

On the Capability of a Fuzzy Inference System With Improved Interpretability

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Abstract

Many studies on modeling of fuzzy inference systems have been made. The issue of these studies is to construct automatically fuzzy systems with interpretability and accuracy from learning data based on meta-heuristic methods[1]. Since accuracy and interpretability are contradicting issues, there are some disadvantages for self-tuning method[2]. Obvious drawbacks of the method are lack of interpretability and getting stuck in a shallow local minimum. Therefore, the conventional learning methods with multi-objective fuzzy modeling and fuzzy modeling with constrained parameters of the ranges have become popular. However, there are little studies on effective learning methods of fuzzy inference systems dealing with interpretability and accuracy. In this paper, we will propose a fuzzy inference system with interpretability. Firstly, it is proved that the proposed model is an universal approximator of continuous functions[3]. Further, the capability of the proposed model learned by the steepest descend method is compared with the conventional models using function approximation problems. Lastly, the proposed model is applied to obstacle avoidance and the capability of interpretability is shown[4].

Reference

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