Performance Evaluation of Fuzzy Single Layer Weightless Neural Network

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Abstract

The paper evaluates the performance of a neuro-fuzzy pattern classification system based on the weightless neural network architecture. The system utilizes a Single Layer Weightless Neural Network (SLWNN) to extract the features vector that measures the similarity of the input pattern to the different classification groups. In contrast to the traditional crisp Winner-Takes-All (WTA) classification scheme used by SLWNN, our system uses a Fuzzy Inference System (FIS) for classification. The network is trained by a hybrid learning scheme that combines a single pass learning phase for training the SLWNN followed by a supervised learning phase for extracting a set of fuzzy rules suitable to classify the training set. The FIS learns fuzzy rules from the feature vectors generated by the SLWNN for the set of training patterns. The recognition of handwritten numerals is employed as a test-bed to demonstrate the effectiveness of the proposed neuro-fuzzy system. Experimental results show that the performance of the proposed system surpasses the performance of the traditional SLWNN.