# Numerical methods for pattern recognition

Background and general goal

In modern society, huge amounts of data are collected and stored in various places. The data is often unstructured and information cannot be analyzed directly by a human being. The computerized extraction of qualitative data from enormous data sets is usually called "data mining". A typical example in data mining is to reliably identify hand-written characters in an automatic way, for instance to determine the hand-written postal code on letters. In this project we study a specific approach to automatically recognize hand-written digits. The approach is based on the numerical method called singular value decomposition.

Tasks

- Learn about theory and computation of singular value decomposition

- Learn about training aspects of pattern recognition

- Characterize the reliability of the approach based on real-world data from hand-written postal codes (provided)

- Experimentally determine a method which classifies digits and classify unidentifyable digits
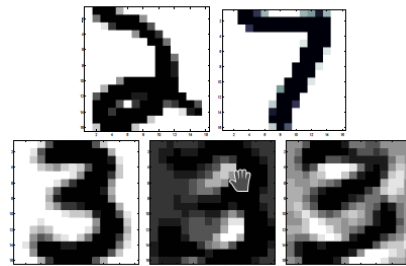
References

- Golub and Van Loan, Matrix computations (4th ed.), ISBN: 9781421407944, Chapter Singular value decomposition,

- *Numerical Linear Algebra in Data Mining*, Acta Numerica (2006), DOI: 10.1017/S0962492904

The project can be done in english or swedish.