

A design of automatic parking system for Intelligent Community

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Abstract: With the continuous development of China's socialist modernization construction, residential lights and parking spaces have become an important part of the city, so it is necessary to adopt advanced technology to improve the level of street lights and parking automation control and management. This paper puts forward the practical topic of "the design of parking control platform for residential road lights based on GIS", The client / server mode, with Super Map as development platform, Visual Studio as the development tool, SQL Server2016 as the database server, for road and parking management needs, achieve the operation plan, street object information, statistical queries, basic data, system settings and map operation module, complete the various lights parking facilities, visual management, graphic display, data analysis, query and statistics.

Keywords: I intelligent parking, Street lamp, GIS

1. INTRODUCTION

As we all know, China's socialist modernization is booming, the District street lamp is not only the use of traffic instructions and lighting. It has been an important part of the evolution of the derivative to residential property security and order management, such as management of small foreign import vehicles, parking spaces to the orderly management and intelligent grid, the need for a unified, systematic and scientific community management platform to control the signal lamp[1,2].

The signal lights and switch control systems are not unified in most of the urban areas in our country, leading to the heavy workload of the related staff, the difficulty of controlling switches and checking the faults, leading to the waste of power energy, and the high failure rate of the district signal lamp, and can not be efficient lighting. This paper adopts advanced GIS technology and SQL server database management technology, effectively improve the automatic control and parking management level of the residential area traffic lights[3,4].

This paper uses the geographic information system, realize the intelligent management of parking control, foreign vehicles restricted access and parking spaces, rational distribution,

scientific and effective with the residential property management staff, to ensure the safety of residents and residents living coordination is of great significance.

The main objective of this paper is to solve the following problems:

(1) analysis of the use characteristics and management flow of signal lights and parking control platform

(2) design the signal light and parking control platform based on GIS

(3) establish the database system of residential lights and parking control platform

(4) use Super map GIS, and select a map of a plot, for mapping, data analysis, data processing and so on. Design scientific and feasible design scheme for GIS, based on this map library, using the integrated secondary development of two intelligent parking scheme with Visual and studio for program development, GIS control system developed should have a graphical display, graphical operation, information query, real-time data display and other functions.

2. RELATED TECHNICAL BACKGROUND

Considering various factors, the related design of this paper includes: SuperMap and SQL server, RFID and other technologies.

2.1. Supermap

Super map GIS is a new generation of large-scale geographic information system platform developed by Beijing hypergraph Geographic Information Technology Co. Ltd. relying on the scientific and technological advantages of the Chinese Academy of Sciences, based on technological innovation, to meet the needs of different types of users in different industries. Super map GIS is the mainstream GIS platform software in Chinese market at present. Its specialty is GIS two development platform, hundreds of developers and integrators use the platform to engage in various fields of GIS projects, many national large-scale projects using the platform[5].

The essence of GIS is to isolate the functions of GIS, the algorithms of analysis and the information technologies they rely on through well-designed software architecture, so that they can develop independently and not interfere with each other. Therefore, there is the core idea of GIS is to establish a set of universal adaptability of the universal GIS kernel (Universal GIS Core, UGC) and implement the core functions of GIS technology environment is relatively stable, away from the change of those, and expanded the technology environment and the continuous development of the close relationship between the external function modules and the man-machine interface based on UGC. Once the relevant technical environment changes, only need to re implement or adjust the external function module can be. This will greatly reduce the cost of technology promotion. This model can also be simply summed up as "nuclear shell" separation. The architecture of the GIS based on the common phase is shown in figure 1.

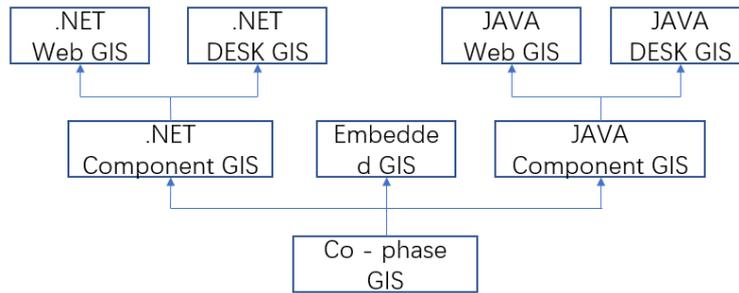


Fig. 1 The architecture of the co - phase GIS software

2.2. SQL Server

SQL is the abbreviation of English Structured Query Language, which means structured query language. The main function of SQL language is to establish communication with various databases and communicate with each other. According to the ANSI standards, SQL is used as the standard language for relational database management systems. SQL Server is a relational database management system (DBMS) developed and promoted by Microsoft.

Characteristic analysis:

- (1). real client / server architecture.
- (2). graphical user interface, make the system management and database management more intuitive, simple.
- (3)., a rich programming interface tool, provides a greater choice for user programming.
- (4).SQL Server is fully integrated with Windows NT, which takes advantage of many functions of NT, such as sending and receiving messages, managing login security, etc.. SQL Server can also be well integrated with Microsoft BackOffice products.
- (5). has very good scalability, can span from running Windows 95/98 laptop computer to run Windows 2000 large multiprocessor and other platforms.
- (6). support for Web technology, so that users can easily publish data in the database to the Web page.
- (7).SQL Server provides data warehouse functionality, which is only available in Oracle and other more expensive DBMS.

2.3. Radio frequency identification technology

The RFID system is different because of its different applications, but the most basic RFID system consists of three parts: Tag, Reader and Antenna.

- (1) electronic tag (Tag), which consists of a coupling component and a chip, each tag has unique electronic code attached to the object to identify the target object;
- (2) reader (Reader): the device that reads tag information in the card reader, which can be designed as hand held or fixed;

Antenna (Antenna): transmit radio frequency signals between tags and readers. Some systems connect to the host computer system through the reader's Rs232 or Rs485 interface to exchange data(see Fig.2).

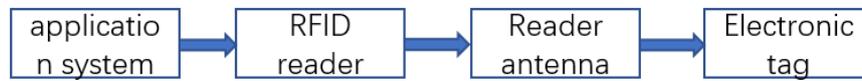


Fig. 2 RFID read flow mode

3. System function design

The specific design of the system is mainly to consider how to deploy the intelligent parking system, the following are discussed from two aspects.

3.1. The design of lamp signal and parking system

Set red and green in the doorway of the community, control the vehicle in and out. Using RFID technology to automatically detect whether there is a vehicle request into the residential area, you can also detect available parking spaces.

If a vehicle requests to enter, the system automatically inquires whether there are available parking spaces in the area, if not, it will show red lights, prohibit the entry of vehicles; if there are available parking spaces, it will show the green light, allowing the vehicle to enter. Users can use the system to query all available parking spaces, select the best parking space according to the user's needs, and then navigate to the selected parking spaces according to the system, then the service is completed.

3.2. Specific parking space design

When there is a vehicle to enter the District, the control platform will query whether there is available parking area, query waiting for the yellow light display, if there is available parking spaces, it shows street lights, can pass, if there is no available parking spaces will show red light, prohibit traffic(see Fig. 3 and Tab.1).

Table 1. Work flow

Numble	Summary
1	register license plate number, release active electronic tag
2	get electronic tags, parking readers collect information
3	vehicle entering, screen indicating available parking information
4	vehicle storage, RFID reader to identify vehicle parking situation
5	pick up the car, the Advisory point swipe card
6	computers can manage current information in real time

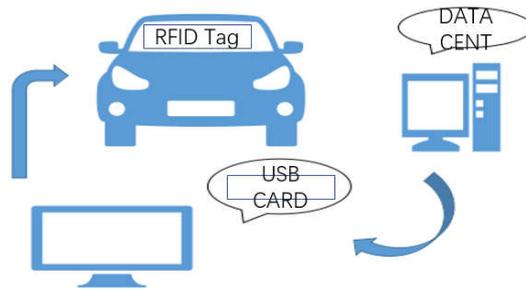


Fig. 3 Intelligent parking mode

4. CONCLUSION

Based on the idea of GIS, this paper carries out the demand analysis of the road signal control platform of residential district. By searching for a large number of literature, taking into account the various factors of their own development conditions, to achieve all the signal devices, circuits, visual management, image display, data management, user requests and other functions. The control platform can complete the above expected function, this design promotes the residential road lights the progress of management, at the advanced level in a variety of technical applications, both from the technical level or the needs of the user application, the control platform has huge application space and economic value.

ACKNOWLEDGEMENTS

This work was financially supported by 2012 Jingdezhen City Technology Fund, and 2012 JiangXi Youth Science Fund Project.

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