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Design of Embedded Intelligent Pension System Based on Internet+

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Abstract:*The social elderly care industry is gradually becoming the focus of society. This paper researches and designs an intelligent pension management system based on Internet technology. The system enables automatic call to know the user's situation at the first time. It enables real-time monitoring to know the real-time heart rate of users; it enables data storage to know the specific situation of each user. The combined services of community and home care for the elderly can not only alleviate the shortage of social institutions for the elderly, but also effectively utilize the strengths and resources of individuals, families, communities and society to meet the elderly needs. In today's society where aging is becoming more and more serious, it is hoped that this study can facilitate the development of intelligent elderly care services in China.*

Keywords:*Internet+, Embedded technology, Intelligent pension, System design*

1. Introduction

The intelligent elderly care model driven by smart technology and the intelligent elderly care products combining smart information technology and elderly care services have upgraded the experience level of elderly service recipients and have become a hot spot in the aging industry. This project precisely makes use of the current Internet of Things and Internet information technology to implement an intelligent and simple home care management system suitable for the elderly through a combination of software and hardware[1,2,3].

The elderly care system proposed in this paper applies the graphical user interface and database to the information of users and staff, and successfully provides a complete record of various service information such as the user's heart rate and services. We apply sensor technology and embedded technology to the implementation of the product, and develop a mobile terminal on cell phones to enable social functions to meet the social needs of the families of the product users, so that they can establish their own circle of friends through the mobile platform.

2. Overall Design of the Intelligent Elderly Care System

2.1. Topological Structure

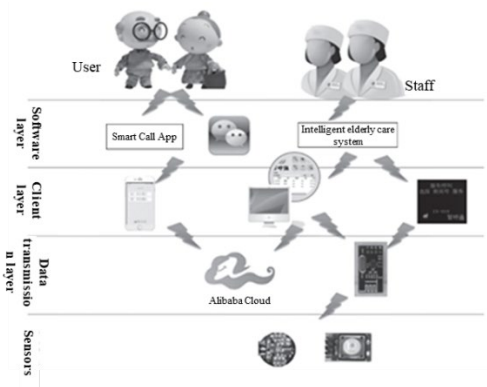

Figure 1: Topological structure diagram

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The intelligent elderly care management system is divided into four main layers: software layer, client layer, data transmission layer and sensors, as shown in Figure 1.

2.2. System Functions

The system is mainly divided into four main functional modules: call answering module, PC terminal module, mobile phone terminal module and heart rate measurement module, as shown in Figure 2.

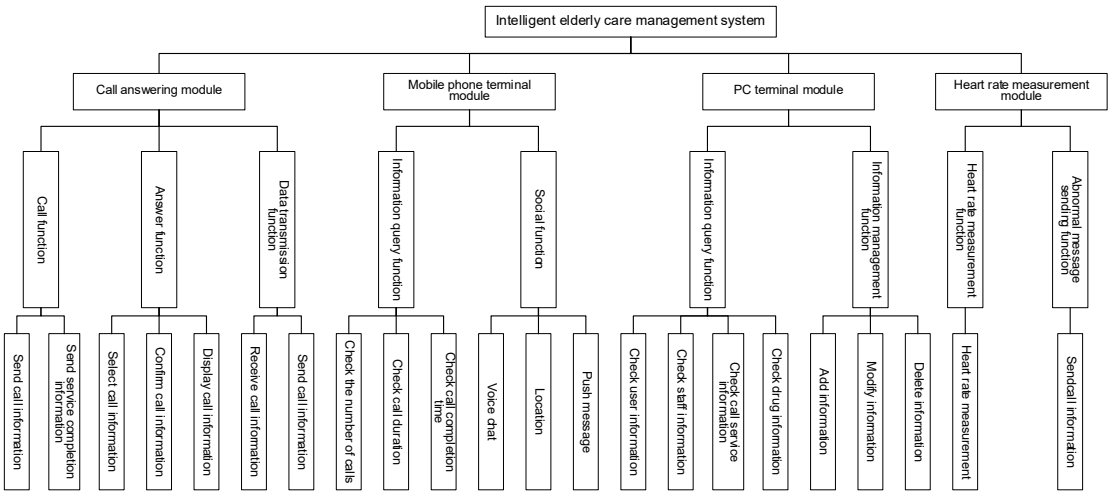

Figure 2: Overall functional diagram

2.2.1. Call Answering Module

The call answering module is the basic module. The system with this module can complete the minimum call service. The call function includes sending call information and sending service completion information. The answer function covers selecting call information, confirming call information and displaying call information, and the data transmission function covers receiving call information and sending call information[4]..

2.2.2. Mobile Phone Terminal Module

The mobile phone terminal module allows users to query information and socialize. The information query function includes checking the number of calls, call duration and call completion time.

2.2.3. PC Terminal Module

The PC terminal module provides the function of information query and management. The information query function covers checking user information, staff information, call service information and drug information. The information management function covers adding information, modifying information and deleting information[5]..

2.2.4. Heart Rate Measurement Module

The heart rate measurement module can monitor the user's heart rate in real time and automatically send a call message when the heart rate is abnormal. The call message can prompt the staff that the user needs assistance.

3. The Scheme of Implementing the Main Modules of the Intelligent Elderly Care System

3.1. Call Answering Module

The system uses a call module to implement the call function, and the call is completed by a button[6].. When the user presses the button, the call information will be transmitted out through the NRF24L01 chip of the data transmission module, which transmits the data to the PC terminal and the TFT screen. The answer module enables the answering function by pushing the button[7].. The received user call information is displayed on the 1.44 TFT screen, and the staff can view the user call

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information on the TFT screen[8]. Then the staff sends out the information to confirm the call by pressing a button. The physical diagram of the call button is shown in Figure 3.

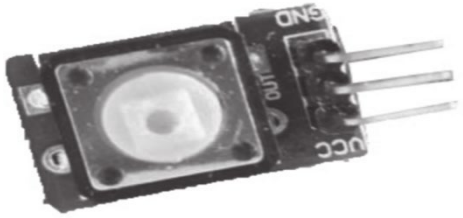

Figure 3: Physical diagram of the button

The system uses the NRF24L01 chip to receive the call information sent by the user, and send that information to the 1.44TFT screen to display the call information. The physical diagram of the 1.44TFT screen is shown in Figure 4.

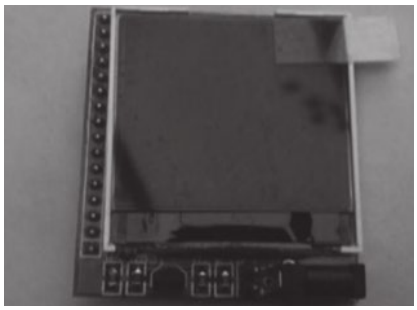

Figure 4: Physical diagram of TFT screen

3.2. Data Transmission Module

The data transmission module accomplishes the data transmission function mainly through the NRF24L01 chip. After the user presses the button, the NRF24L01 chip will receive the data of user call information, and then the chip will transmit the call information data to the TFT screen. At the same time, the chip can also synchronize the data display on the PC side[9].

3.2.1. Hardware Building

The data transmission module mainly implements the function of receiving and sending data. The data on the Arduino development board is sent and received in the system network through the NRF24L01 chip. The physical diagram of the NRF24L01 chip is shown in Figure 5.

Figure 5: The physical diagram of the NRF24L01 chip

The 8 pins of the NRF24L01 chip are interconnected with D2 to D7, 3.3 V and GND pins of the Arduino development board. The physical diagram of the Arduino development board is shown in Figure 6.

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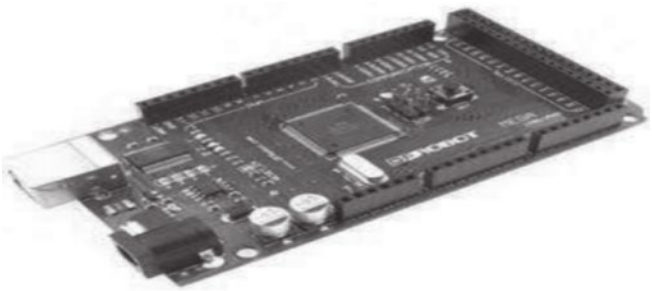

Figure 6: The physical diagram of Arduino development board

3.2.2. Software Control Flow

When the user presses the button, the chip will transmit the user information to the 1.44TFT screen, and at the same time, the database will update the data. When the staff confirms the information by pressing the button, the data information will be transmitted to the PC terminal through the chip. At the same time, the interface on the PC terminal displays the corresponding information.

4. Conclusion

This project is an intelligent elderly care management system based on embedded technology, sensor technology, graphical user interface technology, database technology and Android cell phone emulator technology. The system applies the graphical user interface software as well as the database to the information management of users and staff, and it succeeds in achieving a complete record of the user's heart rate, service and other information. Sensor technology and embedded technology are applied to the implementation of the product, while Android cell phone emulator technology is applied to the design of the mobile phone terminal.

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