International Journal of Information Technologies and Systems Approach
Volume 16 • Issue 2

Intelligent Furniture Design for Elderly Care at Home in the Context of the Internet of Things

Deyu Luo, College of Design, Wenzhou Polytechnic, China*

ABSTRACT

As the number of elderly people in our population continues to grow, so has the attention directed toward their care. Furniture is a pertinent component of this, as its design can significantly impact their day-to-day lives in terms of safety, comfort, and convenience. Researchers, therefore, have analyzed the functionality and operability of these pieces and proposed design strategies that incorporate intelligent technology thereby improving the usability for the elderly. One promising branch of this research is the internet of things (IoT) and its application to smart homes that can greatly improve life for those in their later years. The value of furniture intelligence is evident, particularly with the ever-increasing demands from consumers for comfort and convenience. In recent years, with the continuous enhancement of consumer lifestyle, purchasers have been craving for comfort and intelligence from furniture products. As smart home systems often come with high costs, consuming large amounts of energy, and having low integration levels, this paper proposes a scheme to tackle these issues. It expresses the foundational idea that furniture for the elderly should be made secure, convenient, intelligent, and cost-effective based on the use of the internet of things technology. This technique has increased usability, safety, and economy by 3.54%, 3.81%, and 4.38%, respectively, thus acting as a valuable reference for "aging furniture" designs in theory and practice.

KEYWORDS

Age-Appropriate Furniture, Artificial Intelligence, Home Care, Internet of Things

INTRODUCTION

Artificial intelligence (AI) technology has made several major breakthroughs in recent years, and intelligent furniture also integrates AI related technologies and ideas. Thus, a new concept of smart family and smart life is proposed. Furniture plays an important role in the life of the elderly, which is the basic factor to ensure the life safety and health of the elderly. The physiological function of the elderly decreases with age, and their psychological status also changes. Therefore, their requirements for furniture in terms of function, safety, and economy differ greatly from those of ordinary people. Therefore, conducting scientific and reasonable research on antique furniture design is necessary.

DOI: 10.4018/ijitsa.320764 *Corresponding Author

Scholars have conducted extensive research on the design of age-appropriate furniture. Taifa and Desai (2017) noted that as people age, their physical and cognitive capacities diminish. Therefore, furniture must be safe enough to promote the elderly elderly's wellbeing and instill a sense of security. According to the physical condition of the elderly, they appropriately adjusted the furniture size to ensure their safety. Yao et al. (2017) raised whether the design of aging furniture could attract customers. The comfort of furniture was the attraction of users. According to the physical condition of the elderly, they properly adjusted the size of furniture to make it more comfortable, which was conducive to the health of the elderly. Allahdadi (2017) determined that most of the elderly's furniture was designed traditionally through the study of furniture design standards, which could not highlight the personality of the elderly and fulfill their psychological needs. Therefore, paying attention to personalized design from different aspects such as style, form, function, and so on, is necessary, wherein the elderly can truly understand the characteristics of this type of furniture, gain due respect, and feel the concern of society and family. Fu et al. (2021) found that the older the elderly, the slower the action and reaction. Traditional furniture design brought inconvenience to the elderly. Therefore, adding some humanized design suitable for the elderly in the home is extremely necessary. It should not only add humanized design to the size of furniture, but also consider the design of a smart home to improve the user experience of the elderly. Beer et al. (2017) proposed that smart home design should also be simplified because of the decline in memory and responsiveness of the elderly. Therefore, when designing furniture for the elderly, it is necessary to take the humanized closing ring as the basis and the intelligent development as the demand. The psychological and physiological characteristics of the elderly are combined to achieve aging adaptation and intellectualization.

Relevant studies exist on intelligent furniture. Hui et al. (2020) studied the development status and trend of smart furniture in the context of smart homes. He believed that intelligent furniture used a variety of technologies, such as modern information processing technology, communication technology, and so on, to conduct the real-time collection, sorting, recording, processing, logical judgment, feedback, and other operations on various signals, and fed back the processed information to the relevant information management platform to fulfill users' needs for furniture. Compared with traditional furniture forms, intelligent Internet of Things furniture had more humanized development characteristics, which was the performance of continuous innovation in the furniture industry. Nassar et al., (2019) examined smart home software and hardware modules. He thought that the hardware system mainly completed the function implementation of intelligent furniture, which was the concrete embodiment of realizing the automatic rotation control of furniture and integrating equipment. The software mainly comprised each module's data acquisition programs, main operation programs, and control programs. Papadopoulos et al. (2019) studied the technology and proposed that smart homes comprised three levels of engineering: terminal perception, action processing, and information control interaction. Besides traditional furniture functions, IoT smart homes provided users with richer human-computer interaction interfaces. Lógó and Orbulov (2021) believed that the design of IoT smart homes was function-centered, reflected in the abstract summary of the completion of the furniture system and product tasks to reflect its characteristics and use. The functional principle of intelligent furniture design necessitates that its design takes into account the relationship between people and objects, but also the connection between people and things, as well as people's psychological needs; an exemplification of a humanized design (Lógó & Orbulov, 2021). Labib (2019) proposed that the humanized design of intelligent home products was reflected in fulfilling people's psychological and physical needs, that is, people's body and spirit can be fully released through the design of the intelligent home. Many precision devices and mechanical structures were used in smart home design. Therefore, in the development process of smart home, its thermal insulation performance must be fully considered to ensure its safety in daily life. Therefore, the intellectualization of furniture has broken the limitations of traditional furniture in terms of materials, technology, and so on, in which the functions of furniture can be given more play, thus improving people's quality of life.