

研究论文

自组织特征人工神经网络在庞泉沟自然保护区植物群落分类中的应用

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收稿日期 2006-3-6 修回日期 2006-8-20 网络版发布日期: 2007-3-5

摘要 人工神经网络是较新的数学分析工具, 其中的自组织特征映射网络(SOFM)具有较强的聚类功能。应用SOFM网络对庞泉沟自然保护区植物群落进行了分类研究。在讨论了SOFM网络的数学原理、聚类方法和步骤的前提下, 分类过程在MATLAB(6.5)神经网络工具箱(NNTool)中编程实现。结果将89个样方分为13个植物群落类型。分类结果符合植被实际, 生态意义明确, 表明SOFM网络可以很好地反映植物群落的生态关系, 是非常有效的植物群落数量分类方法。

关键词 [神经网络](#) [自组织](#) [植被](#) [数量分类](#)

分类号 [Q948](#)

Application of self-organizing neural networks to classification of plant communities in Pangquangou Nature Reserve, North China

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Abstract Vegetation classification is an important topic in plant ecology, and many quantitative techniques for classification have been developed in this field. The artificial neural network is a comparative new tool of data analysis, and self-organizing feature map (SOFM) is powerful in clustering analysis. SOFM has been applied to many research fields, and it was applied to the classification of plant communities in the Pangquangou Nature Reserve in the present work. Pangquangou Nature Reserve, located at 37°20'-38°20' N, 110°18'-111°18' E, is a part of Luliang mountain range. Eighty-nine samples (quadrats) of 10 m×10 m for forest, 4 m×4 m for shrubland and 1 m×1 m for grassland along an elevation gradient were set up and species data was recorded in each sample. After discussion of the mathematical algorithm, clustering technique and procedure of SOFM, the classification was carried out by use of the NNTool box in MATLAB (6.5). As the result, the 89 samples were clustered into 13 groups, representing 13 types of plant communities. The characteristics of each community were described in the text. The result of SOFM classification was identical to the result of fuzzy c-mean clustering and consistent to the reality of vegetation in the study area, and show significant ecological meanings. This suggests that SOFM may clearly describe the ecological relationships between plant communities, and it is a very effective quantitative technique in plant ecology.

Key words [Neural network](#) [self-organizing feature map](#) [vegetation](#) [quantitative classification](#)

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