Design of Rural Home Smart Pension Monitoring System Based on Artificial Intelligence

Jingli Liu

（Anhui University of Science and Technology; Huainan, 232001 China)

120161289@qq.com

Abstract. In order to improve the efficiency of elderly care services and solve the problem that the traditional way of providing for the elderly is difficult to provide Effective demand, this paper designs a system for monitoring the quality of the elderly's home environment and detecting abnormal behavior. This paper studies the design of intelligent home care mode based on artificial intelligence, analyzes the unique advantages of intelligent home care in the new era, and summarizes Big data intelligent intervention, intelligent service robots, The intelligent wearable function and intelligent elderly care envision the application of four artificial intelligence technologies. In order to achieve smart elderly care at home, we need to establish an elderly information database system to comprehensively and deeply understand the living conditions and needs of the elderly. This database system contains multiple aspects of information, such as basic information about the elderly, health status, and living conditions. By collecting and integrating this information, we can quickly understand the condition of the elderly in order to provide them with better services and support. The system functional testing results show that the designed home smart elderly care monitoring system is flexible in networking, with high accuracy and reliability.

Keywords: artificial intelligence; aging at home; smart home care

1   Introduction

Since the 21st century, the aging process of our society has been accelerating, and the rapid rise of artificial intelligence has led to the accelerated development of many industries, including the pension industry. Most young people in today's society are only children, and it has long been a common phenomenon that only children go out to study and work. Offspring lack time and energy to take care of the daily life of the elderly because of their busy study and work, which leads to the increasing number of empty nesters all over the country. At present, some nursing homes and health institutions specially serving the elderly have some limitations in taking care of the elderly, and they can't take care of the daily life of the elderly in all aspects, so many elderly people can only live aging at home. For the elderly with health risks, their physical functions are gradually weakened compared with those when they were young, and various accidents may occur when they live alone. How to ensure the health of the

elderly living alone at home has become an important issue for families and society. If the health of the elderly cannot be guaranteed, it will bring huge medical pressure and pension burden. In order to ensure social stability and rapid development, it has become a hot social issue to provide healthy and stable protection for the elderly living alone at home [1].

2   Artificial intelligence to help smart home care model design

For the elderly, maintaining good health and ensuring the normal operation of all aspects of the body are the primary conditions for realizing smart home care. Artificial intelligence technology can help the elderly to realize smart home care, provide all-round services and improve the quality of life of the elderly. To realize smart home care assisted by artificial intelligence, it is necessary to establish an information database system for the elderly at first. This system can collect all kinds of information of the elderly, such as health status, eating habits, social networks, living habits, etc., so as to fully understand the needs and conditions of the elderly. Through this system, we can quickly obtain the relevant information of the elderly, make accurate analysis and evaluation, and provide strong data support for the follow-up smart home care service. Secondly, it is necessary to establish an artificial intelligence smart home care subsystem. This subsystem includes several modules, such as intelligent health monitoring module, intelligent home environment control module, intelligent fitness counseling module, intelligent social interaction module and so on. Each module is designed for the special needs of the elderly and can provide customized and intimate services. Intelligent health monitoring module can monitor the health status of the elderly in real time, such as heart rate, blood pressure, blood sugar and other indicators, to remind the elderly to take medicine on time and carry out rehabilitation training. Intelligent home environment control module can realize intelligent control of temperature, humidity, lighting and other aspects through intelligent home system to ensure the comfort of the elderly. Intelligent fitness counseling module can provide professional fitness guidance, design an exercise plan suitable for the elderly, and promote their health. Intelligent social interaction module can help the elderly to interact with their families and friends, and alleviate their loneliness [2-3].

On the whole, the development of artificial intelligence technology provides new opportunities for smart home care. Through the establishment of the elderly information database system and artificial intelligence smart home care subsystem, we can provide all kinds of needed services for the elderly comprehensively and systematically, promote the transformation of smart home care mode and improve the quality of life of the elderly.

2.1   The elderly information database system construction

In order to realize smart home care, we need to establish an information database system for the elderly, so as to fully and deeply understand their living conditions and needs. This database system contains many aspects of information, such as the basic

information, health status and living conditions of the elderly. By collecting and inte-grating this information, we can know the situation of the elderly more quickly, so as to provide them with better services and support. In the elderly information database system, the basic information database records the gender, age, family residence, education level and whether there is offspring, which can help us better understand the background and living conditions of the elderly. The health database records the mental state and chronic disease history of the elderly, which is very important for finding and dealing with the health problems of the elderly in time. The living condition database records whether the elderly are empty nesters, solitary elderly, disabled elderly, etc. This information can help us better understand the living environment and needs of the elderly. By establishing the information database system for the elderly, we can lay a solid foundation for smart home care. This system can help us better understand the actual needs and problems of the elderly, so as to provide them with services and support more accurately. At the same time, this system also provides a reliable data source for the application of artificial intelligence technology, so that artificial intelli-gence can better serve the elderly, improve the quality and efficiency of pension, and create a more comfortable and safe pension environment [4]. The design of the data-base system for the elderly information is shown in Figure 1.
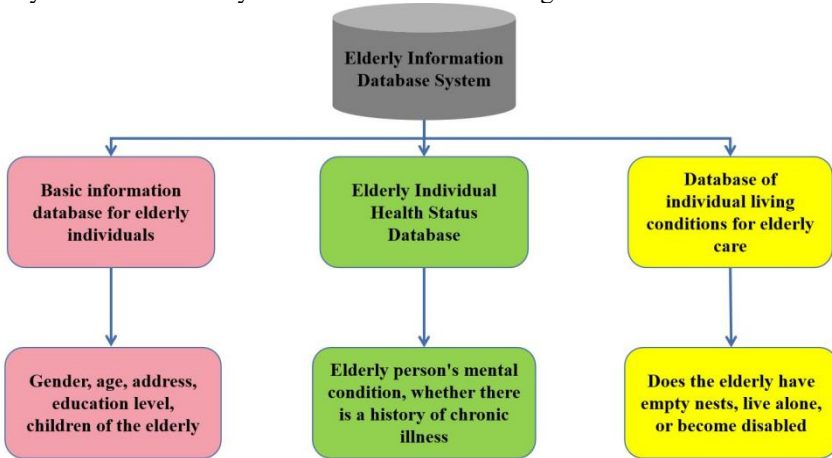

Fig. 1. Construction of database system for elderly information

2.2   Artificial intelligence smart home care subsystem construction

The construction design of artificial intelligence smart home care subsystem is shown in Figure 2. In order to achieve the goal of smart home care, it is necessary to establish an information transmission system for the elderly based on the cloud platform, so as to transmit the health, life and location data of the elderly to the cloud platform, which is convenient for offspring and community service centers to monitor and provide nec-essary help in real time. Artificial intelligence robot is a very useful auxiliary tool, which can help the elderly to complete daily activities such as turning over and falling rescue, and can also improve their mental health and quality of life through compan-

ionship, music and drama. In addition, the artificial intelligence robot can also make video calls with the family members of the elderly through the screen on the chest to enhance the social contact of the elderly and improve their happiness and satisfaction. Artificial intelligence wearable device is another powerful tool for the elderly, which can monitor the health data of the elderly in real time, such as heart rate, body temperature, sleep, etc., and the location information of the elderly, effectively preventing the elderly from getting lost. Through sensors, wearable devices can transmit these data to the community service center, and community workers can find the health problems of the elderly in time and provide appropriate help. In addition, artificial intelligence wearable devices can also monitor chronic diseases of the elderly, such as high blood pressure and heart disease, to help the elderly grasp their physical condition in time and reduce the care burden of offspring. Through the establishment of these artificial intelligence auxiliary tools, the quality of life and happiness of the elderly can be greatly improved, while the burden of providing for the elderly in offspring and society can be reduced, and a more intelligent and humanized aging at home model can be realized [5].
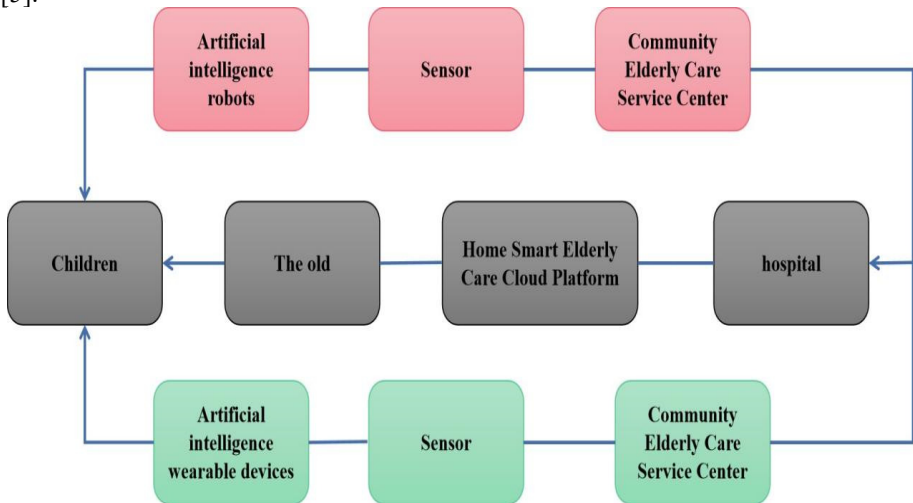

Fig. 2. Construction of artificial intelligence smart home care subsystem

Create a new "combination of medical care and old-age care" model, aiming at providing timely medical services for the elderly. Through the online platform and offline services, the intelligent old-age care model provides personalized life care needs for the elderly, and realizes all-round coverage of aging at home, community service and medical care. This model integrates the health information resources of the elderly, saves time and money costs, and is convenient for both offspring and hospitals, which promotes the development of intelligent old-age care and contributes to the sustainable development of old-age care in China. This model aims to achieve the goal of "getting medical care for the sick and providing the old with a sense of security" and provide better life and medical services for the elderly [6-7].

3   Design process of rural smart home care monitoring software system based on artificial intelligence

With the acceleration of population aging in China, the problem of providing for the aged in rural areas is becoming more and more prominent. The design of rural smart home care monitoring system based on artificial intelligence can provide more convenient and caring services for the elderly. First of all, the system can monitor the living conditions of the elderly in real time through various sensors, such as heart rate, blood pressure, body temperature, sleep, diet, activity, etc., and upload the data to the cloud platform for analysis and processing, providing comprehensive and accurate health reports. At the same time, the system can also predict the health status of the elderly and remind them to take preventive health care. Secondly, the system can also be combined with smart home system to realize intelligent home life. The elderly can control household appliances such as lighting, air conditioning and television through voice commands, which is convenient for their daily life. At the same time, the system can also automatically detect the use of household appliances, remind the elderly to repair or replace aging equipment in time, and ensure the safety of the elderly [8]. In addition, the system can also provide social services to keep in touch with family and friends through video calls and online chats, so as to reduce the loneliness of the elderly. Specifically, it can be divided into the following processes:

Data collection: Real-time data collection of the health status of the elderly using sensors or wearable devices, including monitoring of health indicators such as heart rate, blood pressure, body temperature and sleep.

Data transmission: transmit the collected data to the cloud platform through the Internet or the Internet of Things to facilitate data processing and analysis.

Data processing and analysis: Using artificial intelligence technology to process and analyze the health data of the elderly, machine learning or deep learning algorithm can be used for data mining and prediction, as well as analyzing and diagnosing the daily living habits of the elderly, and providing corresponding pension suggestions and health care programs.

Data display and sharing: the analysis results are displayed on the interface of the monitoring software system in a visual form, so as to facilitate the elderly and their families or guardians to check and monitor their health status. At the same time, you can also share health data with community hospitals or family doctors, so that doctors can make diagnosis and treatment.

Software application: The monitoring software system can be combined with intelligent hardware devices, such as robots and voice assistants, to provide voice interaction, video call, emergency call and other functions for the elderly, and provide more comprehensive care and services for the elderly.

Through the above process, the rural smart home care monitoring software system based on artificial intelligence can provide more intelligent care and services for the elderly, and also provide more comprehensive and accurate health information for family guardians, community hospitals and doctors, which promotes the sustainable development of the old-age care cause. Generally speaking, the design of rural smart home care monitoring system based on artificial intelligence can provide comprehen-

sive and caring services for the elderly and achieve full coverage of old-age care services. At the same time, it can also reduce the pressure of providing for the aged in offspring and community service centers and promote the development of rural old-age care [9-10]. The rural home smart elderly care monitoring system based on artificial intelligence aims to provide intelligent elderly care monitoring and auxiliary services for rural elderly people. The following is an example of how to use voice input for interaction in the system:

Elderly (user): The system opens the intelligent elderly care monitoring function.

System: Welcome to use the smart elderly care monitoring system. May I help you?

Elderly (user): System, I feel a bit uncomfortable, my chest is a bit sore.

System: Please wait for a moment, I will conduct a health check for you. Please describe your symptoms and feelings into the microphone.

Elderly (user): I feel a sense of pressure on my chest, sometimes with intermittent pain and some difficulty breathing.

System: Thank you very much for the information you provided. According to your description, there may be heart related issues. I will immediately arrange for a doctor to provide you with further diagnosis and guidance. At the same time, I will send notifications to your family members to ensure that you receive timely support and care.

In this example, the elderly use voice input to interact with a smart elderly care monitoring system. He described his symptoms and feelings, and the system converted speech into text through speech recognition technology, and conducted preliminary analysis based on the provided information. After the system detects a possible heart related issue, it automatically triggers further medical support, including contacting a doctor and notifying family members.

The intelligent elderly care monitoring system uses artificial intelligence technology to achieve voice recognition, Natural-language understanding, decision inference and other functions. Through voice input, elderly people can easily interact with the system, providing information on elderly care needs and health status. The system can provide corresponding support and services based on this information, improving the quality of life and sense of security for rural elderly people.

4   Conclusion

We are in a new era of artificial intelligence, in which the new man-machine interaction mode of smart home care assisted by artificial intelligence has begun to change the problem of the traditional aging at home mode and improve the efficiency of the aged care service. This will also be the development direction and inevitable trend of the future pension industry. However, there are still many problems to be solved when artificial intelligence helps smart home care. Building an artificial intelligence smart home care service platform needs to realize the comprehensive system integration of various resources, which takes time to complete. Undoubtedly, artificial intelligence will continue to penetrate deeply into the scope of smart home care. We hope that with the introduction of technologies, products, systems, platforms and other tools, the future development of smart home care assisted by artificial intelligence will become

more diversified, humanized and efficient, so as to connect more elderly people. At the same time, population aging is also a realistic problem that needs to be solved under the background of the times. Relieving this important problem requires the long-term unremitting efforts of the whole society.

Fund project

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