Data Science with Python : Logistic Regression Algorithm #1125
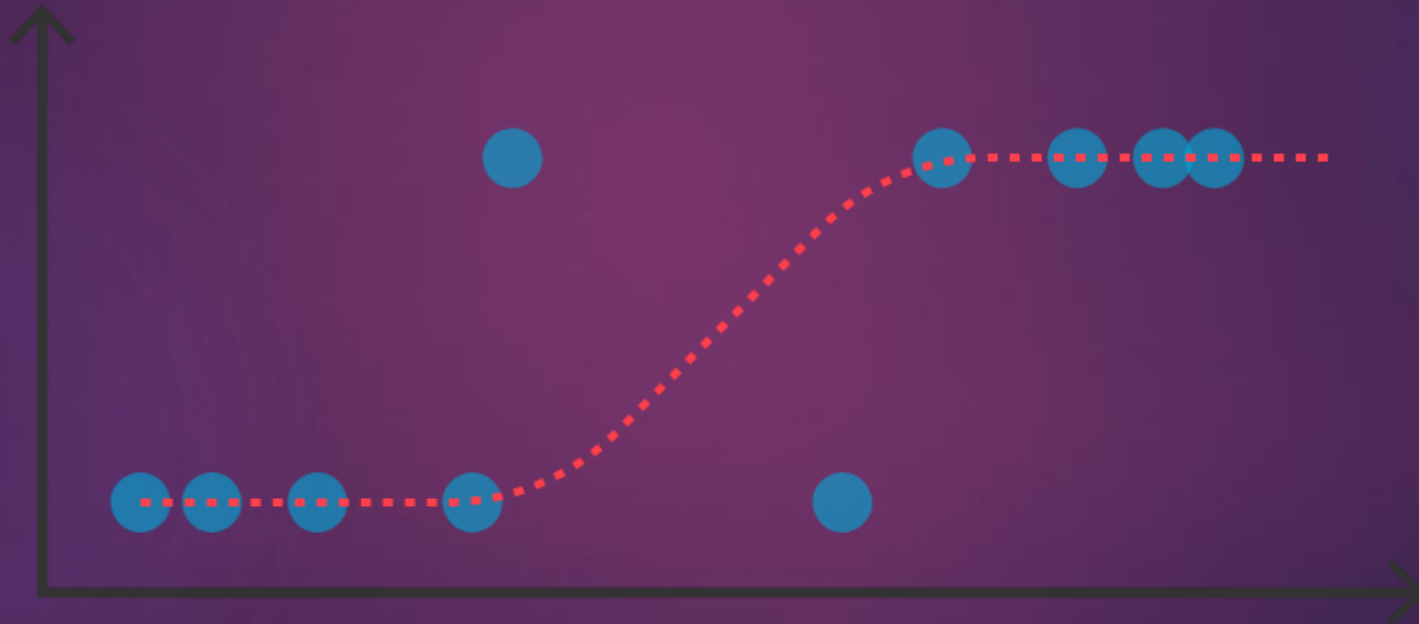
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Logistic Regression

- Logistic Regression both are supervised machine learning techniques.

Logistic Regression:

- Logistic Regression makes predictions when output variable is discrete or categorical in nature.
- It shows a sigmoid relation between dependent variable and independent variables.
- Equation:

$$\ln(\frac{P}{1-P}) = a + bX$$

Types of logistic regression:

- Simple logistic regression
- Multiple logistic regression.

- Equation of simple logistic regression:

$$\ln(\frac{P}{1-P}) = a + bX$$

- Equation of multiple logistic regression:

$$\ln(\frac{P}{1-P}) = a + bX$$ **+ cX2+……**

How to measure logistic regression?

Error functions and accuracy functions:

- Mean error.
- Mean absolute error.
- Mean square error.
- Root mean square error.
- Mean percentage error.
- Mean absolute percentage error.

Assumptions for best fit of logistic regression:

- Multi-collinearity.
- Homoscedasticity.
- Normal distribution.
- Auto-correlation.

The Differences between Linear Regression and Logistic Regression:

•Linear Regression is used to handle regression problems whereas Logistic regression is used to handle the classification problems.

•Linear regression provides a continuous output but Logistic regression provides discrete output.

•The purpose of Linear Regression is to find the best-fitted line while Logistic regression is one step ahead and fitting the line values to the sigmoid curve.

•The method for calculating loss function in linear regression is the mean squared error whereas for logistic regression it is maximum likelihood estimation.

Advantages	Disadvantages
Logistic regression is easier to implement, interpret, and very efficient to train.	If the number of observations is lesser than the number of features, Logistic Regression should not be used, otherwise, it may lead to overfitting.
It makes no assumptions about distributions of classes in feature space.	It constructs linear boundaries.
It can easily extend to multiple classes(multinomial regression) and a natural probabilistic view of class predictions.	The major limitation of Logistic Regression is the assumption of linearity between the dependent variable and the independent variables.