

Notation Reference Sheet

Hypotheses

h : hypothesis

$H = \{h_1, h_2, h_3, \dots\}$: hypothesis space

Data

$\mathbf{x} = \begin{pmatrix} x_1 \\ x_2 \\ \vdots \\ x_M \end{pmatrix}$: data point corresponding to a column vector of M features

$\bar{\mathbf{x}} = \begin{pmatrix} 1 \\ \mathbf{x} \end{pmatrix} = \begin{pmatrix} 1 \\ x_1 \\ x_2 \\ \vdots \\ x_M \end{pmatrix}$: concatenation of 1 with the vector \mathbf{x}

$\mathbf{X} = \begin{pmatrix} x_{11} & \cdots & x_{1N} \\ \vdots & \ddots & \vdots \\ x_{M1} & \cdots & x_{MN} \end{pmatrix}$: dataset consisting of N data points of M features

$\bar{\mathbf{X}} = \begin{pmatrix} 1 & \cdots & 1 \\ x_{11} & \cdots & x_{1N} \\ \vdots & \ddots & \vdots \\ x_{M1} & \cdots & x_{MN} \end{pmatrix}$: concatenation of a vector of 1's with the matrix \mathbf{X}

y : output target (regression) or label (classification)

$\mathbf{y} = \begin{pmatrix} y_1 \\ y_2 \\ \vdots \\ y_N \end{pmatrix}$: vector of outputs for a dataset of N points

N : # of data points in a dataset

n : index of a data point in a dataset

M : # of features in a data point

m : index of a feature in a data point

Weights

$\mathbf{w} = \begin{pmatrix} w_1 \\ w_2 \\ \vdots \\ w_M \end{pmatrix}$: vector of weights

$\mathbf{w}^T = (w_1, w_2, \dots, w_M)$ or $(w_0, w_1, w_2, \dots, w_M)$ depending on the context (here w_0 is an additional weight that multiplies the first entry of $\bar{\mathbf{x}}$ when computing $\mathbf{w}^T \bar{\mathbf{x}}$)