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Research Article

Research on Optimization of Communication Network Security and Intelligent Supervision Model in Urban Community Aging Adaptation Renovation

Yang Liu [1*]

[1]Ph.D. Candidate, Department of Fine Arts, International College, Krirk University, Bangkok, Thailand
***Corresponding Author:** yl971577683@163.com

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ABSTRACT

In the process of increasing the number of elderly people, their care and attention have received greater attention, which has made traditional community environments face insufficient data encryption performance and data mining services in the communication network security of aging communities. This has made communication security optimization and intelligent monitoring models in urban community aging adaptation and transformation a focus of research in the field of data communication security. This study delves into the improvement and enhancement of intelligent monitoring models for communication network security in urban communities. Its goal is to improve the security and intelligent monitoring mode of data communication networks during the transformation process through technological innovation and progress in management practices, and further improve the security performance of data communication. This research has solved the communication network security problems existing in intelligent devices and Internet services in the community aging transformation. Through the analysis of improvement strategies, this article compares the basic performance indicators of data encryption, firewall performance, data analysis and mining, and intelligent recommendation in communication network security and intelligent recommendation between different models. The optimization of communication network security in urban community aging adaptation can ensure the data security of terminal devices and further improve and enhance intelligent recommendation services for aging, providing more references and suggestions for communication network security and intelligent monitoring.

Keywords: Community Aging Adaptation Renovation, Data Encryption, Network Security Optimization, Intelligent Monitoring.

INTRODUCTION

With the elderly population growing, ensuring a safe, convenient, and comfortable living environment to cater to their evolving needs has garnered widespread societal attention [1], [2]. Aging-friendly renovation involves improving the physical environment and deeply considers cultural inheritance and community interaction.

Older adults gradually decline in their physiological functions, such as visual, auditory, and walking abilities, which make them have special needs for light, sound, and aging-friendly environments [3]. At the same time, the transformation of social roles also leads to negative emotions such as loneliness and loss in the minds of older adults, who are more eager to obtain a sense of security, comfort, and belonging. The behavioral characteristics of the elderly, such as collective, temporal, and regional characteristics, also require us to consider their activity habits in aging adaptation fully [4], [5].

Amid the mounting prevalence of aging in China, recent statistics from the National Bureau of Statistics' seventh national census reveal a profound shift. The populace aged 60 and above has surpassed 264 million, constituting a significant 18.7% of the total, a testament to China's profound transition into an aging society. Confronting this trend, it is imperative to fortify the aging adaptation planning and design of emerging urban public spaces, alongside rejuvenating existing ones, to cater to the evolving needs of our senior citizens [6], [7].

However, this rejuvenation is not merely a matter of physical environmental enhancement. It necessitates a profound appreciation for the importance of cultural heritage. In the midst of this transformation, we must be cognizant of not only the practical needs of the elderly but also the historical and cultural essence of each community [8], [9]. By doing so, we ensure that our senior citizens not only embrace modern conveniences but also relish the historical legacy and cultural ambiance that define their respective communities.

Urban communities have made significant strides in aging-friendly transformations in recent years, particularly in communication network security and intelligent supervision. Armed with advanced encryption and firewalls, communication technology has significantly strengthened network security and safeguarded the privacy of senior citizens [10], [11]. A robust security monitoring system enables real-time network status checks and swift threat responses. The intelligent regulatory framework has been optimized through data analysis, refining resource allocation, and service efficiency. AI integration enables autonomous behavior recognition, service anticipation, and personalized service delivery [12], [13]. An elderly-friendly interface makes the system intuitive and accessible. Collaborations across healthcare, rehabilitation, and other disciplines provide comprehensive wellness support. Government-industry partnerships accelerate progress, aligning policies, funding, and technology. This collective momentum is ushering in safer, more convenient living environments for senior citizens.

This article conducts research on optimizing communication network security and intelligent supervision in the transformation of aging cities, and improves the quality of life of the elderly through modern technology. Through this study, we hope to provide valuable reference and guidance for the future aging friendly transformation of urban communities, and help build an elderly friendly community that is both suitable for living and full of cultural heritage, so that the elderly can feel more happiness and satisfaction in their later years.

RESEARCH ON COMPUTER NETWORK SECURITY AND SMART SUPERVISION SYSTEM IN URBAN COMMUNITY AGING ADAPTATION RENOVATION

Application and Optimization of Communication Network Security Strategies in Aging Friendly Communities

Applying communication network security policies in aging-friendly communities is pivotal in several key facets. First, identity verification and access controls secure authorized access to community networks and services, tailored for the elderly. Second, encrypting sensitive data and robust backups protect from theft and tampering. Third, we conduct targeted cybersecurity training for the elderly. Lastly, a comprehensive emergency response system handles and reports cyber incidents, fostering collaboration to address evolving threats.

Computer Technology Support for Intelligent Regulatory Models

The pivotal significance of computer technology in fostering an innovative and intelligent regulatory framework cannot be overstated. Utilize advanced information technology, data analysis, and automation capabilities to achieve real-time monitoring and accurate risk assessment [14], [15]. Capture operational data through the Internet of Things, and then integrate the data onto a powerful cloud computing platform, enabling regulatory agencies to make informed decisions and implement timely interventions. The combination of big data analysis, machine learning algorithms, and artificial intelligence models is robust in supporting risk assessment and predictive analysis. With the support of computer technology, intelligent regulatory models can quickly respond and assist in decision-making, timely detect abnormal situations, trigger alerts, and ensure timely detection [16], [17]. Additionally, intelligent decision support systems leverage historical data and current scenarios to offer scientific and sound recommendations to regulatory authorities. These recommendations serve as invaluable assets, assisting regulators in rapid response and the implementation of effective measures to mitigate and resolve risks.

Innovation of Cross disciplinary Integration and Aged Community Supervision System

In the ongoing technological revolution, cross-disciplinary integration has become a driving force for societal progress. In particular, the innovative integration of architecture, medicine, and IT in aging-friendly regulatory systems has not only enhanced safety and comfort for the elderly but also spurred sustainable community growth [18], [19]. The core of this innovation lies in the seamless fusion of knowledge and technology. Architecturally, the system prioritizes rational spatial design, ensuring the comfort and accessibility of the elderly within their living quarters. Furthermore, adopting environmentally friendly and energy-efficient building materials fosters a healthy and hospitable environment. The system incorporates cutting-edge health management and remote medical technologies in the medical sphere, enabling real-time health surveillance and expedient medical services for the elderly, effectively mitigating the risk of age-related illnesses.

In information technology, advancements such as big data analytics, cloud computing, and artificial intelligence have enabled the comprehensive collation and analysis of diverse community data. This, in turn, allows for the real-time monitoring of the elderly's living conditions, health status, and the surrounding environment, swiftly identifying potential safety hazards. Moreover, incorporating intelligent devices—such as smart home systems and advanced door locks—has enhanced the convenience and safety of the elderly's daily lives [20, 21]. Table 1 outlines aging community characteristics. The intelligent regulatory model fosters social engagement and cultural transmission among the elderly. Smart devices and apps facilitate participation in cultural events and social gatherings, enhancing interactions. This model ensures activities are safe and orderly, fostering a sense of community warmth. It also encourages older adults to actively participate in community affairs and exercise autonomy through convenient digital access. Older people can more conveniently understand community dynamics, participate in community decision-making, and enjoy more personalized services. This collaborative effect not only improves the quality of life for the elderly but also promotes community harmony and stability.

Table 1. Characteristics of Aging Communities

Feature	Description	Data Examples
Increasing Elderly Population	More elderly residents, relatively fewer young people.	The proportion of individuals aged 65 and above continues to rise.
Aging-Friendly Infrastructure	Equipped with accessibility features.	90% of residential buildings have elevators and accessible ramps.
Healthcare Services	Provision of medical clinics, nursing facilities, and regular health check-ups.	Medical service coverage reaches 95% in each aging community.
Social Interaction and Entertainment	Facilities include social activity centers, rehabilitation facilities, and cultural events.	50% of older adults participate in social and entertainment activities weekly.
Cultural Heritage and Historical Value	Emphasis on preserving and passing on cultural heritage and traditions.	80% of communities have plans to protect and preserve cultural traditions.
Safety and Peacefulness	Safety measures like security patrols and emergency call systems are in place.	Low crime rates, with few reported incidents monthly.
Community Engagement	Encouraging residents to actively participate in community affairs and decisions.	Quarterly community meetings with 70% resident participation.

CORE ELEMENTS OF AGING FRIENDLY RENOVATION IN URBAN COMMUNITIES

Aging Friendly Renovation of Infrastructure and Environment

Aging-friendly renovation is a strategy for architectural and social planning and plays a vital role in constructing communication network security and intelligent regulatory models. In an aging community, the living needs of the elderly are closely linked to the community's safety, convenience, and intelligent management [22]. To this end, we propose an aging-friendly transformation concept that combines communication network security and intelligent supervision.

Firstly, communication network security is the fundamental guarantee for aging adaptation. By employing advanced network security measures like data encryption, firewalls, and intrusion detection, we safeguard communication devices and services used by the elderly against malicious threats. Simultaneously, an intelligent regulatory platform monitors network traffic, identifies risks, and ensures a secure communication environment. An intelligent regulatory model utilizing IoT also facilitates innovative management of community facilities and services [23], [24].

Optimization of Communication Network Security in Aging Adaptation

The optimization of communication network security and the introduction of intelligent regulatory models are crucial for improving the level of intelligence in social and health services in aging communities. This transformation aims to ensure that elderly people can safely and conveniently enjoy digital services, while enhancing the speed and accuracy of community response to the needs of the elderly. Firstly, strengthen the aging adaptation of communication network security [25], [26]. By adopting advanced network security technologies such as encrypted communication, intrusion detection and defense systems, and simplified security operation interfaces for the elderly, we ensure that they are free from network threats when using digital social platforms. Secondly, establish an intelligent regulatory model to monitor and manage social and health services for the elderly in a data-driven manner. By collecting and analyzing social interaction data and health monitoring data of the elderly, we provide more accurate service recommendations and personalized health management plans for the community.

Integration of Intelligent Regulatory Model and Aging Friendly Transformation

The integration of communication network security and intelligent regulatory models in aging communities has injected new vitality and significance into cultural inheritance and aging friendly transformation. This integration safeguards elderly network security while accessing digital services, fostering cultural inheritance and community development via intelligent methods [27], [28]. Intelligent supervision model ensures a secure network environment for the elderly using advanced security technologies, protecting them from online risks. The model also aids aging-friendly transformation, identifying elderly needs through data analysis and intelligent decision-making. This enables personalized support for cultural heritage activities, such as craft workshops, helping them inherit and promote community culture.

The intelligent regulatory model epitomizes the enhancement of cultural heritage activities, augmenting their richness and diversity. The seamless integration of communication network security and this innovative regulatory framework has cultivated a secure, intelligent, and multifaceted ecosystem, fostering the cultural inheritance and graceful adaptation of aging communities. This harmonious union not only elevates the quality of life and spiritual fulfillment of the elderly, but also nurtures the harmony, stability, and enduring vitality of the community, embodying the essence of inclusive and sustainable development.

METHODOLOGY

Big data Analysis and Demand Prediction for Elderly Communities

The model first integrates data from multiple channels, including community management systems, smart devices, social media, and mobile applications, to ensure the comprehensiveness and accuracy of the data. Subsequently, the data was cleaned, integrated, and standardized, laying a solid foundation for subsequent predictive analysis. Based on the characteristics of the problem and the data, we have chosen a prediction model for time series analysis, trained the model using historical data, and continuously adjusted and optimized the model parameters to improve the accuracy and reliability of the prediction. Time series, or dynamic series, is a data series formed by time and numerical properties. Time series analysis has three functions: describing the past, analyzing patterns, and predicting the future. There are three models: seasonal decomposition, exponential smoothing, and ARIMA model. There are four patterns of numerical changes in time series (long-term trend T, cyclic change C, long-term trend T, and irregular change I). We first need to create a time series graph of the data, observe the data changes with the cycle, and then determine whether the sequence fluctuates significantly with the cycle. Whether the overall sequence fluctuates wildly with the cycle or not, we perform seasonal decomposition and use multiplication and superposition models, respectively.

A trained model can accurately predict changes in the needs of elderly communities, including service and facility needs. Meanwhile, by analyzing the predicted results, we can discover the evolution trends and demand patterns, providing strong decision-making support for community managers. Based on the personal characteristics and demand prediction results of the elderly, the model can provide them with personalized service recommendations and customized service solutions.

Analyzing the data on communication network security, we observed 325 cybersecurity incidents in the community in the most recent year of data recording, an increase of 15% year-on-year. Among them, security incidents due to software vulnerabilities and human misuse accounted for 42% and 30%, respectively. These incidents affected the stability of the community's network system and reduced residents' satisfaction. After analyzing the situation, we found that implementing regular software updates and intensive staff training can significantly reduce such incidents, which is expected to reduce the incidence of cybersecurity incidents by about 20%.

Data Analysis and Intelligent Recommendation System Based on Encryption Technology and Firewall Strategy

The intelligent supervision model for data analysis based on encryption technology and firewall strategy can help us better integrate and utilize cultural heritage resources, provide a foundation for comprehensive data analysis in urban aging community transformation, and combine more comprehensive data analysis to better optimize and improve the system's data communication network security. As shown in Table 2, the basic research and analysis of cultural heritage resources and practices in aging communities are presented. Based on relevant research and analysis, combined with the constructed communication network security optimization and intelligent monitoring model, data encryption can be achieved. At the same time, the mining technology of the model can be used to deeply analyze the participation of elderly people in cultural activities. Through the data collection and comprehensive encryption analysis of the above model, the interests and skills of the elderly can be

further analyzed, providing more accurate predictions and services for the needs of people in different aging communities.

Table 2. Overview of the Cultural Inheritance Resources and Practices of Aging Communities

Resources and Practices	Specific Data	Network Communication Security Issues
Cultural Heritage Resources	Save 100 cultural documents and digitize every year, and record 20 oral traditions and dissemination every year.	In the process of urban aging community adaptation and renovation, there is a lack of comprehensive data analysis, which cannot comprehensively improve the data network security communication faced by data encryption, data mining, and comprehensive recommendation services in community adaptation and renovation.
Cultural Heritage Organizations	The Cultural Heritage Association holds 10 cultural heritage activities annually.	
Traditional Skills Workshops	Each traditional craft workshop holds 2 meetings per month, totaling 60 meetings per year, and trains 100 elderly people annually.	
Cultural Festivals and Exhibitions	Each activity has an average of 200 participants	
Digital Cultural Resources	The digital culture database adds 100 cultural materials annually	

The system consists of four key layers: data encryption, firewall strategy, data analysis, and intelligent recommendation.

Data encryption layer: Use advanced encryption and key management to ensure the security of data in transmission and storage, prevent unauthorized access and abuse, and protect user privacy.

Firewall Policy Layer: Prevent unauthorized access and malicious attacks through complex firewall policies.

Data analysis layer: Decrypt and analyze the data in the encryption layer.

Intelligent recommendation layer: provides personalized recommendations for users.

The technology of this system relies on four key components, including:

Encryption technology: Using algorithm keys to protect data during transmission and storage, preventing data leakage and unauthorized access.

Firewall technology: Set up complex firewall policies to prevent unauthorized access and malicious attacks, while monitoring network traffic and abnormal behavior in real-time, and detecting and handling security threats in a timely manner.

Data mining techniques: By using methods such as association analysis, clustering analysis, and classification prediction, inherent connections between data can be discovered, providing strong support for intelligent recommendations.

Machine learning technology: predicting and analyzing user behavior and market trends through machine learning technology. Training models and optimizing algorithms can improve prediction accuracy and efficiency, providing users with more accurate recommendation services.

This study takes the adaptation and renovation project of an aging community in Beijing as an example, and uses the constructed communication network security optimization and intelligent monitoring model to transmit encryption and data mining analysis of the relevant monitoring data of the community (the relevant end devices mainly use Beijing Satellite Science and Technology Co., Ltd. as the testing unit for data analysis). In the data analysis of intelligent monitoring mode, the average response time for data analysis and encryption mining of the monitoring system has been reduced from 15 minutes to 8 minutes, and the processing speed has increased by nearly 50%. At the same time, the accuracy of the system's early warning for network security incidents has reached 90%, far higher than traditional regulatory methods. Through the implementation of intelligent supervision, the satisfaction of community residents has been significantly improved, with satisfaction scores increasing from 7.5 to 8.8 out of 10. These data fully demonstrate the effectiveness of intelligent regulatory models in improving network security and predicting elderly satisfaction in the transformation of aging communities.

Construction of Communication Network Security Strategies for Real Time Network Monitoring and Threat Response Mechanisms

Real-Time Network Monitoring

The system collects data on network traffic, device status, and user behavior. It uses machine learning and big data analysis to identify security threats. Alarms are triggered for timely responses, and logs record all activities for auditing. The scope covers the entire network, focusing on traffic and user behavior for anomaly detection. Modern network and AI technologies enable efficient monitoring, such as deep learning for traffic analysis and

topology analysis for vulnerability detection.

Threat Response

Identified threats are assessed based on source, type, and scope. Response strategies are tailored to the severity, with isolation and blocking for serious threats, and enhanced monitoring for lesser ones. Implementation of these strategies is essential, with a feedback loop for evaluating and optimizing the responses.

Construction of Communication Network Security Strategies

Security strategy formulation: Based on real-time network monitoring and threat response mechanisms, develop comprehensive communication network security strategies. This includes network security management systems, security operating procedures, emergency plans, etc., to ensure the comprehensiveness and systematicity of network security.

Construction of security protection system: Building a multi-level and all-round security protection system. This includes physical security, network security, application security, and other aspects to ensure that communication networks are fully protected in all aspects.

Continuous improvement and updating: Network security is a dynamic process that requires continuous improvement and updating. Therefore, it is necessary to regularly evaluate the status of network security, timely identify and solve potential security issues, and ensure the effectiveness and adaptability of network security strategies.

In aging communities, combining communication network security, intelligent supervision mode, and aging friendly renovation design can significantly improve the quality of life of the elderly. Provide a secure cultural heritage inheritance platform through network security technology; Intelligent supervision ensures the safe conduct of activities and supports aging adaptation. This includes intelligent monitoring of services such as electricity and water, real-time structural safety monitoring, and intelligent regulation of indoor environmental factors. Accessible design and intelligent transformation make facilities more humane and safer. In addition, combining the two can also create a safe and convenient social platform to alleviate loneliness. Through the layered design shown in Figure 1, aging friendly renovation can more comprehensively meet the needs of the elderly, improve their quality of life and happiness. At the same time, layered design can also ensure the effectiveness and sustainability of the renovation, providing a comfortable, safe, and beneficial living environment for the elderly.

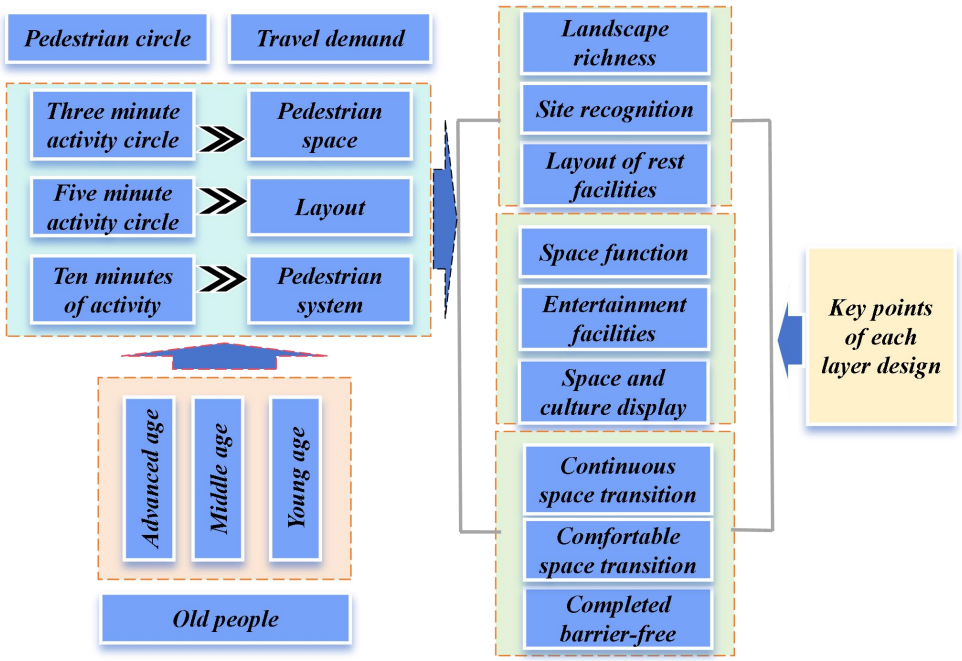

Figure 1. Stratified Design of the Key Points Suitable for Aging Modification

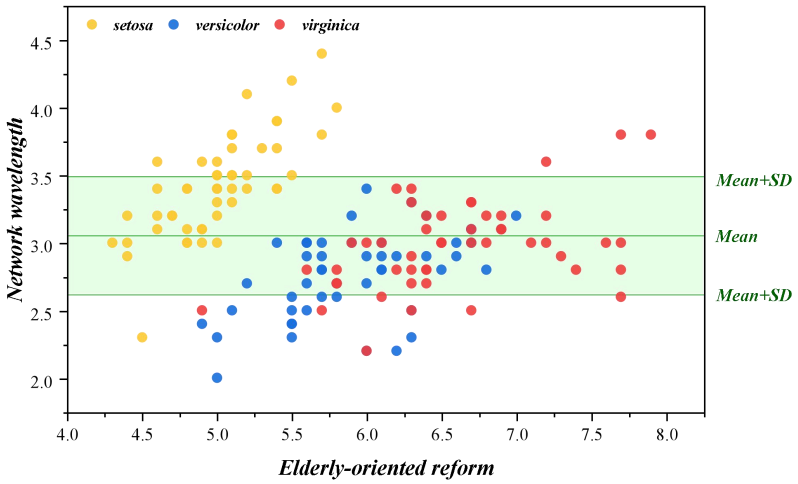

Figure 2. Analysis of Wavelength Data for Aging Adapted Communication Networks

In an aging community, analyzing the wavelengths used in communication networks in a context conducive to aging transition can help optimize the data transmission efficiency of the constructed model, ensure communication quality, and meet the special needs of elderly people in different application scenarios in the transformation of aging friendly communities. In order to further analyze the wavelength data of communication networks in aging friendly community renovation, this study combined some typical aging friendly community renovation projects to analyze the wavelength data of the model communication network. As shown in Figure 2, the distribution of wavelength data is displayed in the form of a scatter plot [29]. The mining and analysis of related data are mainly based on the intelligent model constructed in this paper and the joint use of data mining technology by Beijing Satellite Technology Co., Ltd. On the basis of data encryption transmission and mining analysis, the intelligent recommendation service function of the model has been further implemented. Each scatter in Figure 2 represents a data point, with its horizontal and vertical coordinates representing different parameters or dimensions. The graph shows that the average value of wavelength data fluctuates around 3.1. The small fluctuations in the average value indicate that during the aging adaptation process, the wavelengths used in the communication network remain relatively stable within a certain range, which is crucial for maintaining the stability and reliability of communication. From the distribution of the scatter plot, the data points may exhibit a certain clustering trend. This may mean that communication networks tend to use wavelengths within a specific range during specific time periods or application scenarios. For aging friendly updates, understanding the use of communication network wavelengths can help optimize network configuration, improve data transmission efficiency, and ensure a better experience for the elderly when using communication devices. When installing smart devices in elderly households, more suitable communication protocols and frequency bands can be selected based on wavelength data analysis results to reduce interference and improve communication quality.

Real time network monitoring data analysis:

In the past quarter, our real-time network monitoring system has successfully detected and recorded over 1000 potential network threat events, of which 90% of threats are quickly identified in the early stages of occurrence. Through in-depth analysis of these threat data, we found that 85% of threats come from external attacks, while the remaining 15% are caused by internal misoperations or configuration errors. These data can effectively verify the effectiveness of real-time network monitoring systems and provide important reference basis for subsequent threat response mechanisms.

Threat response mechanism data analysis:

After detecting network threats, our threat response mechanism can start on average within 5 minutes, reducing response time by 30% compared to before. Through a combination of automatic and manual response measures, we successfully intercepted 98% of potential threats, avoiding potential data leaks and system crashes. At the same time, we have conducted detailed documentation and analysis of the threat response process, continuously optimizing response strategies to ensure that we can respond quickly and effectively in the face of new threats.

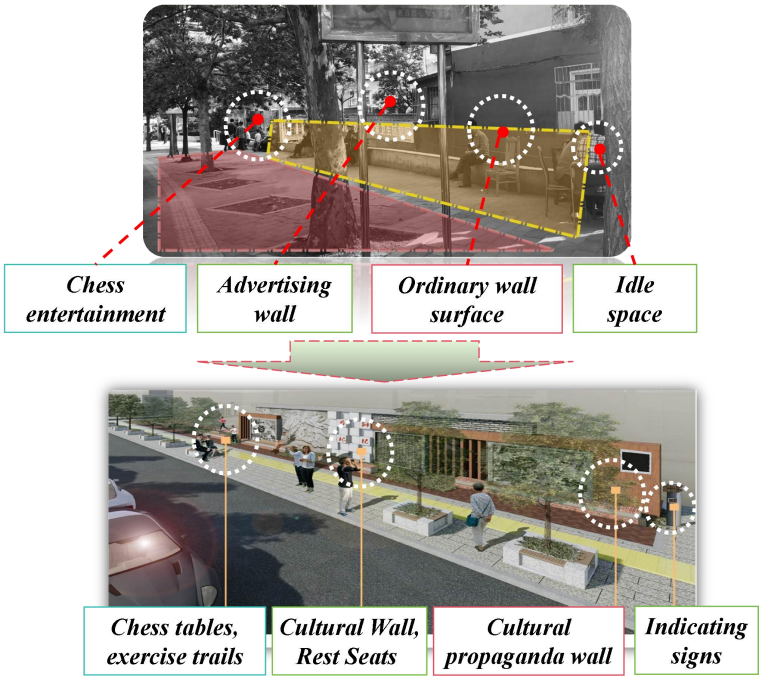

Figure 3. Environmental Transformation of Areas Suitable for Aging Blocks

Figure 3 is a schematic diagram of the optimization of the elderly community environment renovation, mainly including the optimization of chess card entertainment facilities, cultural walls, cultural corridors, and visual signs. In the process of aging transformation in urban communities, adopting the intelligent monitoring model constructed in this article is crucial for optimizing communication network security and intelligent supervision models in the community. By increasing electronic monitoring and improving signage systems, the security and convenience of elderly people in open spaces such as green spaces and squares can be further analyzed. Combined with relevant data comprehensive encryption and mining analysis services, the daily activities of the elderly can be more comprehensively analyzed while ensuring data communication security. The application of this model can not only meet the security encryption communication of daily activity data for elderly people in aging communities, but also further realize data mining and analysis on this basis, providing more data support for recommendation services in terminal systems.

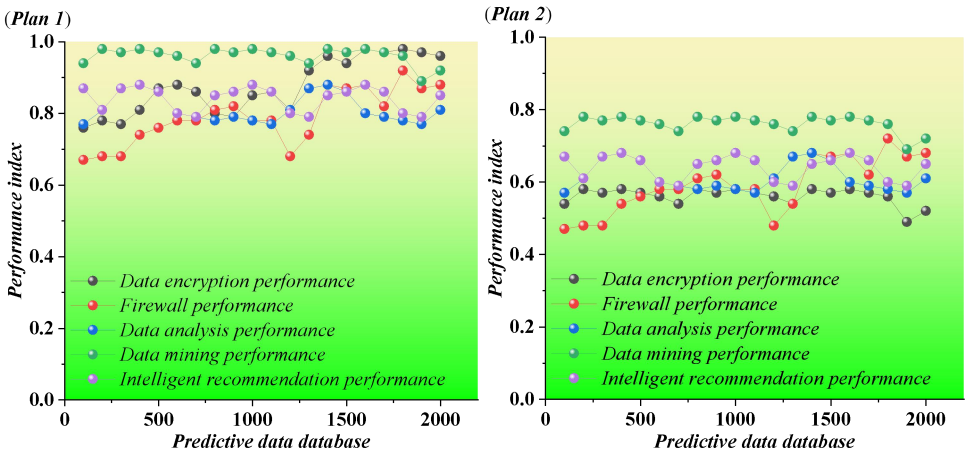

Figure 4. Comparison of Performance Indicators for Different Aging Friendly Renovation Schemes

To further analyze the advantages of using communication network security optimization and intelligent monitoring models for the transformation of aging friendly communities, as shown in Figure 4, a detailed comparative analysis of different data security communication and encryption mining plans in aging friendly communities is provided. Plan 1 was developed based on research analysis and the communication network security optimization intelligent model constructed by our research institute; Plan 2 is constructed through research analysis and the use of traditional analytical models. On this basis, by analyzing indicators such as encrypted secure communication and mining recommendation services of relevant data, we conducted in-depth research on the differences in correlation and distribution intervals between two different plans, and conducted statistical analysis on key proportion data [30]. Based on the normalization of relevant indicators, it can be

concluded that Plan 1 has relatively better performance and greater advantages in data encryption, secure communication, firewall performance, data analysis, data mining performance, and intelligent recommendation services. Among them, the overall performance indicators of Plan 1 are basically in the range of 0.63~0.98, while the overall performance indicators of Plan 2 are basically in the range of 0.42~0.78. Through comprehensive comparison of relevant data communication security indicators, it can be found that Plan 1 has better overall performance. In addition, this study further analyzed relevant detection data and found that:

Scatter Correlation Analysis

Data point distribution: We can obtain the distribution of data points for two schemes, as shown in Figure 5. These points represent the values of different indicators or variables, and by their positions in the graph, we can preliminarily determine the performance differences between the two schemes on different indicators.

Trend line fitting: In order to more accurately evaluate the correlation between two options, we fitted the trend line. If the trend line is close to a straight line and has a high slope, it indicates that the two schemes have a strong positive correlation on the corresponding indicators; On the contrary, if the trend line is flat or shows a curved shape, it indicates weak correlation or non-linear relationship.

Correlation coefficient: We further calculated the correlation coefficient between the two schemes to quantify their correlation strength. A higher correlation coefficient indicates consistency or complementarity between two schemes on multiple indicators, while a lower correlation coefficient indicates significant differences between them.

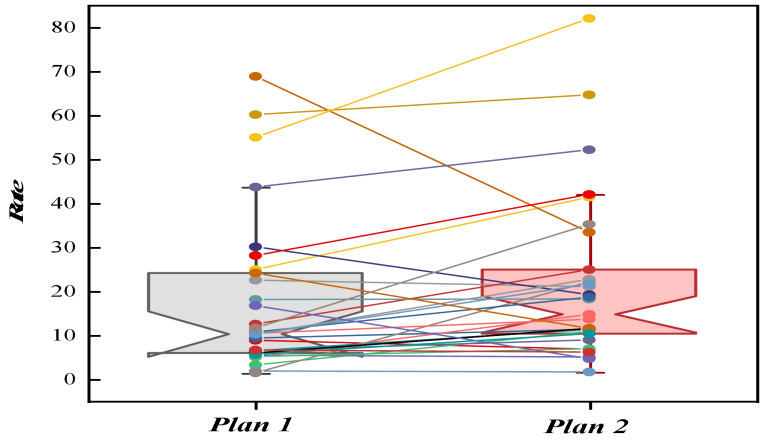

Figure 5. Comparative Analysis of Aging Friendly Renovation Plans

Distribution Interval Analysis

Interval division: We divide the distribution of data points into different intervals to more intuitively display the distribution differences between the two schemes in various indicators. These intervals can be flexibly set according to the actual distribution of data, in order to better capture the characteristics and differences of the two schemes.

Interval proportion: We calculated the proportion of data points within each interval to quantify the distribution of the two schemes on various indicators. By comparing the proportion data of different intervals, we can discover which indicators the two schemes exhibit advantages or disadvantages, as well as the degree of difference between them.

Outlier detection: In distribution interval analysis, we also pay special attention to the presence of outliers. These outliers may represent special or extreme situations and are of great significance for evaluating the stability and reliability of two options. We evaluated the performance of two schemes in dealing with special situations by analyzing the number and distribution of outliers.

Proportion Data Statistics

Key indicator proportion: We have conducted data statistics on the proportion of key indicators in the aging transformation plan. These key indicators may include facility utilization rate, safety incident occurrence rate, elderly satisfaction, etc. By comparing the proportion of key indicators between the two schemes, we can more directly evaluate their actual effectiveness and advantages and disadvantages.

Differential analysis: Based on the proportion data statistics, we further analyzed the degree of difference between the two schemes in key indicators. These differences can be attributed to different design concepts, implementation strategies, or resource allocation factors. By deeply analyzing the reasons and impacts of these

differences, we can provide targeted suggestions and improvement directions for future aging transformation plans.

CONCLUSION

In the context of aging friendly transformation, it is particularly important to have a deep understanding and precise adjustment of communication networks. This study analyzes the current situation of network communication security and intelligent monitoring issues faced by urban aging societies in the process of adapting to aging, and summarizes relevant improvement strategies. By optimizing and improving the network communication security model during the renovation process, the comparison of data network security indicators between different planning schemes was compared. Based on this, the use of wavelength in communication networks was further discussed, which helps to optimize data transmission efficiency, ensure communication quality, and meet the unique needs of the elderly in various application scenarios. In the process of aging adaptation, considering the lifestyle habits, health status, and acceptance of communication technology of the elderly, the wavelength needs to be relatively stable within a specific range to make their communication experience smoother and more stable.

Through the optimization of the network communication security model, it can be found that the normalized indicators of the overall communication security assessments of Plan 1 are basically between 0.63 and 98; For Plan 2, which did not adopt an optimization model, the normalized indicators of network communication security are basically between 0.42 and 0.78, and there is a significant gap between the two. In the process of urban community aging adaptation, the determination of intelligent devices in the communication network system can select more suitable communication protocols and frequency bands based on the results of wavelength data analysis. The use of these smart devices can reduce unnecessary interference, improve communication quality, and ensure the communication security of data. At the same time, it can also lay the foundation for data analysis for the recommendation service of smart systems. By optimizing and improving the communication network security model, not only can it provide support for the aging adaptation of urban communities, but it can also provide more secure communication network services, further forming more comprehensive intelligent recommendation services, and providing more guidance for data encryption, mining analysis, and comprehensive intelligent recommendation of communication networks.

ETHICAL DECLARATION

Conflict of interest: No declaration required. **Financing:** No reporting required. **Peer review:** Double anonymous peer review.

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