CSE 471: Machine Learning

Regression Algorithms: Linear Regression

Tajkia Nuri Ananna

January 30, 2023

Lecturer, Metropolitan University

Table of contents

Use of Linear Regression

Use of Linear Regression

Use of Linear Regression

Find out the **factors** effecting the annual sales

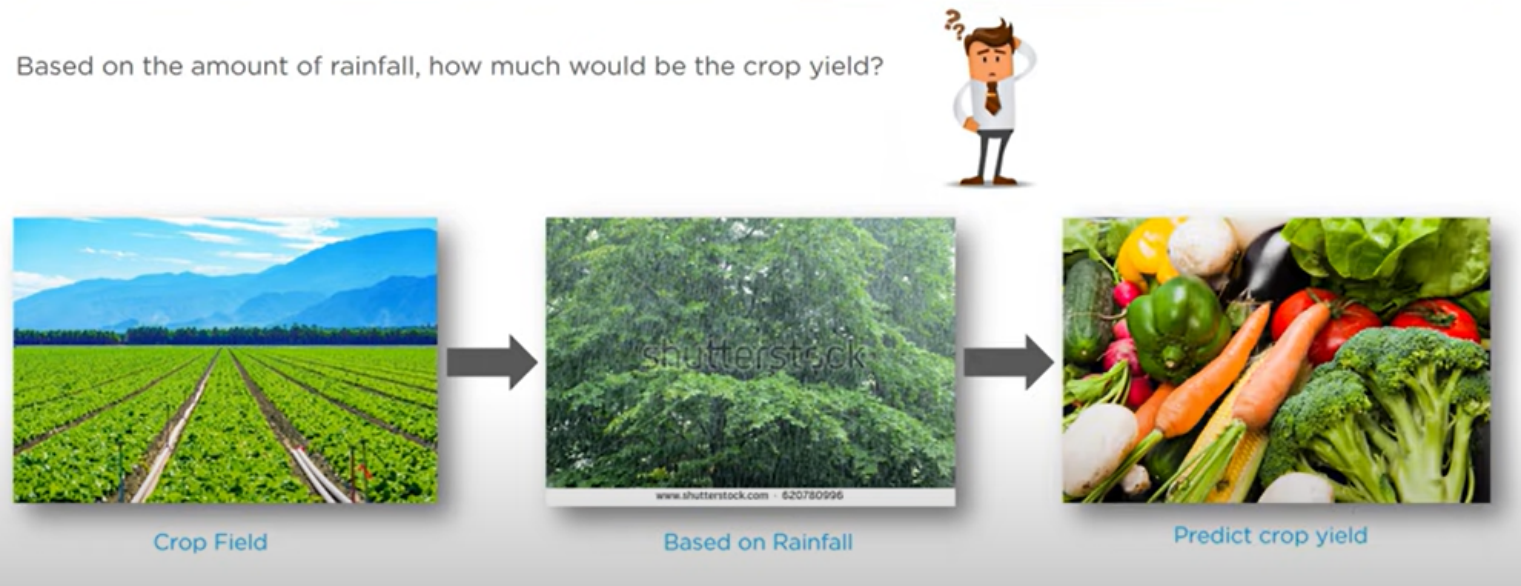
Annual Sale

Predict the Annual Outcome

Terminologies

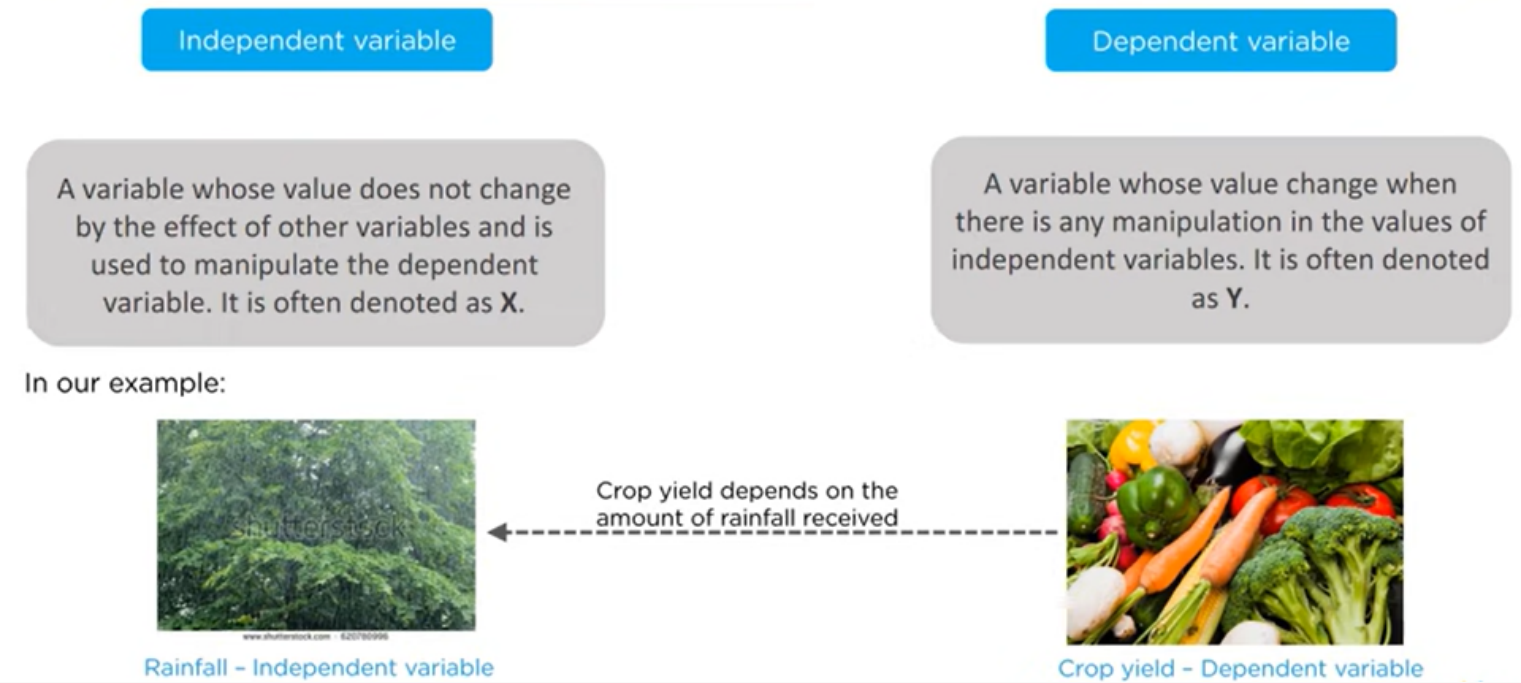
Terminologies

Based on the amount of rainfall, how much would be the crop yield?

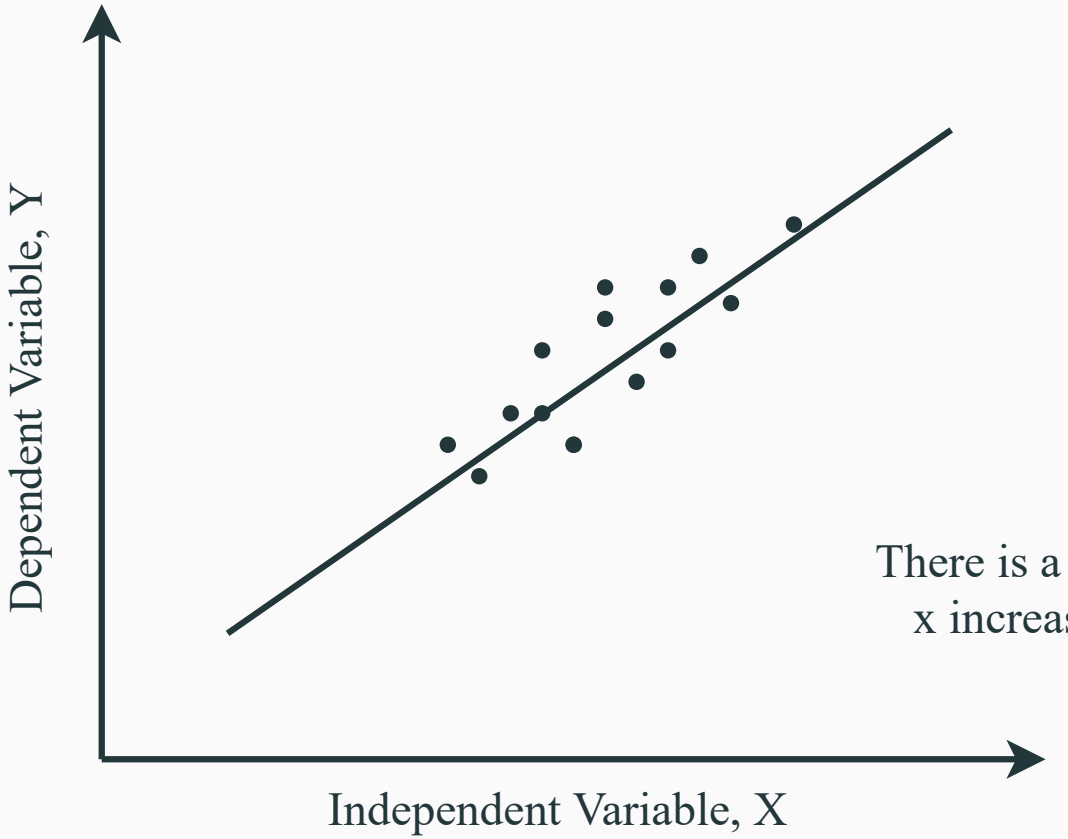


Independant and Dependant variable

Our motive is to find a relationship between the dependant and independant variable!



Linear Regression



There is a linear relationship, if
x increases y also increases

Types of Linear Regression

There are Two types of linear regression.

Simple Linear Regression

- Single dependant and independent variable
- We use simple linear equation: $\hat{y} = \beta_0 + \beta_1 x$, where x = independant variable or feature, = dependant variable or outcome and β_0 = constant and β_1 = Regression Coefficient
- We can also represent it in the following form:$y = mx + c$

Types of Linear Regression

There are Two types of linear regression.

Multiple Linear Regression

- Single dependant variable and multiple independent variable
- We use simple linear equation:
  $\hat{y} = \alpha_0 + \alpha_1 x_1 + \alpha_2 x_2 + \alpha_3 x_3 ..... + \alpha_m x_m$, where x = independant variable or feature, y = dependant variable or outcome and $\alpha_0 to \alpha_m$ = Regression Coefficient

Linear Regression Example

Linear Regression Example

x	y
1	3
2	4
3	5
4	7

Linear Regression Example

Solution

- We have to find a relationship, $Y = \beta_0 + \beta_1 X$
- $\beta_1 = \frac{\sum xy - \frac{\sum x \sum Y}{n}}{\sum x^2 - \frac{(\sum x)^2}{n}}$
- $\beta_0 = \frac{\Sigma y - \beta_1 \Sigma x}{n}$


Thank
YOU!