import numpy as np

X = np.array(([2, 9], [1, 5], [3, 6]), dtype=float) # two inputs [sleep,study]

y = np.array(([92], [86], [89]), dtype=float) # one output [Expected % in Exams]

X = X/np.amax(X,axis=0) # maximum of X array longitudinally

y = y/100

#Sigmoid Function

def sigmoid (x):

return 1/(1 + np.exp(-x))

#Derivative of Sigmoid Function

def derivatives\_sigmoid(x):

return x \* (1 - x)

#Variable initialization

epoch=5000 #Setting training iterations

lr=0.1 #Setting learning rate

inputlayer\_neurons = 2 #number of features in data set

hiddenlayer\_neurons = 3 #number of hidden layers neurons

output\_neurons = 1 #number of neurons at output layer

#weight and bias initialization

wh=np.random.uniform(size=(inputlayer\_neurons,hiddenlayer\_neurons)) #weight of the link from input node to hidden node

bh=np.random.uniform(size=(1,hiddenlayer\_neurons)) # bias of the link from input node to hidden node

wout=np.random.uniform(size=(hiddenlayer\_neurons,output\_neurons)) #weight of the link from hidden node to output node

bout=np.random.uniform(size=(1,output\_neurons)) #bias of the link from hidden node to output node

#draws a random range of numbers uniformly of dim x\*y

for i in range(epoch):

#Forward Propogation

hinp1=np.dot(X,wh)

hinp=hinp1 + bh

hlayer\_act = sigmoid(hinp)

outinp1=np.dot(hlayer\_act,wout)

outinp= outinp1+ bout

output = sigmoid(outinp)

#Backpropagation

EO = y-output

outgrad = derivatives\_sigmoid(output)

d\_output = EO\* outgrad

EH = d\_output.dot(wout.T)

#how much hidden layer weights contributed to error

hiddengrad = derivatives\_sigmoid(hlayer\_act)

d\_hiddenlayer = EH \* hiddengrad

# dotproduct of nextlayererror and currentlayerop

wout += hlayer\_act.T.dot(d\_output) \*lr

wh += X.T.dot(d\_hiddenlayer) \*lr

print("Input: \n" + str(X))

print("Actual Output: \n" + str(y))

print("Predicted Output: \n" ,output)





