Week 1 Report: Supervised Learning review

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1 Supervised Learning

Supevised Learning is a Statiscal Learning technique in which for each observation of the predictor mesurement x_i there is an associated respond measurement y_i. The target is to fit a model that related the relation between the predictor and the respond for prediction or inference.

2 Description of Linear Model

2.1 Model Form

$$Y = F(X) + \varepsilon = \beta_0 + \beta_1 * X_1 + ... + \beta_n X_n + \varepsilon$$

where Y is the respond, X is the predictor. The Linear Model assume the linear relationship between the predictor X and respond Y

2.2 Normal Equation

In order to solve the weights for linear regression problem, we compute the least square line/plane. The least square vector is the solution of the normal equation:

$$(X^T X)\hat{\beta} = X^T Y$$

2.3 Geometric Interpretation of the solution

2.4 Computation of the Prediction of a Linear Model

After the weight for a linear system have been calcualted, prediction $\hat{Y}$ can be obtained by

$$\hat{Y} = \hat{F}(X),$$

where $\hat{F}$ represent the estimation of $F(X)$. The form of $\hat{F}(X)$ is not relevant as long as it yield accurate $\hat{Y}$