

1. Assumptions of Simple Linear Regression:

- a. *Linear Relationship*: The relationship between independent and dependent variables are linear in nature. Plotting a scatter plot lets us visualize the extent of linearity between the two variables.
- b. *Multivariate Normal*: We assume that all the variables in the distribution are multivariate normal in nature. A Q-Q plot can be used to test this criterion.
- c. *No (or little) Multicollinearity*: If the independent variables are dependent on each other, this leads to Multicollinearity. This can be verified by computing Pearson's Bivariate Correlation among all the independent variables.
- d. *No (or little) Autocorrelation*: There should be no autocorrelation in the data. That is, Y_{N+1} and Y_N must be independent of each other. This also translates the the residuals.
- e. *Homoscedasticity*: The error terms along the regression line must be uniform (i.e., is the error terms along the regression are equal). Again, plotting a scatter plot may assist us in determining the homoscedasticity of the data.

2. Assumptions of Multiple Linear Regression:

Multiple linear regression makes the same assumptions as a standard linear regression. The key difference here is that the regression is performed with more than one independent variable where as simple linear regression works on just one independent variable at a time.

3. Assumptions of Logistic Regression:

- a. *Binary/Ordinal Dependent Variable*: The dependent variable must be binary or ordinal in nature.
- b. *Independent Observations*: When a collection of observations are made, it needs to be ensured all observations are independent of each other.
- c. *No Multicollinearity*: Independent variables must not be dependent on each other.
- d. *Linearity of independent variables and log odds*: Although the Logistic Regression doesn't require the dependent and independent variables to be linearly related like in simple/multiple linear regression. It is necessary that the independent variables and log odds are linearly related.

References:

[1] <http://www.statisticssolutions.com/>