

Theory and Application of Cellular Automata For Pattern Classification

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Abstract

This paper presents the theory and application of a high speed, low cost pattern classifier. The proposed classifier is built around a special class of sparse network referred to as Cellular Automata (CA). A specific class of CA, termed as Multiple Attractor Cellular Automata (MACA), has been evolved through Genetic Algorithm (GA) formulation to perform the task of pattern classification. The versatility of the classification scheme is illustrated through its application in three diverse fields - data mining, image compression, and fault diagnosis. Extensive experimental results demonstrate better performance of the proposed scheme over popular classification algorithms in respect of memory overhead and retrieval time with comparable classification accuracy. Hardware architecture of the proposed classifier has been also reported.