

# Large Scale Optimization for Sparse Modeling

## Keywords

Optimization, sparse coding

## Outline

At the heart of many machine learning algorithms is the problem of convex optimization. It characterizes the desirable properties of a model by regularizers and loss functions, and the convexity allows modelling to be decoupled with optimization. In the era of big data, the computational cost of conventional optimization methods has become exorbitant, and therefore customized algorithms are required to restore efficiency. This requires a refined exploitation of the structures in the problem, such as decomposition of loss, sparsity or low-rankness of the optimal model, and other efficient approximations of convex sets or functions.

## Goals of this project

The project aims to develop novel efficient optimization algorithms for advanced sparse models, which originate from convex relaxation of submodular functions. It will leverage techniques from discrete optimization, convex analysis, and statistics. The developed approach can be readily used in applications such as computer vision and language modelling.

## Requirements/Prerequisites

Good knowledge of linear algebra.  
Ability to program, and willingness to learn.

## Background Literature

See my publication page.