

# Simple Linear Regression

Simple linear regression is a statistical method that allows us to summarize and study relationships between two continuous variables

Here one of the variable is independent (Predictor) and the other variable is dependent (response) variable

As we are dealing with only one independent value we name it as simple linear regression. We basically use linear regressions to find out how much a dependent variable is related to the independent variable.

Here the basic idea is that we plot a graph of dependent variable vs independent variable and out of the scattered points we find a line (Called “**Best Fitting Line**”) which predicts the best suiting points in which the data can be generally denoted.

Hence we represent this by using a mathematical formula known as Mean Squared Error(**MSE**) . Our main objective is to reduce the MSE and create a better line that represents the data.

Hence for that we use the concepts of **gradient decent** where slope of some points in the cost

Chart are found to find the least value of weights to cost which becomes our MSE

Simple Linear Regression Formula

$$Y=b_0+b_1*x_1$$

Where:

Y=dependent variable

$b_0$ =Constant

$b_1$ =Coefficient

$x_1$ =Independent Variable

## Some facts:

Regressions were first studied in depth by **Sir Francis Galton** (Source : towardsdatascience.com )

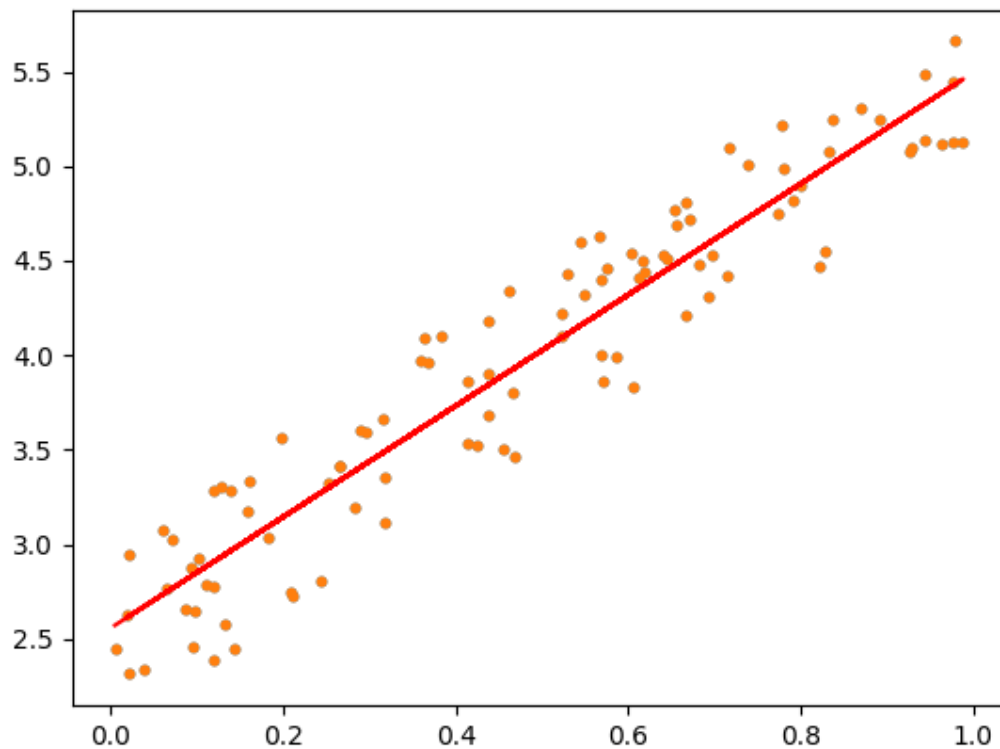
## Sources of Information

[https://online.stat.psu.edu/stat462/node/91/#:~:text=Simple%20linear%20regression%20is%20a,two%20continuous%20\(quantitative\)%20variables%3A&text=The%20other%20variable%2C%20denoted%20y,%2C%20outcome%2C%20or%20dependent%20variable.](https://online.stat.psu.edu/stat462/node/91/#:~:text=Simple%20linear%20regression%20is%20a,two%20continuous%20(quantitative)%20variables%3A&text=The%20other%20variable%2C%20denoted%20y,%2C%20outcome%2C%20or%20dependent%20variable.)

<https://www.scribbr.com/statistics/simple-linear-regression/>

[https://en.wikipedia.org/wiki/Simple\\_linear\\_regression](https://en.wikipedia.org/wiki/Simple_linear_regression)

The obtained Simple Linear regression with Best fitting line



The obtained Results of the Linear regression program

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PS D:\College\First Semester\PESU.IO\Introduction to Machine Learning\Programs>  
U.IO/Introduction to Machine Learning/Programs/lineareg.py"  
Slope [[2.93655106]]  
Intercept: [2.55808002]  
RMS error 0.07623324582875007  
R2 score 0.9038655568672764
```