

Convex Relaxation for Latent Models

Keywords:

Convex optimization, graphical models

Outline:

Latent variables play a key role in machine learning to encode the underlying regularities in the data. Examples include PCA, mixture models, and restricted Boltzmann machine (RBM). Learning these models from data usually results in a non-convex optimization and only locally optimal solutions are found. Convex relaxation tries to design a convex approximation of the problem, e.g. via relaxing discrete constraints, while at the same time retaining the salient regularities in the data. In many problems it proffers state-of-the-art performance in learning. Recently many novel latent models have been shown effective, such as RBM, and deep network.

Goals of this project

The goal of this project is to develop convex relaxations for these models, in a way that is both tight and efficiently optimizable. This will enable more accurate learning of these latent models which have been conventionally trained by heuristic methods, and will have profound impact on a number of machine learning applications such as clustering and feature extraction.

Requirements/Prerequisites

Good knowledge of linear algebra.

Ability to program, and willingness to learn.

Background Literature

See my publication page.