

# Application Research of Information Technology in Environmental Protection

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**Abstract:** With the rapid development of information technology, the application of information technology in the field of environmental protection tends to be frequent, which is of great significance to environmental protection. This paper analyzes the application status and existing problems of information technology in the field of environmental protection from the aspects of monitoring, benefit evaluation and prevention, and puts forward the application of information technology in the field of environmental protection from three perspectives: constructing carrier, building platform and innovation mechanism. The path is intended to provide valuable advice to relevant researchers for reference.

## 1 Introduction

With the continuous development of emerging industries such as big data and cloud computing, society has entered an information age. With the further maturity of information technology, its application has penetrated into all aspects of environmental protection, and the scope of application has been continuously expanded, which has become an indispensable technical means in the environmental field. Informatization technology has the ability to monitor, predict and evaluate in real time, which is of great significance to environmental protection.

## 2 Information Technology Overview

### 2.1 GIS technology

The full name of GIS is geographic information system, which makes full use of computer software and hardware systems to describe and display the distribution of surface and space, and to collect, store and analyze [1]. GIS has obvious advantages in data collection and processing. In recent years, with the development of science and technology, GIS has been widely used in urban planning, land and resources management, surveying and mapping industries. Compared with traditional analytical methods, GIS technology has a multi-source, multi-stage, multi-temporal comprehensive feature that changes the traditional single manual analysis method. At the same time, GIS technology has powerful data integration, simulation and analysis and evaluation functions. The acquired data information is more comprehensive and reliable than traditional

methods and general information systems, helping to simulate and predict geospatial changes.

### 2.2 panoramic true three-dimensional technology

The panoramic true 3D technology obtains multi-angle tilt images by tilt photography and the onboard laser point cloud obtained by Lidar (Li DAR), and the 3D panoramic image automation platform is used to generate panoramic 3D models [2]. Due to the short acquisition cycle, high efficiency, low cost and high authenticity, the panoramic 3D modeling technology is now more and more used in the construction of digital cities and smart cities [3, 4], and can be used once. Obtaining various data results, the model synthesis process is basically automated, with less manual intervention. Compared with traditional manual modeling, the accuracy and authenticity are greatly improved.

### 2.3 Remote sensing information technology

Remote sensing information technology is a technique for determining specific environments and resources by collecting electromagnetic radiation information from ground objects of satellites, aircraft or other aircraft. Remote sensing systems can be used to sense and acquire large amounts of information from different heights, large scales, fast and multi-spectral parts, and are widely used in many aspects of the national economy and military, such as meteorological observations and resource surveys. The application of this technology can effectively improve the level of urban planning and

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planning, greatly improve the management efficiency of contemporary cities, and has great application value [5].

### **3 Application Status and Problems of Information Technology in Environmental Protection**

#### **3.1 Using information technology to monitor environmental protection**

Panoramic true 3D technology that measures the height and footprint of vegetation and buildings and calculates the scale of illicit cultivation and construction. At the same time, it can clearly distinguish illegal construction such as expansion and expansion, and provide a scientific basis for illegal construction and illegal land use investigation. According to the recognition of the remote sensing image, the difference of the color spots can be distinguished, and the distribution area of the species can be drawn, and the specific conditions of the water body, soil and vegetation in a specific area can be determined. Using GIS-related technologies, technicians collect and organize remote sensing information at various time periods, obtain overall planning and basic terrain data of the monitoring area, conduct site surveys on the basis of positioning, and compare with monitoring information to ensure that the monitoring information is consistent with the actual situation.

#### **3.2 Using information technology to assess the benefits of environmental protection**

As part of the field of environmental protection, information technology can objectively quantify the scientific nature of planning and layout in the field of environmental protection, and feedback to improve the planning of future environmental protection zones. Environmental protection benefit assessment mainly includes water environment and atmospheric environment. Remote sensing monitoring for water environmental assessment is the identification of water pollution through remote sensing image monitoring. The spatial distribution and pollution degree of polluted water bodies are extracted and classified by using the differences in spectral characteristics of different polluted water bodies. Remote sensing monitoring and assessment of atmospheric environment The spatial distribution of urban air pollutants (PM<sub>2.5</sub>, etc.) is estimated by quantitative simulation, and the regional air quality status is quantitatively evaluated according to urban population distribution, industrial layout and vegetation status.

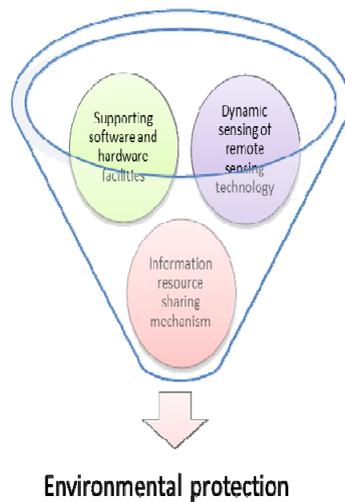
#### **3.3 Using information technology to prevent environmental protection**

Informatization technology can objectively quantify the scientific nature of planning and layout in the field of environmental protection. Through high-precision online monitoring, the acquisition, storage, analysis and other

aspects of monitoring data are collated, and an evaluation information system is established to simulate large-scale remote sensing image information. Natural environmental changes, and then summarize the conclusions and evaluation results of environmental protection monitoring, information technology to prevent and prevent environmental protection.

#### **3.4 Problems in the field of environmental protection in information technology**

The application of information technology in the field of environmental protection is still immature, and there are many problems, mainly focusing on supporting software and hardware facilities, remote sensing technology dynamic information perception, information resource sharing mechanism, etc., which restricts the development of environmental protection. (Fig 1) In the application of information technology in the field of environmental protection, its corresponding supporting software and hardware facilities are relatively scarce, such as hardware equipment of related data and picture processing systems, and soft equipment lacking relevant technical talents. In the application process of information technology, computer hardware equipment of supporting equipment is needed. In actual use, due to financial problems, the number of hardware facilities is small and the configuration is low, and it is difficult to meet the processing requirements of images and data. There are fewer talents related to information technology, fewer talents can be used flexibly, and most technicians have lower levels of remote sensing technology. In environmental protection, the level of dynamic information perception of remote sensing technology needs to be improved. At present, the application of remote sensing technology dynamic information sensing technology in environmental protection is still not widespread, and the technical achievements are few, which restricts the development of environmental protection. In recent years, information technology has not formed an information resource sharing mechanism in the field of environmental protection, such as image sharing and data sharing. The research on information technology in the field of environmental protection has just started, and the data obtained are few, which greatly limits the development of environmental protection. The establishment of an information resource sharing mechanism will reduce the cost of environmental protection. Experts and scholars can also conduct in-depth discussions on relevant fields, find problems, solve problems, and reduce duplication of work.



**Fig 1.** The problem map of information technology in the field of environmental protection

## 4 Application path of information technology in the field of environmental protection

### 4.1 Construction of the application of information technology in the field of environmental protection

The talent team is the carrier for constructing the application of information technology in the field of environmental protection, and it is necessary to focus on optimizing the training mechanism for the talent team of the environmental protection information structure. In the process of environmental protection project operation, talent cultivation is also a very important environment. Only by improving the computer level and information integration ability of environmental protection department staff can we construct a professional environmental protection information model and better provide data for environmental protection work. Support and information base. Therefore, relevant environmental protection departments should make great efforts to improve the information level and skill level of managers. It is necessary to fully integrate the actual needs of the market and society and increase the intensity of training.

### 4.2 Building a platform for the application of information technology in the field of environmental protection

Traditional survey drawings are limited by time cost, labor cost and weather changes, and cannot monitor the environment in real time in a timely and effective manner. The image mapping is drawn by the remote sensing technology has low cost and high efficiency, and realizes the macroscopic and objective actual reflection process state of the unified benchmark. In order to consolidate and improve the environmental protection

work, it is of great significance to construct a carrier for the application of information technology in the field of environmental protection, namely the environmental information database. From the production of image maps to the construction of environmental information databases, monitoring results can be effectively applied to environmental protection, facilitating the convenience and efficiency of environmental protection work.

### 4.3 Application Mechanism of Innovative Information Technology in Environmental Protection

As the natural environment continues to deteriorate, the research on the application mechanism of innovative information technology in the field of environmental protection is accelerating. Based on information technology, innovation in the three-dimensional space of its application field, the effective perception of three-dimensional space has increasingly become an important issue in the planning and management of environmental protection areas. With its powerful analysis capabilities, 3D information technology enables high-performance, efficient, intelligent, real-time analysis and visualization of stereoscopic information in environmental protection zones through computer technology, artificial intelligence technology, big data and cloud computing technologies. By solving the problem of spatial resource allocation in complex environmental protection areas, we can effectively promote the construction of "smart environmental protection zones". Innovative information technology's three-dimensional space mechanism can greatly reduce the workload of relevant personnel, so that more time and energy can be used for environmental protection zone planning information approval and planning work.

## 5 Conclusion

By integrating environmental protection projects and informational operational structures, the most fundamental goal is to establish a more comprehensive and scientific environmental testing system to ensure that the overall environmental ecological structure can achieve optimal results and provide scientific development for the project. The rationalized operation mechanism provides a more comprehensive information protection mechanism and management to control the level for the environmental protection system, and accelerates the optimization and development of law enforcement in the environmental protection department.

## Acknowledgment

This work was supported by the Guangxi education department youth teacher basic ability improvement project ( 2018KY0840 ).

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