

# Research on the Integrated Platform of the Comprehensive Management Information System of the Hollow Village in the Hilly Area

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**ABSTRACT.** Hollow villages are located in hilly areas and their important land resources. There are a lot of data in the research and planning of hollow villages. Therefore, this paper studies the integrated information system platform of hollow villages' comprehensive renovation in Hilly areas. The design principle of the platform is reliability, openness, standardization and practicability. The overall logical framework of the platform is hardware support layer, software support layer, integrated layer and application layer. Data aggregation is used to integrate land use status data, soil quality data and land evaluation data in mountainous and hilly areas. AAF framework is used to complete the application and development of framework-based B/S structure. Knowledge visualization-based comprehensive integration is used to realize the integrated level of hollow village renovation in mountainous and hilly areas. Taiwanese Provides reliable data base and land management for hollow village renovation in mountainous and hilly areas.

**KEYWORDS:** hilly area, hollow village, information system integration

## 1. Introduction

Land is a kind of vital natural resource, which is the basis of human being's foothold. However, with the rapid development of human society, the demand of industrialization and urbanization for land is increasing rapidly, which leads to the deepening of the contradiction between human and land. At the same time, a large number of rural population gradually transferred to the city, reducing the land use of

rural residential areas; the household contract system has brought rapid improvement of rural economy, farmers continue to expand to build new houses, forming a large number of "old inside and new outside", "air inside and expansion outside" hollow villages, resulting in a serious waste of land resources [1]. Hollow village regulation is an important means to effectively solve the problem of idle rural land resources in the process of urban and rural development and transformation [2]. Especially in mountainous and hilly areas, it is difficult to develop idle land, and the geographical location of hollow village is usually better, so hollow village regulation is one of the important measures to increase the cultivated land volume in mountainous and hilly areas. Before the renovation of hollow villages in mountainous and hilly areas, it is necessary to investigate the renovation potential, prepare the renovation plan, and then carry out the approval and implementation. In this process, there will be a large number of data calculation, graphic elements and text data. Relying on traditional paper media and manual operation, these data will be counted, stored, queried and updated, which is heavy and complex. Therefore, by establishing an information system integration platform and relying on information technology to improve management efficiency and level, this paper promotes the regulation of hollow villages to be more standardized and scientific [3, 4].

## **2. System design objectives and principles**

### ***2.1 System design objectives***

In order to meet the requirements of policies and regulations, land use, survey technology, planning and design, construction technology, achievement management and office automation for the remediation of hollow villages in mountainous and hilly areas by the development of national economy in the new situation, based on planning data, 3S technology, database management technology, knowledge visualization integrated technology, and computer network technology are used to establish a practical project. The comprehensive information system integrated platform of hollow village renovation technology in mountainous and hilly areas is used to complete the auxiliary decision-making process of hollow village renovation and management in mountainous and hilly areas in the form of human-computer interaction.

### ***2.2 System design principles***

Carry out the guiding ideology of application-oriented, advanced development and effectiveness oriented, design and develop the system to ensure that the system construction conforms to the reality and meets the use requirements. The system development must follow the following principles: (1) Reliability, selection of mature system software products in line with industrial standards; good compatibility and fault tolerance, with appropriate data backup and recovery functions. The function of the regulation system of the hollow village in the hilly

area is complex, involving a large amount of data, a wide range of types, decision-making is of great importance, so it is necessary to ensure the reliability of the system. (2) Openness, using the open system structure, classifying the homestead information, establishing the information model, dividing the information into the basic level and the information aggregated according to the subject, so as to adapt to the continuous formation and expansion of the system business needs, and enhance the system's scalability and openness. (3) Standardize, adopt unified program development framework, standard program development language, use general technology development platform, and establish a complete standardized development and application platform. (4) Practical, convenient and flexible human/computer interface; full function Chinese character processing and display, vivid and intuitive geographic information and image display, convenient for system maintenance and management.

### **3. Overall structure of the system**

#### ***3.1 System logic architecture***

The overall logic framework of the integrated platform for the treatment of hollow villages in mountainous and hilly areas is divided into four parts: hardware support layer, software support layer, integrated integration layer and application layer. (1) Hardware support layer: mainly based on the basic network, server, PC as the basic control equipment, to provide hardware support equipment for the integrated platform system of hollow village renovation in the whole mountainous and hilly area. The selection of hardware platform is based on the international advanced middle and high grade. (2) Software support layer: mainly composed of basic database, operating system, etc. (3) Comprehensive integration layer: through the integrated middleware technology, the relevant subsystems in the integrated platform for the treatment of hollow villages in mountainous and hilly areas are integrated to realize data sharing and information exchange. (4) Application layer: decision support service based on visualization and application of B / S structure.

#### ***3.2 Main functions of the system***

The implementation of the comprehensive knowledge integration platform for the remediation of hollow villages in mountainous and hilly areas is the key to comprehensively start the informatization construction of the remediation of hollow villages in mountainous and hilly areas. It comprehensively and systematically integrates the business, data, process and standards of the remediation of hollow villages in mountainous and hilly areas, and constructs the information management platform for the remediation of hollow villages in mountainous and hilly areas, which integrates countries, provinces, cities and counties. Through the use of modern information and network technology, the whole process management of the hollow village renovation project in the mountainous and hilly area is informationized, and the electronic report and approval are realized through

computer management, as well as the investigation, monitoring, statistics, evaluation and analysis of the project, so as to promote the scientificity, standardization, transparency and publicity of the project. The system involves the whole process of the hollow village renovation project, such as the filing of human resources database, the application of preliminary design and budget information, the reception and review of the Department window office, the task assignment, the technical and economic review, the project implementation management, and the file management.

#### **4. Implementation Technology**

##### ***4.1 Data integration***

The spatial data and attribute data, such as land use status data, soil quality data, and various factors data of land evaluation, are the main data for the treatment of hollow villages in mountainous and hilly areas. Therefore, in order to achieve better data integration, the database established by the platform is a comprehensive database integrating basic data and professional data, attribute statistics data and spatial graphics data, so as to improve data resource sharing. Data integration in database field has developed for quite a long time, and there are two main technical methods to solve data integration: data concentration and data aggregation [5]. In the process of system development, data aggregation is used to generate data aggregation by data aggregation tools, forming a virtual memory database to store logical and physical unified data. The data integration of the integrated platform for the treatment of hollow villages in mountainous and hilly areas is mainly the design of wireless sensor network security transmission.

This system needs to connect a wide range of nodes, distributed intensively, use wireless sensor network for data center transmission, design node sensor, let it have the function of terminal system and routing system at the same time, that is, real-time collection of information, processing and receiving and sending information. Because the aggregation node is responsible for the convergence of regional nodes, the energy consumption of nodes in this process is more than that of ordinary nodes, which is easy to cause attacks on the network. At the same time, the data packet nodes will be sent through middleware after being generated, which may cause attacks from network hackers when the data packets are transferred in the process. Therefore, based on security considerations, this design first integrates the data threats and security risks existing in the system, uses heartbeat mechanism to detect, and forms a graphic detection effect. The data conversion or transmission between nodes needs to be confirmed by legal identity. The keys between nodes are set up in pairs or groups. After the data of the aggregation node is generated, the communication mechanism of the group is used to protect.

#### ***4.2 Integrated platform for hollow village renovation in hilly area based on B / S structure***

This system designs an AAF framework to complete the application development of B / S structure based on the framework. In the process of system development, AAF framework is used to build the foundation of an application system. Through a group of collaborative classes, a reusable design is built for the application software of hollow village in mountainous and hilly area based on J2EE.

#### ***4.3 Comprehensive integration based on Knowledge Visualization***

In the practice of decision support, it is often necessary to make a comprehensive analysis and judgment on the current situation of land use, planning and design, economy and society and many other factors. Therefore, on the basis of completing the framework service, component service, knowledge map, GIS integration and management of the hollow village in mountainous and hilly areas, a comprehensive integrated distribution system for knowledge and decision-making service is established. The comprehensive integrated discussion will learn from From qualitative to quantitative, a comprehensive integrated platform for the treatment of hollow villages in mountainous and hilly areas is developed to realize the application of man-machine integration.

### **5. Conclusion**

By means of advanced information technology, an integrated platform of comprehensive information system for hollow village renovation technology in mountainous and hilly areas with faster update and richer contents is established. The system is divided into hardware support layer, software support layer, comprehensive integration layer and application layer. It can realize the research, monitoring, statistics, evaluation, analysis, etc. of hollow village renovation projects, and relevant policies in hollow village renovation work, standardize the construction process, improve the quality of new cultivated land, and achieve the purpose of promoting the comprehensive renovation of the hollow village. This paper does not involve the specific implementation process of the platform, which needs further research to promote the use of the integrated platform.

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