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**DATA SCIENCE LAB**

**Experiment No.: 4**

**Aim**

Perform Z-score normalization, Min-max normalization

**Procedure and Output**

1. Z-score Normalization

import pandas as pd

import numpy as np

import scipy.stats as stats

data = np.array([6, 7, 7, 12, 13, 13, 15, 16, 19, 22])

print("\n Data before aplying z-score operation\n",data) # z-score normalization

new\_data=stats.zscore(data)

print("Normalized Data are:\n",new\_data)

**Output**

Data before aplying z-score operation

[ 6 7 7 12 13 13 15 16 19 22]

Normalized Data are:

[-1.39443338 -1.19522861 -1.19522861 -0.19920477 0. 0.

0.39840954 0.5976143 1.19522861 1.79284291]

2). Min-max Normalization

from numpy import asarray

from sklearn.preprocessing import MinMaxScaler

# define data

data = asarray([[100, 0.001],

[8, 0.05],

[50, 0.005],

[88, 0.07],

[4, 0.1]])

print("\n before normalization\n",data)

# define min max scaler #min max normalization's another example

scaler = MinMaxScaler()

# transform data

print("\n After applying transformation")

scaled = scaler.fit\_transform(data)

print(scaled)

**Output**

before normalization

[[1.0e+02 1.0e-03]

[8.0e+00 5.0e-02]

[5.0e+01 5.0e-03]

[8.8e+01 7.0e-02]

[4.0e+00 1.0e-01]]

After applying transformation

[[1. 0. ]

[0.04166667 0.49494949]

[0.47916667 0.04040404]

[0.875 0.6969697 ]

[0. 1. ]]