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Batch: A

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Class: BE IT

Exp5

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import math
import numpy as np
import matplotlib.pyplot as plt

input=np.array([[ -0.1961,0.9806],[0.1961,0.9806],[0.9806,0.1961],[0.9806,-0.1961],[ -0.5812
weights=np.array([[0.7071,-0.7071],[0.7071,0.7071],[-1,0]])
epochs=10
alpha=0.5

def circle():
    x1 = []
    y1 = []
    x2 = []
    y2 = []
    fig, ax = plt.subplots(figsize=(5,5))
    for i in range(len(input)):
        x1.append(input[i][0])
        y1.append(input[i][1])
    for i in range(len(weights)):
        x2.append(weights[i][0])
        y2.append(weights[i][1])
    circle=plt.Circle((0,0),1,zorder=0,color="#e6ffe6")
    ax.add_patch(circle)
    plt.scatter(x1, y1, c ="red",linewidths = 2)
    plt.scatter(x2, y2, c ="blue",linewidths = 2)
    plt.xlabel("X-axis")
    plt.ylabel("Y-axis")
    plt.show()

for i in range(epochs):
    for order in [3,2,1,0,5,4]:
        network=np.zeros(len(weights))
        for j in range(len(weights)):
            network[j]=np.dot(input[order],weights[j])
        winner=max(network)
        winner_ind = np.argmax(network)
        deltaW=alpha*np.subtract(input[order],weights[winner_ind])
        print("_____")
        print("\n\nEpoch No\t"+str(i+1))
        print("Pattern\tP"+str(order+1))
        print("Input\t"+str(input[order]))
```

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print("Initial Weights\n"+str(weights))
print("Winner\t"+str(weights[winner_ind]))
weights[winner_ind]=np.add(weights[winner_ind],deltaw)
print("DeltaW\t"+str(deltaw))
print("Updated Weights\n"+str(weights))
circle()
print("=====")
```

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```

Epoch No          1
Pattern P4
Input  [ 0.9806 -0.1961]
Initial Weights
[[ 0.7071 -0.7071]
 [ 0.7071  0.7071]
 [-1.      0.    ]]
Winner [ 0.7071 -0.7071]
DeltaW [0.13675 0.2555 ]
Updated Weights
[[ 0.84385 -0.4516 ]
 [ 0.7071  0.7071 ]
 [-1.      0.    ]]

```

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Epoch No          1
Pattern P3
Input  [0.9806 0.1961]
Initial Weights
[[ 0.84385 -0.4516 ]
 [ 0.7071  0.7071 ]
 [-1.      0.    ]]
Winner [0.7071 0.7071]
DeltaW [ 0.13675 -0.2555 ]
Updated Weights
[[ 0.84385 -0.4516 ]
 [ 0.84385  0.4516 ]
 [-1.      0.    ]]

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Epoch No          1
Pattern P2
Input  [0.1961 0.9806]
Initial Weights
[[ 0.84385 -0.4516 ]
 [ 0.84385  0.4516 ]
 [-1.      0.    ]]
Winner [0.84385 0.4516 ]
DeltaW [-0.323875  0.2645 ]
Updated Weights
[[ 0.84385 -0.4516 ]
 [ 0.519975  0.7161 ]
 [-1.      0.    ]]

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Epoch No          1
Pattern P1
Input  [-0.1961  0.9806]
Initial Weights
[[ 0.84385 -0.4516 ]
 [ 0.519975  0.7161 ]
 [-1.      0.    ]]

```

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