Notation Reference Sheet

Hypotheses

\( h \): hypothesis

\( H = \{h_1, h_2, h_3, \ldots \} \): hypothesis space

Data

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

\( \bar{x} = \left( \begin{array}{c} 1 \\ x_1 \\ x_2 \\ \vdots \\ x_M \end{array} \right) \): concatenation of 1 with the vector \( x \)

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

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

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

\( y = \begin{pmatrix} y_1 \\ y_2 \\ \vdots \\ y_N \end{pmatrix} \): 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

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

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