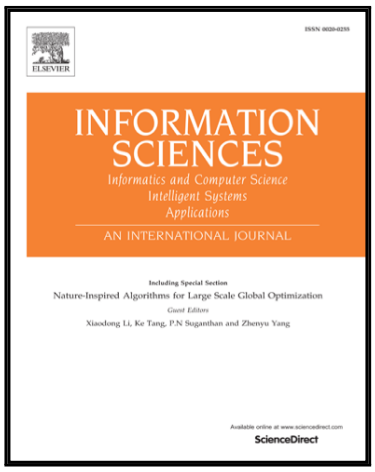

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Multi-Objective Optimization for Modular Granular Neural Networks applied to Pattern Recognition

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Abstract: A new method for Modular Neural Network optimization based on a Multi-objective Hierarchical Genetic Algorithm is proposed in this paper. The modular neural network using a granular approach and its optimization using a multi-objective hierarchical genetic algorithm provides better results than when the modular neural network is applied without a granular approach and optimization of parameters. The optimization of different parameters of the modular granular neural network architecture, such as the number of modules (sub-granules), size of the dataset for the training phase, goal error, learning algorithm, number of hidden layers and their respective number of neurons are performed in the proposed method. The fitness functions aim at minimizing the size of the dataset for the training phase and the error using a multi-objective approach. This method can be used in different areas of application, such as human recognition, classification problems or time series prediction. In this case the proposed method is tested with human recognition based on the face and ear biometric measures, where the proposed method aims at finding non-dominated solutions based on the number of data points for training and the recognition error. Benchmark face and ear databases are used to illustrate the advantages of the proposed approach.