제천시를 위한 새주소 관리 및 안내시스템 구축에 관한 연구

A study on the Implementation of the New Address Management and Guide System for Jecheon city area

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중심어 : Main Gate, Street Name and Building Number Generation, New Address Management and Guide System, WEB-GIS, Life-GIS

요약

본 연구는 제천시 새주소 부여사업에서 추진된 새주소 부여를 위한 수치지도상의 건물 및 도로의 데이터베이스와 주출입구 조사 및 입력, 도로구간 설정, 도로명 제정 및 입력, 건물번호부여 등의 작업과정을 통하여 도시공간정보의 체계적인 관리와 활용을 위한 새주소 관리 시스템과 웹상에서 구현한 제천시 새주소 안내와 더불어 생활지리정보 등의 부가정보의 편리한 사용을 위하여 개발된 안내시스템에 대한 것이다. 본 연구를 통하여 지방 중소도시의 새주소 관리 및 안내시스템 개발과 구축은 클라이언트 서버 기반의 GIS 기능을 충분히 활용하여 관리시스템을 설계하고, 관리시스템과 동일한 데이터베이스로 안내시스템을 객체지향형으로 설계하여 WEB-GIS로 구현하여 새주소의 안내 및 생활지리정보서비스의 다양한 기능을 추가할 수 있도록 개발하였다. 그 결과로 제천시의 새주소 관리 및 안내시스템은 일반 시민이 쉽게 접근하여 생활에 필요한 다양한 정보를 손쉽게 이용할 수 있는 그 효용가치를 크게 높일 수 있었다.

Abstract

The purpose of this study is development of the management and guide system for convenient use of new address guide system for systematic management and use of spatial information gained by mapping of numerical map of building and road to large basic new address, survey and input of main gate, setting up the road session, naming and input of road name, grant of given number of building, new address guide, life GIS and added information on Web-site in Jecheon-si city area.

In this study, development and establishment of new address management and guide system in local cities are designed by making full use of GIS function of client server base.

A guide system is designed the same database as management system, and it is transformed into Web-GIS environment and developed in order to add the various functions of life GIS as well as new address guide.

In the result, the effectiveness of new address system and guide of Jecheon-si city could be highly increased owing to not only citizens' easy access but also easy availability of various informations necessary in life by developed its system.

Ⅰ. Introduction

Regarding the current address system based on the established locational code institution, namely Jibeun, it is very inconvenient to identify the location after the address alone. In order to revise the current futile address system, Jecheon city is promoting a new address assignment project since October, 2000, to settle the new address system

based on the location of the roads or the buildings. GIS (Geographic Information System) based new address management system and information system, developed as a part of the new address assignment project, is supposed to maintain the various changes on the digital map for each construction, modification and destruction of the roads and the buildings. The information system could be of help in both the indirect advertisement and the convenience of the civil life of the area, because its basis on the web makes it possible for anyone to access the informations of the outline map, travel, transportations and major buildings on the internet. This paper is focused on the development and the improvement of the new address system for Jecheon area, so that the analysis can be made the best use of as a reference in developing the address system for the other small or midium sized city.

II. Research topics and development

1. Database construction

The database construction procedures for the management and the information system are as the Fig.1. The main properties used in constructing the database are name, category, photo, the number of buildings of apartment for the building properties, and number, category, name, width of the road for the road properties, respectively. Also, road name, category of facilities, installation type, direction, inscription type, installed location, size, contents are the properties related to buildings and road signs.

2. Construction and design of the management and the information system

The new address management system for Jecheon city is to manage the building number after each construction and destruction of roads and buildings. It is implemented on the object related database management system (ORDBMS) ZEUS, whose components are adopted in the development. The following Fig 2. shows the development procedures of the management system and the information system.

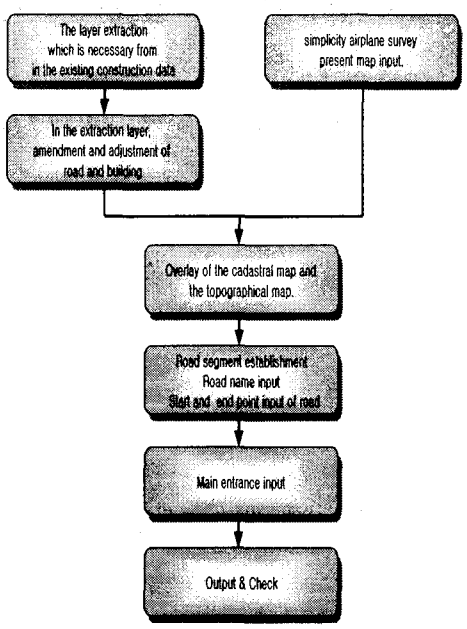

Fig 1. Primitive database construction

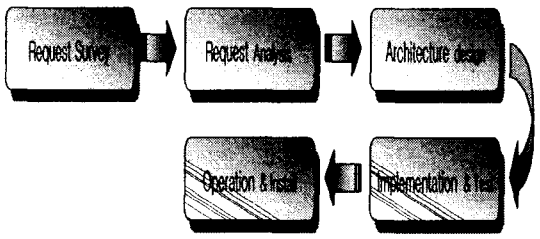

Fig 2. Program development stage

The first stage is the request survey. The required references and transaction procedures are to be figured out. The following Fig 3. shows the second stage of the request analysis.

The third stage is the architecture design to decide overall architecture to implement an efficient and economical system in performing the defined functions on the request analysis stage and storing the data. Addition, deletion of new classes and determination of the user interface is fulfilled in this stage. The following Fig 4. shows the procedure of the architecture design.

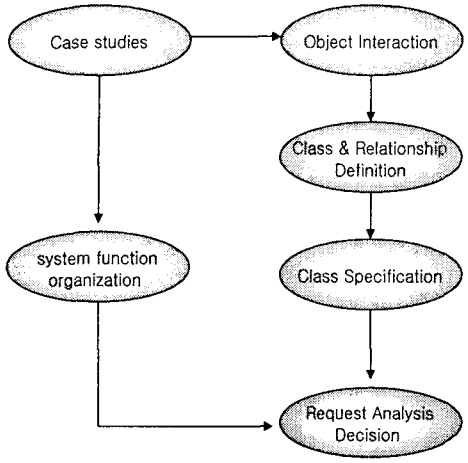

Fig 3. Request analysis stage

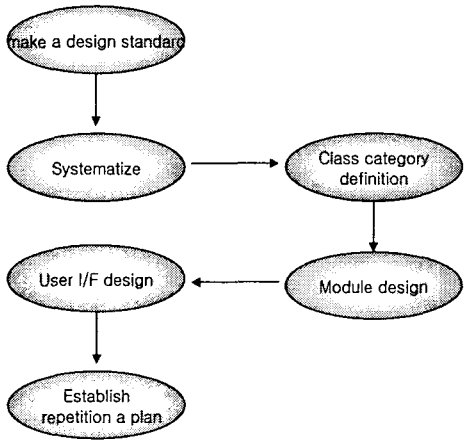

Fig 4. Architecture design stage

The fourth stage, the last one, is the implementation and the test. On this stage, integrated test on each subsystem in the ground of case studies and stage scenario is performed by the generated code obtained from the listed designed module and subsystem. The following Fig 5. shows the procedure of implementation and the test stage.

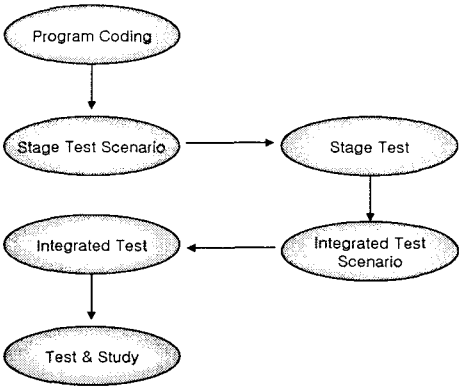

Fig 5. Implementation and test stage

3. Management and information system design

In constructing the management system, there are three divisions. Namely, the management program to maintain and repair the buildings after the construction and the destruction of the buildings, the output program to print the result, the arbitration program to sustain the consistency of the database when there are simultaneous accesses and modifications on the database system from various clients.

The main role of the management system is to maintain various building numbers and properties assigned to each building after respective construction and destruction, by searching ability in reference to the area or the locational code so that synchronization can be managed. On this management system, API from ZEUS is adopted.

The output part is designed as an independent module to print the vector image of numeric data on plotter. All systems are constructed to be used in GUI environment without any configuration.

Information system has the properties of searching and printing. It reflects the changes of the management system in real-time using the established database such as the new address management system so that the changes can be applied on another service immediately.

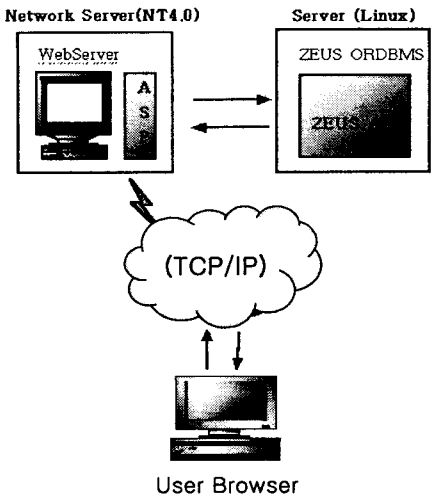

Fig 6. Network system configuration

A server, independent from the homepage server, is constructed to provide faster information for users because searching and printing abilities are the cause of overwhelming load on the network. The resultant information system is as Fig 6, Fig 7.

4. The characteristics of management and the information system for Jecheon

The management system has adopted object oriented functions, i.e. search deletion, addition of all the building, road and topography related data. Regarding screen configuration, panning, scale-up, scale-down, selective scale-up/down are possible, and its design allows each transaction to be performed per layer. Besides those, a lot of new functions are included such as the address management ability and the building property addition ability. The former can partition each basic area by the main road line, assign each building a number successively, and the latter can store photograph.

Information system applies the management system technique into web directly to get a link of the database on the properties of each building based on the numeric map of the new address system that is a result of the road name, building number assignment project.

Also, the connection with the internet based new address information system and the geographic information system make the new address system to be accustomed by common people with ease. Wide accessibility of the

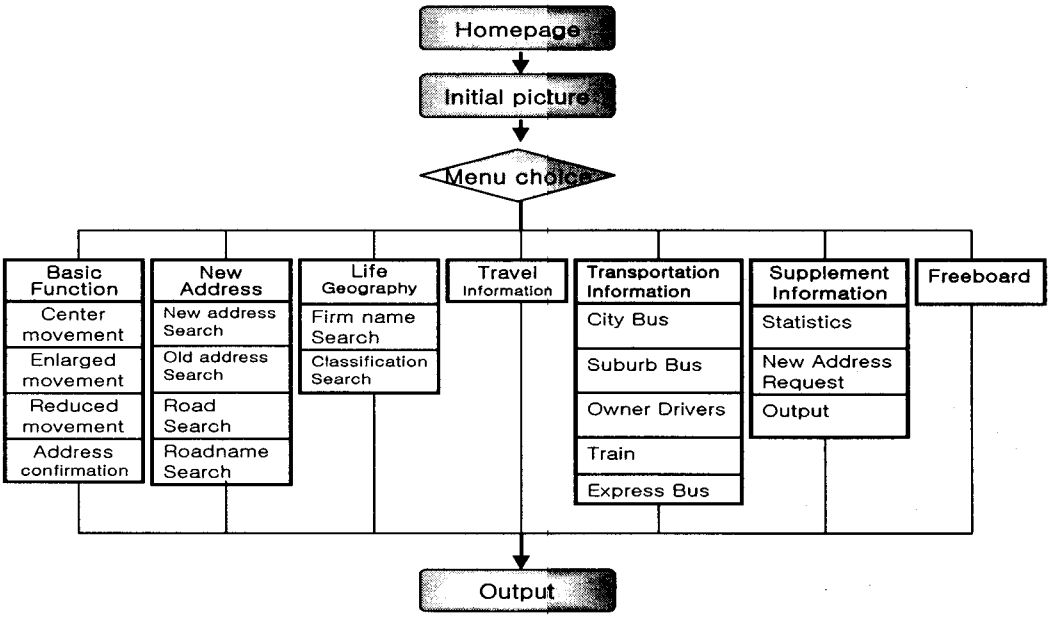

Fig 7. GUIDE SYSTEM USE FLOW OF NEW ADDRESS

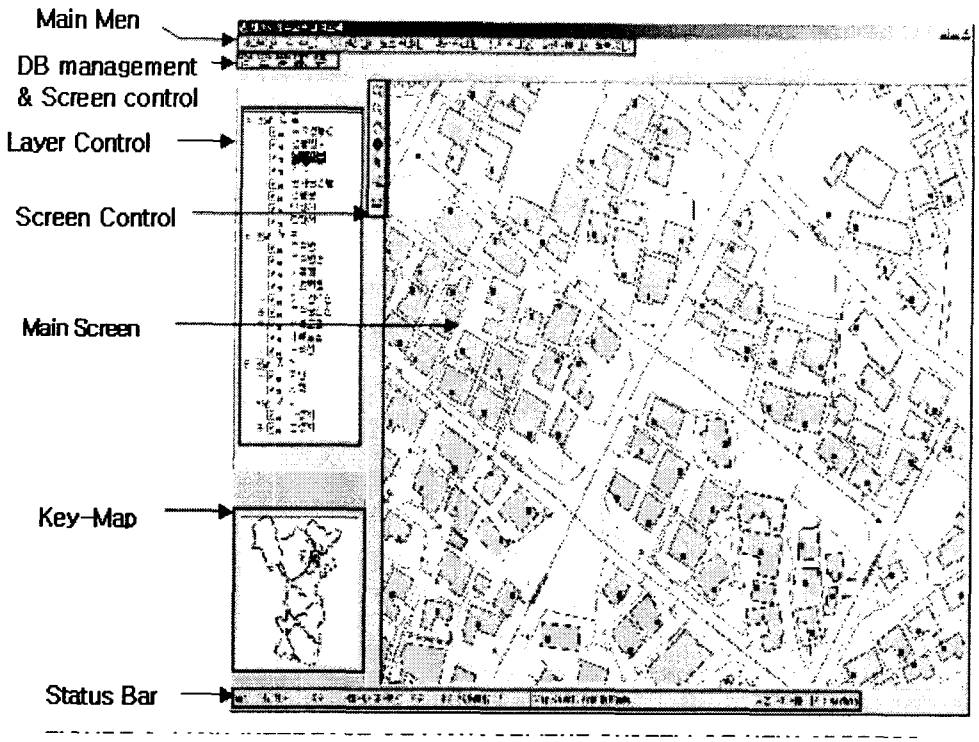

Fig 8. MAIN INTERFACE OF MANAGEMENT SYSTEM OF NEW ADDRESS

geographic informations on the internet due to its WEB-GIS based approach is its strong advantage.

The main characteristics of the management system help the user to reduce the time taken to be accustomed to the system by the efficiently incorporating the facility and the information. The operation of the geographic data by the client on the internet, adoption of both image and vector approach, interconnection with a lot of databases of the new address system, printing ability are those characteristics.

III. Implementing the new address information system

NT machine and Windows 98/NT are employed as server and client for the new address system, respectively. Visual Basic 6.0 is adopted as a programing language, and ZEUS GIS package is used as a database and API development tool.

This research makes stress upon the easiness of learning, the reduction of working hours and errors, the simplicity of operation, simplification in representing information interchanged between the user and the computer, the simplification in supporting the user's works.

1. Development of the user interface

GUI(Graphic User Interface) is employed as an user interface, with graphic object that supports input devices i.e. keyboard, shape of icon, button, scroll bar, menu. Also, users are classified by their works and computer dexterity, in order to implement GUI efficiently, and to reflect on design procedure, so that all the requirements can be satisfied by the user interface. Consistency, dialogue ability, stage based approach, user based approach, the selection of proper tools were of concern, in designing the user interface

2. Menu configuration and functions on the user interface of the new address management system

The following new functions are included in this system implementation to support programming. Open, close, save and quit and on-line manual are included as database management tools. Full screen mode, refresh, selective scale-up, scale-up/down, pan functions are adopted. Newly added key-map abilities will make ease in moving the locations.

The essential functions provided as a main menu are system management module to maintain the data based user history, searching module to search buildings and roads, building management module to modify the properties of buildings, road management module to update road information, sign management module, statistics management module, and zoom-in/out functions as supplements.

3. System design for new address information and travel/life geographic information

Information system can be classified into new address information function, travel/life geographic information function, and supplementary functions. They have their principal roles in searching after name or area, referring search result, printing outline map and e-mail, interconnecting with transportation web site, servicing express bus time schedule, freeboard, screen control, and transfer function. Users can access the anticipated information even though they have incorrect one, because the information system adopts top down approach, that finds the requested facilities after couple of selections on their rough categories.

Especially, referring to life geographic information, the characteristics of travel business, which plays the major role in Jecheon, is well focused so that its 20 beautiful sites and food stores, scene spot are introduced. Time schedule for train, express bus are also provided in convenience for the users. The other supplementary functions are changing ability of the map into outline to send with an e-mail, freeboard function to obtain feedback, new address request function to deal with the modification request for the new building on the internet.

The information system is opened for the administrative

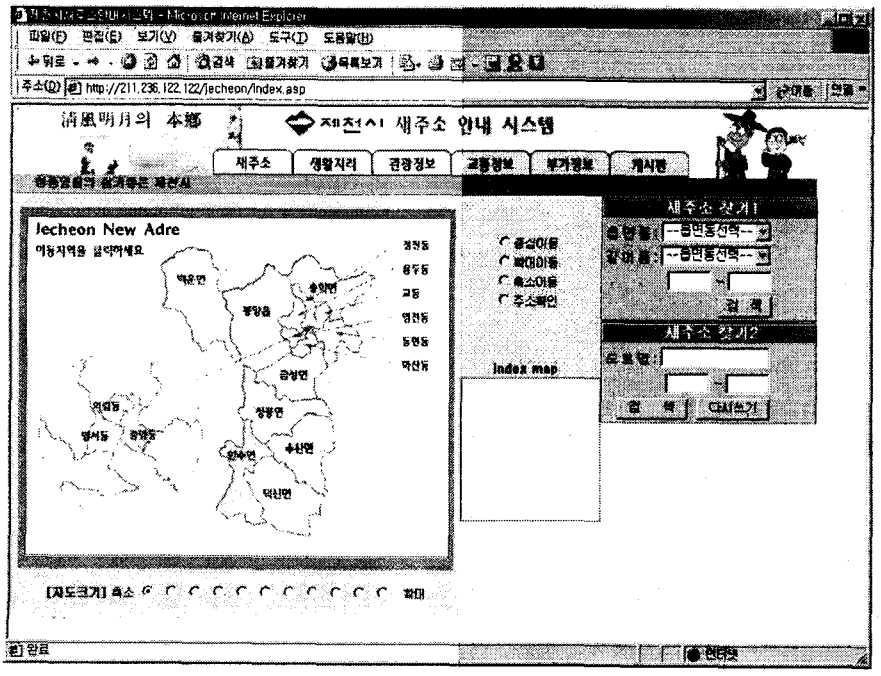

Fig 9. MAIN INTERFACE OF GUIDE SYSTEM

office of public institution and calamity recovery institution as post office, fire station and police station, which seriously requires the road name and building number assignment project. It is developed to play an important part as an intermediator to settle down the new address system from 'the new address assignment project for Jecheon'. To minimized unnecessary disorder of the residents due to the new address system, geographic information system(GIS) is employed, so that internet access by the common pc environment can be guaranteed.

As a result, road finding, course guide, address related information and life geographic information service will put the new address system closer to resident's daily life. Expressly, the property of Jecheon city information system such as the operation of the map date via the internet by the client, the adoption of image together with vector style, interconnection between the new address related database(various informations), printing functions have organically linked the user convenience and the necessary informations to increase the use of the common people.

IV. Evaluation and conclusion

There was some unexpected difficulties in assigning road name and building number for Jecheon city, unlike the major or middle sized cities. Jecheon area has its own peculiarity of the wide range of mountains and agricultural land(more than 90%) in comparison to downtown , of just 14 main arterial road among overall 60 roads. Setting the road interval, assigning basic interval and numbers on them in consideration with the complexity as both city and farmland are important subjects that should be solved by the local government It is the major point in management system to keep timely and successive maintenance of the database system together with sustaining accessibility between the manager and the user, and with strict security. But considering the common people, how to make them to be used to the new road based address system, instead of the locational code, has the key for the success of the project.

It is of significant concern for the new address system that successive education and promotion should be provided together with the easy access on the new address system on the internet to support the residents to be accustomed to it. The road based new address system will facilitate the daily life more than the previous one, and historic, cultural human conception should be changed in accordance with the new road based address system.

It is expected for the continual progress of the management and guidance of the new address assignment project to adopt regional diversity and characteristics, so that common people can have interest and participate in the project. This approach will lead to develop the best solution to make an excellent result.

References

[1] Dae-hee Ham, Sang-ho Yeon, Sung-wook Shin. Jecheon City New Address Management And Guide System Development. 2001.

[2] Korean Geographic Information Institution, Academic Seminar on Fall. 169-176, 2001.

[3] Min-young Lee, Min-soo Oh, Ji-young Lee, Young-cheol Shin. Research on The New Address Management System. Korean Geographic Information Institution 4(1): 47-56.

[4] The Ministry of Government Administration and Home Affairs.2000, Road Name And Building Number Assignment Project Reference Manual.

[5] Daejeon district, Road Name and Building Number Assignment Project Reference Manual. 2000.

[6] Jecheon city, 2000. Basic Plan For Jecheon City Information System was established, 2000.

[7] Chungbuk Small And Medium Business Administration. Investigation on Commercial Area of Jecheon for the Small Sized Businessman, 1999.

[8] Sang-ho Yeon, Dae-chul Yeon. Research On Construction Of Building Information Management System In The Space Of The Internet City. Korean Geographic Information Institution,2000, Academic Seminar On Fall,

2000.

[9] Soo-mee Lim, Jang-soo Kim, Object Oriented DBMS:GEUS. Object Oriented Open GIS Research Group. 2000.

[10] Clementini, E. Felice, P. Ooserom. A Small Set of Formal Topological Relationships Suitable for End-User Interaction. SSD '93, singapore. pp. 277-295, 1993.

[11] Shin-bong Kang. Research on the Object Grouping Of GIS System And On The MMP Of The Multi-Spatial Filter. Yonsei Univ., 1995.

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