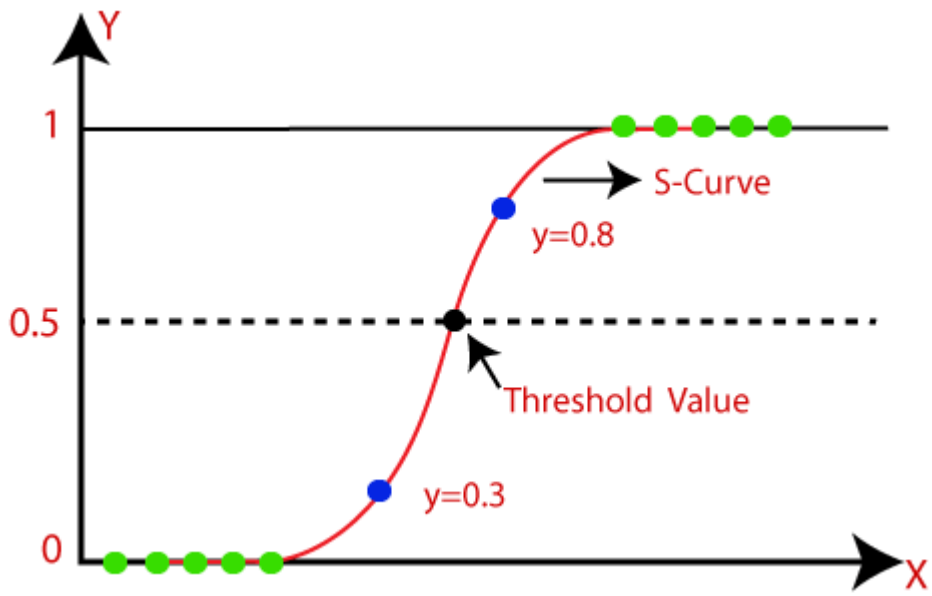
Logistic Regression

Logistic Regression is a Classification Machine Learning technique which it borrowed by ML from the field of statistics. It means that Logistic Regression is a statistical technique. It is one of those algorithm that Machine Learning enthusiasts are comes across in the early stage of machine learning. Under the Supervised Machine Learning there are two types of variables.

1. **Independent variable**: it is independent that does not effect by other valuable.
2. **Dependent variable**: It depends on independent variable.

The main aim of Logistic Regression is to predict the categorical value, this value would be True/ False, 1/0, Yes/ No. But in Logistic Regression the value is between (0 – 1). The name of Logistic Regression is derived from logistic function that it uses. The logistic function is also known as Sigmoid function. And because of this function the values is between zero to one.



The Threshold which is indicated on the graph is like separated line between categories. But this Threshold convert predicted probability into class label. The values that are higher than the threshold value tend towards having probability of 1. On the other hand, values lower than

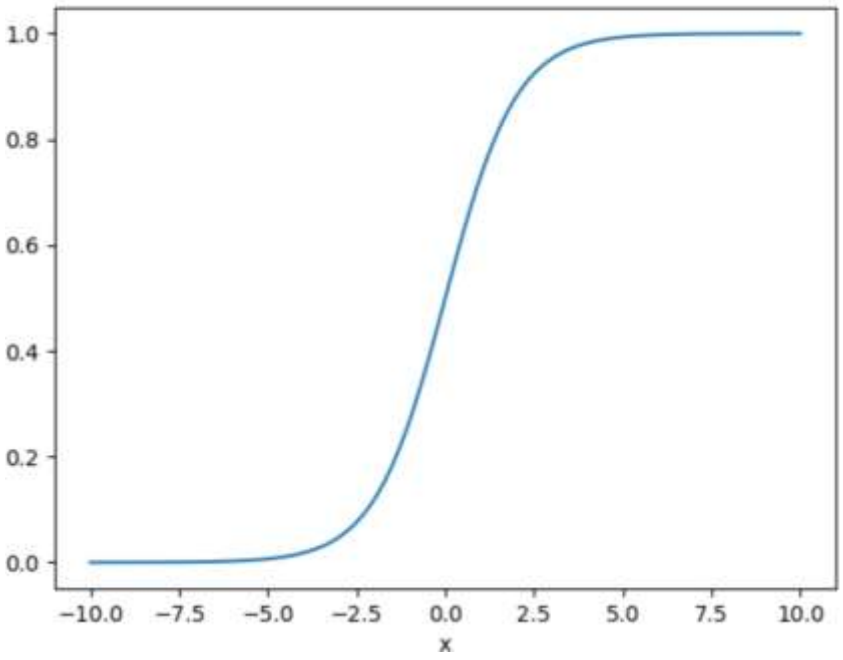
threshold tends toward having probability of 0. The curve from the logistic function indicates the likelihood of something.

Logistic Function (Sigmoid Function)

Sigmoid function is a mathematical function that takes any real number and it map it to a probability between (0, 1).

The formula of sigmoid function is:

$$f(x) = \frac{1}{1 + e^{-x}}$$



Linear Regression vs. Logistic Regression

Linear Regression	Logistic Regression
It is used to solve regression problem	It is used to solve classification problem
The output is continues	The output is categorical
It is a straight line	It is an S-curve (S = Sigmoid)

Types of Logistic Regression:

In general, there are three type of Logistic Regression.

1. **Binary**: Deals with two possible values. Such as, (YES / NO)
2. **Multinomial**: Deals with three or more values.
3. **Ordinal**: Deals with three or more classes in a predetermined order.

Steps in Logistic Regression

1. Data preprocessing step.
2. Fitting Logistic Regression to the Training set.
3. Predicting the test result.
4. Test accuracy of the result.
5. Visualizing the test set result.