ETH

Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

TIK

Technische Informatik und Kommunikationsnetze
Computer Engineering and Networks

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Semester / Master Thesis:

Feature Selection VS Feature Extraction

Motivation and Informal Description: In machine learning and pattern recognition, a feature is a measurable property of a phenomenon being observed. Choosing discriminating and independent features is key to any pattern recognition algorithm being successful in classification. For instance, if our goal is to detect a cow in an image while any pixel of the image can be seen as a feature, not all of the are informative and useful for our goal. In real applications usually tens of thousands of features are measured while only a very small percentage of them carry useful information towards our learning goal. Therefore, we usually need an algorithm that compress our feature vector and reduce its dimension. Two groups of methods which can be used for dimensionality reduction are: 1) Feature extraction methods where apply a transformation on the original feature vector to reduce its dimension from d to m. 2) Feature selection methods that select a small subset of original features. In this work, we want to comparte the linear discriminant analysis (LDA) which is a traditional feature extraction method with a forward selection based method (which is an instance of the feature selection algorithms) and find under which conditions, one of these algorithms works better.

Requirements: Some background in linear algebra and convex optimization is very helpful.

**Interested? Please have
a look at** http://www.tec.ethz.ch/research.html
**and contact us for more
details!**

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