Ekoloji 28(108): 889-893 (2019)

LETTER TO THE EDITOR

Optimization Design of Regional Natural Ecological Environment Dynamic Monitoring System Based on GIS

Tao Jiang[1, 2*], Xiaoying Yang[2]

[1]Social Sciences Research Base of Colleges and Universities in Guizhou Province, Guizhou Cultural and Natural Heritage Protection Research Center, Guizhou University, Guiyang 550001, China

[2]School of International Tourism & Culture, Guizhou Normal University, Guiyang 550001, China

[*]Email: jiangtao201966@163.com

Traditional regional natural ecological environment dynamic monitoring system has the problem that information data cannot be shared. To this end, the GIS-based regional natural ecological environment dynamic monitoring system optimization design is proposed. By analyzing the characteristics of GIS technology, the importance of ecological environment dynamic monitoring system is discussed. Sexuality, through the optimization of objectives, optimization principles and optimization of content and technical routes to achieve this research.

GIS technology; ecological environment; dynamic monitoring; data sharing.

1 INTRODUCTION

The ecological environment is one of the special concerns of human beings in the new century. As stated in the preamble to the United Nations Agenda 21, “Combining environmental and development issues and raising attention to these issues will result in meeting basic needs, improving the standard of living of all, transforming the protection and management of ecosystems, and creating a safer, more prosperous future” .Therefore, ecological environmental problems are a more serious problem than environmental pollution in many developing countries.

November 2000. China has promulgated the “National Outline for Ecological Environmental Protection”, requiring all provinces and regions to pay close attention to formulating ecological environmental protection plans.

It is necessary to adhere to prevention, protect ecological function zones that directly affect the safety of countries and regions, build a number of ecological demonstration zones with a virtuous circle of economy and ecology, strengthen the construction and management of nature reserves, and strive to improve the capacity of environmental protection in China. Level.

Ching-Hsiang Lee, Hsu-Ping Yang, Ming-Hung Lin et al. published a title in the journal Ekoloji’s 2019 Issue 107. “Dynamic Environmental Visual Image Identification and Monitoring Based on New Adaptive Segmentation”. An original study that integrates computer vision and extreme activity into academic research is conducted. Many extreme activities (sports and leisure) include a large number of participants. These activities depend on weather conditions (sunlight, wind, waves, etc.) that are directly or indirectly affected. In this paper, a new adaptive image segmentation (NAIS) is proposed to search the target data of the region of interest (ROI) region in the global histogram. Thereafter, adaptive singular value decomposition (ASVD) is utilized to limit the various illuminations of the video image. The HSV color model integrates computer vision technology to adapt to dynamic environments for target detection. Several tracking algorithms have also been applied to track extreme activity. Experiments show

that when the accurate tracking rate of the Kalman filter (HSV) exceeds 86.61%, the target can be successfully detected and tracked in continuous video images. The concept of dynamic monitoring is applied to images and can also be used to monitor the ecological environment (Xie H L. et al. 2018). Its proposed that ecological space bears the mission of maintaining regional ecological balance and provides sustainable ecological space services for the society. It is the basic guarantee for the continuous provision of natural space services by regional land ecological energy. Taking the Poyang Lake Ecological Economic Zone, which is fragile in natural ecological environment, as the research area, combined with relevant practical experience and research results of domestic and foreign scholars, based on relevant spatial information technologies such as RS and GIS, through the importance evaluation of ecosystem service functions and ecosystem sensitivity. The evaluation method selects the corresponding evaluation indicators according to local conditions, and identifies the key ecological space of Poyang Lake ecological economic zone by grid (Zita Lagos et al. 2017, Ramon Leggieri et al. 2017, Araiza Aguilar et al. 2017).

The results show that the key ecological space area of Poyang Lake Ecological Economic Zone is 27751.25 km^2, accounting for 52.55% of the total area of the study area, of which the bottom-line ecological space area is 17125.31 km^2, accounting for one-third of the total area of the study area. The area of crisis-type ecological space is 4341.19 km^2, accounting for 8.39% of the total area of the study area, and the buffer-type ecological space area is 6194.55 km^2, accounting for 11.73% of the total area of the study area. In the current analysis of land use ecological security conflicts, 14.29% of cultivated land and 9.31% of construction land are in key ecological zones.

Zhang T. et al proposed that the reporting of dynamic monitoring data of traditional Chinese medicine resources is one of the daily tasks and important tasks of the dynamic monitoring system of traditional Chinese medicine resources (Zhang T. et al. 2017). The data is true and accurate, which is the basis for the continuous and healthy development of dynamic monitoring of Chinese medicine resources. It is an effective means to improve the efficiency of data reporting and the quality of reporting. In order to realize the real-time mastery of the changes in Chinese traditional medicine resources, a dynamic monitoring and reporting system for Chinese medicine resources was constructed. In order to solve the problems in practice, the use of GIS technology to achieve multi-dimensional data, improve the security, practicability and standardization of data, laid the foundation for the subsequent processing of data. According to business requirements, 12 forms were designed, 98 Collecting indicators to meet the needs of dynamic monitoring of Chinese medicine resources. This article introduces the development content, design and implementation, main functional characteristics and application effects of the dynamic monitoring and reporting system of traditional Chinese medicine resources. The role of GIS technology in the reporting of dynamic monitoring data of traditional Chinese medicine resources, and how the system can routinely report the data of planting, production and sales of Chinese herbal medicines, and meet the external environment of Chinese herbal medicine market, distribution center and planting area. Features such as rapid location and information collection are described.

The above two papers apply GIS technology to key ecological spatial discrimination and dynamic monitoring of traditional Chinese medicine resources. The research and design are meticulous and have achieved good results. In this paper, GIS technology is applied to the optimization of regional natural ecological environment dynamic monitoring system. To achieve environmental dynamic monitoring while achieving data sharing.

2 IDEA DESCRIPTION

Geographic information system is a decision support system, which is a kind of spatial data reflecting the status quo and changes of the real world on which people live and the attributes describing the characteristics of these spatial data. Supported in computer software and hardware. Next, the technical system 12211231 for inputting, storing,

retrieving, displaying and comprehensively analyzing applications in a certain format. Generally speaking, GIS is a technical system that comprehensively processes and analyzes spatial data. It is a specific and important spatial information system. Its basic characteristics are: public geolocation basis, standardization and digitization, multidimensional structure.

Geographic information systems have the following three characteristics:

(1) Ability to collect, manage, analyze and output multiple geographic information, spatial and dynamic.

(2) Space computer data management is supported by computer systems to accomplish tasks that are difficult for humans to accomplish.

(3) The support of computer systems is an important feature of GIS, which enables GIS to quickly and accurately and comprehensively perform spatial location and process dynamic analysis of complex geographic systems.

2.1System optimization goal and optimization principle

System optimization aims to dynamically monitor, efficiently manage, comprehensively analyze, and timely release regional ecological environment information for decision-making at all levels.

Provide scientific evidence. The basic principles of system design:

(1) Principle of practicality. System construction starts from the practical, so that the database is easy to use management and data real-time expansion and update; the information system is easy to operate and maintain and analyze applications.

(2) Systematic principles. The system from the current situation of the regional environment investigation to the dynamic monitoring of the ecological environment; from the database construction to the establishment of the dynamic monitoring system, and even the establishment of the ecological environment management subsystem, should consider the content of the ecological environment and its interaction and role Reflecting the comprehensive and systematic nature of the ecological environment.

(3) The principle of advancement. The system adopts “3S” and new technologies such as multimedia, virtual reality, computer visualization and information network, and should reach the domestic advanced level in terms of overall structure, database platform, system layout, application function and security reliability.

(4) Standardization principles. The system design must meet the unified goals and requirements of the national environmental protection department on the status quo of ecological environment survey, dynamic monitoring and protection construction, and meet the unified principles and standards of “digital city” network construction and information sharing. Adopt a unified software system and data coding system, and implement the standards and specifications for network information sharing established by “Digital City”.

(5) Safety principles. In order to ensure the safe and reliable operation of the system, it is necessary to realize real-time operation of multiple users, and to strictly limit user rights. Network design must emphasize the security control capabilities of the network. Only the system administrators of critical application servers and core network devices have the power to operate and control.

2.2System construction content

The system is divided into two parts: the basic network platform and the application system. The basic network mainly includes the local area network, main server, data collection platform, data processing platform, database server construction of the ecological environment monitoring and management center, monitoring equipment and data processing equipment of the typical monitoring area, network equipment, etc. The application system mainly includes the regional natural ecological environment dynamic monitoring subsystem, the ecological environment database subsystem, and the ecological environment management subsystem：

First, the remote sensing dynamic monitoring system uses satellite remote sensing image comparisons of different

periods or different phases to analyze the dynamic changes of various elements and factors in the ecological environment, and provides dynamic information of the province's ecological environment;

Second, the ground dynamic monitoring system establishes a typical monitoring area with different ecological environment dynamic changes to form a monitoring network and is connected with the overall monitoring system. It can be further expanded according to needs and conditions;

Third, the emergency response monitoring system uses a small remote-controlled aircraft to conduct real-time monitoring of small-scale ecological environment dynamics. The airborne camera system obtains the spatial distribution information of the quality and quantity of the ecological environment, completes the emergency monitoring of the ecological environment in the local area, and obtains the latest information of the ecological environment in time.

Eco-environment database subsystem. It includes the basic database (including background data and background data) and the dynamic database. The comprehensive series of regional natural ecological environment maps is the basic map of the basic database and graphic library for the establishment of regional ecological environment dynamic monitoring. It is also the basic basis for the regional ecological environment functional zoning, planning layout and ecological province construction macro decision-making. Based on the ecological environment database and the comprehensive series of maps, the comprehensive information map of the ecological environment will form a comprehensive graphic pedigree through information mining, knowledge discovery, abstract summarization and model analysis to reflect the temporal and spatial changes of the ecological environment of the province.

The ecological environment decision support management information subsystem can quickly retrieve the query, statistical analysis and consulting management; analyze and evaluate the ecological environment information, forecast and forecast, plan and make decisions, and become the information management system of the environmental protection department. At the same time, through the regional government network sub-center of the Environmental Protection Agency Information Center to provide information resource sharing, to provide ecological environmental information services for various government departments.

3 RESULTS

The design of the remote sensing dynamic monitoring system. Remote sensing monitoring focuses on solving the temporal and spatial changes of ecological environment elements, including: topography, river waters, land resources, forest resources, grassland resources, wetland resources, nature reserves, forest parks, urban ecology, etc., as well as land degradation, drought, floods Problems such as geological disasters and ecological environment destruction in resource development.

The dynamic changes of the ecological environment are planned to be comprehensively compared and analyzed using satellite images from the 1970s (M SS), 80s (TM), 90s (TM), 2001 (TM, local SPOT), and each future Data updates and comparative analysis were performed using M ODIS, TM, and SPOT images for about 2 years. Remote sensing image analysis and processing is proposed to use ERDAS, ENVI and other software systems and SuperMapIII image integration.

4 DISCUSSION

The system uses SuperMap, which includes SuperM ap III, SuperaMap DeskPro and SuperM ap IS. As a spatial data processing platform, it realizes the functions of efficient acquisition, update, conversion, editing, data integration, query analysis, spatial analysis and output of ecological environment monitoring data through secondary development, and establishes a map-based and geographic information service network. To make the

application of ecological monitoring information global and popular, and to establish an intelligent information management system suitable for ecological environment analysis, evaluation, dynamic monitoring, early warning, planning, decision-making, consulting and management.

The main server of the Eco-environment Monitoring and Management Center is connected to the external network through the EPA Information Center. The main server is responsible for LAN management, data reception and forwarding, receiving service requests, coordinating external services, issuing commands, and collaborative computing. The main server is connected to three processing platforms: data acquisition platform, data processing platform, and database server.

5 CONCLUSIONS

The system provides a scientific basis for the planning, governance, protection and construction of the regional ecological environment, as well as the comprehensive decision-making of population, resources, environment and economic and social sustainable coordinated development. It also provides a solid foundation and technical support for ecological construction, and promotes regional ecological environment planning and construction. Modernization of management and services will provide advanced means for leading decision-making departments to take timely emergency response measures and preventive measures.

Acknowledgements

The work was supported by Research Base of Humanities and Social Sciences in Higher Education Institutions of Guizhou Province; Analysis of Geological Tourism Elements in Guizhou Based on GIS--Taking Guanling Triassic Geopark as an example, JD2013053; Achievements of Independent Bidding for Humanities and Social Sciences Research Base of Guizhou Normal University.

References

Araiza Aguilar JA, Chavez Moreno JC, Moreno Perez JA (2017) Quantification of solid urban waste generated in the municipal headquarters of berriozabal, chiapas, mexico. Revista Internacional De Contaminacion Ambiental 33 (4):691-699

Dai KX, Feng ZL, Wan XR (2016) Study on Developments of Space Situation Awareness System in Russia. Journal of China Academy of Electronics and Information Technology 11 (3):233-238.

Ramon Leggieri L, Soledad De Anna J, Abel Ceron G, Arias Darraz L, Fuentes Monasterio D, Guillermo Carcamo J, Marcelo Luquet C (2017) Cyps molecular biomarkers in rainbow trout oncorhynchus mykiss to assess oil contamination in a patagonian stream. Revista Internacional De Contaminacion Ambiental 33 (4):681-690.

Xie HL, Yao G, He YF (2018) Study on spatial identification of critical ecological space based on GIS: a case study of Poyang Lake Ecological Economic Zone. Acta Ecologica Sinica 38 (16):5926-5937.

Zhang T, Li JD, Cheng M, et al. (2017) Design and implementation of real-time control of changes to national Chinese medicine resources fill system based on GIS. China Journal of Chinese Materia Medica 42 (22):4306-4309.

Zita Lagos ME, Figueroa Garcia EC, Narvaez Hernandez LE (2017) Impact of determining attributes of an urban dry sanitary on consumer acceptance. Revista Internacional De Contaminacion Ambiental 33 (4):671-679.