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GOFAM: a hybrid neural network classifier combining fuzzy ARTMAP and genetic algorithm

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Abstract Fuzzy ARTMAP (FAM), which is a supervised model from the adaptive resonance theory (ART) neural network family, is one of the conspicuous neural network classifier. The generalization/performance of FAM is affected by two important factors which are network parameters and presentation order of training data. In this paper we introduce a genetic algorithm to find a better presentation order of training data for FAM. The proposed method which is the combination of genetic algorithm with Fuzzy ARTMAP is called Genetic Ordered Fuzzy ARTMAP (GOFAM). To illustrate the effectiveness of GOFAM, several standard datasets from UCI repository of machine learning databases are experimented. The results are analyzed and compared with those from FAM and Ordered FAM which is used to determine a fixed order of training pattern presentation to FAM. Experimental results demonstrate the performance of GOFAM is much better than performance of Fuzzy ARTMAP and Ordered Fuzzy ARTMAP. In term of network size, GOFAM performs significantly better than FAM and Ordered FAM.

Keywords Pattern classification · Fuzzy ARTMAP · Neural network classifier · Genetic algorithm · Adaptive resonance theory

1 Introduction

Pattern classification, in general, involves partitioning a feature space into several regions and assigning an incoming pattern into one of the classes defined on these regions. An output class is then determined from the mapping between the feature space and the decision space. There are several approaches to solving pattern classification problems, e.g., statistical

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