Research on the Integration Method of Intelligent Terminal Services Oriented to the Aged Cross-Border Platform

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Abstract. To meet the needs of the elderly for smart, healthy, and elderly care, the paper uses the Internet, the Internet of Things, cloud computing, and other technical means to build a cloud platform-based smart health and elderly care cross-border platform service system. Designed and developed a health all-in-one smart terminal suitable for a home environment to realize physiological parameter collection and vital sign monitoring. This system promotes the intelligent upgrade of the cross-border platform for the elderly, and improves the quality and efficiency of the health of elderly services.

Keywords: cloud platform, smart health care, health all-in-one machine, smart terminal service system

1. Introduction

With the gradual acceleration of China's aging process, the number of senior citizens in China is increasing. In today's Internet + big data background, more and more offline services and physical services have been transformed into online services. This offline-to-online business flow has greatly reduced businesses' operating costs, thereby reducing the living costs of contemporary residents in disguise. This rapid and large-scale business model transformation is largely unfamiliar with these technological means the elderly brought the same. Moreover, most of the main user groups of technology products on the market are aimed at young and middle-aged people. These technology products, such as smartphone apps, are not well optimized and improved for the characteristics of the elderly. Simultaneously, there are relatively few mobile phone applications specifically for the elderly on the market, and services such as smart elderly care and smart housekeeping are still in their infancy. Most elderly care services apps in the app store do not meet the characteristics of the elderly such as the inconvenience of typing. Generally, typing is required when inputting content, which is very inconvenient for the elderly. And some housekeeping and elderly care service websites can only provide descriptions of the business and contact information of relevant personnel. Generally, the children of the elderly are the ones who operate on the website. However, if children are not around, and the elderly urgently need services such as part-time work, such websites cannot meet this demand.
To meet the growing demand for elderly care services of the elderly, the elderly need a new form of intelligent elderly care service technology application. The application of this new type of elderly care service technology should meet the daily needs and common characteristics of the elderly. The elderly are generally not accustomed to typing, they are more accustomed to using voice for input, so the new type of elderly service technology applications should have voice input and can be converted into text. Moreover, the elderly are not good at using complex interfaces and complex functions. This smart application interface should be as simple as possible and provide services concisely and such as dialogue, to avoid the possibility of complex application interfaces when used by the elderly [1]. Confusion. Besides, the memory of the elderly is not as good as that of the young. This memory decline is very likely to affect the use of the application by the elderly. Maybe an older adult chose a service last time but still wants to use the same service this time but remembers can’t get some specific details. At this time, such smart applications should have functions such as smart reminders and smart guesses. The limited information input by the elderly and the knowledge stored in the database are used to make reasonable guesses about their real needs. The purpose of this is to alleviate the inconvenience of the use of smart applications due to memory loss caused by the elderly. Therefore, we can see from the above analysis. Competent elderly care and housekeeping application dedicated to serving the elderly should have voice input characteristics, intelligent dialogue, and intelligent recommendation. However, there are no intelligent applications on the market that have all these three characteristics. In this context, this article starts from the three characteristics of voice input, intelligent dialogue, and intelligent recommendation, and constructs an intelligent application for elderly care and housekeeping services suitable for the elderly.

2. Smart home care service platform architecture

![Figure 1. New ecological chain for the elderly](image)

Based on the basic data of the elderly and the resources of elderly care services, establish three basic databases for the elderly population, elderly care institutions, and service personnel for the elderly to realize the direct correlation of the elderly population information with streets, communities,
networks, corridors, units, floors, and households. Through the combination of the database of the elderly population, houses, families, and elderly care institutions with spatial geographic information, it realizes the information query of the elderly population, the housing information query, the family information query and the precise positioning of the elderly care institutions, the analysis, and statistics of the regional elderly population and the elderly resources. And so on, master basic data on elderly care services and industries.

Based on the collection of internal elderly care data in civil affairs, data exchange, and sharing with external systems such as communities, medical care, housekeeping services, and emergency assistance are realized. Big data processing technologies such as multi-dimensional data feature association are used to analyze, evaluate and process through cloud platforms, To seamlessly connect the elderly’s health care, medical treatment, safety precautions, learning, entertainment, housekeeping services, and many other needs with hospitals, senior universities, housekeeping service companies, and other elderly care resources to provide a full range of health care services for the elderly [2]. The home care service platform's architecture based on the Civil Affairs Data Center is shown in Figure 2.

![Figure 2. Architecture of smart home care service platform](image)

2.1. Intelligent health care terminal
Smart health and elderly care terminals are mainly composed of elderly mobile phones, locators, smart watches, smart crutches, health all-in-one machines, GPRS blood pressure monitors, smart mattresses and other types of smart elderly monitoring equipment, portable health monitoring equipment, self-service health testing equipment, smart It is composed of wearable devices to realize real-time and continuous monitoring of location information and vital signs information [3].

2.2. Heterogeneous network transmission
Based on methods such as data fusion and compressed sensing, the massive heterogeneous data obtained by smart health and elderly care terminals are transmitted to the cloud computing center through a heterogeneous network environment such as wired, Wi-Fi, GPRS/4G/5G.

2.3. Health care data management and services
Supported by the cloud computing center, the national supercomputing center, and the data disaster recovery center, it establishes dynamic electronic health files for the elderly, integrates information
resources, provides smart health care services and management for the elderly, and improves the health and quality of life of the elderly.

3. Design of remote monitoring health service platform

Nowadays, most families in China have an 8-4-2-1 structure, and one child needs to support many elderly people. However, children have their own careers. As a result, the elderly faces the situation of no one to take care of, and this problem has always plagued their children. Therefore, it has become a crucial link for children to learn about the life and health of the elderly in time. In order to solve this problem, it is necessary to design and develop a remote monitoring health service platform for the elderly.

3.1. Architecture design of remote monitoring health service platform

As the core of smart home care services, the remote monitoring health service platform can remotely monitor the health of the elderly in real time, and transmit the collected physiological index data to the health monitoring center or mobile terminal through mobile phones and other communication terminals. The health monitoring center can monitor and track the health of the elderly 24 hours a day. Children can also track and understand the physical condition of their parents in time based on the information sent by the health monitoring center [4]. Figure 3 shows the remote monitoring health service platform for the elderly. The monitoring system consists of five parts: sensor module, communication module, visual mouse module, alarm center, and health information processing center.

![Figure 3. Remote monitoring health service platform for the elderly](image)

(1) Sensor module. Through this module, the physical condition of the elderly can be tracked and monitored in real time. (2) Communication module. This module can locate the location of the elderly and transmit their health data to the information processing center. (3) Visual mouse module. This module is to install a display screen in front of the wheelchair. For some elderly people, they do not know the computer very well and can operate it through their eyes. (4) Health Information Processing Center. This module analyzes and processes the transmitted health data of the elderly, and sends the processed information to the children's mobile phones. (5) Alarm center. When the health status of the
elderly exceeds the standard threshold, the detection equipment will also upload the detection information to the alarm center to notify the relevant doctors to come to check in time. When the elderly feels unwell or have other emergencies, they can call the police through the help button on the mobile communication device [5]. After receiving the help alarm information, the alarm center will take relevant measures for the elderly.

3.2. Design of personal health index collection module
Remote monitoring of important life parameters is an important part of the daily monitoring of the elderly. The health physiological indicators that need to be collected mainly include blood pressure data (systolic blood pressure, diastolic blood pressure), pulse (heart rate), electrocardiogram (ECG), body temperature, blood glucose concentration, Blood oxygen saturation (SpO2), exercise parameters, etc. These physiological indicators generally require non-invasive or minimally invasive testing in remote monitoring systems. The composition of the personal health index collection system is shown in Figure 4.

![Figure 4. Personal health index collection system](image)

Use mature blood pressure sensors, pulse sensors, ECG sensors and other medical sensors on the market to build a human body sensor network to collect various physiological index data of the elderly, and send the detected data to the mobile phone or PC through the wireless transceiver module, and then it is transmitted to the health information processing center through the public network for data analysis and processing.

4. Operating mechanism and advantages of the model
The smart home care service model constructed by using big data is a cyclic system, with the big data cloud computing platform as the core part of the system operation. The operation mechanism of this model is shown in Figure 5.
Figure 5. Operation mechanism of smart home care service model

First, the elderly care service demand information and data of the elderly care group at home are monitored through smart terminal equipment, and uploaded to the big data cloud computing platform from the equipment to provide basic data support for the operation of the platform. In addition, for some smart terminal equipment that is difficult to monitor and collect data on the needs of elderly care services for the elderly at home, it needs to be improved by community managers and professional service personnel visiting the elderly in the community, and upload these data to the platform in time.

Second, on the basis of collecting and uploading various data and information to the big data cloud computing platform, the platform uses data processing to obtain various elderly care services actually needed by the elderly in the community. On this basis, the government will take the lead to purchase relevant home care services through bidding, and the bidder will upload relevant materials to the platform [6]. After integrating the service needs of the elderly and the data of the bidder, the platform finally determines the provider of home care services and shares the specific service requirements with the service provider.

Third, after determining the specific information, data and service providers for the needs of home care services, the service providers will provide personalized and customized care services for the elderly in the community to ensure service quality.

Fourth, after the service provider provides corresponding services to the elderly, it does not mean the end of the service. At this time, the third-party professional evaluation agency fully understands the opinions of the elderly at home on the basis of the service provider’s fundamentals. The second service is evaluated objectively, and the evaluation report is uploaded to the platform, and the platform sends the evaluation report and improvement opinions to the service provider, and also uses the quality of the service supply as a reference for the next bidding of the company or unit.

Fifth, the smart home care service model constructed by using big data is a continuous cycle of operation. The data and information required for home care services for the elderly are continuously updated, and the operation of the entire system continues to cycle. In this process, the government and society have always played their supervisory and management responsibilities and functions to ensure the healthy operation of the model, thereby protecting the rights and interests of the elderly at home.

5. Related Suggestions
The use of big data to build a smart home care service model is of great significance to the development of home care services, but there are still some problems in current practice, which need to be further improved from the following aspects.
5.1. Led by the government, promote the interconnection and sharing of public data and information for the elderly of all parties

The prerequisite and foundation for using big data and other technical means to build a smart home care model is the collection and analysis of big data. The operation of the big data platform involves many parties. The government departments alone include civil affairs, finance, public security, health, price, food and drug supervision and other departments and organizations. At present, there is a lack of linkage among the various subjects, which requires the government to coordinate. In February 2017, the Ministry of Industry and Information Technology, the Ministry of Civil Affairs and the National Health and Family Planning Commission jointly issued the Action Plan for the Development of Smart Health and Elderly Care Industry (2017-2020), proposing the need to build a unified, standardized and interconnected health and elderly care information sharing system, in-depth mining, Apply health big data [7]. Government departments at all levels need to actively implement the state's policy documents on promoting the disclosure, interconnection and sharing of elderly care data information, strengthen the disclosure of relevant elderly public data information, and guide and encourage elderly service participants to do a good job in the development and utilization of data, Improve the big data cloud computing service platform, and promote the healthy and stable development of the elderly care industry.

5.2. Cultivate and develop the market for smart terminal equipment for the elderly

Intelligent terminal monitoring equipment for the elderly in China is difficult to meet the data collection needs of big data platforms, and there is still a shortage of equipment for collecting data on the life and health of the elderly. At present, most of the devices on the market still mainly collect basic and shallow data such as heart rate, blood pressure, and movement trajectory of the elderly, which makes it difficult to analyze and tap the potential diversified service needs of the elderly. Cultivating and developing the market of smart terminal equipment for the elderly is a necessary support condition for the use of big data. The more the smart terminal equipment market develops, the more comprehensive and in-depth collection of elderly care data will be, and the more effective the application of big data will be. Building a big data smart home care model based on big data needs to promote the development of the smart terminal equipment market. First of all, encourage more technically qualified enterprises to participate in the production and service of smart terminal equipment to form a benign competitive atmosphere and promote the development and upgrading of smart terminal equipment. Second, vigorously promote and promote the use of smart terminal detection equipment, especially the use of wearable smart devices for the elderly. Third, the government and relevant units have done a good job of financial support and provided corresponding subsidies to economically difficult and special elderly groups. Finally, to strengthen the supervision of the smart terminal equipment market, the government, the media, and individuals must fulfill their supervision obligations. Comprehensive supervision can effectively promote the healthy development of the market and protect the rights and interests of the elderly.

5.3. Pay attention to the cultivation and training of professional and compound talents

The use of big data to build a smart home care service model requires compound talents with big data-related professional knowledge and management skills. At present, the development and application of big data in China is still in its infancy. The domestic talents with big data-related expertise and abilities are relatively short. This requires us to focus on training professional and compound big data talents, and continue to build and improve a team of big data professionals [8]. First, the vocational education, undergraduate education and postgraduate education are organically combined. Vocational education pays more attention to the cultivation of practical abilities and skills, which can quickly form a large-scale professional talent team. Undergraduate education actively offers big data-related majors and courses to guide students to actively engage in corresponding work, while graduate education mainly adopts In-depth research activities, enrich and perfect theories in related fields, and provide theoretical references for practice. At the same time, speed up the construction of training
bases, let students participate in practical work, understand the mechanism and principle of the integration of big data and elderly care services, and improve practical ability in practical training. Second, strengthen exchanges and cooperation with Western developed countries, learn from their advanced technology and practical experience in using big data to serve the elderly, analyze Western success and failure cases, and improve China’s professional education level. Finally, the government formulates personnel training and training policies, and improves corresponding laws and regulations. The society and the media play the guiding role of public opinion, create a positive and healthy social atmosphere, encourage the masses to actively participate in the elderly care service industry, learn professional knowledge and skills, and promote the development of elderly care services.

6. Conclusion
This article uses technologies such as the Internet, the Internet of Things, and cloud computing to automatically upload the collected health data to the cloud computing center through self-developed smart health collection terminals and wearable devices. The elderly can complete the detection of some basic items or chronic disease items by swiping their ID card or health card to log in to the elderly care service platform. The front-end hardware equipment combined with the elderly care platform software can realize the self-inspection of the elderly, the establishment of dynamic health files, real-time health monitoring, comprehensive health assessment, Real-time health intervention, remote consultation and other functions, and formulate personalized health promotion programs, effectively prevent and control disease dangerous invasion, reduce morbidity, improve quality of life, and achieve comprehensive health management.

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