, 'sigma': 6.3795375832313255, 'x': 36.90089626009069}

---------SOM has been turned!-----------

Starting SOM Weights init

/home/huunoi/Projects/research/papers/SOM-KNN-IoT\_AD/utils/minisom.py:370: ComplexWarning: Casting complex values to real discards the imaginary part

self.\_weights[i, j] = c1 \* pc[pc\_order[0]] + c2 \* pc[pc\_order[1]]

Perform SOM (turned) train random

0.5

Total train time: 108.4180748462677

Shape: (109860, 115) (109860,)

----------------------Test is starting----------------------

Scale data

Shape: (109860, 115) (109860,)

Normalize data

Shape: (109860, 115) (109860,)

Testing

----------------------------------------------------------------------

SOM classification

precision recall f1-score support

1 0.985 0.994 0.990 14865

2 0.999 0.998 0.998 94995

accuracy 0.997 109860

macro avg 0.992 0.996 0.994 109860

weighted avg 0.997 0.997 0.997 109860

AUC score: 0.9959724525306951

-----------Testing SOM done!-------------

----------------------Test Done----------------------

Process finished with exit code 0

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SVM

/home/huunoi/anaconda3/bin/python /home/huunoi/Projects/research/papers/SOM-KNN-IoT\_AD/main\_script.py

2022-08-03 18:18:00.722222: I tensorflow/core/util/util.cc:169] oneDNN custom operations are on. You may see slightly different numerical results due to floating-point round-off errors from different computation orders. To turn them off, set the environment variable `TF\_ENABLE\_ONEDNN\_OPTS=0`.

2022-08-03 18:18:00.738080: W tensorflow/stream\_executor/platform/default/dso\_loader.cc:64] Could not load dynamic library 'libcudart.so.11.0'; dlerror: libcudart.so.11.0: cannot open shared object file: No such file or directory

2022-08-03 18:18:00.738092: I tensorflow/stream\_executor/cuda/cudart\_stub.cc:29] Ignore above cudart dlerror if you do not have a GPU set up on your machine.

/home/huunoi/Projects/research/data/nbaiot

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(34683, 115) (34683,)

(69366, 115) (69366,)

(109860, 115) (109860,)

(210495, 115) (210495,)

(147346, 115) (147346,)

--------------Training and testing in the same device----------------

(69366, 115) (69366,)

------------Scale data-----------------

(69366, 115) (69366,)

X\_train\_scaled

[[ 3.29612709e-03 1.21268756e-01 0.00000000e+00 ... 9.73875109e-18

5.68714750e-30 1.94359005e-13]

[ 3.29612709e-03 1.16513119e-01 0.00000000e+00 ... 1.74196825e-17

-5.33030687e-34 0.00000000e+00]

[ 6.58594153e-03 1.21268756e-01 1.06290987e-17 ... 9.73875109e-18

1.68012462e-33 5.75224125e-17]

...

[ 3.29612758e-03 7.13345701e-02 1.54319329e-09 ... 4.85741148e-18

-1.04821934e-33 -7.19848165e-17]

[ 9.85861840e-03 1.21268756e-01 2.12581974e-17 ... 8.70984127e-18

-3.30077580e-36 0.00000000e+00]

[ 1.31838629e-02 1.21268756e-01 1.06290987e-17 ... 2.31624350e-16

1.06308770e-27 1.49859300e-12]]

---------Normalize data--------------

(69366, 115) (69366,)

--------------------Train SOM on normalized data--------------

---------------------------------Train SOM-------------------------------------

Number of feature: 115

The default values of som\_x and som\_y are None

Hyper-parameters optimization process. The algorithm used is rand.

Best: {'learning\_rate': 2.563650740853597, 'sigma': 6.695088722294852, 'x': 21.395208088301626}

---------SOM has been turned!-----------

Starting SOM Weights init

Perform SOM (turned) train random

/home/huunoi/Projects/research/papers/SOM-KNN-IoT\_AD/utils/minisom.py:370: ComplexWarning: Casting complex values to real discards the imaginary part

self.\_weights[i, j] = c1 \* pc[pc\_order[0]] + c2 \* pc[pc\_order[1]]

0.5

Total train time: 95.8501124382019

Shape: (109860, 115) (109860,)

----------------------Test is starting----------------------

Scale data

Shape: (109860, 115) (109860,)

Normalize data

Shape: (109860, 115) (109860,)

Testing

----------------------------------------------------------------------

SOM classification

precision recall f1-score support

1 0.982 0.996 0.989 14865

2 0.999 0.997 0.998 94995

accuracy 0.997 109860

macro avg 0.990 0.997 0.993 109860

weighted avg 0.997 0.997 0.997 109860

AUC score: 9.965522376795124e-01

-----------Testing SOM done!-------------

----------------------Test Done----------------------

Process finished with exit code 0

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/home/huunoi/anaconda3/bin/python /home/huunoi/Projects/research/papers/SOM-KNN-IoT\_AD/main\_script.py

2022-08-03 18:21:54.721807: I tensorflow/core/util/util.cc:169] oneDNN custom operations are on. You may see slightly different numerical results due to floating-point round-off errors from different computation orders. To turn them off, set the environment variable `TF\_ENABLE\_ONEDNN\_OPTS=0`.

2022-08-03 18:21:54.725801: W tensorflow/stream\_executor/platform/default/dso\_loader.cc:64] Could not load dynamic library 'libcudart.so.11.0'; dlerror: libcudart.so.11.0: cannot open shared object file: No such file or directory

2022-08-03 18:21:54.725809: I tensorflow/stream\_executor/cuda/cudart\_stub.cc:29] Ignore above cudart dlerror if you do not have a GPU set up on your machine.

/home/huunoi/Projects/research/data/nbaiot

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(34683, 115) (34683,)

(69366, 115) (69366,)

(109860, 115) (109860,)

(210495, 115) (210495,)

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--------------Training and testing in the same device----------------

(69366, 115) (69366,)

------------Scale data-----------------

(69366, 115) (69366,)

X\_train\_scaled

[[ 3.29612709e-03 1.21268756e-01 0.00000000e+00 ... 9.73875109e-18

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[ 3.29612709e-03 1.16513119e-01 0.00000000e+00 ... 1.74196825e-17

-5.33030687e-34 0.00000000e+00]

[ 6.58594153e-03 1.21268756e-01 1.06290987e-17 ... 9.73875109e-18

1.68012462e-33 5.75224125e-17]

...

[ 3.29612758e-03 7.13345701e-02 1.54319329e-09 ... 4.85741148e-18

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[ 9.85861840e-03 1.21268756e-01 2.12581974e-17 ... 8.70984127e-18

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[ 1.31838629e-02 1.21268756e-01 1.06290987e-17 ... 2.31624350e-16

1.06308770e-27 1.49859300e-12]]

---------Normalize data--------------

(69366, 115) (69366,)

--------------------Train SOM on normalized data--------------

---------------------------------Train SOM-------------------------------------

Number of feature: 115

The default values of som\_x and som\_y are None

Hyper-parameters optimization process. The algorithm used is rand.

Best: {'learning\_rate': 1.470029218540214, 'sigma': 8.397631783903883, 'x': 47.60626380815725}

---------SOM has been turned!-----------

Starting SOM Weights init

/home/huunoi/Projects/research/papers/SOM-KNN-IoT\_AD/utils/minisom.py:370: ComplexWarning: Casting complex values to real discards the imaginary part

self.\_weights[i, j] = c1 \* pc[pc\_order[0]] + c2 \* pc[pc\_order[1]]

Perform SOM (turned) train random

0.5

Total train time: 107.74635863304138

Shape: (109860, 115) (109860,)

----------------------Test is starting----------------------

Scale data

Shape: (109860, 115) (109860,)

Normalize data

Shape: (109860, 115) (109860,)

Testing

----------------------------------------------------------------------

SOM classification

/home/huunoi/anaconda3/lib/python3.9/site-packages/sklearn/linear\_model/\_logistic.py:444: ConvergenceWarning: lbfgs failed to converge (status=1):

STOP: TOTAL NO. of ITERATIONS REACHED LIMIT.

Increase the number of iterations (max\_iter) or scale the data as shown in:

https://scikit-learn.org/stable/modules/preprocessing.html

Please also refer to the documentation for alternative solver options:

https://scikit-learn.org/stable/modules/linear\_model.html#logistic-regression

n\_iter\_i = \_check\_optimize\_result(

precision recall f1-score support

1 0.985 0.997 0.991 14865

2 1.000 0.998 0.999 94995

accuracy 0.998 109860

macro avg 0.993 0.998 0.995 109860

weighted avg 0.998 0.998 0.998 109860

AUC score: 0.9975355014967329

-----------Testing SOM done!-------------

----------------------Test Done----------------------

Process finished with exit code 0

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