

研究报告

集成的专家系统和神经网络应用于大熊猫生境评价

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收稿日期 2005-3-7 修回日期 2005-7-31 网络版发布日期 接受日期

摘要

充分了解大熊猫生境的时空格局及其变化,对有效保护大熊猫非常重要.绘制生境图既是野生动物生境评价和监测的一个有效方式,也是一个必要的步骤.新发展起来的人工智能方法(包括专家系统和神经网络方法),在模拟复杂系统过程中能够同时综合定性和定量信息,并可集成于GIS中,有助于大熊猫复杂生境的制图及评价.为了对大熊猫生境进行评价,本文建立了一个较全面的综合制图方法,将专家系统、神经网络和多类型数据全部集成在GIS环境下.结果表明,采用专家系统和神经网络集成方法绘制的大熊猫生境图的精度达到80%以上,高于单一的专家系统方法、神经网络方法和传统的最大似然法制图的精度.Z统计方法也证实了新建立的专家系统和神经网络集成方法要显著好于3种单一方法.

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分类号

Assessment of giant panda habitat based on integration of expert system and neural network

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Abstract

To conserve giant panda effectively, it is important to understand the spatial pattern and temporal change of its habitat. Mapping is an effective approach for wildlife habitat evaluation and monitoring. The application of recently developed artificial intelligence tools, including expert systems and neural networks, could integrate qualitative and quantitative information for modeling complex systems, and built the information into a GIS, which could be helpful for giant panda habitat mapping. This study built a mapping approach for giant panda habitat mapping, which integrated expert system and neural network classifiers (ESNNC), and used multi-type data within GIS. The giant panda habitat types and their suitability were mapped by ESNNC. The results showed that the habitat types and their suitability in Foping Nature Reserve were assessed with a higher accuracy (>80%) by ESNNC, compared with non-integrated classifiers, *i.e.*, expert system, neural network, and maximum likelihood. Z-statistic test showed that ESNNC was significantly better than the other three non-integrated classifiers. It was recommended that the integrated approach could be widely applied into wildlife habitat assessment.

Key words

[Expert system](#) [Neural network](#) [Remote sensing](#) [GIS](#) [Habitat mapping](#) [Spatial](#)

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