Introduction to Machine Learning

What is Machine Learning ? (...the short version)

Machine learning is about using some properties of a dataset to make assumptions and then testing those assumptions against another data set to see if they are true and/or how well they work.

Types of Machine Learning

- **Supervised learning,** in which the data comes with additional attributes that we want to predict This problem can be either:
  - **Classification:** samples belong to two or more classes and we want to learn from already labeled data how to predict the class of unlabeled data.
  - **Regression**, the desired output consists of one or more continuous variables, then the task is called regression.
- **Unsupervised learning**, the training data consists of a set of input vectors x without any corresponding target values. The goal in such problems may be to discover groups of similar examples.

Ref: https://scikit-learn.org/stable/tutorial/basic/tutorial.html

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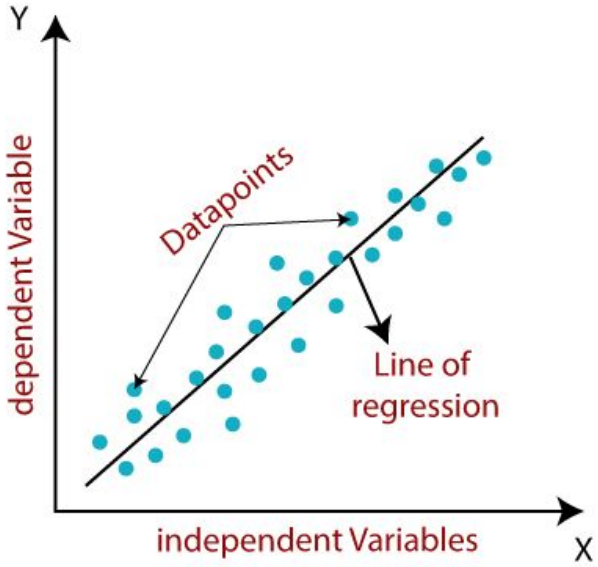
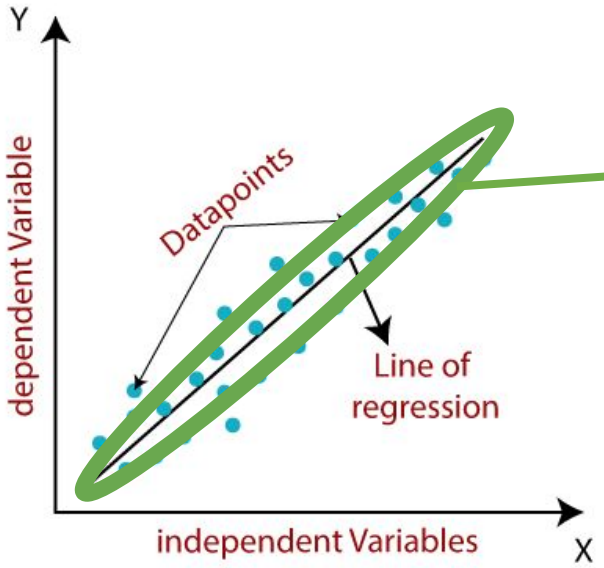
Linear Regression



Simple Linear Regression	$y = b_0 + b_1 x_1$
Multiple Linear Regression	$y = b_0 + b_1 x_1 + b_2 x_2 + \ldots + b_n x_n$
Polynomial Linear Regression	$y = b_0 + b_1 x_1 + b_2 x_1^2 + \ldots + b_n x_1^n$

Linear Regression

The formula using the calculated coefficients of this line is the model!



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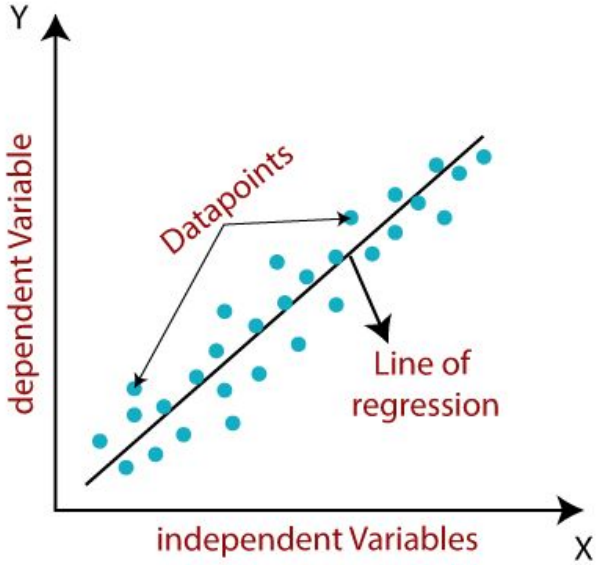
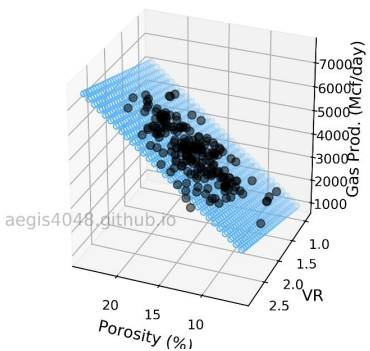
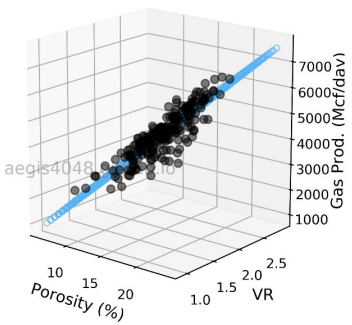
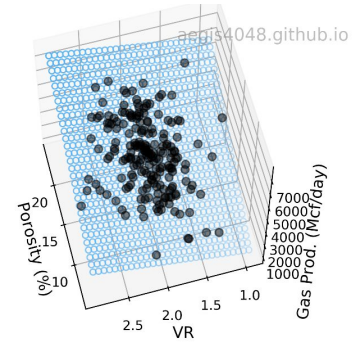
Linear Regression vs Multivariate Regression



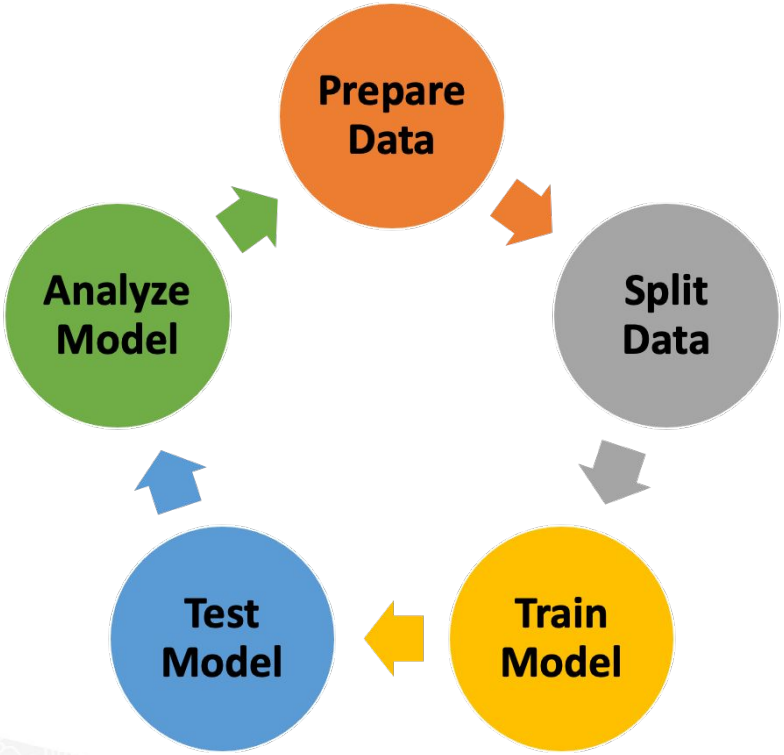






Line **vs** **Plane**

How does it work?



Demo Time!