

Research on the Information System of Pension Service based on Community in Xi'an

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Abstract

In the context of the rapid development of digital cities and the increasing population aging, the establishment of the pension community system can effectively solve the social contradictions that follow. Through the analysis of the daily life and health needs of the elderly, combined with the relevant image, GPS coordinate data, traffic information data, based on software engineering ideas to establish the Xi'an community pension system, followed ArcGIS Server technology, RIA and Flex technology, ArcGIS Server API for Flex technology and uses B/S (server/client) mode, In the Flex Builder 4 environment, the system has been initially designed and developed to realize the integration of spatial data resources. The system to meet the daily health information of the elderly daily inquiry and management to facilitate the daily life of the elderly travel, and for the elderly health emergencies designed emergency medical assistance function, greatly improving the system's practicality.

Keywords

GIS; ArcGIS Server; Flex; Community pension service; GPS.

1. Introduction

In order to actively respond to the national pension policy, optimize the old age of the elderly life, and strive to achieve efficient relief. Based on the theory of software engineering, this system is based on the theory of geography, database, GPS positioning technology and geographic information system. Based on the needs of software engineering, the design of community information system of community service in Xi'an is carried out. ^[1] The software platform is used to create the community convenient service distribution map, mark the location of each store on the map, and use GPS technology to carry on the fast navigation and the positioning, and carry on the related data processing, establishes the spatial database, is the comprehensive visualization old-The elderly provide a full range of high-performance pension services. ^[2]

2. System analysis

2.1 System requirements analysis

With the aging of the Chinese population intensified, the family pension is facing difficulties, the elderly pension service has become a major social problem. ^[3]At present, China's main pension model has family pension, community pension and institutional pension, according to social development and the actual family situation, the traditional family pension model has been gradually shifted to the community pension model. ^[4]

Since 2000, Xi'an has entered the ranks of the aging city. At present, Xi'an has entered the accelerated development of population aging, is expected to reach the peak in 2040, when the city's elderly over 60

years old will account for 30% of the total population. ^[5] To this end, the purpose of this system is to build a pension service platform, in the management of the elderly information at the same time, the integration of the elderly convenient travel, medical assistance and life services to the elderly to provide better living security. ^[6] At the same time in a sudden situation, timely contact with the user's family and planning the best route to the nearby hospital. In addition, the system will regularly analyze the user's physical condition and give a report. Is the intelligent community pension specific implementation of a good attempt. ^[7]

2.2 The basic function of the system analysis

Geographic information system is the most effective and direct software system for carrying, managing and displaying spatial data. It is the key to establish community service platform for public support. ^[8] System construction to fast, convenient and accurate for the purpose of service, to provide users with accurate personal information query, spatial location and attribute inquiries, real-time navigation line inquiries and other services. ^[9] The platform integrates the social resources related to the elderly, the professional emergency medical assistance services, daily physical condition feedback services and the system connected to build a comprehensive pension service system. The realization of the system requires the following aspects:

Rights management (data management, user management);

Map operation function (zoom, refresh, roam, switch);

Target point positioning function;

Information inquiry (personal information, community information, hospital and Shopping malls information);

Spatial analysis (shortest path, buffer analysis, multi-form traffic navigation);

The elderly health management function.

2.3 The data source of the system

Divided into three parts:

(1) Basic data

① 1: 10000 image data;

② Digital raster data;

③ Digital orthophoto data.

(2) Pension special data

① Pension census data;

② Health management data;

③ Old age design database.

(3) Medical assistance data

① Traffic data of Xi'an;

② GPS network coordinate data.

3. The design of the paper

3.1 The overall design of the system

The overall design of the system is shown in Fig 1.

Three-dimensional basic data technology through sketchUp three-dimensional modeling of three-dimensional structure, and then by Multipatch three-dimensional data model storage GIS objects. Select the system structure module for the system requirements, based on ArcGIS Server and rich client technology to achieve the demand for the module. Basic Geographic Data The geodatabase is established by the multi-resolution hierarchical model of ti-dimensional tile technology. The

combination of the three constitutes a three-dimensional visual community based on ArcGIS pension system.

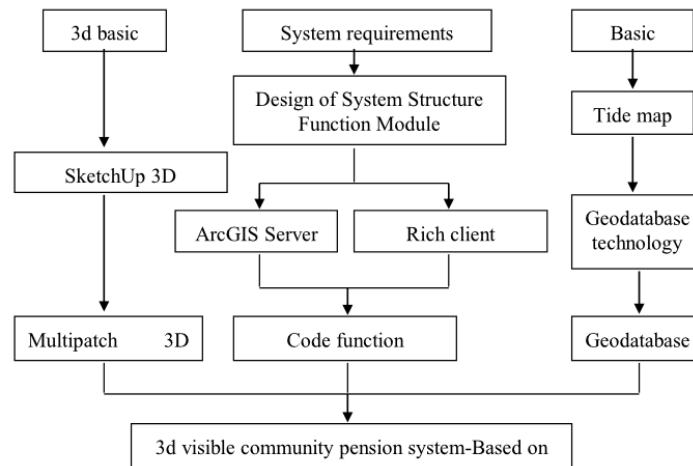


Fig. 1 The overall design of the system

The technical route is shown in Fig 2.

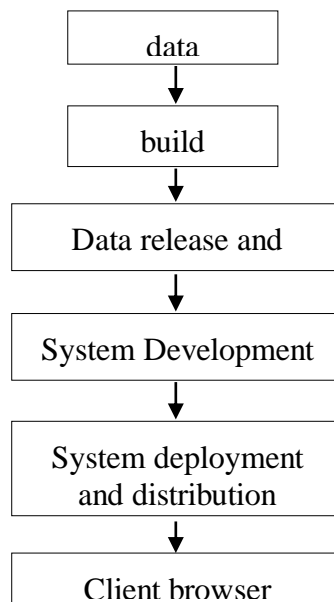


Fig. 2 Technical route flow chart

3.2 The Design of System Database

Spatial data is the basic carrier of spatial display, spatial query and spatial analysis. Spatial entity is an abstract model of geographic graph. In this system, the spatial entities mainly include point-like features (such as community points, etc.), linear feature information (such as roads, etc.) and surface features (such as urban areas). The spatial data hierarchy table is shown in Table 1.

Table 1. Spatial data hierarchical table

Layer code	Layer name	Data set type	Content description
CQ	City	Polygon	Areas of Xi'an
SQ	community	Point	Community distribution
GJXTP	Bus line topology	line topology	Urban bus line topology
SQJD	Urban street	Line	The main street of the city
JD	Attractions	Point	Distribution of urban attractions

BG	Hotel	Point	
XX	School	Point	
YY	Hospital	Point	
YH	Bank	Point	
SC	Market	Point	
.....

The attribute database is a two-dimensional data table that describes the spatial entity's identity or nature, and is typically established using a relational database approach. The establishment of the information system attribute database is to use Access database management system to achieve. It must meet the ease of use, flexibility, redundancy, management, high logic operation and other features. Therefore, the design should strive to reduce the redundancy of data storage, improve the speed of retrieval, and the system has a variety of data management, computing, conversion capabilities. The attribute data in this system basically includes personnel information, health information, hospital information, etc., see the attributes of information in Table 2.

Table 2. The attribute information tables involved in this database

Database table name	Relationship model name
Person	Personnel information
Health	Health information
Market	Market
Hospital	Hospital
Community	Community

As can be seen from Table 2, the system has five main data structure table, the staff information table as an example, see Table 3.

Table 3. Personnel Information Table

Field name	Field Type	Description
ID	int	Primary key
DM	varchar(4)	Person code
Community	varchar(3)	Community code
Name	nvarchar(20)	Personnel name
Sex	nchar	Male/Female
Age	int	age
Contact Name	nvarchar(20)	Emergency contact name
Phone	varchar(20)	Emergency contact telephone number
Memo	text	Remarks

In order to realize the query of spatial data and attribute data, it is necessary to establish an associated identification identifier (ID) in the spatial data table and attribute data table, and to judge the relationship between spatial data and attribute data according to the identification code. The two interact.

3.3 The Design of System Architecture

System framework is divided into three layers, namely the presentation layer, web service layer, data layer.

The presentation layer is a rich client based on the browser that presents a rich, highly interactive visual interface for users to display spatial and attribute information in a graphical and integrated manner, as well as providing maps, information queries, maps Analysis of the interactive interface.

Web service layer contains web server and GIS server in two parts, web server is running the web application machine. The web server uses the service resources on the GIS Serve for web application deployment and web services. GIS server on the one hand the application of the world map tile technology multi-resolution hierarchical model to establish a geodatabase, making the system can quickly obtain map information, thus speeding up the system operating efficiency. On the other hand, only through the MXML and Action Script call ArcGIS Flex API in the class code to call each resource URI can be obtained in ArcGIS Server resources to achieve Flex and ArcGIS Server communication.

The database layer is the bottom of the system, mainly including spatial database, attribute database and local file, maintain the relationship between various data, and provide data backup, data archiving, data security mechanism for the entire system to provide data source protection. Where the spatial geographic information is published through the ArcGIS Server server.

3.4 The functional design of the system

System module shown in Fig 3:

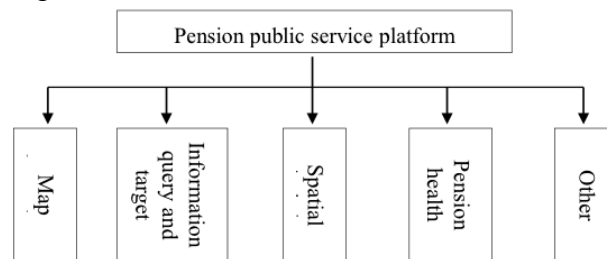


Fig. 3 System module

(1)Map browsing function. The map operation is done by entering the program directly into the zoom, full graph display, refresh, previous view, post view, image map and vector switch and other operations.

(2)Information query and target location positioning function. The administrator can query the system user's personal information, community information and so on. Users can query their own community around the facilities, such as hospitals, shopping malls and so on. At the same time you can also query the spatial coordinates of the feature, in order to achieve positioning.

(3) Spatial analysis function. Through the system can query the location and destination between the shortest path, buffer analysis, multi-form traffic navigation.

(4) old-age health management function. The system stores and manages the user's health status information and periodically pushes the user's daily health status.

4. System function implementation

The implementation of the function includes the following:

(1) System login requires the user to connect to the Internet computer terminal, enter the URL in the IE address bar, you can open the IE browser, enter the address in the address bar shown in Fig 4, and then you can connect to the system login interface, such as Fig 5 shows.

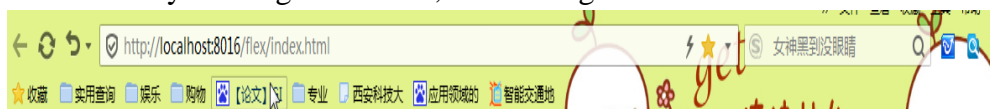


Fig. 4 System login interface



Fig. 5 System login interface

There are two types of system users, namely, ordinary users and administrators, the administrator can maintain the data on the system, and ordinary users do not have this permission, when the user through the authority to verify the system can be entered. (2) Data management module mainly includes: data management, user management.

Data maintenance includes: data backup, upgrade, restore three parts. Because data security is the prerequisite for the stability of the entire system, so the operation of this module is not open to the general user, data management and maintenance options are not available before the management authority, if you need to operate and maintain the data, please use the administrator To enter the system. This function enables the data to be backed up and restored. If there is new data, the upgrade can also be completed. However, the upgrade data must be provided by the developer.

(3) The map operation is done by entering the program directly into the map zoom, full graph display, refresh, previous view view, post view view, image map and vector diagram switching function.

(4) Information query and target location service

Elderly information query results shown in Fig 6.

姓名	年龄	性别	紧急联系人	联系电话
张亮红	65	女	李绍山	17825346220
陈继红	62	男	陈明阳	18602359867
李兴东	70	女	张欢喜	15522385612
王永斌	68	男	王子轩	13215162432
盛钟	72	男	刘萍	13067112758
赵天阳	64	男	赵晓阳	13355174826

时间	健康信息
2015-07-01	高血压
2016-05-05	高血脂

Fig. 6 Elderly information query result interface

Click on the map can be adopted on the mining, where the WGS84 coordinates, as shown in Fig 7.



Fig.7 WGS84 coordinates at the target point on the map

Community search function:

You can search for a cell name in the search box or search through a list of regions. For example, click on the Beilin area to choose “君怡家园”, the results shown in Fig 8.



Fig. 8 Community search results interface

The search results in the lower left corner can be retrieved in the district where the elderly living and the community around the hospital and shopping malls.

Click the "route navigation" button to view the route navigation on the map as shown in Fig 9.



Fig. 9 Walk the shortest path navigation results

After determining the starting point and the end point on the map, the system will automatically give the walk, driving, bus three detailed travel routes, bus travel routes also include specific transfer mode. And then you can choose to travel mode planning. Planning line results in the left side of the text display, there are lines on the map marked.

If you click on the drive to determine the end point after the start point, the system will automatically give the trip route index box as shown in Fig 10.

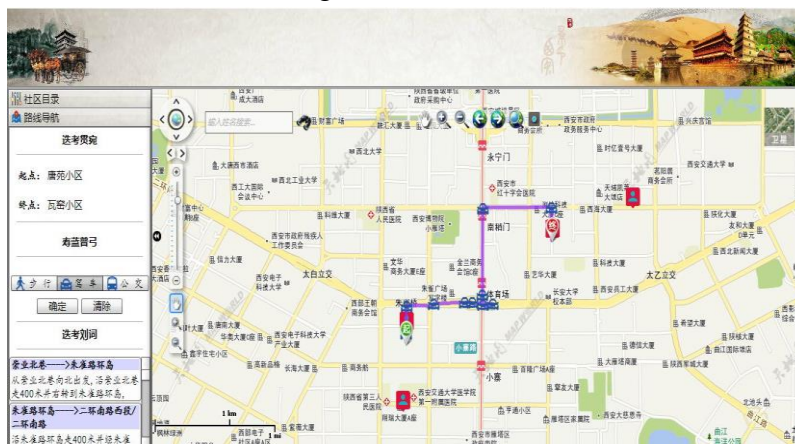


Fig. 10 Driving the shortest path to navigation results

If you click on the bus travel mode, the system will automatically give the bus route index box as shown in Fig 11.



Fig. 11 Public transport navigation results

5. Concluding

Based on the theory of map, database, GPS positioning and geographic information system, the system is based on the data of the major shopping malls, communities and hospitals in Xi'an, and the database of community service is designed and the database of community service system in Xi'an is established. Community pension database, and finally produced into the community of Xi'an community pension service information system, allowing users to at any time through the system to understand personal health information, query and positioning the community around the hospital shopping malls, user-friendly life. At the same time according to the elderly body of the sudden situation of the rapid navigation function, making the system greatly improved practicality. In addition the system itself is strong visualization, simple operation, for the user health and life to provide services.

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