Translation, rotation and scale invariant pattern recognition using spectral analysis and hybrid genetic neural-fuzzy networks

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Abstract
A two dimensional image recognition method using spectral analysis and hybrid network classifiers was developed. The feature vectors using spectral analysis on normalized centroidal distance sequences of each image were extracted. The hybrid network classifiers using the advantages of conventional methods which are gradient-descent-searching backpropagation network (BPN), global searching genetic algorithm (GA), and fuzzy c-means algorithm (FCMA) were developed. The proposed method is applied to the recognition of aircraft, letters (Arabic numerals and English alphabet) and machine tools. The experimental results show that the proposed method has a higher accuracy, averaging 3.2% than BPN at a noise rate of 13 dB-25 dB, and the training times can be shortened by half of BPN while maintaining the same performance. Copyright © 1996 Elsevier Science Ltd.

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New algorithms for solving the fuzzy clustering problem


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