Enhance Neuro-Fuzzy System for Classification Using Dynamic Clustering

Modules:

1. Dynamic Clustering Process:

This paper introduces a new approach to perform dynamic clustering by referencing to a class of the dataset. The main idea is to group the data in the same class with the smallest distance value. In order to deal with the noise, the method of calculating the threshold is proposed for exceeding cluster eliminating. The ideas described above resulted in a number of clusters that is appropriate for the classification precision.

1. Transition Process:

The number of clusters and initial values of the mean and standard deviation from a dynamic clustering process are used in the transition process. The original inputs are fed to the Gaussian membership function layer of the model. All results from the first layer are fed to the binary transform layer. The membership values are transformed into a binary value.

1. Classification Process:

The binary inputs are fed to the neural network in the output layer. The nodes in binary transform layer consider as input layer are equal to the number of clusters from each feature. The nodes in the output layer are equal to the number of classes in the dataset.

Problem Statement:

The new algorithm resolves the limitations of the original algorithm that uses only 3 membership functions for all features to find the appropriate function for each feature. Each feature of the dataset is pre-processed by a new approach to clustering automatically. The Neuro-fuzzy classification models for each dataset is created in accordance with the number of clusters have been divided for each feature. In order to be appropriate functioning in the Neuro-fuzzy structure, a new algorithm has been adapted to use the binary instead of the bipolar as original algorithm.

The new method of the enhance Neuro-fuzzy system for classifications using dynamic clustering shows the impressive high accuracy of classification than the Neuro-fuzzy method for linguistic feature selection and rule-based classification. A significant addition is the dynamic clustering that can determine the appropriate group for each feature in the dataset.