WU Chaojie

GEOINFORMATION MODELING
OF GREEN INFRASTRUCTURE IN MAJOR CITIES OF CHINA:
A CASE STUDY OF HANGZHOU

Master's degree thesis

Scientific supervisor:

PhD in Geography,

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Admitted to defense

«___» _____ 2025 г.

Head of Department _____

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Minsk, 2025

GENERAL CHARACTERISTICS OF WORK

Wu Chaojie, Geoinformation Modeling of Green Infrastructure in Major Cities of China: A Case Study of Hangzhou (Master's degree thesis). – Minsk, 2025.

Bibliogr. title 72, fig. 24, table 6, appendix 2.

URBAN GREEN SPACE, GEOGRAPHIC INFORMATION SYSTEM (GIS), CA-MARKOV SPATIOTEMPORAL PREDICTION MODEL, MULTI-SOURCE DATA FUSION, ECOLOGICAL PLANNING, HANGZHOU CITY

The purpose of the master's thesis is to develop and apply geographic information models for analyzing and forecasting the development of green infrastructure in large cities in China using the example of Hangzhou.

The study pursues a series of interrelated objectives: to examine the theoretical foundations of green infrastructure and geoinformation modeling; to assess the current state of green infrastructure in Hangzhou; to collect and process relevant spatial and statistical data; to construct and apply geoinformation models for analyzing and forecasting green area dynamics; to evaluate the environmental and social impacts of green infrastructure; and to formulate recommendations for its enhancement and integration into urban planning frameworks.

The research methodology encompasses a comprehensive approach involving comparative geographical, mathematical, cartographic, statistical, and literary analyses. Key methodological stages include the development of a conceptual framework, examination of the study area's geographic and environmental characteristics, acquisition and processing of spatial data (utilizing satellite imagery, maps, and statistical sources), model construction through geospatial analysis and machine learning techniques, and synthesis of results to inform policy recommendations.

Primary data sources consist of scholarly literature, open-access cartographic materials, Earth observation data, statistical yearbooks, and related publications. The thesis is structured into the following main sections: introduction; theoretical background on geoinformation modeling of green infrastructure; research methodology; analysis and modeling of Hangzhou's green infrastructure; formulation of recommendations and practical application of results; and conclusion.

The findings of this study contribute to the advancement of urban spatial planning practices in Hangzhou, offer methodological insights for similar applications in other Chinese cities, and support the academic development of future experts in the fields of geography and environmental science.

工作的一般特征

吴超杰，**中国主要城市**绿色基础设施地理信息建模：以杭州为例（硕士学位论文）。– **明斯克**，2025**年**。

参考文献：标题72，图24，**表**6，**附录**2。

城市绿地，地理信息系统（GIS），CA-马尔可夫时空预测模型，多源数据融合，生态规划，杭州市

本硕士论文旨在以杭州为例，开发并应用地理信息模型，用于分析和预测中国大城市绿色基础设施的发展。

本研究旨在实现一系列相互关联的目标：探讨绿色基础设施和地理信息建模的理论基础；评估杭州绿色基础设施的现状；收集和处理相关的空间和统计数据；构建并应用地理信息模型，用于分析和预测绿地动态；评估绿色基础设施的环境和社会影响；并制定改进绿色基础设施并将其纳入城市规划框架的建议。

研究方法涵盖比较地理、数学、制图、统计和文献分析等综合方法。关键方法阶段包括：构建概念框架；考察研究区域的地理和环境特征；获取和处理空间数据（利用卫星图像、地图和统计数据）；通过地理空间分析和机器学习技术构建模型；以及综合研究结果以提供政**策建**议。

主要数据来源包括学术文献、开放获取制图资料、地球观测数据、统计年鉴和相关出版物。本论文主要分为以下几个部分：引言；绿色基础设施地理信息建模的理论背景；研究方法；杭州绿色基础设施的分析与建模；建议的制定和结果的实际应用；以及结论。

本研究结果有助于推动杭州城市空间规划实践的发展，为中国其他城市的类似应用提供方法论上的启示，并支持未来地理和环境科学领域专家的学术发展。