LR:linear regression is a type of supervised machine learning algorithm that computes the linear relationship between the dependent variable and one or more independent features by fitting a linear equation to observed data.

When there is only one independent feature, it known as simple linear regression, and when there are more than one feature , its known as multiple linear regression

#### The goal of the algorithm is to find the **best Fit Line** equation that can predict the values based on the independent variables.

The best Fit Line equation provides a straight line that represents the relationship between the dependent and independent variables. The slope of the line indicates how much the dependent variable changes for a unit change in the independent variable(s).

### Why Linear Regression is Important?

facilitating a deeper understanding of the underlying dynamics

Its simplicity is a virtue

as linear regression is transparent, easy to implement, and serves as a

foundational concept for more complex algorithms.

can handle large datasets effectively

It can be trained quickly on large datasets, making it suitable for real-time applications.

Disadv

* Linear regression assumes a linear relationship between the dependent and independent variables. If the relationship is not linear, the model may not perform well.

Linear regression provides limited explanatory power for complex relationships between variables. More advanced machine learning techniques may be necessary for deeper insights

polo regre

Polynomial regression is a type of regression analysis used in statistics and machine learning when the relationship between the independent variable (input) and the dependent variable (output) is not linear

polynomial regression allows for more flexibility by fitting a polynomial equation to the data.

When the relationship between the variables is better represented by a curve rather than a straight line, polynomial regression can capture the non-linear patterns in the data

### **Advantages of using Polynomial Regression**

* A broad range of functions can be fit under it.
* Polynomial basically fits a wide range of curvatures.
* Polynomial provides the best approximation of the relationship between dependent and independent variables.

### **Disadvantages of using Polynomial Regression**

* These are too sensitive to outliers.
* The presence of one or two [outliers](https://www.geeksforgeeks.org/machine-learning-outlier/) in the data can seriously affect the results of nonlinear analysis.
* In addition, there are unfortunately fewer model validation tools for the detection of outliers in nonlinear regression than there are for linear regression.

RF

A random forest is an ensemble learning method that combines the predictions from multiple decision trees to produce a more accurate and stable prediction

It is a type of supervised learning algorithm that can be used for both classification and regression tasks.

the output doesn’t depend on one decision tree but on multiple decision trees. In the case of a classification problem, the final output is taken by using the majority voting classifier. In the case of a regression problem,