DS222: Assignment-2

Rahul Chittimalla

1. Local Logistic regression

Logistic regression algorithm also uses a linear equation with independent predictors to predict a value. The predicted value can be anywhere between negative infinity to positive infinity. We need the output of the algorithm to be class variable, i.e 0-no, 1-yes. Therefore, we are squashing the output of the linear equation into a range of [0,1]. To squash the predicted value between 0 and 1, we use the sigmoid function.

$$z = \theta_0 + x_1 \cdot \theta_1 + x_2 \cdot \theta_2 ...$$
$$h = g(z) = \frac{1}{1 + e^{-z}}$$

The cost function used for logistic regression is

$$J = \frac{-1}{m}[\sum y^{(i)} log h_\theta^{(i)} + (1-y)^{(i)} log(1 - h_\theta^{(i)})]$$

If w is the weight parameter then the gradient of the loss function with respect to w is given by

$$J = \frac{-1}{m} X^T (h - y)$$

where X an mxd matrix, m are the number of instances and d is the dimension of features.