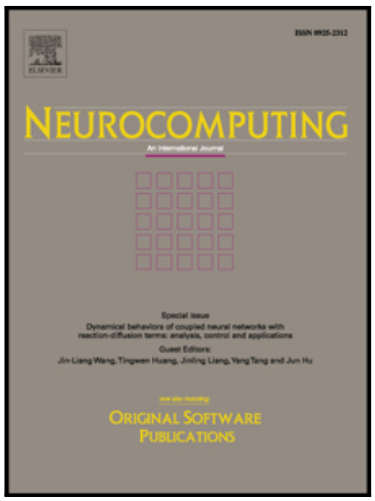

USNFIS: Uniform Stable Neuro Fuzzy Inference System

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USNFIS: Uniform Stable Neuro Fuzzy Inference System

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Abstract

The algorithms utilized for the big data learning must satisfy three conditions to improve the performance in the processing of big quantity of data: 1) they need to be compact, 2) they need to be effective, and 3) they need to be stable. In this paper, a stable neuro fuzzy inference system is designed from the multilayer neural network and fuzzy inference system to satisfy the three conditions for the big data learning: 1) it utilizes the numerator of the average defuzzifier instead of the average defuzzifier to be compact, 2) it employs gaussian functions instead of sigmoid functions to be effective, and 3) it uses a time varying learning speed instead of the constant learning speed to be stable. The suggested technique is applied for the modeling of the crude oil blending process and the beetle population process.

Keywords: Neuro fuzzy system, fuzzy inference system, multilayer neural network, big data learning, crude oil blending, beetle population.

1 Introduction

The neuro fuzzy intelligent systems are the combination of the neural networks and the fuzzy systems which are applied for the learning of nonlinear behaviors. Some interesting investigations are detailed as follows. In [4], [5], [12], [19], novel algorithms used in the modelling are detailed, in [6], [7], self learning algorithms for the classification are designed, in [13], [24], [25], interesting algorithms used in the prediction are studied, in [15], [16], [50]