

基于消除不确定性的模糊聚类方法的模糊神经网络

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摘要: 模糊神经网络是一种将模糊推理系统嵌入到神经网络推理过程中的神经网络. 如何确定模糊神经网络的结构是一个影响神经网络决策性能的关键问题. 而模糊集的个数则是确定模糊神经网络结构的关键. 许多研究使用模糊聚类来确定模糊集的个数. 然而, 现有的模糊聚类算法需要预设参数, 这就使得整个过程受到了人为干涉. 本文提出了一种自适应的模糊聚类方法来确定模糊集的个数. 该方法以两个模糊集交界处的样本的模糊程度为标准, 利用分裂法获得最终的聚类结果. 实验表明, 我们的算法在多个经典数据集上的决策结果在精度上超越了以前的算法.

关键词: 模糊聚类; 模糊神经网络

Fuzzy Neural Networks Based on Fuzzy Clustering for Eliminating Uncertainty

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Abstract: A fuzzy neural network is a learning machine that embeds a fuzzy system (i.e., fuzzy sets, fuzzy rules) into neural networks. It is crucial to determine the architecture of the networks according to the number of fuzzy sets. In previous works, the number is determined using fuzzy clustering. However, these methods is depended on some parameters which are set artificially. Thus, the methods are somewhat subjective. In this paper, an adaptive clustering method is proposed. It implements splitting technique and limits the number of samples in the intersection of two fuzzy sets to decrease the uncertainty. Finally, the results show that our algorithm brings out significant improvement over existing methods.

Key words: fuzzy clustering; fuzzy neural networks

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