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HANDWRITTEN CHARACTER RECOGNITION USING A NEURO-FUZZY SYSTEM

Baemuu Chang[1,2], Hunghsu Tsai[3] and Paota Yu[4]

[1]Department of Computer Science and Information Engineering
National Chung Cheng University
Min-Hsiung, Chia-Yi 621, Taiwan
bmchang@cs.ccu.edu.tw

[2]Department of Information Management
Chienkuo Technology University
Chang-Hua, Chang-Hua 500, Taiwan

[3]Department of Information Management
National Formosa University
Hu-Wei, Yun-Lin 632, Taiwan
thh@nfu.edu.tw

[4]Department of Computer Science and Information Engineering
National Chung Cheng University
Min-Hsiung, Chia-Yi 621, Taiwan
csipty@cs.ccu.edu.tw

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Abstract. *A novel character recognition method called Handwritten Character Recognition using a Neuro-Fuzzy (HCRNF) system is proposed in this paper. The HCRNF system integrates a Recurrent Neural Network (RNN) and a Fuzzy Inference System (FIS) to recognize handwritten characters. It employs an RNN to effectively extract oriented features of a handwritten character, and then, these features are applied to create an FIS which can powerfully estimate the similarity ratings between a recognized character and sampling characters in the character database. Experimental results demonstrate that the HCRNF system achieves a satisfying recognition performance.*
Keywords: Neuro-fuzzy system, Recurrent neural network, Fuzzy logics, Fuzzy inference system, Handwritten character recognition

1. **Introduction.** The recognition of handwritten characters plays an important role in the issue of research and development in image processing [1,3-10,13-16,18,20]. Visual recognition process always begins with extraction of some features from an input image. For example, oriented lines are such features. Oriented features of different types are popularly used for character recognition in OCR [2,18]. Actually, a character can be considered as a construction of parts at different orientations, lengths, and positions [2-6,14,18]. Therefore, a method for extracting such oriented parts from an input image is urgently required. Recurrent neural network (RNN) efficiently offers a solution to this problem [3-6].

Many kinds of recognition methods have been developed based on various feature representations [3-5,13]. Specially, in [13] Liou's method compares the unknown input character with each of all the standard characters in database and measures the similarity degree between them according to a certain similarity measurement. The method presents a