Research on the Application of Smart Home Products in Design of Rural Homestay

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Abstract. Along with the increasing popularization of smart home products, the operational mode of combining homestay with smart home products has become one new trend at present. The application of smart home products in homestay can not only bring the unique intelligence and convenience to tourists, but also enable the landlord and manager to escape the complexity of traditional homestay management and to reduce the unnecessary expense. Based on introducing the smart home products, this paper analyses the application field and means of smart home products in rural homestay design, and provides reference for the intellectual rural homestay construction.

Keywords: Rural homestay, Smart home products, Design application

As one of the most popular industries at present, the combination of homestay with intelligence is more likely to open a brand new mode of life. The smart home products full of sense of science fiction and the homestay decoration style with a sense of design not only meet the enjoyment of perception visually, but also more significantly enhance the residents to enjoy different residential experience. Along with the popularization of smart home products, more than more rural homestays are becoming the "Smart Homestay", providing the more high-end and personalized service for consumers. How to integrate the smart home products into rural homestay has become one crucial content of practical research

1   Introduction to Smart Home Products

1.1   Definition of Smart Home Products

The smart home products are the products from joint development of several high and new technologies such as Internet technology, digital chip, artificial intelligence technology etc. The appearance of smart home products aims to facilitating people's life and improving people's life quality. Compared with the traditional home products, smart home products can not only reserves the basic using functions of traditional home products, but also endow the more advanced functions and better using experience to products through intelligent

technology based on this, which strives to create a high-quality and comfortable living space.

The advanced comprehensive cabling technology, network technology and computer technology are applied in the smart home products technically, which integrates the originally single individual systems together. Upon these products are integrated, it is able to fulfill a more efficient, stable and safe operation so as to create a good living environment and residential experience for residents.

1.2   Working Principle of Smart Home Products

There are three important modules in the practical operation of smart home products for the working principle of smart home products, which include the sensor module, function model and control module respectively.

The main function of sensor module is to perceive the change of indoor environment, as well as collected the environmental parameters such as temperature, humidity, illuminance etc. These data is the quantitative indication of current residential environment, which play a significant role for the work of other two modules. Compared with human body's feelings, the sensor module has a higher perceptive precision.

The control module is the brain of smart home system, which responsible for receiving the data transmitted by sensor module. Combined with these data, the control module can deliver the correct instruction according to the previous program setting so as to control the subsequent operation of smart home products. With the help of Internet technology, the control module can not only perform the control operation at smart home products locally, but also receive the control instruction from Cloud while upgrading the version of its own control system. The functions of remote operation or intelligent operation of many smart home products all rely on the operation of this module. It is required to point out that the control module doesn't cover all control operations of smart home products, and partial operations can be completed by user manually.

The function module is one working module for smart home products to fulfill the specific functions of home products. This module is instructed by the control module of smart home products, which can also be controlled by user manually. When the function module completes the specific function effects, and the sensor module perceives the corresponding data, the control module can control the function module to stop working so as to reach the purpose of saving energy.

The greatest difference of smart home products from traditional home products is that the traditional home products are always one closed system, each traditional home product is operating in a separate manner without collaborative work. The smart home products can perform information transmis-

sion during work by various means of communication. The environmental information obtained by sensor module can also be shared with more environmental information to be collected from the Internet. A variety of smart home products under the same environment can be dispatched under the same control module for fulfill the collaborative work. It greatly reinforces the using experience and working efficiency of smart home products.

1.3   Application and Effect of Smart Home Products in Buildings

Smart voice control platform: The smart voice control platform is one fast channel for smart home products to communicate with users. Users can awaken the smart voice control system through the natural language and give instruction to them (For instance, the awakening word for voice assistance produced by MI Company is "Xiao Ai Tong Xue", the awakening word for voice assistance produced by Alibaba Group is "Tian Mao Jing Ling"). Through a series of dialog, the smart voice control system can help users to automatically complete a series operations: information search, turn on and off smart home products, play music etc. functions. There are a number of voice control products can be used as the channel of connecting various smart home products, fulfill communication with the smart home products through Bluetooth or wireless network.

Smart sensor component: The smart sensor component can't independently complete any function among home products but playing an significant role in the system of smart home products. The smart sensor component can monitor various data of smart home products and perceive users' behaviors in the application scenarios. It can be regarded as the perceiving organ of many smart home products. The data parameters indoors such as temperature, humidity, air PM 2.5 index etc. can all be perceived for determining the operation of smart home products.

Smart air regulating system: The smart air regulating system covers regulation for the temperature, humidity, PM 2.5 index etc. indoors. Many smart air regulating equipment such as smart air conditioner, smart humidifier, smart air purifier etc. are all equipped with the sensor. It is able to connect with the mobile phone of users by Bluetooth or wireless network in real time. Meanwhile, these home equipment can obtain the environmental data of other equipment in real time through the Internet connection. It is able to regulate the operational strategy smartly based on the users' demands, making the current indoor environment more comfortable.

Smart security system: The smart security system includes smart surveillance camera, smart alarming device, smart door lock, smart door bell etc. a series of security and protection system. Compared with the traditional security system, its functions are more advanced, comprehensive and intelligent. Users can watch the monitoring screen of smart surveillance camera remotely

by the Cloud servo. They can also fulfill the remote alarm by mobile phone APP in case of monitoring any danger. The smart door lock has more functions compared with the traditional door lock. It supports the fingerprint unlocking and face recognition unlocking, which will bring a better and safer user experience in the course of using.

Smart lighting control system: The lighting products in smart home products are more optional in case of lighting intensity, lighting color temperature etc. Users can adjust the lighting according to their own demands. Apart from this, it is able to change the light color and form the ambient lighting effect required by some users. The above-mentioned smart sensor can be configured with the lighting products for using and completing some automatic effects "light is on when people walk in, light is off when people walk out".

Smart audio and video entertainment system: There are less optional programs due to the traditional television can only receive the simulation signals. In today with an advanced Internet, the programs of television have been greatly enriched as the entertainment center of daily family's living room. It is unnecessary to rely on the remoter to control television but controlling it by the natural language due to the smart voice control system. In the smart audio and video entertainment system, television is not the only terminal for users to watch programs. Users can continue watching the programs that are not finished on television by mobile phone, computer and other devices.

2   Smart Home Products in Rural Homestay

The application of smart home products in rural homestay is difference from the previous using scenarios of smart home products. The smart home products for consuming market are mostly used in the residential environment upon purchasing. The various smart home products indoors are collaborating mutually and jointly constructing the entire home system. Under the environment of homestay, difference customers have various demands and living space. The launching of smart home products for homestay can't remain the original using means in residence under the environment of homestay. Different groups of tourists should have the corresponding sub-systems of smart home products according to the division of homestay's functional space, providing personalize services for difference groups of customers. Meanwhile, each sub-system can also constitute the complete smart home system of entire homestay with the smart home products in public space. Such mode can sort of comply with the using demands under homestay environment. The smart home products can be widely applied in homestay such as remote control. It is able to control by mobile phone applications, and support the connection of Internet of Thing. Users can remotely control the smart home products in homestay by APP researched and developed by Dongguan Dierxi In-

formation Technology Co., Ltd. For example, change the lighting luminous environment, timed power shutdown, automatic capturing and alarming etc. basic anti-theft function; Gas leakage detector, kitchen safeguard, automatically monitor the gas leakage degree indoors (e.g. kitchen etc.) with the networking alarm system, smart ventilation or close gas source so as to avoid any emergent accident caused by gas leakage; Moreover, the smart audio and video can not only combine with the functions of traditional home theatre, but also integrate the practical functions of smart home system, instantaneously changing homestay as one theater but simplifying the use. There may certainly some people doubt that the homestay is one place for leisure and relaxation, whether the smart products will damage the homestay concept of original ecology. It is required to stress another concept of homestay "smart can" when applying smart home products in homestay, that is to enjoy life. The main task of smart homestay is to provide convenience such as reduce the reservation and waiting time, reduce the check-out and waiting time, reduce the safety hazard etc.

3   Smart Elements of Rural Homestay Design

Under the great concept of smart home products, the different market segments for whole-house intelligence, family security and fire fighting, smart household appliances, home theatre, smart door lock, environmental control, lighting control and various smart products have been comprehensively developed. How to integrate the smart elements into design of rural homestay, how to promote the efficient management of rural homestay by smart home products. The author makes the following discussions.

3.1   Break Traditional Check-in Procedure

As the landlord or homestay manager, they may always encounter the circumstance of failing to arrive in a timely manner for tourists checking house due to sending or taking keys. First of all, it is unnecessary for the landlord to rush around at all if tourists need to check house if having Quzhai whole-house smart door lock. The landlord can directly unlock the door on mobile phone remotely or push one time-efficient password without worrying about the circumstances that tourists may forget to lock the door after checking house etc. With the help of door sensor, the locking and unlocking of door can be sent to mobile phone in real time; Secondly, the door lock can support landlord to make room card on its own. For instance, if the landlord finds the magnetic card is insufficient or lost when setting up opening door by swiping card, they don't need to worry about it. They can make the corresponding room card by scanning normal IC card with smart housekeeper APP, and the tourists can

directly use it within the effective period set by room card. Of course, ID card, bank card can also support to make room card by reading at the door lock. It should be noted that the landlord can directly push the information of self-defined content to the door lock screen for reminding tourists. The tourists can see the corresponding reminders at the door lock screen when locking and unlocking the door. Such as please keep warm outdoors since it is cold out-side, such simple sentence can bring more warm to tourists. By doing so, it is not only convenient for landlord to manage, but also enable tourists to feel the intelligent, convenience. and sense of safety

3.2   Smart Control Energy Conservation and Environment Protection

The whole-house smart system can support the remote control and real-time feedback for all lights and home household appliances. The tourists may for-get to turn off some household appliances upon leaving, actually the landlord mostly worry about the safety of tourists and house but failing to monitor in real time. At the moment when tourists leave, the whole-house smart home system will automatically turn on the leaving mode. All household appliances, equipment and lights will be regulated to an appropriate status for conserving energy and saving power. The tourists don't have to worry about any accident caused by not turning off the household appliances even though they go out for a long time. The landlord can directly turn on the smart housekeeper to remotely turn off the household appliances that are unnecessarily turned on. In terms of the monthly power consumption of household appliances, the current status of air conditioner is on or off, the landlord will clarify all issues e.g. power statistics, real-time status of equipment etc. due to having the whole-house smart home system. It it not only able to conserve energy and protect environment, but also realize the digital management.

3.3   Whole-House Linkage of Household Appliances

The whole-house smart can also bring a difference experience and comfort for tourists. For example, the voice housekeeper will automatically remind tour-ists "The water is boiled, please make a tea" upon the teakettle boils water; The tourists can turn on television only by remote when they want to watch it, and the household appliances in room e.g. lights, curtains etc. will be auto-matically regulated to an appropriate movie-watching status; The moment when tourists turn off the bedside lamp when they want to take a rest, the main light and spotlight will be automatically turned off with household ap-pliances to be regulated to an appropriate status. Sleeping mode, getting-up mode, movie-watching mode, entertaining mode etc. DIY scenarios are all supported. The landlord can also easily set up the unique scenarios for tourists

by mobile phone according to the room arrangement, local customs, surrounding environment etc.

About the Author: Wei Wei (1984-) is a female master and associate professor, with research interests in smart tourism and virtual simulation experimental teachin

Reference

1. Zhang Yi, Wu Jianfen, LB/T 065-2019 Basic Requirements and Evaluation of Tourist Homestay [J], Standard Life, 2019(08):46-491
2. Zhang Danxie, Research on China Smart Home Industry [J], Future and Development, 2021,45(12): 14-19
3. Wei Na, Research on Development of Smart Home Products under the Times of IoT and Big Data [J], Digital Technology and Application, 2021,39(11):130-132
4. Huang Xiting, Xiong Qiang, Research on Application of Smart Home Products in Interior Design [J], Smart City, 2021,7(21):48-50
5. Shen Pengyuan, Research on Application of Smart Home Products in Design of Huzhou Mogan Mountain Homestay [D], Huzhou University,2022.