import numpy as np

X = np.array(([2, 9], [1, 5], [3, 6]), dtype=float)

y = np.array(([92], [86], [89]), dtype=float)

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=7000 #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))

bh=np.random.uniform(size=(1,hiddenlayer\_neurons))

wout=np.random.uniform(size=(hiddenlayer\_neurons,output\_neurons))

bout=np.random.uniform(size=(1,output\_neurons)) #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)

hiddengrad = derivatives\_sigmoid(hlayer\_act)#how much hidden layer wts contributed to error

d\_hiddenlayer = EH \* hiddengrad

wout += hlayer\_act.T.dot(d\_output) \*lr# dotproduct of nextlayererror and currentlayerop

* bout += np.sum(d\_output, axis=0,keepdims=True) \*lr wh += X.T.dot(d\_hiddenlayer) \*lr

#bh += np.sum(d\_hiddenlayer, axis=0,keepdims=True) \*lr

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

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

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

**output**

Input:

[[ 0.66666667 1. ]

[ 0.33333333 0.55555556]

[ 1. 0.66666667]]

Actual Output:

[[ 0.92]

[ 0.86]

[ 0.89]]

Predicted Output:

[[ 0.89559591]

[ 0.88142069]

[ 0.8928407 ]]