Multiple Linear Regression

Uses multiple independent variables.

Y = b0 + b1\*x1 + b2x2 + … + bn\*xn

Assumptions of Linear Regression

1. Linearity
2. Homoscedasticity
3. Multivariate normality
4. Independence of errors
5. Lack of multicollinearity

Since x can now contain multiple variables, it can be represented as a vector e.g. y = wTx +b where w has dimensionality D. Since we are taking the dot product of w and x, it thereby stands that y has to also have dimensionality D.

If we rename b to w0, we can have the value absorbed into w by appending 1 to a feature vector x. This is because since w0 will be the initial weight i.e. the bias, it will be normally linked to an initial x value, x0 which is normally equal to 1. This would be the equivalent of adding an NxD column of 1s. where N is the number of samples and D is the number of features(inputs).

The error function for w will still be the mean squared error.