Bachelor Thesis or Research Thesis (Forschungsarbeit)
Unsupervised Representation Learning for Clustering

Motivation and Background

Clustering is a fundamental task in the field of machine learning. Especially, in the last years an enormous amount of real world data became available — but in most of the cases without any information or label. To learn “how the world works”, unsupervised learning algorithms are essential for the future of AI.

However, the performance of clustering algorithms is dependent on the distribution of the data. As a result, representation learning is often used alongside clustering to map the input data into a clustering-friendly feature space.

Since supervised deep learning offered great possibilities in the last decade, it can be used for the unsupervised representation learning to enable a non-linear mapping to the clustering-friendly feature space. Since clustering is handled in an unsupervised fashion, the application of deep learning is less trivial and requires more theoretical analysis [1].

Proposed Topics

Current topics are possible, including:

- Implementation and Analysis of state-of-the-Art deep learning based clustering algorithms

Please contact me for more information.

Prerequisites

- High motivated, independent and structured way of working
- Theoretical background in the field of machine learning and deep learning
- Programming expertise in Python or is beneficial

Interested applicants should send their curriculum vitae and list of grades to: alexander.bartler@iss.uni-stuttgart.de

References