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# Design and Implementation of Smart Phone Assistant System for the Elderly Based on WeChat Mini Program

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**Abstract.** The smart phone assistance system for the elderly based on WeChat mini program mainly solves the problem that the elderly can not or can not skillfully use smart phones. The system is designed with the idea of microservice architecture, and coded with WeChat mini program, SpringBoot framework, intelligent remote control and intelligent voice interaction technologies. In addition, in terms of interface design, the aging design is also carried out for the elderly. The smart phone assistant system for the elderly based on WeChat mini program aims to help the elderly adapt to the rapidly changing technological society, bridge the "Digital Divide" and create a "Digital Huilao" environment.

**Keywords.** WeChat Mini Program; Smart Phone; Assistant System; the Elderly; SpringBoot.

## 1. Introduction

At present, the Internet penetration rate of the elderly is increasing, but the Internet usage rate is low, not to mention the proficiency level. The smart phone assistance system for the elderly based on WeChat mini program uses intelligent voice interaction technology and intelligent remote control technology to help the elderly proficiently operate smart phones, so that elderly users can keep up with the pace of scientific and technological development, enjoy the convenience of the information age, reduce the "Digital Divide" of the elderly[1], and realize the "Digital Huila". More older people can be made to consume digitally like younger people.

## 2. Key Technology

### *2.1. WeChat Mini Program*

The development of WeChat mini program mainly uses WXML combined with basic components and event system to build the structure of the page; Use WXSS to describe the component style of WXML, so that the page of the small program

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presents the best visual effect. Use JavaScript to develop business logic and invoke API[2] for small programs to fulfill business requirements. Using JavaWeb Servlets[3] to process client requests and respond to client dynamic resources can minimize the impact on response performance in the background.

### *2.2. SpringBoot Framework*

SpringBoot framework is designed based on Spring4.0, which not only inherits the original excellent features of Spring framework, but also further simplifies the whole construction and development process of Spring applications by simplifying configuration. In addition, SpringBoot solves problems such as conflicting versions of dependency packages and reference instability by integrating a large number of frameworks.

In addition, SpringBoot can not only better handle the loose coupling relationship between the business logic layer and other layers [4], but also deploy and monitor the system faster, which can improve the development efficiency to a large extent [5].

### *2.3. Intelligent Voice Interaction Technology*

Intelligent voice interaction technology[6] is a systematic project; It mainly involves speech recognition, natural language understanding, dialogue management, natural language generation, speech synthesis and other technologies and comprehensive application. Among them, the process of natural language understanding, dialogue management and natural language generation is also called intelligent dialogue system, which is the core technical difficulty in the whole intelligent speech interaction process [7]. In recent years, intelligent voice interaction technology has made significant breakthroughs in speech recognition, speech synthesis, natural language understanding and other modules with the help of artificial intelligence technologies such as big data deep learning, and has been widely used in finance, justice, e-commerce and other fields.

### *2.4. Intelligent Remote Control*

The remote control function[8] of The smart phone assistance system for the elderly based on WeChat mini program is mainly built according to the C/S structure mode. The Server program is installed on the controlled computer, and the Client server is installed on the main control computer [9]. The program on the client side submits the user's requirements to the program on the server side. The program on the server side receives the requirements submitted by the user, carries out corresponding processing, and finally presents the result returned by the server side to the user in a specific form. The data exchange between the system client and the server is realized through TCP protocol[10].

## 3. System Design

### *3.1. System Structure Design*

The smart phone assistance system for the elderly based on WeChat mini program is mainly divided into front-end, back-end and database parts.

Among them, the front-end part of the smart phone assistance system for the elderly based on WeChat mini program mainly uses WeChat mini program for page display, uses WXSS and WXML to write page content and style, and uses JSON file to store static data. The back-end part of the smart phone assistance system for the elderly based on WeChat mini program mainly uses SpringBoot+Mybatis framework to write business functions and data processing of Controller layer, Service layer and Dao layer. The database part uses MySQL database for data storage.

### *3.2. System Function Structure Design*

The smart phone assistance system for the elderly based on WeChat mini program is mainly composed of seven functional modules: intelligent voice function, remote assistance function, mobile phone use tutorial, life software center, control center, communication community and individual center. In addition, in the interface design for the elderly users to make aging adjustment. The functional structure of the elderly smart phone assistant system based on WeChat mini program is shown in figure 1.

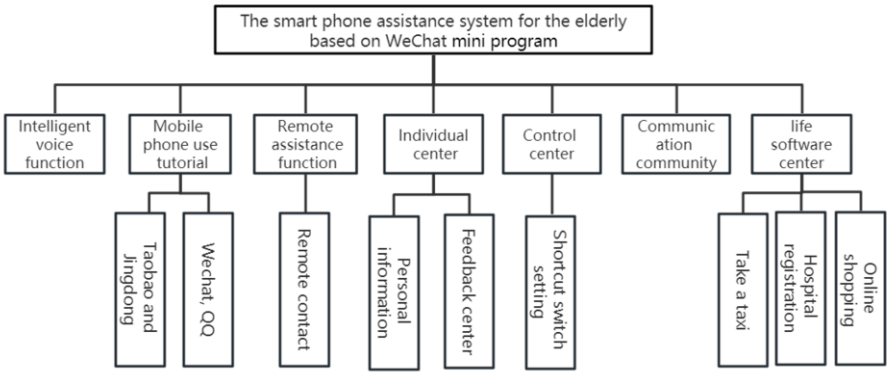


**Figure 1.** System function structure diagram

### *3.3. Database Structure Design*

The smart phone assistance system for the elderly based on WeChat mini program needs to use MySQL database to store entity information such as users, mobile APP tutorials, opinions or suggestions, communication community problems and remote assistance contacts. The overall E-R diagram of the elderly smart phone assistant system based on WeChat mini program is shown in figure 2.

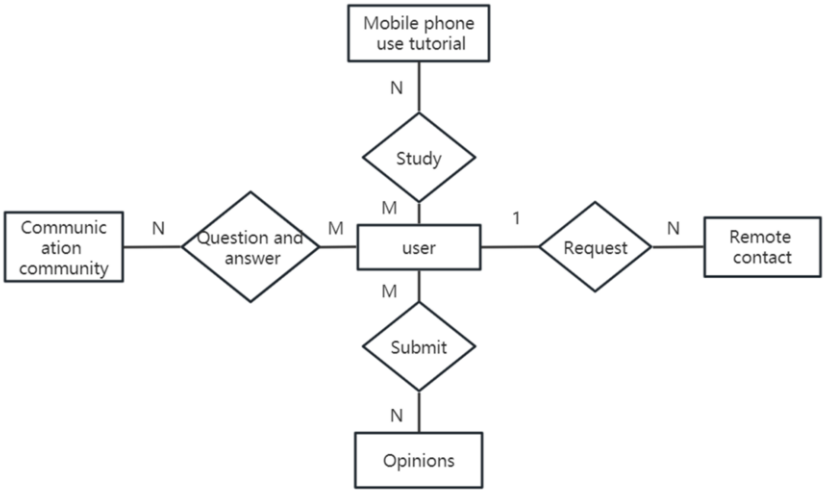


**Figure 2.** Global E-R diagram of the elderly smart phone assistant system based on WeChat mini program

According to the global E-R diagram of the relationship between entities, the database data table structure design, easy to add, delete, modify and check system data operations. The user information table of the elderly smart phone assistant system based on WeChat mini program is used to store the basic information of users, as shown in table 1.

**Table 1.** User information table

| Field name | Field type | Primary key | Null or not | Describe |
|---|---|---|---|---|
| user_id | int(20) | √ | not null | User number, unique identification |
| username | varchar(20) | - | not null | - |
| password | varchar(20) | - | not null | - |
| sex | int(1) | - | - | - |
| age | char(2) | - | - | - |
| tel | varchar(10) | - | - | - |

The user opinion form of the elderly smart phone assistant system based on the WeChat mini program is used to store the user's feedback on the system and other information. As shown in table 2.

**Table 2.** User opinion table

| Field name | Field type | Primary key | Null or not | Describe |
|---|---|---|---|---|
| recommend_id | int(20) | √ | not null | User number, unique identification |
| user_id | int(20) | - | not null | - |
| username | varchar(20) | - | not null | - |
| recommend | varchar(50) | - | - | - |
| recommend _time | varchar(30) | - | - | - |

The information table of the mobile APP tutorial for the elderly smart phone

assistant system based on WeChat mini program is used to store the relevant information of the mobile APP tutorial. As shown in table 3.

**Table 3.** Information table of mobile APP application tutorial

| Field name | Field type | Primary key | Null or not | Describe |
|---|---|---|---|---|
| app_id | int(20) | √ | not null | APP tutorial number, unique identification |
| app_name | varchar(20) | - | not null | - |
| app_type | varchar(30) | - | - | - |
| course_type | varchar(30) | - | - | - |
| course_count | int(100) | - | - | - |
| study_count | int(100) | - | - | - |

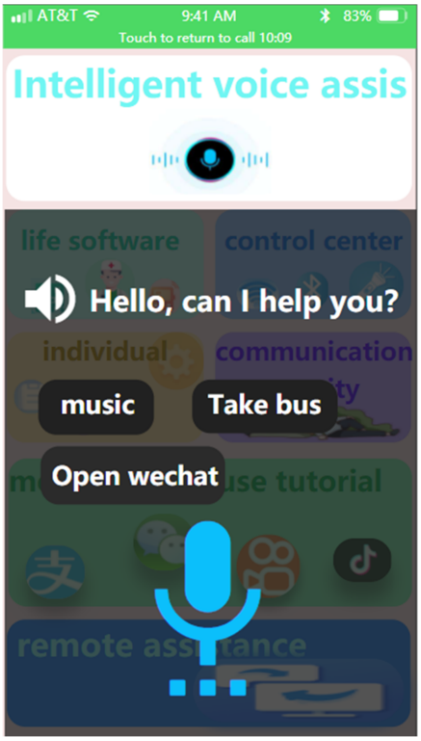


**Figure 3.** Intelligent voice assistant interface

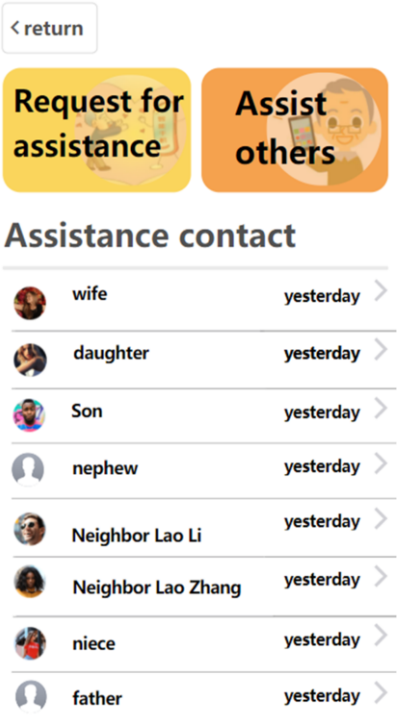


**Figure 4.** Remote assistance interface

## 4. System Implementation

### *4.1. Intelligent Voice*

The smart phone assistant system for the elderly based on WeChat mini program has set up the intelligent voice assistant function according to the needs of the elderly

users. The elderly users can help users solve life problems through intelligent interaction of intelligent dialogue and instant question and answer. In addition, the intelligent voice assistant also adds functions such as dialect recognition ability, screen reading compatibility and subtitles to help users communicate with people without obstacles. The intelligent voice assistant interface is shown in figure 3.

### *4.2. Remote Assistance*

The smart phone assistant system for the elderly based on the WeChat mini program supports the remote assistance function, which can help the elders to use the smart phone remotely, and guide the elders to use the smart phone through the voice call and remote control function. Remote control of mobile phones can be realized without opening root permissions, and children can easily teach their parents and elders to use mobile phones even if they are not around. The remote assistance interface is shown in figure 4, The remote control interface is shown in figure 5.

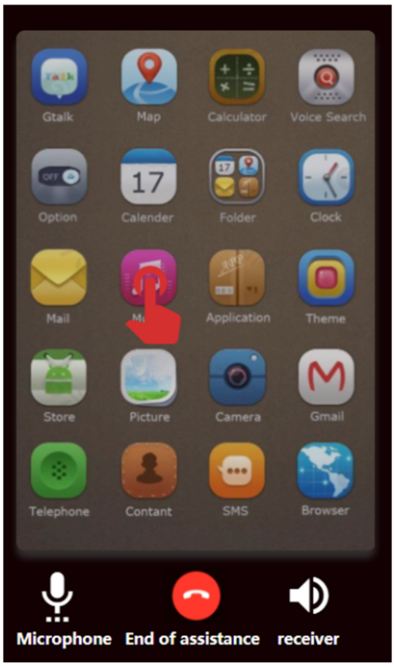


**Figure 5.** Remote control interface


**Figure 6.** Mobile phone tutorial interface

### *4.3. Mobile Phone Use Tutorial*

The mobile phone use tutorial module in the smart phone assistant system for the elderly based on WeChat mini program includes some settings of the mobile phone system and the use of various commonly used software tutorials, such as WeChat, Meituan takeout, etc. The mobile phone tutorial is rich in content, with two teaching methods: voice plus gesture guidance teaching and video teaching. Users can choose the learning method according to their own situation. The mobile phone tutorial interface is shown in figure 6.

### *4.4. Life Software Center*

The life software center module of the smart phone assistant system for the elderly based on the WeChat mini program is essential for the daily travel of the elderly users. It includes travel health code, GSP positioning and navigation, emergency help and other functions. This function module ensures users' daily life travel, medical treatment and other aspects. The interface of life software center is shown in figure 7.


**Figure 7.** Life software center interface

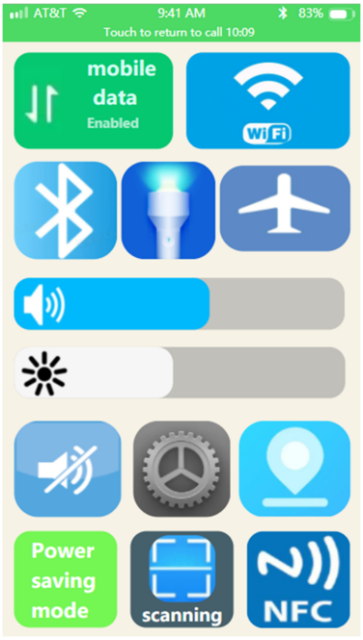


**Figure 8.** Quick switch interface

### *4.5. Mobile Phone Control Center*

The control center module of the smart phone assistant system for the elderly based on the WeChat mini program includes the common basic function settings of the mobile phone, such as WiFi settings, Bluetooth settings, location settings, mobile phone ring tone and brightness adjustment, etc. In the page design, a more friendly aging friendly interactive design is used, which is more convenient for the elderly user to easily set up the mobile phone, as well as a more convenient operation and interactive experience. The shortcut switch interface is shown in figure 8.

### *4.6. Communication Community*

The smart phone assistant system for the elderly based on WeChat mini program provides users with an exclusive online communication community. Users can ask questions about using their smart phones or answer questions from others in the community. At the same time, they can discuss their experiences and tips about using their smart phones with each other. The communication community interface is shown in figure 9.

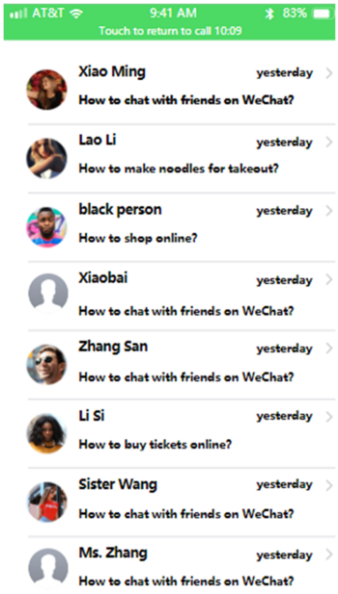


**Figure 9.** Communication community interface

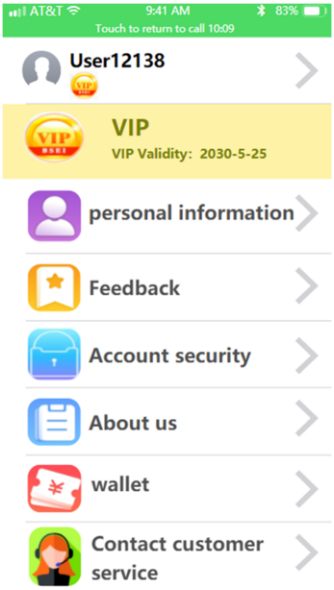


**Figure 10.** Personal center interface

### *4.7. Personal Center*

The personal center module of the smart phone assistant system for the elderly based on WeChat mini program contains the user's personal information and system customer service. Users can view and modify their own information, or give feedback to customer service. The personal center interface is shown in figure 10.

## 5. Conclusion

This paper proposes the design and implementation scheme of the elderly smart phone assistant system based on WeChat mini program, It also introduces the key technologies used in the development of WeChat mini program, SpringBoot framework and intelligent voice interaction system in detail, and shows the system structure design, system function module design, and database design.The preliminary interface design diagram of each functional module of the elderly smart phone assistant system based on WeChat mini program is displayed. In the WeChat mini program development tool, the elderly smart phone assistant system based on WeChat mini program is implemented.

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