eCornell

CHEAT SHEET

Perceptron

Algorithm Name	Perceptron
Description	The perceptron attempts to converge to a weight vector $\mathbf{w}$ that separates the data points. In essence, it iterates through the whole data set and when it encounter a misclassified points, it updates using $\mathbf{w} \leftarrow \mathbf{w} + y\mathbf{x}$.
Applicability	Binary classification problems.
Assumptions	Data are linearly separable and the labels have to be ± 1.
Underlying Mathematical Principles	A hyperplane is defined as $\mathbf{w}^T\mathbf{x} = 0$, where $\mathbf{w}$ determines the the orientation of the hyperplane. Predictions areing at the sign of $h(\mathbf{x}) = sign(\mathbf{w}^T\mathbf{x})$.
Additional Details	• Perceptron is a mistake-driven algorithm in the sense that it will update the parameter $\mathbf{w}$ when it incorrectly classifies any data. • You can append bias b to $\mathbf{w}$ by appending a 1 to all data points. • Depending on how our data points are ordered, the parameter $\mathbf{w}$ will be different.
Example	You want to classify cats and dogs based on number of meows (x-axis) and number of woofs (y-axis). The data should be linearly separable.