

Construction and Application of a Quality Evaluation System for Group Elderly Care Services Based on the Internet of Things

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Abstract: With the continuous intensification of global aging, the issue of elderly care has become an increasingly prominent social problem. The Internet of Things (IoT) technology, as an emerging field, holds broad application prospects. This article focuses on the application of IoT technology in group elderly care services and constructs a quality evaluation system for these services based on IoT technology. Through the analysis of practical application cases, the advantages and challenges of IoT technology in group elderly care services have been examined, confirming the feasibility and effectiveness of the evaluation system.

Keywords: Internet of Things; Group retirement; Quality assessment system

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1. Introduction

With the continuous intensification of global aging, the issue of elderly care has become an undeniable social issue. As the country with the largest population in the world, China faces particularly serious aging challenges. Therefore, solving the problem of elderly care has become a common concern for the Chinese government and various sectors of society.

Against the backdrop of increasingly prominent elderly care issues, the Internet of Things (IoT) technology, as an emerging field, holds broad application prospects. IoT technology can connect various information-sensing devices to the Internet, enabling intelligent management and control, and offering new solutions for elderly care services. It facilitates real-time monitoring and health assessment of the elderly, providing personalized health management and medical services. Moreover, it enables intelligent control and monitoring of the elderly care environment, ensuring a comfortable, safe, and environmentally friendly living environment. Additionally, it fosters social interaction and entertainment activities for the elderly, enriching their life experiences and facilitating emotional communication. Thus, the application of IoT technology in elderly care services presents significant advantages and potential.

The application of IoT technology in elderly care services not only improves service efficiency and quality while reducing operating costs but also enhances user experience and satisfaction. For instance, real-time monitoring and health assessment of the elderly, enabled by IoT technology, provide personalized health management and medical services. Similarly, IoT facilitates intelligent control and monitoring of the elderly care environment, ensuring a comfortable, safe, and environmentally friendly living environment. Furthermore, IoT technology fosters social interaction and entertainment activities for the elderly, enriching their lives and facilitating emotional connections. Therefore, the application of IoT technology in elderly care services offers significant advantages and benefits ^[1].

2. The application of IoT technology in group elderly care services

IoT technology is an emerging field that connects various information-sensing devices to the Internet, enabling intelligent management and control and offering new solutions across various sectors. In the realm of elderly care services, the application of IoT technology has brought about revolutionary changes, not only enhancing service efficiency and quality but also reducing operating costs and improving the quality of life for the elderly.

2.1. The characteristics and advantages of IoT technology

2.1.1. Real-time monitoring and data collection

IoT technology enables real-time monitoring and data collection of elderly individuals through various information perception devices, such as sensors and cameras. These devices can monitor the health status, living environment, activity levels, etc., of the elderly in real time and transmit data to the backend system for analysis and processing. The advantage of this real-time monitoring and data collection is its ability to detect abnormal situations promptly, allowing for timely intervention and processing, thereby enhancing the timeliness and effectiveness of services ^[2].

2.1.2. Intelligent management and control

IoT technology facilitates intelligent management and control, unifying the management and scheduling of various devices and resources through backend systems, thereby achieving optimized configuration and utilization of resources. In elderly care services, IoT technology can achieve intelligent control and monitoring of the elderly care environment, including temperature, humidity, lighting, air quality, etc., providing a comfortable, safe, and environmentally friendly living environment for the elderly. Additionally, it can enable intelligent management and scheduling of elderly care services, such as the intelligent management and scheduling of elderly food, lodging, medical services, etc., to enhance service efficiency and quality ^[3].

2.1.3. Improve service efficiency and quality

The application of IoT technology can significantly enhance service efficiency and quality. Real-time monitoring and data collection enable the detection and handling of abnormal situations promptly, improving the timeliness and effectiveness of services. Through intelligent management and control, resource optimization and utilization can be achieved, enhancing resource utilization efficiency. Furthermore, IoT technology can provide personalized service solutions tailored to the needs of the elderly, thereby enhancing the quality and satisfaction of services.

2.2. The application status and trends of IoT technology in group elderly care services

2.2.1. Intelligent health monitoring system

The intelligent health monitoring system stands as a typical application of IoT technology in group elderly care services^[4]. Through intelligent health monitoring devices, real-time monitoring of the elderly's health status – such as heart rate, blood pressure, blood sugar, and other indicators – is facilitated, enabling the timely detection and management of abnormal situations. Additionally, the integration of the intelligent health monitoring system with medical resources allows for the provision of timely medical services and assistance for the elderly^[5]. Looking ahead, these systems are expected to evolve towards greater intelligence and personalization, offering tailored health management plans and services based on the individual health status of the elderly.

2.2.2. Smart home and environmental control system

Smart home and environmental control systems enable intelligent monitoring and control of the living environment for the elderly through smart home devices, including temperature, humidity, lighting, air quality, and more. Moreover, these systems offer intelligent security features such as door lock control and intrusion alarms, ensuring a safe and comfortable living environment for the elderly. In the future, these systems are anticipated to become more intelligent and user-friendly, providing personalized service solutions tailored to the living habits and needs of the elderly.

2.2.3. Social interaction and entertainment system

Social interaction and entertainment systems represent another significant application of IoT technology in group elderly care services. Through social interaction platforms, elderly individuals can forge new friendships, share life experiences, and exchange emotions, enhancing their quality of life and happiness. Moving forward, these systems are expected to become more intelligent and compassionate, offering a diverse range of social interaction and entertainment activities based on the interests, hobbies, and needs of the elderly.

In summary, the application of IoT technology in group elderly care services holds significant advantages and potential. With the continuous development and promotion of IoT technology, it is poised to play an increasingly vital role in elderly care services, delivering higher quality, more intelligent, and personalized care for the elderly^[6].

3. Construction of a quality evaluation system for group elderly care services

As a novel form of elderly care model, group-based elderly care emphasizes resources and time sharing among the elderly, fostering an environment where they cohabit and support each other to enhance their quality of life and alleviate burdens on their families and society. To assess the efficacy of IoT technology in group elderly care services, it is imperative to establish a scientific and rational quality evaluation system for such services^[7].

3.1. Establishment of evaluation index system

The establishment of a quality evaluation index system for group elderly care services should encompass multiple dimensions, including health status, quality of life, social interaction, and other aspects. When constructing such a system, it is crucial to ensure that the evaluation indicators cover all facets of group elderly care services to guarantee the comprehensiveness of the evaluation. Moreover, these indicators should be quantified as much as possible to objectively measure service quality and elderly satisfaction. Additionally, they should account for the evolving needs of the elderly and changes in the environment to enable timely adjustments in service content and methods^[8]. Specific indicators include health status assessment (physical

condition, disease status, rehabilitation status), quality of life assessment (satisfaction with diet, living conditions, entertainment, environment, etc.), and social interaction assessment (frequency and methods of interaction, emotional support, etc.).

3.2. Selection and implementation of evaluation methods

To ensure the accuracy and reliability of the evaluation, the quality evaluation method for group elderly care services should incorporate a blend of qualitative and quantitative approaches, as well as a combination of manual and intelligent evaluation. Qualitative evaluation seeks to understand the needs and satisfaction of the elderly through interviews, observations, and other means, while quantitative evaluation aims to assess service quality and the elderly's basic situation through data statistics and analysis. These two methods complement each other, ensuring the comprehensiveness and objectivity of the evaluation. Manual evaluation involves evaluators conducting face-to-face interviews and observations with the elderly to grasp their needs and satisfaction. Intelligent assessment collects data on the elderly through smart devices, such as health monitoring and environmental monitoring data, and conducts intelligent analysis and evaluation. The combination enhances the efficiency and accuracy of evaluation.

The specific implementation steps are as follows:

- (1) Develop an evaluation plan: Clarify the evaluation time, location, and participants to ensure the smooth progress of the evaluation work.
- (2) Data collection: Gather basic information, health status, quality of life, social interaction, and other aspects of elderly people through manual and intelligent devices.
- (3) Preliminary analysis: Conduct an initial analysis of the collected data to understand the basic situation of the elderly and the current status of services.
- (4) Develop an evaluation report: Based on qualitative and quantitative analysis results, draft an evaluation report and propose improvement suggestions.
- (5) Feedback and improvement: Provide the evaluation report to relevant personnel, discuss improvement measures collectively, and monitor the effectiveness of the implemented changes.

During implementation, it is essential to ensure the authenticity and accuracy of the data. Authenticity and accuracy must be prioritized during data collection to avoid misleading decisions. Additionally, emphasis should be placed on communication and interaction with the elderly during the evaluation process to grasp their real needs and sentiments accurately. Finally, timely feedback and follow-up on improvement measures are crucial. After drafting the evaluation report, promptly share the results with relevant personnel and monitor the implementation of improvement measures to ensure their effectiveness.

In conclusion, constructing a quality evaluation system for group elderly care services is vital to ensure the effectiveness of IoT technology applications in this domain. By establishing a scientific and rational evaluation index system and employing evaluation methods that blend qualitative and quantitative analyses with artificial intelligence, the accuracy and reliability of evaluation can be assured, providing robust support for enhancing the quality of group elderly care services and meeting the needs of the elderly ^[9].

4. Application and effect analysis

4.1. Analysis of practical application cases

- (1) Case background: A group elderly care services institution in a certain city has implemented IoT technology to monitor and intelligently manage the health status, living environment, social interaction, and other aspects of the elderly in real-time.

- (2) Summary of application effects: The adoption of IoT technology has significantly enhanced the service efficiency and quality of this institution. Specifically, the benefits are evident in the following areas: firstly, real-time monitoring and data collection enable timely detection and management of health issues and environmental anomalies among the elderly, thereby enhancing service timeliness. Secondly, intelligent management and control have facilitated optimized resource allocation and utilization, thereby improving resource efficiency. Thirdly, IoT technology enables the provision of personalized service solutions tailored to the individual needs of the elderly, such as personalized diet plans, living arrangements, medical care, etc., thus enhancing service quality and satisfaction.
- (3) Improvement suggestions and prospects: Building upon the observed benefits, the organization can further optimize the application of IoT technology to enhance service quality and efficiency. Specific suggestions include: firstly, analyzing and leveraging collected data to devise more accurate and personalized service plans for the elderly. Secondly, developing more sophisticated intelligent devices, such as smart home and medical devices, to elevate the level of service intelligence. Lastly, fostering communication and interaction with the elderly through smart devices to better understand their needs and sentiments, consequently enhancing service quality.

4.2. Application and effect analysis

Through the above case analysis, it is evident that the application of IoT technology in group elderly care services offers significant advantages and potential. This application can enhance service efficiency and quality, reduce operating costs, and improve user experience and satisfaction. Real-time monitoring and data collection enable the prompt identification of health issues and environmental abnormalities among the elderly, facilitating personalized health management and medical services. Additionally, intelligent management and control optimize resource allocation and utilization, enhancing resource efficiency. Social interaction and entertainment systems enrich the lives of the elderly by providing diverse and engaging experiences. Furthermore, the integration of IoT technology with medical resources enables the provision of timely medical services and assistance for the elderly.

To further enhance the application effectiveness of IoT technology in group elderly care services, it is recommended to focus on the following strategies:

- (1) Strengthening technology research and application: Continuously develop new IoT technologies and devices to improve service intelligence and personalization.
- (2) Enhancing communication and interaction with the elderly: Utilize intelligent devices to better understand their needs and feelings, thereby improving service quality.
- (3) Improving the evaluation system: Regularly evaluate and provide feedback on the application effectiveness of IoT technology in group elderly care services, enabling timely identification of issues and implementation of improvements.

The application of IoT technology in group elderly care services holds significant development prospects and significance. By continually advancing technological equipment, enhancing communication with the elderly, and refining the evaluation system, service quality and efficiency can be further enhanced, thereby providing higher quality, intelligent, and personalized elderly care services. In the future, with the continuous development and promotion of IoT technology, it will play an increasingly vital role in elderly care services, ensuring a higher quality, safer, and more comfortable environment for the elderly.

5. Conclusion

IoT technology presents significant advantages in group elderly care services, primarily in enhancing service efficiency and quality, reducing operating costs, and improving user experience and satisfaction. However, challenges such as security and privacy issues, as well as standardization and interoperability issues, persist. By establishing a quality evaluation system for elderly care services based on IoT technology, real-time monitoring and intelligent management of the elderly can be achieved, thereby enhancing service timeliness and effectiveness. Additionally, personalized health management and medical services can be provided, ultimately improving service quality and satisfaction. The feasibility and effectiveness of the evaluation system have been verified ^[10].

Moving forward, the application of IoT in group elderly care services should prioritize the following strategies:

- (1) Continuing to strengthen the research and development of IoT technology, introducing new technological equipment, and enhancing service intelligence and personalization.
- (2) Increasing the promotion and dissemination of IoT technology in elderly care services to broaden acceptance and understanding.
- (3) Strengthening communication and interaction with the elderly to better understand their needs and feelings, thus providing more accurate and personalized service plans.
- (4) Improving the quality and capabilities of service personnel to deliver more professional and efficient services.
- (5) Further enhancing the quality evaluation system for group elderly care services to monitor and evaluate the health status, living environment, social interaction, and other aspects of the elderly, thereby improving the accuracy and effectiveness of evaluations. Establishing a regular evaluation and feedback mechanism to promptly identify and address issues.

With the continuous development and promotion of IoT technology, its role in elderly care services will become increasingly vital. Future efforts should focus on staying abreast of the latest developments and applications of IoT technology in elderly care services, providing a better, safer, and more comfortable elderly care environment. Additionally, attention should be given to the development of other emerging technologies, such as artificial intelligence and big data, and their integration with IoT technology to further enhance the quality and efficiency of elderly care services.

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Disclosure statement

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