

# Master-IT: Project Work WS 2010 / 2011

## Topic:

## Image Processing Algorithms for Structural Analysis of Printed Surfaces

### Area: Industrial Image Processing

- Start: September 2010
- Partner: SOI II – Banknote Research
  
- Tool: Matlab/Simulink
- Prerequisites: Programming know-how in Matlab's m-language, excellent knowledge in discrete signal processing or signals & systems.

### Description:

Within the scope of an industrial research project in the field of industrial signal processing, new approaches for the structural analysis of printed surfaces are to be researched. In particular, new feature extraction and classification algorithms are to be developed. Within the frame of this project, the project work will focus on the investigation of pattern recognition methods that discriminate and classify textures differently printed and structured. In particular, the algorithm should be able of clustering regions that feature specific structures. Subsequently, these clusters should be classified to families exhibiting similar textural surfaces.

The implementation of the algorithm might be realized as follows: a mask of arbitrary size is shifted in x and y direction over the image to be analyzed. Both the increment and the area of the mask are freely selectable. The smaller the dimension of the mask and the increment, respectively, the more detailed the analysis. However, a small mask and a narrow shift size result into high computational effort. Hence, a compromise between computational effort and resolution should be investigated.

For each region, which is bordered by the mask, one or several specific characteristics, i.e. features, are to be determined. Therefore, after having shifted the mask over the entire image, one obtains a screened map of features. Using this map, it should be possible to cluster the image according to regions that feature specific structures. With this in mind, the features should be chosen, so that a reliable clustering is possible. In order to achieve this goal, the application of several feature spaces is conceivable. This would have the advantage of separating different qualities of one characterization. For example, the color of a region and the direction of its structure could be analyzed in two separate feature spaces.

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