

## **Ex.No.04.                      Back propagation in single neuron**

### **Aim:**

To write a python program to perform back propagation in single neuron.

### **Equipment's Required:**

1. Hardware – PCs
2. Anaconda – Python 3.7 Installation / Moodle-Code Runner / Google Colab

### **Concept:**

#### **NUMPY**

NumPy is a library for the Python programming language, adding support for large, multidimensional arrays and matrices, along with a large collection of high-level mathematical functions to operate on these arrays.

#### **SK LEARN**

Scikit-learn is a free software machine learning library for the Python programming language. It features various classification, regression and clustering algorithms including support-vector machines.

#### **MATPLOTLIB**

Matplotlib is a plotting library for the Python programming language and its numerical mathematics extension NumPy. It provides an object-oriented API for embedding plots into applications using generalpurpose GUI toolkits like Tkinter, wxPython, Qt, or GTK.

### **Algorithm:**

1. Start the program.
2. Import libraries required as per requirement.
3. Define neuron weight, eeta, i, y.
4. summarize observations by class label
5. □ summarize first few examplesuse for loop for range.
6. stop the program.

## **Program:**

```
/*
```

```
Program to implement binary classification.
```

```
Developed by: BHARATH RAJ V
```

```
Register Number : 212219040015
```

```
*/
```

```
#back propagation in single neuron
```

```
#BACK PROPOGATION IN SINGLE WINDOW
```

```
import numpy as np
```

```
i=1.5 w_o=0.0 y=0.5
```

```
#eeta r=0.01 def
```

```
dc_dw(a,y,i):
```

```
dc_da=2*(a-y)
```

```
da_dw=i return
```

```
dc_da*da_dw
```

```
w=[w_o] a=[w_o*i]
```

```
for j in range(0,100):
```

```
    a.append(w[-1]*i)
```

```
    w.append(w[-1]-r*dc_dw(a[-1],y,i)) if(a[-1]- y)**2<0.001:
```

```
        break
```

```
print(a)
```

```
print(" ")
```

```
print(w)
```

## **Output:**

[0.0, 0.0, 0.0225, 0.0439875, 0.06450806249999999, 0.08410519968749999,  
0.10282046570156249, 0.12069354474499219, 0.13776233523146753,  
0.1540630301460515, 0.1696301937894792, 0.18449683506895262,  
0.19869447749084973, 0.2122532260037615, 0.22520183083359224,

0.23756774844608058, 0.24937719976600697, 0.26065522577653666,  
0.2714257406165925, 0.28171158228884585, 0.29153456108584785, 0.3009155058369847,  
0.30987430807432037, 0.31842996421097597,  
0.32660061582148203, 0.33440358810951537, 0.3418554266445872,  
0.3489719324455808, 0.3557681954855296, 0.36225862668868075,  
0.36845698848769015, 0.3743764240057441, 0.3800294849254856,  
0.3854281581038388, 0.390583890989166, 0.39550761589465355,  
0.40020977317939416, 0.40470033338632144, 0.40898881838393697,  
0.41308432155665975, 0.41699552708661014, 0.42073072836771264,  
0.42429784559116557, 0.4277044425395631, 0.43095774262528275, 0.43406464420714497,  
0.43703173521782346, 0.4398653071330214, 0.4425713683120355, 0.44515565673799384,  
0.44762365218478417,  
0.4499805878364689, 0.45223146138382775, 0.45438104562155546,  
0.4564338985685854, 0.458394373132999, 0.4602666263420141,  
0.46205462815662346, 0.4637621698895754, 0.4653928722445445,  
0.46695019299354, 0.46843743430883067]

[0.0, 0.015, 0.029324999999999997, 0.043005375, 0.056070133125,  
0.06854697713437499, 0.08046236316332812, 0.09184155682097836,  
0.10270868676403433, 0.11308679585965278, 0.12299789004596841, 0.13246298499389983,  
0.14150215066917435, 0.1501345538890615,  
0.15837849896405373, 0.16625146651067133, 0.17377015051769112, 0.18095049374439504,  
0.18780772152589725, 0.19435637405723188, 0.20061033722465646, 0.20658287204954692,  
0.21228664280731732,  
0.21773374388098804, 0.22293572540634357, 0.22790361776305812, 0.2326479549637205,  
0.23717879699035307, 0.24150575112578718,  
0.24563799232512676, 0.24958428267049607, 0.25335298995032374, 0.2569521054025592,  
0.260389260659444, 0.26367174392976905,  
0.26680651545292944, 0.26980022225754763, 0.27265921225595796,  
0.27538954770443985, 0.2779970180577401, 0.28048715224514176,  
0.2828652303941104, 0.2851362950263754, 0.2873051617501885,  
0.28937642947143, 0.29135449014521564, 0.2932435380886809,  
0.2950475788746903, 0.29677043782532925, 0.29841576812318943,  
0.2999870585576459, 0.3014876409225518, 0.30292069708103697, 0.3042892657123903,  
0.3055962487553327, 0.30684441756134273,  
0.3080364187710823, 0.3091747799263836, 0.31026191482969634,  
0.31130012866236, 0.3122916228725538, 0.3132384998432889]

**Result:**

Thus, the python program performed back propagation in single neuron.