

# The Application of Intelligent Technology in Interior Design and Its Impact on Living Experience

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**Abstract:** The development trend of intelligent residential interior design suggests that deep personalization, integration, greenness, and security will become mainstream. Designers will utilize AI technology to comprehensively understand user needs and craft unique smart home experiences. The future home environment will seamlessly integrate devices and offer efficient control methods for convenience. Additionally, there will be a heightened focus on environmental sustainability, optimizing energy usage through intelligent systems and potentially incorporating renewable energy sources to achieve zero-energy living spaces. Intelligent technology is significantly transforming interior design, guiding living spaces towards a smarter, more comfortable, and more sustainable future. Throughout this progression, design is evolving from a singular aesthetic focus to the fusion of technology and art. Designers are transitioning into technology leaders and artistic innovators, collectively shaping the future lifestyle of humanity.

**Key words:** intelligent technology; interior design; living experience; AI (artificial intelligence) model; smart home

## 1. Smart Home

The smart home system utilizes sophisticated computer technology, network communication technology, integrated wiring technology, automatic control technology, audio and video technology, and integrates individual needs based on ergonomic principles to combine various subsystems related to home life (such as lighting control, curtain control, gas valve control, information appliances, scene linkage, floor heating, health care, sanitation and epidemic prevention, security and safety, etc.) in an integrated manner. Intelligent control and management are then conducted through the network to establish efficient residential facilities and family management systems<sup>[1]</sup>.



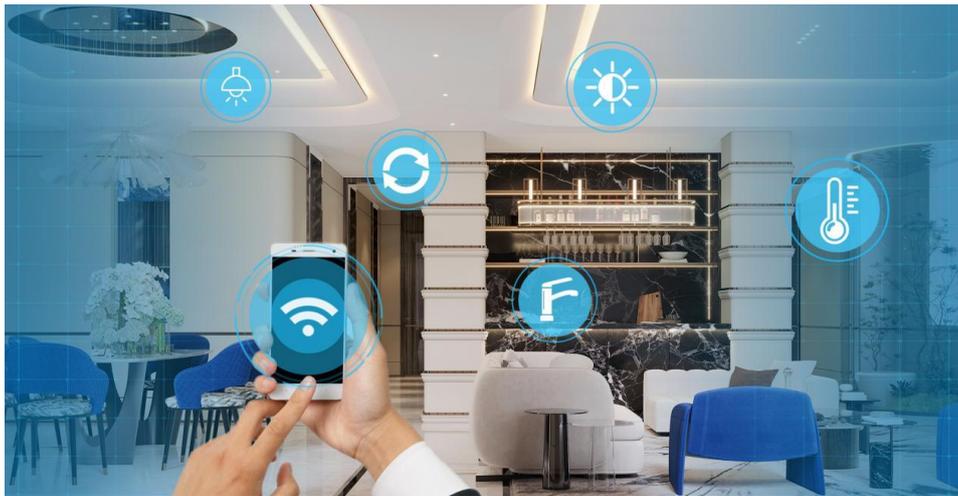
Figure 1. Introduction to smart home system functions.

## 2. Application of Intelligent Technology in Interior Design

### 2.1 Application of AI model in smart home design

Smart home design relies heavily on AI models, incorporating deep learning, machine learning, and other technologies. AI can analyze user behavior patterns, predict needs, and offer personalized services, significantly enhancing the home environment's intelligence. The AI model's integrated sensor technology allows the home to monitor real-time environmental changes like light, temperature, humidity, and human activity. By analyzing data accurately, AI can dynamically adjust environmental parameters to meet user comfort expectations. For instance, upon detecting the owner's return, AI can automatically activate lights, adjust the air conditioner's temperature, and even prepare the coffee machine, creating a cozy home ambiance for the residents<sup>[2]</sup>.

The application of AI models extends to energy consumption management as well. By utilizing big data analysis, AI can pinpoint inefficient energy consumption patterns and optimize energy distribution. For instance, it can automatically regulate the operation of electrical appliances based on the user's daily schedule, or decrease the power usage of energy-intensive devices when not in use, leading to a substantial reduction in overall energy consumption. This demonstrates that AI not only enhances home comfort but also promotes sustainable development through energy efficiency, aligning with contemporary green building principles.



**Figure 2.** Application of AI model in smart home design.

### 2.2 Adaptive development of smart home systems and interior design

The integration of smart home systems and interior design plays a crucial role in the implementation of intelligent technology in interior design. As the Internet of Things technology becomes more widespread and consumers seek greater convenience in their lives, smart home systems have become a significant aspect of contemporary interior design. Designers now believe that smart systems are crucial for creating cohesive user experiences, and their focus has shifted from the aesthetics and functionality of space to other aspects.

Data security is gaining importance in the integration of smart homes and interior design. With the continuous accumulation of user data, the challenge of maintaining privacy while enjoying smart services has emerged for designers and smart home manufacturers. Leading companies in the smart home industry like Schneider Electric prioritize user data security by implementing strict measures such as encrypted communication and user rights management. This helps alleviate consumer concerns about privacy breaches and ensures a secure smart living experience<sup>[3]</sup>.

The adaptive development of smart home systems and interior design presents unlimited potential for innovation at

the intersection of technology and aesthetics. Designers need to continuously learn and master new technologies to ensure that the integration of smart systems and interior design can achieve the desired results. As consumers' expectations for smart homes continue to increase, the role of designers will increasingly focus on combining technology and art to create smart living spaces that meet functional needs while considering aesthetics. Future research should further explore how to achieve efficient, safe, and personalized smart home systems while ensuring design aesthetics, in order to advance development and innovation in the field of interior design.



**Figure 3.** Adaptive development of smart home systems and interior design.

### **3. Development Trends in Intelligent Residential Interior Design**

The development trend of intelligent residential interior design indicates a shift towards diversification and deep integration. Advancements in technology and increasing consumer demand for personalization are driving future interior design to prioritize customization and differentiation. Designers are leveraging AI, big data, and IoT technologies to gain a deep understanding of each user's unique habits and preferences, enabling the creation of a smart home environment tailored to individual needs. For instance, by utilizing AI algorithms to analyze user behavior patterns, designers can establish various scene modes like 'fitness mode' or 'romantic dinner mode', enabling the home space to intelligently respond to the user's requirements and emotional state.

#### **4. The Impact of Intelligent Technology on Living Experience**

##### **4.1 Improve living comfort and safety**

The application of intelligent technology in interior design has greatly enhanced the comfort and safety of living spaces, meeting consumers' fundamental expectation for smart homes. Through the integration of smart home systems with AI models, designers can effectively manage the living environment, enabling homes to sense and adjust to residents' needs, thereby establishing a consistent and comfortable living environment<sup>[4]</sup>.

AI has the capability to automatically adjust indoor light and temperature based on the time of day, mimicking natural lighting changes and enhancing the quality of life for occupants. For instance, during cold winter days, AI can preheat the room so that returning residents can immediately feel the warmth, while on hot summer days, the AI can anticipate the need for air conditioning to create a comfortable indoor environment. Moreover, the intelligent lighting system can adapt brightness and color temperature to suit different activities like reading, relaxing, and entertainment, offering a visually comfortable experience and potentially improving the mental well-being of residents.

Smart home systems enhance security by continuously monitoring home conditions using sensors and video

surveillance for detecting issues like smoke, water leakage, or unauthorized entry. Upon detecting any anomalies, the system promptly alerts residents through a mobile app and can even trigger the alarm system for added safety. Additionally, remote monitoring capabilities enable residents to check on their homes from anywhere, providing peace of mind.

#### 4.2 Promote the development of green and low-energy buildings

The application of intelligent technology in interior design is instrumental in driving the development of green and low-energy buildings. Through the integration of AI models and big data analysis, smart home systems can effectively manage energy usage and automatically adjust energy distribution according to occupants' behavior patterns. This intelligent energy management system not only reduces energy consumption significantly but also enables the sustainable development of residential buildings, aligning with the fundamental principles of modern green architecture.

By analyzing the user's work and rest patterns, AI can intelligently adjust the timing of air conditioners, lighting, and other appliances to prevent unnecessary energy consumption. When the room is unoccupied, the system will automatically decrease the power usage of non-essential equipment or turn off high-energy-consuming devices, leading to a significant reduction in energy consumption without compromising comfort. Moreover, AI can detect and optimize energy-wasting habits, such as excessive lighting or standby energy usage of appliances, to enhance overall energy efficiency.

When implementing intelligent technology, designers consider aesthetics and energy conservation, incorporating green design elements into the layout and decoration of indoor spaces. They opt for energy-efficient smart equipment like LED lighting systems and energy-saving appliances, along with natural lighting and ventilation to minimize the need for artificial lighting and air conditioning. Additionally, designers utilize smart curtain systems that automatically regulate the opening and closing of curtains based on the sun's position to manage indoor temperature and light levels, while also preserving privacy and conserving energy<sup>[5]</sup>.

### 5. Conclusion

Intelligent technology is significantly transforming the field of interior design, guiding living spaces towards a more intelligent, comfortable, and sustainable future. Throughout this evolution, design is transitioning from a focus solely on aesthetics to a fusion of technology and art. As a result, designers are now assuming the role of technology leaders and artistic innovators, collaboratively shaping the future lifestyle of humanity.

#### Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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