

151-15-5116_Gradient-Descent

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In [6]: import numpy as np
import pandas as pd

x1 = [0, 0, 1, 1]
x2 = [0, 1, 0, 1]
y = [0, 0, 0, 1]

t1 = 0.3 #theta1
t2 = -0.1 #theta2

n = 0.1 #Learning Rate
Th = 0.2 #Threshold Value

for i in range(5):
    print('-'*79)
    print(' '*35, 'Epoch:', i+1)
    print('-'*79)
    error = []
    temp = []
    for j in range(len(x1)):
        h = np.dot(x1[j], t1)+np.dot(x2[j], t2) #Predict Y value according to hypothesis

        if h < Th:
            h = 0
        else:
            h = 1
        cost = y[j]-h #Cost Function
        temp.append(h)
        error.append(cost)

    if temp == y:

        print('Input:', x1[j], x2[j], ' Output:', y[j], ' Old Weight:', t1_temp, t2_
        break

    else:
        t1_temp = t1 #updating the weights w1 and w2
```

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t1 = t1+n*x1[j]*cost
t1 = float("{0:.2f}".format(t1))

t2_temp = t2

t2 = t2+n*x2[j]*cost
t2 = float("{0:.2f}".format(t2))

print('Input:', x1[j], x2[j], ' Output:', y[j], ' Old Weight:', t1_temp, t2_

```

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                        Epoch: 1
-----
Input: 0 0  Output: 0  Old Weight: 0.3 -0.1  Output: 0  Cost: 0  New Weight: 0.3 -0.1
Input: 0 1  Output: 0  Old Weight: 0.3 -0.1  Output: 0  Cost: 0  New Weight: 0.3 -0.1
Input: 1 0  Output: 0  Old Weight: 0.3 -0.1  Output: 1  Cost: -1  New Weight: 0.2 -0.1
Input: 1 1  Output: 1  Old Weight: 0.2 -0.1  Output: 0  Cost: 1  New Weight: 0.3 0.0
-----
                        Epoch: 2
-----
Input: 0 0  Output: 0  Old Weight: 0.3 0.0  Output: 0  Cost: 0  New Weight: 0.3 0.0
Input: 0 1  Output: 0  Old Weight: 0.3 0.0  Output: 0  Cost: 0  New Weight: 0.3 0.0
Input: 1 0  Output: 0  Old Weight: 0.3 0.0  Output: 1  Cost: -1  New Weight: 0.2 0.0
Input: 1 1  Output: 1  Old Weight: 0.2 0.0  Output: 1  Cost: 0  New Weight: 0.2 0.0
-----
                        Epoch: 3
-----
Input: 0 0  Output: 0  Old Weight: 0.2 0.0  Output: 0  Cost: 0  New Weight: 0.2 0.0
Input: 0 1  Output: 0  Old Weight: 0.2 0.0  Output: 0  Cost: 0  New Weight: 0.2 0.0
Input: 1 0  Output: 0  Old Weight: 0.2 0.0  Output: 1  Cost: -1  New Weight: 0.1 0.0
Input: 1 1  Output: 1  Old Weight: 0.1 0.0  Output: 0  Cost: 1  New Weight: 0.2 0.1
-----
                        Epoch: 4
-----
Input: 0 0  Output: 0  Old Weight: 0.2 0.1  Output: 0  Cost: 0  New Weight: 0.2 0.1
Input: 0 1  Output: 0  Old Weight: 0.2 0.1  Output: 0  Cost: 0  New Weight: 0.2 0.1
Input: 1 0  Output: 0  Old Weight: 0.2 0.1  Output: 1  Cost: -1  New Weight: 0.1 0.1
Input: 1 1  Output: 1  Old Weight: 0.1 0.1  Output: 1  Cost: 0  New Weight: 0.1 0.1
-----
                        Epoch: 5
-----
Input: 0 0  Output: 0  Old Weight: 0.1 0.1  Output: 0  Cost: 0  New Weight: 0.1 0.1
Input: 0 1  Output: 0  Old Weight: 0.1 0.1  Output: 0  Cost: 0  New Weight: 0.1 0.1
Input: 1 0  Output: 0  Old Weight: 0.1 0.1  Output: 0  Cost: 0  New Weight: 0.1 0.1

```

Input: 1 1 Output: 1 Old Weight: 0.1 0.1 Output: 1 Cost: 0 New Weight: 0.1 0.1