

Machine Learning

Ex: 07 Single Layer Peceptron

Name:Athithraja. R

Reg.no: 2022503702

1)

Code:

```
def modify_w(w,x,error,l):
```

```
    return(w+l*error*x)
```

```
#Gate Inputs and Output
```

```
x1=[0,0,1,1]
```

```
x2=[0,1,0,1]
```

```
y=[0,1,1,1]
```

```
#And [0,0,0,1]
```

```
#OR [0,1,1,1]
```

```
#Nand [1,1,1,0]
```

```
#Nor [1,0,0,0]
```

```
print("x1: "+str(x1))
```

```
print("x2: "+str(x2))
```

```
print("y: "+str(y))
```

```
#Learning rate
```

```
l=0.1
```

```
#initial weights
```

```
w1=2
```

```

w2=0
wb=0
print("\nBefore:")
print("w1= "+str(w1))
print("w2= "+str(w2))
print("wb= "+str(wb))
print("\n")

#b values
b=[1,1,1,1]

th=0 #throushhold

# for AND gate th=0
# for OR gate th=-1
# for NAND gate th=-1
# for NOR gate th=0

epoc=100

for i in range(epoc):
    yout=[]
    for i in range(4):
        fx= (x1[i]*w1)+(x2[i]*w2)+(b[i]*wb)
        if fx>th:
            yout.append(1)
            error=y[i]-1
        else:
            yout.append(0)
            error=y[i]

    if (error!=0):
        w1=modify_w(w1,x1[i],error,l)

```

```

w2=modify_w(w1,x2[i],error,l)
wb=modify_w(wb,b[i],error,l)

#testing
ytest=[]
for i in range(4):
    fx= (x1[i]*w1)+(x2[i]*w2)+(b[i]*wb)
    if fx>th:
        ytest.append(1)
    else:
        ytest.append(0)
    if (ytest==yout):
        print(ytest==yout)
        break
    else:
        print(ytest==yout)
        print("\nAfter:")
        print("w1= "+str(w1))
        print("w2= "+str(w2))
        print("wb= "+str(wb))
        print("yout: "+str(yout))

```

Output:

```

⇨ x1: [0, 0, 1, 1]
   x2: [0, 1, 0, 1]
   y: [0, 1, 1, 1]

Before:
w1= 2
w2= 0
wb= 0

False
False
True

After:
w1= 2.0
w2= 2.0
wb= 0.0
yout: [0, 1, 1, 1]

```
