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Optimal stroke-correspondence search method for on-line character recognition

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Abstract

This paper describes an optimal stroke-correspondence search method that makes possible stroke-order-free on-line character recognition. During the stroke-correspondence search process, conventional individual stroke-information regarding the shape and position of each stroke, and interstroke-information regarding the mutual relationships among strokes are both employed. The optimal path search for stroke-correspondence, being based on an optimal criterion including both intra- and interstroke-information, is systematically carried out. The reasonable level stroke-correspondence search is achieved partially by using the information regarding the actually occurring stroke-order, which does not hinder the framework of stroke-order-free recognition due to its use of statistically stable information. A large improvement in both computational time and recognition-accuracy were achieved in the current experiments.

Keywords: On-line character recognition; Stroke-correspondence; Stroke-order information; Dynamic programming; Markov cube search

1. Introduction

For on-line recognition of large-alphabet languages such as Chinese or Japanese, much research has been carried out in an attempt to address three major issues: stroke-order-free recognition, stroke-number-free recognition, and the robustness of stroke-deformation (Nakagawa, 1990; Tappert et al., 1990). Previous works on stroke-order-free Chinese character recognition have been carried out by Odaka et al. (1982) and Wakahara et al. (1983, 1996). They define stroke-distance matrix as the distance between each stroke of the input pattern and each stroke of the reference pattern. Based on this matrix, the correspondence between input-pattern and reference-pattern strokes is determined. The problem with this approach, however, is that though it determines the rule of stroke-correspondence, the closest input-pattern stroke, i.e., that with the smallest stroke-distance, to the reference-pattern stroke is locally selected for correspondence (Odaka et al., 1982). Hence, there is the possibility of instability in the correspondence selection. Though previous

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