Support Vector Classification-Summary Sheet

ML@LSE

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Abstract

Objectives: Understand linear classification methods. Understand their generalization to non-linear classification. Get a sense of the Kernel idea and Support Vector Machines.

Requirements: Introductory Bootcamp (you can read the slides if you didn't attend). Although not necessary, familiarity with notions of linear algebra may greatly help: hyperplanes, dot and inner products. Some familiarity with constrained optimization may help.

Keywords: Hyperplane, Margin, Maximal Margin Classifier, Soft Margin Classifier, Non-linear Boundaries, Inner Product, Kernels, Support Vector Machines.

A *LINEAR CLASSIFICATION*

A.1 Maximal Margin Classifier

a Hyperplanes?

b Maximal Margin Hyperplane

A.2 Soft Margin Classifier

a The Optimization Problem of SMC

b The Bias-Variance trade-off

B *SUPPORT VECTOR MACHINES*

B.1 Non-linear Decision Boundaries

a What if we enlarged the Features Space?

b The New Optimization Problem

B.2 Kernel Tricks

a Inner Product and the Kernel Idea

b Support Vector Machines