Chair of Communications Engineering
TUM Department of Electrical and Computer Engineering
Technical University of Munich

Master's Thesis

Designing Clustering Algorithms based on Message Passing Approximation Techniques

Clustering is the task of grouping objects in a ''meaningful'' way such that objects in the same group are more similar to eachother than to those in other groups. Clustering is the main workhorse in un-supervised learning and has numerous applications in various disciplines including data mining and pattern recognition.

Since it's introduction in 2007, Affinity Propagation (AP) has become one of the most well known clustering algorithms. The main idea of AP is to optimize the final pairwise similarity based clustering cost function in an approximate way by using a low complexity message passing algorithm. It has been applied to various kinds of datasets ranging from gene expression data to image categorization tasks. Unfortunately AP suffers from the fact that it searches for spherical neighbourhoods to form clusters.

In this work the student will work on designing a new algorithm which in principle is motivated also by AP but is much more effective in discovering non-spherical patterns in data as well.

Advisors

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