Master's Thesis

Rate-Distortion Theory for Sparse Sources

This project investigates information theory limits for the lossy compression of sparse sources. Motivated by the recent mathematical theory **Compressed Sensing** that deals with the efficient acquisition and reconstruction of sparse signals, we try to determine the fundamental limits of digitally storing data created by such sources.
A sparse source emits a string of symbols of which - loosely speaking - only a few contain information. There are different ways to model these sources. An example is the Gaussian spike source which emits a Gaussian symbol with probability p and a zero with probability 1-p.

Possible directions of a project are:

- Investigating different source models
- (Numerically) determining the rate distortion function of a sparse source
- Computing finite length performance bounds for sparse sources

Prerequisites:

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- Information Theory (must)
- Pleasure with mathematics (must)
- Multiuser information theory (beneficial)

Advisors

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