

Abstract

This thesis is related to handwriting recognition (HWR). Its main part is the description of the original algorithm for automatic recognition of the handwritten word from a digital image (off-line recognition). This algorithm does not use a pre-defined dictionary. Moreover, it is developed in a white-box model, so the intermediate results between its stages might be understood by a developer. The proposed algorithm contains three main stages: stroke extraction, pattern recognition, and text variant selection.

The first stage transforms an input image into a set of objects called strokes. A stroke is a basic fragment of a handwritten letter that might be created by a single move of a hand. A stroke may be a fragment of a straight line, a curve, or a cycle. In the stroke extraction stage, there are used some image processing algorithms, heuristics (especially greedy methods), and polynomial approximation.

In the pattern recognition stage, a set of extracted strokes is transformed into a set of variants of recognized text. Decision trees and some aspects of the fuzzy logic are used there. Each word variant has assigned a value describing how much the letters inside match patterns.

The final stage includes deciding which word variant should be selected. The value from the previous stage and some language statistics about the order of the letters are taken into account.

The last chapters contain a description of the implemented system and the obtained results. Besides that, the first chapters contain theoretical background about handwriting recognition and various aspects related to the proposed algorithm.