Program 5

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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)
y=y/100
def sigmoid(x):
    return 1/(1+np.exp(-x))
def sigmoid_grad(x):
    return x*(1-x)
epoch=1000
eta=0.2
input_neurons=2
hidden_neurons=3
output_neurons=1
wh=np.random.uniform(size=(input_neurons,hidden_neurons))
bh=np.random.uniform(size=(1,hidden_neurons))
wout=np.random.uniform(size=(hidden_neurons,output_neurons))
bout=np.random.uniform(size=(1,output_neurons))
for i in range(epoch):
    h_ip=np.dot(X,wh)+bh
    h_act=sigmoid(h_ip)
    o_ip=np.dot(h_act,wout)
    output=sigmoid(o_ip)
    Eo=y-output
    outgrad=sigmoid_grad(output)
    d_output=Eo * outgrad
    Eh=d_output.dot(wout.T)
    hiddengrad=sigmoid_grad(h_act)
    d_hidden=Eh*hiddengrad
    wout+=h_act.T.dot(d_output)*eta
    wh+=X.T.dot(d_hidden)*eta
print("Normalized Input : \n"+str(X))
print("Actual Output : \n"+str(y))
print("Predicted output : \n",output)
```