**Practical No: 6(A)**

**Aim: To implement Regression.**

**Code:**

class RegressionDemo :

def \_\_init\_\_(self, a,b,c,tval):

self.x = a self.y = b

self.result = c

self.threshold = tval

self.w0 = []

self.w1 = []

def h(self, w0, w1 hresult= []

for i in range(0 , len(self.x)):

hresult.append(w0[i] + w1[i]\*self.x[i])

return hresult

def checkthreshold(self, hresult

flag = True

actfun =[]

for i in range(0 , len(self.x)) :

if (hresult[i] < self.threshold ):

actfun.append( "no")

else :

actfun.append( "yes")

#print("new hresult act fun:", actfun)

for i in range(0 , len(self.x)) :

if (actfun[i] != self.result[i]) :

return False

return True

def training(self, w0, w1, alpha):

i=1

while i<=1000 : # Max 1000 attempts

hresult = self.h(w0,w1)

#print("Attempt ", i )

#print("w1 :", w1 ,", hresult :" , hresult)

if(self.checkthreshold(hresult)) :

self.w0 = w0

self.w1 = w1

print("In Attempt number ", i, ", i got it! I think i have learnt enough: w0-->", self.w0, ", w1-->", self.w1)

break

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i = i +1

for j in range(0,len(self.x)) :

w0[j] = w0[j] + alpha\*(self.y[j] - hresult[j])

w1[j] = w1[j] + alpha\*(self.y[j] - hresult[j]) \*self.x[j]

if(i>=1000):

print("I am exhausted, tried 1000 iterations! plz change something else...")

a = [1,2,3,4,5,6]

b = [3,5,7,9,11,13]

c = ["no", "no", "no", "yes", "yes", "yes"]

p = RegressionDemo(a,b,c,9)

print("number of hours of study x=", p.x)

print("some function y=", p.y, " with threshold value :", p.threshold)

print("whether a student will get O grade =", p.result)

print("trying with w0=1, w1=3, alpha=0.01 -->")

p.training([1,1,1,1,1,1],[3,3,3,3,3,3], 0.01)

print("trying with w0=1, w1=1 , alpha=0.01 -->")

p.training([1,1,1,1,1,1],[1,1,1,1,1,1], 0.01)

print("trying with w0=1, w1=1 , alpha=0.02 -->")

p.training([1,1,1,1,1,1],[1,1,1,1,1,1], 0.02)

**Output:**

number of hours of study x= [1, 2, 3, 4, 5, 6]

some function y= [3, 5, 7, 9, 11, 13] with threshold value : 9

whether a student will get O grade = ['no', 'no', 'no', 'yes', 'yes', 'yes']

trying with w0=1, w1=3, alpha=0.01 -->

In Attempt number 5 , i got it! I think i have learnt enough: w0--> [0.9611840799999999, 0.9258025, 0.89683, 0.87637252, 0.8653588, 0.8633831799999999] , w1--> [2.9611840800000007, 2.851605, 2.69049, 2.50549008, 2.326794, 2.18029908]

trying with w0=1, w1=1 , alpha=0.01 -->

I am exhausted, tried 1000 iterations! plz change something else...

trying with w0=1, w1=1 , alpha=0.02 -->

In Attempt number 88 , i got it! I think i have learnt enough: w0--> [1.485659401436073, 1.3999582017294674, 1.299999998888397, 1.235294117647059, 1.1923076923076918, 1.1621621621621625] , w1--> [1.485659401436073, 1.7999164034589346, 1.8999999966651875, 1.941176470588235, 1.9615384615384617, 1.9729729729729728]