

结构自适应的半监督自组织过程神经网络

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Semi-supervised self-organizing process neural network with self-adaptive structure

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摘要

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摘要

针对时域空间中模式识别、聚类分析和未标记样本的有效利用问题, 提出一种基于半监督学习的网络结构自适应的二维自组织过程神经网络模型和算法。通过构建可度量时变样本间相似性的广义Fréchet距离, 利用部分已标记动态样本的类别信息和过程特征, 采用奖励-惩罚更新规则, 根据网络学习目标函数, 对网络二维平面竞争层节点进行动态拆分或合并, 实现网络结构的自适应调整和样本的有效聚类。仿真实验结果验证了模型和算法的有效性。

关键词: 自组织过程神经网络, 半监督学习, 结构自适应, 模式识别

Abstract:

Aimed at the problems such as pattern recognition, cluster analysis, effective use of unlabeled samples, etc. in the time-varying space, a two-dimensional self-organizing process neural network with self-adaptive structure based on semisupervised learning is proposed. By building the generalized Fréchet distance which is used to measure the similarity among time-varying function samples, using the class information and process features of partial labeled dynamic samples, adopting reward-punishment update rule, and according to the network learning objective function, the dynamic reconstruction of the network structure is realized with splitting and merging competitive nodes in two-dimensional plane layer, and then effective clustering is implemented. Experimental results verify the effectiveness of the proposed model and algorithm.

Key words: self-organizing process neural network semi-supervised learning self-adaptive structure pattern recognition

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