

Logistic Regression (Binary Classification)

Despite its name, Logistic Regression is a supervised machine learning classification algorithm used to predict the categorical dependent / target variable using a given independent variable set.

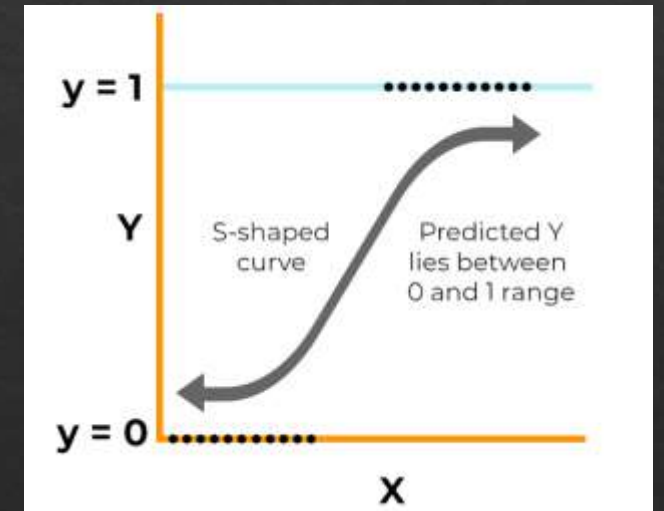
Logistic Regression for binary classification is when we have two possible values for the target variables.

It uses S-Curve to classify different categories in the dataset.

Mathematical Equation: $Y = 1 / 1 + e^{- (m*x + c)}$

This is also known as the sigmoid function.

Eg: Passing a test or not, responding yes or no on the survey, having high or low blood pressure.



Logistic Regression (Multiclass classification)

Logistic Regression for multiclass classification is used to predict having more than two possible values of the target variable using a given set of the independent variable.

It is also known as multinomial logistic regression.

If we have more than one predictive variable our formula is:

$$f(x) = m_1x_1 + m_2x_2 + m_3x_3 + \dots + m_nx_n + c$$

So using $f(x)$ in the prediction of the target variable:

$$\text{Mathematical Equation: } Y = 1 / 1 + e^{- (f(x))}$$

Example: Mail Classification on primary, social, promotion and forums.

GitHub link: [https://github.com/AmeenUrRehman/Machine-Learning-Projects/tree/up-pages/Logistic%20Regression%20\(Multiclass%20Classification\)](https://github.com/AmeenUrRehman/Machine-Learning-Projects/tree/up-pages/Logistic%20Regression%20(Multiclass%20Classification))

Advantages:

- Logistic Regression is easy to implement and efficient to train.
- It is very fast at classifying unknown records.
- It makes no assumption about the distribution of classes in feature space.

Disadvantages:

- It is not good for complex relationship datasets.
- It assumes linearity between the Independent and Dependent variables.
- It requires average or no multicollinearity between independent variables.

Logistic regression is used when your Y variable can take only two values, and if the data is linearly separable, it is more efficient to classify it into two separate classes