

## Experiment 3

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**Branch:** CSE

**Semester:** 5<sup>th</sup>

**Subject Name:** Machine Learning Lab

**UID:** 21BCS8105

**Section/Group:** 20BCS\_WM-702A

**Date of Performance:** 14/09/2022

**Subject Code:** 20CSP-317

**Aim/Overview of the practical:**

**Implement Linear Regression on any dataset.**

**Task to be done:**

**To implement linear regression on any data set.**

**Apparatus/Simulator Used:**

- Google Collab
- Python
- .csv file

## Code and Output:

```
In [1]: 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)
```

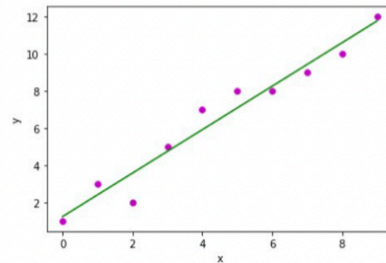
```
def main():
    # observations / data
    x = np.array([0, 1, 2, 3, 4, 5, 6, 7, 8, 9])
    y = np.array([1, 3, 2, 5, 7, 8, 8, 9, 10, 12])

    # 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)

if __name__ == "__main__":
    main()
```

Estimated coefficients:  
b\_0 = 1.2363636363636363  
b\_1 = 1.1696969696969697



## Learning outcomes (What I have learnt):

1. Learnt how to implement linear regression
2. Learnt about numpy, seaborn, pandas libraries.
3. Learnt how to use python for linear regression.

**Evaluation Grid :**

Sr. No.	Parameters	Marks Obtained	Maximum Marks
1.	Student Performance (Conduct of experiment) objectives/Outcomes.		12
2.	Viva Voce		10
3.	Submission of Work Sheet (Record)		8
	Total		30