MACHINE LEARNING

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Kelas : Informatika A2 - 2021

Tugas Pertemuan 13

Self Organizing Maps (SOM).ipynb

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Self Organizing Maps (SOM)

```
print('Hanif Ridal Warits - 41155050210060')
```

```
Hanif Ridal Warits - 41155050210060
```

```
[2] !pip install SimpSOM
```

```
Requirement already satisfied: SimpSOM in /usr/local/lib/python3.10/dist-packages (2.0.2)
Requirement already satisfied: numpy>=1.19.5 in /usr/local/lib/python3.10/dist-packages (from SimpSOM) (1.26.4)
Requirement already satisfied: scikit-learn>=0.22.2.post1 in /usr/local/lib/python3.10/dist-packages (from SimpSOM) (1.6.0)
Requirement already satisfied: matplotlib>=3.3.3 in /usr/local/lib/python3.10/dist-packages (from SimpSOM) (3.10.0)
Requirement already satisfied: contourpy>=1.0.1 in /usr/local/lib/python3.10/dist-packages (from matplotlib>=3.3.3->SimpSOM) (1.3.1)
Requirement already satisfied: cycler>=0.10 in /usr/local/lib/python3.10/dist-packages (from matplotlib>=3.3.3->SimpSOM) (0.12.1)
Requirement already satisfied: fonttools>=4.22.0 in /usr/local/lib/python3.10/dist-packages (from matplotlib>=3.3.3->SimpSOM) (4.55.3)
Requirement already satisfied: kiwisolver>=1.3.1 in /usr/local/lib/python3.10/dist-packages (from matplotlib>=3.3.3->SimpSOM) (1.4.8)
Requirement already satisfied: packaging>=20.0 in /usr/local/lib/python3.10/dist-packages (from matplotlib>=3.3.3->SimpSOM) (24.2)
Requirement already satisfied: pillow>=8 in /usr/local/lib/python3.10/dist-packages (from matplotlib>=3.3.3->SimpSOM) (11.1.0)
Requirement already satisfied: pyparsing>=2.3.1 in /usr/local/lib/python3.10/dist-packages (from matplotlib>=3.3.3->SimpSOM) (3.2.1)
Requirement already satisfied: python-dateutil>=2.7 in /usr/local/lib/python3.10/dist-packages (from matplotlib>=3.3.3->SimpSOM) (2.8.2)
Requirement already satisfied: scipy>=1.6.0 in /usr/local/lib/python3.10/dist-packages (from scikit-learn>=0.22.2.post1->SimpSOM) (1.13.1)
Requirement already satisfied: joblib>=1.2.0 in /usr/local/lib/python3.10/dist-packages (from scikit-learn>=0.22.2.post1->SimpSOM) (1.4.2)
Requirement already satisfied: threadpoolctl>=3.1.0 in /usr/local/lib/python3.10/dist-packages (from scikit-learn>=0.22.2.post1->SimpSOM) (3.5.0)
Requirement already satisfied: six>=1.5 in /usr/local/lib/python3.10/dist-packages (from python-dateutil>=2.7->matplotlib>=3.3.3->SimpSOM) (1.17.0)
```

```
[4] import pandas as pd
    from sklearn.preprocessing import StandardScaler


    import simpsom as sps
```

```
[5] url = 'https://raw.githubusercontent.com/kokocamp/vlog119/refs/heads/main/vlog119.csv'
    vlog139 = pd.read_csv(url)
```

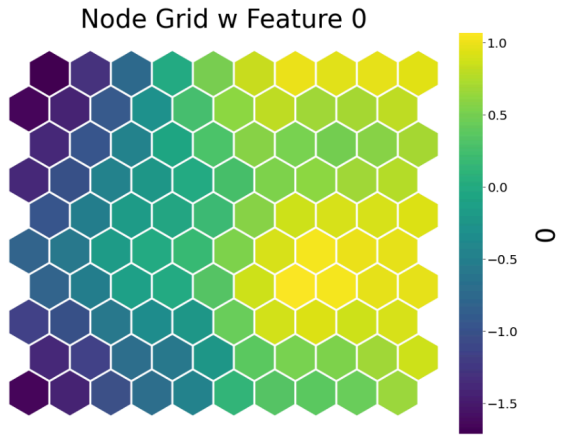
```
X = vlog139[['gpa', 'gmat', 'work_experience', 'admitted']]
y = vlog139[['admitted']]

scaler = StandardScaler()
data = scaler.fit_transform(pd.DataFrame(X))
labels = scaler.fit_transform(pd.DataFrame(y))

print(data)
```

```
[[ 1.45200142  2.07733076 -0.24768082  1.05131497]
 [ 1.29155928  1.5827282   0.33509757  1.05131497]
 [ 0.3289064   0.59352307 -0.24768082 -0.95118973]
 [ 0.97067498  0.92325811  0.91787596  1.05131497]
 [ 1.29155928  0.42865555  0.33509757 -0.95118973]
 [ 0.97067498  1.25299315  1.50065435  1.05131497]
 [-1.27551506  0.59352307 -1.4132376  -0.95118973]
 [ 0.3289064   1.08812563  0.33509757  1.05131497]
 [ 0.3289064   1.41786068  0.91787596  1.05131497]
 [-2.23816794  0.59352307 -1.4132376  -0.95118973]
 [-0.63374648 -0.72541709 -0.24768082 -0.95118973]
 [ 0.97067498  0.59352307  0.91787596  1.05131497]
 [ 0.97067498  0.92325811  1.50065435  1.05131497]
```

```
[ 0.3289064   1.08812563  0.33509757  1.05131497]
[ 0.3289064   1.41786068  0.91787596  1.05131497]
[-2.23816794  0.59352307 -1.4132376  -0.95118973]
[-0.63374648 -0.72541709 -0.24768082 -0.95118973]
[ 0.97067498  0.59352307  0.91787596  1.05131497]
[ 0.97067498  0.92325811  1.50065435  1.05131497]
[ 0.3289064   0.42865555  0.33509757 -0.95118973]
[ 0.3289064   1.91246324 -0.24768082  1.05131497]
[-0.15242004 -0.72541709 -1.4132376  -0.95118973]
[-0.63374648 -1.22001965  0.33509757 -0.95118973]
[ 0.97067498 -0.06594701  1.50065435  1.05131497]
[-0.63374648 -1.87948973 -0.83045921 -0.95118973]
[-1.27551506 -1.05515213 -0.24768082 -0.95118973]
[ 0.3289064  -0.56054957 -0.83045921  1.05131497]
[-1.7568415  -0.89028461 -1.4132376  -0.95118973]
[-1.27551506 -1.71462221  0.33509757 -0.95118973]
[-0.63374648 -1.71462221 -1.4132376  -0.95118973]
[-0.15242004 -1.38488717 -0.83045921 -0.95118973]
[ 0.3289064   0.26378803  1.50065435  1.05131497]
[ 0.97067498  0.09892051  0.33509757  1.05131497]
[-1.27551506 -1.22001965 -0.83045921 -0.95118973]
[ 0.97067498 -0.06594701  1.50065435  1.05131497]
[ 0.3289064   0.09892051  0.91787596  1.05131497]
[-0.15242004 -0.23081453 -1.4132376  -0.95118973]
[-0.63374648 -0.56054957 -0.83045921 -0.95118973]
[ 1.45200142  0.09892051  0.33509757  1.05131497]
[ 0.3289064   0.09892051  1.50065435  1.05131497]
[ 0.3289064   0.42865555  0.91787596  1.05131497]
[-1.27551506 -0.06594701 -1.4132376  -0.95118973]
[-0.63374648  0.26378803 -0.83045921 -0.95118973]
[ 0.3289064  -1.22001965 -1.4132376  -0.95118973]
[-2.23816794 -1.05515213  0.33509757 -0.95118973]
[ 0.97067498  0.59352307  0.91787596  1.05131497]]
```

```
net = sps.SOMNet(10, 10, data)#inisialisasi lebar dan panjang neuron, serta data nya
net.train(start_learning_rate=0.01,epochs=1000) #untuk training dengan parameternya
net.nodes_graph()
net.diff_graph()
net.project(data, labels=labels)
net.cluster(data)
```

```
Periodic Boundary Conditions inactive.
The weights will be initialized with PCA.
The map will be trained with the batch algorithm.
Training SOM... done!
/usr/local/lib/python3.10/dist-packages/simpsom/network.py:629: UserWarning: No data for colormapping provided via 'c'. Parameters 'cmap' will be ignored
  plt.scatter([pos[0]-0.125+random.random()*0.25 for pos in bmu_list],
[[2,
  4,
  6,
  9,
  10,
  11,
  13,
  15,
  16,
  18,
  19,
  20,
  21,
  22,
  23,
  24,
  26,
  27,
  29,
  30,
  ...,
  31,
  32,
  34,
  35,
  36,
  37,
  38,
  39],
 [0, 1, 3, 5, 7, 8, 12, 14, 17, 25, 28, 33]]
```




```
<Figure size 1000x1000 with 0 Axes>
<Figure size 640x480 with 0 Axes>
```