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ann lab

**1.**

**CODE:**

import numpy as np  
operator = 'and'  
  
atributes = np.array([[0, 0], [0, 1], [1, 0], [1, 1]])  
labels = np.array([0, 0, 0, 1])  
  
w = [+9, +9]  
threshold = 5  
alpha = 0.5  
epoch = 1000  
  
print("Learning Rate: ", alpha, ", Thresh: ", threshold)  
  
for i in range(0, epoch):  
 print("epoch ", i + 1)  
 global\_delta = 0  
 for j in range(len(atributes)):  
  
 actual = labels[j]  
  
 sum = atributes[j][0] \* w[0] + atributes[j][1] \* w[1]  
  
 if sum > threshold:  
 predicted = 1  
 else:  
 predicted = 0  
  
 delta = actual - predicted  
 global\_delta = global\_delta + abs(delta)  
  
  
 for k in range(0, 2):  
 w[k] = w[k] + delta \* alpha  
  
 print(atributes[j][0], " ", operator, " ", atributes[j][1], " --> actual: ", actual, ", predicted: ", predicted,  
 " (w: ", w[0], ")")  
  
 if global\_delta == 0:  
 print("\n\nCorrect weights found!")  
 break  
  
 print("---------------------------------------------------------------")

**OUTPUT:**

A picture containing calendar

Description automatically generated

Text

Description automatically generated