Hand-printed Arabic character recognition system using an artificial network.

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Pattern Recognition

Hand-printed arabic character recognition system using an artificial network

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Abstract

Character recognition systems can contribute tremendously to the advancement of the automation process and can improve the interaction between man and machine in many applications, including office automation, check verification and a large variety of banking, business and data entry applications. The main theme of this paper is the automatic recognition of hand-printed Arabic characters using artificial neural networks in addition to conventional techniques. This approach has a number of advantages: it combines rule-based (structural) and classification tests; it is more efficient for large Dand complex sets such as Arabic characters; feature extraction is inexpensive and the execution time is independent of character font and size. The technique can be divided into three major steps. The first step is pre-processing in which the original image is transformed into a binary image utilizing a 600 dpi scanner and then thinned using a parallel thinning algorithm. Second, the image skeleton is traced from right to left in order to build a

graph. Some primitives, such as Straight lines, Curves and Loops, are extracted from the graph. Finally, a five layer artificial neural network is used for the character classification The algorithm was implemented on a powerful MS-DOS microcomputer and written in C. The system was tested by 10 different users, whose writing ranged from acceptable to poor in quality and the correct recognition rate obtained was 92%.

Keywords

Pattern recognition; Arabic characters; Hand-printed; Parallel thinning; Feature extraction ; Structural classification; Back-propagation; Neural networks

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