 

Experiment: 1.2

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**Branch:** MCA **Section/Group:**21MCA-9/B

**Semester:** 3rd **Date of Performance:**31-08-2022 **Subject Name:** Machine Learning Lab **Subject Code**: 21CAP703

1. **Task to be done:**
   1. Linear Regression using def function (without library).
   2. Predicting if a person would buy life insurance based on his age using logisticregression.
   3. Implement sigmoid function using Numpy

# Steps for experiment/practical & Output: Answer a)

import numpy as np

import matplotlib.pyplot as plt def estimate\_coef(x, y):

# number of observations/points n = np.size(x)

# mean of x and y vector m\_x = np.mean(x)

m\_y = np.mean(y)

# calculating cross-deviation and deviation about x SS\_xy = np.sum(y\*x) - n\*m\_y\*m\_x

SS\_xx = np.sum(x\*x) - n\*m\_x\*m\_x

# calculating regression coefficients b\_1 = SS\_xy / SS\_xx

b\_0 = m\_y - b\_1\*m\_x

return (b\_0, b\_1)

def plot\_regression\_line(x, y, b):

# plotting the actual points as scatter plot plt.scatter(x, y, color = "m",

marker = "o", s = 30)

# predicted response vector y\_pred = b[0] + b[1]\*x

# plotting the regression line plt.plot(x, y\_pred, color = "g") # putting labels plt.xlabel('x')

plt.ylabel('y')

# function to show plot plt.show()

def main():

# observations / data

x = np.array([0, 1, 2, 3, 4, 5, 6, 7, 8, 9])

y = np.array([1, 3, 2, 5, 7, 8, 8, 9, 10, 12])

# estimating coefficients b = estimate\_coef(x, y)

print("Estimated coefficients:\nb\_0 = {} \

\nb\_1 = {}".format(b[0], b[1])) # plotting regression line plot\_regression\_line(x, y, b)

ifname== "main":

main()

**Output a)**

# 

# Answer b)

import pandas as pd import numpy as np

import matplotlib.pyplot as plt import seaborn as sns

from sklearn.model\_selection import train\_test\_split from sklearn.linear\_model import LogisticRegression from sklearn.metrics import confusion\_matrix

data = pd.read\_csv("/content/drive/MyDrive/Colab Notebooks/CSV Files/insurance\_data.csv")

x = data.iloc[:,:-1].values y = data.iloc[:,1].values

x\_train,x\_test,y\_train,y\_test = train\_test\_split(x,y,test\_size = 0.2) ml = LogisticRegression()

ml.fit(x\_train,y\_train) y\_pred = ml.predict(x\_test)

plt.scatter(x\_test,y\_test,color= 'red', marker='+') plt.scatter(x\_test,y\_pred,color='blue', marker='.') plt.xlabel("Age of person")

plt.ylabel("Bought Insurance 1=Bought 0=Did not Buy")

**Output b)**



# 

# Answer c)

# Import matplotlib, numpy and math import matplotlib.pyplot as plt import numpy as np

import math

x = np.linspace(-100, 100, 200)

z = 1/(1 + np.exp(-x)) plt.plot(x, z)

plt.xlabel("x") plt.ylabel("Sigmoid(X)") plt.show()

**Output c)**



**Evaluation Grid:**

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| --- | --- | --- | --- |
| Sr. No. | Parameters | Marks Obtained | Maximum Marks |
| 1. | Demonstration and Performance |  | 5 |
| 2. | Worksheet |  | 10 |
| 3. | Post Lab Quiz |  | 5 |