Convex Analysis Motivation for Support Vector Machine

Lenny Fishler & Tin Tun Naing

April 2018

1 Content

1.1 Motivation

- Spam or not spam.

- Linear Classification using hyperplanes

1.2 Concepts(Background) for Support Vector Machine

- Primal Constrained Optimization Problemm

- Laragian Dual Function

- Dual Optimization

- Farkas' Lemma (Proof)

- Linear Separability (Proof)

- Margin of Hyperplane (Proof)

- Strong Duality??

- Cost Function??

- Addressed Issues/concerns and further discussions.

1.3 Code

Note: should use program demonstration as an opener, then exmplanation after all the concepts

- Simple example from scikit learn on SVMs

- Find an interesting problem/data set

- try to incorporate convex into the code