Assessment of EFuNN Accuracy for Pattern Recognition Using Data with Different Statistical Distributions

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Abstract. This work assesses the accuracy of Evolving Fuzzy Neural Networks (EFuNNs) for pattern recognition tasks using seven different statistical distributions data. The recently proposed EFuNNs are dynamic connectionist feed forward networks with five layers of neurons and they are adaptive rule-based systems. Results of assessment are provided and show different accuracy according to the statistical distribution of data.

Keywords: Evolving Fuzzy Neural Networks, Pattern Recognition, Accuracy Assessment.

1 Introduction

In 2001 Kasabov [5] proposed a new class of Fuzzy Neural Networks named Evolving Fuzzy Neural Networks (EFuNNs). EFuNNs are structures that evolve according determined principles. EFuNNs have low complexity and high accuracy which are important features to a pattern recognition method. In several papers EFuNN showed best results when compared to Multilayer Perceptron Neural Networks (MLP) [4, 7, 8, 9]. However, it is known that results of both nets depend on the training data for a specific applications. In particular, results are dependent on statistical distribution of training data. Previous works related to analysis of results on EFuNN with respect the statistical distributions of data were not found.

In this paper we made an assessment of accuracy of EFuNNs in pattern recognition tasks using seven different statistical distributions, with 1, 2, 3 and 4 dimensions for each. Results of those comparisons are provided with an analysis about the better kind of statistical distribution of data to be used for better EFuNN performance for each dimension of data.