

Design and Implementation of Mobile Digital Campus System

Xiangling Ning, He Jiang, Haowen Song, Yuncheng Zhu and Jian Li
School of Information, Qilu University of Technology, Jinan, China
ningxiangling@qq.com, jianghe09@126.com

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Abstract: The mobile digital campus system as a tool to access the campus network resources, and its design and implementation meet everyone's basic needs, which greatly enhance the information level of school. This Paper describes a comprehensive Android handheld digital campus system which is based on Baidu map. The IFLY intelligent voice technology and the functions about Baidu map have been combined with the system. This system implement voice dialogue and voice navigation of the mobile terminal device. The operation of the system is very human and it makes the users have an intelligent experience felling.

1 INTRODUCTION

As information technology and wireless network technology becomes more and more mature, the domestic and foreign universities are carrying on the different levels of the construction of campus information. The digital campus is the inevitable trend of development in the modern distance education and network (Shengwu Duan and Sijun Jia, 2014). "Digital Campus" is a kind of virtual education environment (ZhangMin, 2014). In view of the specific situation of Qilu university of technology, we developed this set of integrated Android mobile digital campus system which is based on Baidu maps. The software system includes voice dialogue, information query, bar code scanning, books information query, campus navigation and so on.

The mobile digital campus system relying on mobile communications and WLAN network (Xiao Hu, Changhong Liu and Waixi Liu, 2012). Depending on the portable mobile terminal equipment, the mobile digital campus system applying all kinds of information resources and services for effective integration and display (Zhang H, Feng B and Zhang L, 2012). In this way, it can realize all kinds of campus information sharing and provide great convenience for school teachers and students to receive the information resources (Zeng M and Ge, 2014). The system uses the method of data integration and it will be scattered in each information island in the effective information resources integrated into a system. In this way, we

can easily access to the campus network resources. There is no doubt that this system improves the school's information level and achieves the real mobile campus digital.

2 THE DESIGN OF MOBILE DIGITAL CAMPUS SYSTEM

In terms of speech recognition, using China's largest intelligent speech technology provider IFLY intelligent speech technology. It is taken into consideration and detailed, and it is practical as well as strong stability, conforming to the direction of the development of technology today. Applications on the map, it uses with the upgrade Baidu map which possess the function of Baidu mobile phones voice navigation. In this way, users don't need to download the navigation data packets and it provides a powerful support for the navigation functions of this system.

2.1 Principles of System Design

The principles of integrity and openness: this system design fully consider the relationship between the various units of the school, the overall design and planning of the system. This system pays more attention to the organic integration of various information resources and makes it have certain openness. The principle makes us grasp the relationships between information sharing and

information security.

The Principles of scalability and maintainability: This system has forward-looking in the design, and it fully takes into account the feasibility of the system upgrade, expansion and maintenance. We have considered this system may involve the characteristics of the users and business more multifarious. We all hope to offer convenience for everyone. This system fully considers how to improve the response speed of the business process as well as the speed and accuracy of statistical summary.

2.2 The Design of System Module

The mobile digital campus system is based on Android platform and it can be divided into five functional modules in general as shown in figure1.

The Campus Navigation: We use Baidu map and the intelligent voice robot with dispatch voice into the system. The system adopt an appropriate technology to plan out the optimal path between two points. Under the condition of the network, when we say the name of the building, it will be immediately locate to the destination. If the digital campus system can't find the destination, it will have a feedback information.

Voice Dialogue: We use the IFLY's voice technology to carry on the simple chat dialogue. In this way, it can realize pronunciation fuzzy matching, pronunciation localization, pronunciation navigation, dialogue quiz and so on.

Information Inquiry: This system makes use of the Chinese word segmentation technology to query the campus information. The default homepage web connection is Qilu University of technology. Combined with the current existing campus resources, we can check the school information.

Bar Code Scanning: Designing bar code scanner and by scanning the books on the back of the bar code, the system automatically connected to the campus library database and query information related to books borrowing.

Electronic Data Query: This module includes online video class, electronic schoolbag and study BBS. Students could carry on the effective review and study exchanges, answering all kinds of questions according to own actual situation.

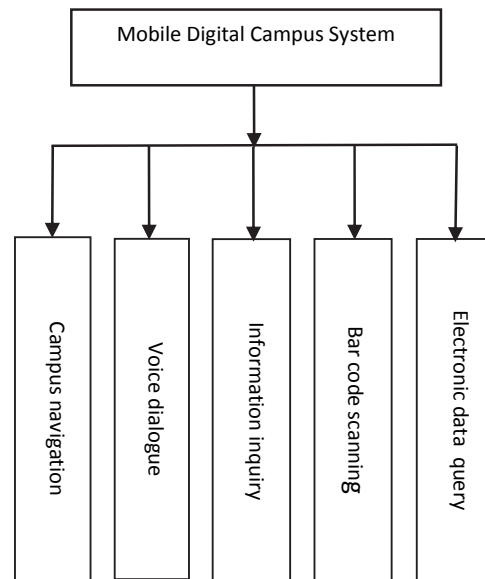


Figure 1: Software overall module.

2.3 The Design of System Interface

This system adopts the visualization of the graphical user interface (Qi W U and Lin J and Yang J T, 2014).The graphical interface instead of the ordinary user interface. The interface is intuitive and transparent to the users and it is very easy to use for the ordinary users. The main body of the system includes three parts: The campus satellite map, covered with some pictures of the building points and the commonly used function buttons of the system. The construction methods of the main interface of the system:

The satellite photos in the campus satellite map are taken from the Baidu map. It is convenient for school teachers and students to search the campus information. The users can directly click on the button to see the clear picture of buildings and get the related information. The users will have a perfect experience just the same as using the Baidu panorama map.

The virtual campus's background is the Baidu campus satellite map. The information of the campus teaching building, the office building, the laboratory building, the library, gym, canteen, dormitory and the shop are skilfully embedded in the map. In order to enhance the convenience of query information in the virtual campus, all the information can be indexed by the tags. The user can experience a strong interaction when completing a variety of operations via the keyboard, touch screen or voice navigation system.

The system user interface realizes the communication between the users and the terminal equipment, and it is the most direct layers between the software and the human users interaction. Designing a good human interface can not only allow users to meet their own information needs, but also brings pleasant feeling to the users. When enjoying the warm service, the users not only bring some economic benefits to the software developers, but also it is conducive to the promotion of software products.

3 THE IMPLEMENTATION OF KEY TECHNOLOGIES IN MOBILE DIGITAL CAMPUS

Voice as an interactive tool, it can bring a new mode of interaction for geographic information. Based on the campus Baidu map, the system calls IFLY intelligent voice interface. It smoothly realizes the combination between voice technology and Baidu map. Baidu map has the open interface based on the Android platform and it is open and free. It can reflect the actual location and get the favor of the software practitioners. The operation object of GIS is spatial data. Dot, plant, line and body which has a three elements in geographical entities. The most fundamental characteristics of the spatial data in each data is coded in accordance with the unified geographic coordinates, and realizing the description of the localization, the qualitative and the quantitative. Geographic information system (GIS) has become a very mature technology.

3.1 The Implementation of IFLY Voice Technology

Speech recognition is a technology to solve machine understanding the human language. Speech recognition technology is an intelligent technology which transforming the pronunciation signal into the corresponding text or the order through the process of recognition and understanding. As the main direction of the intelligent computer research and the key technology of human machine speech communication. Speech recognition technology has got the extensive attention by the scientific community. Speech recognition is essentially a process of pattern recognition. The reference patterns of unknown speech pattern and the know speech are compared one by one and the pattern of the unknown speech is compared with the

reference pattern of the known speech. The best matching reference pattern is used as the recognition result.

Pattern matching method is the most commonly used method for speech recognition. The method generally needs four steps to complete, namely, feature extraction, model training, pattern recognition and judgment. In the training phase, the users only need to say every word in the vocabulary list, and store the feature vector in the template library used as template. In the recognition phase, the feature vector of the input speech is compared with each template in the template library, and the highest similarity template will be output as the recognition results.

The system firstly integrates the IFLY voice of intelligent speech technology and encapsulates a unified voice recognition interface for the entire application package. When programming, you just simply calls the underlying unified interface to enable voice recognition capabilities, and specific logic and processes are encapsulated in the bottom. By importing the function of speech recognition, speech recognition ,speech synthesise and semantic comprehension, this system has completed the integration between the fly smart voice and mobile digital campus system, and this system realized the voice conversation, which prepared for the following voice navigation feature.

3.2 The Implementation of Precise Positioning Technology

Mobile GIS is a system which based on the mobile Internet and relying on mobile intelligent terminal and combining GPS positioning or base station positioning. The intelligent terminal all carries the GPS localization hardware system, so the moving GIS is welcomed increasingly in recent years (Cheng G and Liang X L, 2014). With the rapid development of mobile GIS, there are many open interfaces of GIS system. Baidu map API are a set of application program interfaces which compiled by the JavaScript language. We can build a content-rich and interactive mobile digital campus system. The system adopts the Baidu satellite maps to overlook the campus. It can make the software surface more intuitive and clear. Through the user's terminal interface of this system to realize the operation of click, double-click, click, zoom, rotating changing perspective on the map .

Satellite maps accurately should be called satellite remote-sensing images. The satellite map is the real geography landscape and it can be used to

detect the information of the ground. The system calls the API of the Baidu map and the codes are as follows:

```
bMap.setMapType(BaiduMap.MAP_TYPE_SATELLITE); // Satellite maps
```

The Baidu map SDK supports positioned layer, map marking, mulch line planning results and so on (Fan Z and Li L, 2014). We called the content stacking or covering on the map as the mulch and the codes are as follows:

```
createMarker("library", GeoFactory.GEO_LIBRARY, GeoFactory.LIBRARY_NORTHEAST, GeoFactory.LIBRARY_SOUTHWEST, ImageFactory.JIDIANLOU_IMAGR;
```

GPS positioning provides the accurate location information to the users. After processing the received signals, the GPS hardware module will transmit the positional information to the mobile termination equipment. After receiving the processed information, the mobile termination equipment will apply it into the program and the localization function will be completed. The Baidu map can use GPS, WIFI, base stations, IP hybrid positioning mode. In the software development, this system directly locates the latitude and longitude of the library, and it can jump directly to the core area of the school after opening the system. The codes are as follows:

```
// Longitude and latitude about the library of the Qilu university of technology  
public static LatLng GEO_CENTER =  
new LatLng(36.563758, 116.818105);  
// Locating to the latitude and longitude which assigns  
bMap = mapView.getMap();  
bMap.setMapStatus(MapStatusUpdateFactory.newLatLng(GeoFactory.GEO_CENTER));  
bMap.setMapStatus(MapStatusUpdateFactory.newMapStatus(newMapStatus.Builder().zoom(19).build()));
```

4 CONCLUSION

The mobile digital campus based on the digital campus platform, and it uses the data from the existing campus to accomplish a smart mobile digital campus system. As long as using a smart phone or other smart mobile terminal equipment, the users can get their information resources through the mobile Internet whenever and wherever. The mobile

digital campus fully meets the needs of the campus users (Cao Y, Chen L, Wang J L, 2014). The interaction between the users and the mobile digital campus intelligent platform has set up a direct communication bridge for students and schools and it has enhanced the felling between the students and the schools. The information is not limited by the fixed areas or places (Ma L, Zhou Y, Liao K, 2014). Mobile campus integrated platform can greatly improve the efficiency of interaction, and fully utilize the debris time of school teachers and students to realize the sharing of the mobile campus resources.

This system combines the mobile technology and education information construction organically, through the mobile Internet access to a variety of teaching and educational administration data, the teachers and students get great convenience. The implementation of the mobile digital campus system has greatly improved the level of the school's information and enhanced the students' autonomous learning ability. This system has a wide applications prospect.

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