

Exercises for Image Processing 1 - WiSe 2012/13

Exercise 7

Project "Finding Characters by using SIFT Features"

The following exercise project has to be solved until 20.01.2013.

For the analysis of historic documents it is often necessary to search for all instances of a given character in a large image. Since the exact appearance of different handwritten instances of one character is never the same, one has to find similar images of characters.

Write a program for finding similar chinese characters in the document "ChinZeichen1.png" by using SIFT-like features. Ignore the color information and use just grayscale data. The program gets a character image as input and returns a list of coordinates, each describing the upper left hand corner of a similar character in the document. The found character windows are assumed to be of the same size as the input character image.

The following subtasks A to C have to be solved and documented separately. For each subtask write a brief description of the method, and describe the experimental results.

A Finding Points of Interest

Implement an "Interest Operator", which detects points of interest in an image (either the document image or the input character image).
(20 Points)

B Generating SIFT-Features

Design a descriptor for the surrounding area of some point of interest, e.g. by using gradient histograms. You can assume that the search character is of the same scale and orientation as the characters in the document. Thus your method does not have to be invariant regarding scale or rotation.
(20 Points)

C Retrieval

Implement an algorithm which searches in a document image for a given character. Show the results for at least three different search characters which you also can extract from the document image itself.
(20 Points)

You will have to present your method on 21.01.2013 by using a second document file "ChinZeichen2.png", which has the same characteristics as "ChinZeichen1.png". Dependent on the quality of your results on that file you can get up to 20 additional points.

Hint: The following document describes a possible solution. You can use it as orientation, but don't have to: <http://www.cvc.uab.es/icdar2009/papers/3725a763.pdf>