**Function Matching of Terminal Modules of Intelligent Furniture for Elderly Based on Wireless Sensor Network**

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**ABSTRACT**

As the aging problem continues to intensify, the number of empty-nest elderly groups increases. Taking the living needs of the elderly as the core, intelligent and innovative design of elderly bedroom furniture in the direction of old age has become a hot topic. Therefore, it is very necessary to actively carry out research on the function matching of smart adaptable furniture terminal modules based on wireless sensor networks. The purpose of this article is to discuss the research on the functional matching of smart adaptable furniture terminal modules based on wireless sensor networks. The research object is the smart system for nursing homes. The system uses ZigBee technology to complete the indoor wireless sensor network (WSN) layout and conducts fall test experiments, Power saving experiment, network performance experiment, observe its performance. The research results show that the number of frontal fall tests is 50, the number of alarms is 48, and the accuracy rate is 96%; the number of back fall tests is 50, the number of alarms is 48, and the accuracy rate is 100%; The accuracy rate is 100%; the number of right side fall tests is 50 times and the number of alarms is 50 times, and the accuracy rate is 100%. It can be seen from this that the research on the function matching of smart adaptable furniture terminal modules based on wireless sensor networks is of great significance for enhancing the well-being of the elderly.

**INDEX TERMS** Wireless sensors, smart furniture, terminal modules, function matching.

**I. INTRODUCTION**

At present, aging is a worldwide trend, and China is also a country with a relatively high population aging worldwide [1]. Population aging is a social development phenomenon that our country pays close attention to [2]. Compared with the aging problem in other countries, China, as the world’s largest developing country, has a huge population base and continues to grow, and the aging situation is grim. Therefore, the contradictions that aging will face are more prominent [3]. In the past ten years, the number of people aged 65 and above has increased year by year [4]. The huge number of elderly people, its growth rate and the number of growths also allow China to enter the aging society in advance [5]. For a large number of elderly people, old-age care has become a personal and social pressure, and it is also an urgent problem to be solved [6].

Facing the intensified population aging problem and the negative impact brought by the aging society, we need to adopt a positive response attitude and pay attention to the elderly group [7]. When solving the current problem of old-age care, providing elderly people with convenient and user-friendly household products has become an urgent problem to be solved in China after entering the aging society [8]. The emergence and development of smart old-age products have brought new solutions to old-age problems [9]. Intelligent household products can help the elderly to live well, for example, through appropriate intelligent functions, in order to improve the elderly’s home life problems caused by physical limitations [10]. Therefore, the study of smart furniture has become an important development direction to solve the needs of the elderly [11]. Smart furniture is the use of electronic, mechanical, Internet of things and other technologies to achieve the intelligence of traditional furniture. The intelligent design of furniture is the trend and trend of future life [12].
Volpe introduces the origin, system architecture, intelligent hardware and application technology of smart home in detail. Combined with the typical application cases of smart home, it analyzes the development level and the comparison of the advantages and disadvantages of current famous brands in the field of smart home from the perspective of technology application, function and applicability [13]. Ignacio mentioned that a good design should not only meet the life needs of the elderly, but also meet the spiritual life of the elderly. The value of the elderly is not only the material wealth created for the society or family, but also the spiritual value of the elderly in old age [14]. Matilde designs traditional furniture from the perspective of aging adaptability, analyzes the advantages of intelligent furniture from the perspective of the function of intelligent furniture, analyzes the existing problems of intelligent furniture for the elderly, and obtains the design principles and methods of aging adaptability furniture [15]. Guoqing has studied marketing, demography, ergonomics, psychology and many other fields. It provides theoretical basis for the research through learning and resource arrangement of various disciplines, and proposes a new method combining traditional elderly products with modern new technology based on research and practice [16]. Inkeri elaborated the concept of intelligent pension. Intelligent pension is a combination of current information technology products such as Internet, cloud computing, big data, intelligent hardware, etc., which realizes the allocation of pension resources and promotes the upgrading and optimization of intelligent pension services [17]. Enrico put forward that intelligent pension should avoid entering into the wrong area. While improving the pension service, it is not only to pay attention to the material conditions created by the society or family, but also to ignore the mental health of the elderly. Humanized care is the ultimate goal of intelligent pension [18].

The main research content of this paper is roughly divided into four parts: the first part is the introduction part, which aims to make a systematic overview of the main research content of this paper from the research background, research purpose, research ideas and methods; the second part is the theoretical basis, which introduces the research methods and research theories in detail and systematically. The third part is the experimental part. 160 questionnaires were sent out and 160 were recovered, of which 154 were valid. 70 males (45.5%) and 42 females (54.5%) were surveyed, and the effective rate of the questionnaire was 96.3%. The fourth part is the summary and suggestions of this article, which is the summary of the results of this article.

II. PROPOSED METHOD
As the name suggests, smart home is to take the house as the realization platform, combine various high-end technologies such as network communication technology, automatic control technology, generic cabling technology, video and audio technology and security technology, realize the integration of furniture system, design an efficient and convenient comprehensive management platform for family affairs and housing facilities, and further improve the comfort, safety, art and convenience of home furnishings At the same time, achieve the goal of environmental protection and energy conservation [19]. The smart home system integrates the functions of various controls and so on. Now, the level of science and technology cannot be fully realized. The integration system, network platform, transmission media and so on are the key technologies to be studied, and there are also cost problems. Therefore, the current furniture intellectualization has not been fully realized [20]. At present, we can use the existing technology to improve the system and set up the physical interface. Once the technology reaches a certain degree, it can be upgraded to achieve complete intelligence.

In terms of composition structure, smart home system is composed of internal network, gateway and external network. The internal network connects all kinds of devices and home appliances in the home. It is the internal LAN, which forms a variety of networking modes due to different devices. Generally, the external network can be served by telephone network, local area network, Internet, cable television network, etc., which is often technically mature. From the functional point of view, the family Intranet can be roughly divided into three types. The first is the control network to realize the control of the system, the second is the data network to realize the transmission and exchange of data, and the third is the multimedia network to mainly realize the transmission of video and audio [21]. The gateway is used for the interconnection communication between the internal network and the external network. Through the function of the gateway, the external network can realize the connection between various devices connected with the internal network and achieve the purpose of control. Moreover, the home gateway does not limit the networking form of the internal network. Under the function of the home gateway, the connection between various communication subnets can be realized, and all kinds of household appliances in the subnets can be connected and other devices can also communicate with each other.

The so-called home intelligent gateway refers to the resource allocation and management center of the whole system, realizing various networking forms and controlling node functions. Use different networking technologies to connect the gateway into the home network, control the sensor nodes to work, follow a set of standard protocols to achieve the purpose of control and management, and form a unified interface for the external network to interact [22]. According to the survey, users generally hope that a smart home system can have the following functions. Scene setting, information interaction, home monitoring, home security and energy management, all of these functions are inseparable from the role of gateway. Generally, the qualified gateway can realize the functions of home appliance management and control, family safety, three-meter copying, information exchange between family and Property Center, web browsing, building intercom, home theater, mail receiving and sending, remote education and medical treatment, access control monitoring, etc.
The details of each functional module of the ideal smart home system are as follows: (1) Home appliance control. Real time monitoring of the power and equipment connected to the network, controlling its switch, setting timing, etc. (2) Security function. It is mainly aimed at family safety. In case of gas leakage, fire or illegal intrusion and other accidents, the sensor of the module will sense the danger and give an alarm at the first time, and send the danger information to the gateway. After the gateway receives the information, it will send it to the alarm center, and immediately start the emergency function of each major equipment, enter the warning, and play the role of active prevention. (3) Automatic maintenance. The sensor can download all kinds of information provided by the manufacturer for driving update, fault diagnosis and resolution, and actively expand new functions to solve various problems. (4) Control the lights. According to their own preferences, customers can set special scenes and control the lighting to change accordingly. Just like the living room and bedroom, you can change the scene by adjusting the light. And can only prompt to set the light through the light sensor.

Combined with the requirements of modern people for comfortable, convenient and safe living environment, the development trend of smart home in the future mainly includes the following points: wireless transmission mode [23]. The characteristic of wireless transmission is flexibility, and its mobility and scalability are incomparable with wired transmission. The embedded microprocessor with low power consumption and powerful function is adopted. Embedded system is widely used, easy to develop, and the cost of industrialization mode is constantly reduced. With the support of the embedded operating system platform, the smart home becomes an intelligent home platform including security protection, information transmission, home appliance control and digital audio-visual. With the Internet of things. Smart home develops ahead of the Internet of things, and as a key part of the Internet of things, it must eventually return to this broader environment.

III. THEORETICAL BASIS

Wireless sensor network is called WSN for short. It monitors, perceives and collects the information of various environments and monitoring targets in real time by deploying various integrated micro sensors, processes the collected information in a series of operations, and finally transmits the information to the user terminal through wireless network [24]. Through the integration of various modern advanced technologies, such as computer network technology, wireless communication technology, on-chip system technology, etc., sensor network greatly reduces the cost and power consumption of nodes, improves the characteristics of systematization and integration, integrates more functions, especially reduces the operation power consumption of the whole network. Nowadays, science and technology are developing continuously. This kind of network has been widely used in various fields, such as military, architecture, agriculture, environmental monitoring, medical treatment and so on. It has a very broad application prospect in these fields. It is because of its wide application field and the superiority of its performance that wireless sensor network is more and more favored and concerned by professionals from all walks of life and all fields. More and more resources are put into the research and application of wireless sensor network. Based on this, it has successfully become 21 one of the most influential technologies in the 21st century has greatly improved the way of production and life of human beings. To a certain extent, wireless sensor network improves the way of communication between human and nature, improves the efficiency of interaction between human and nature, and greatly improves the human perception of nature.

There are two main types of nodes in WSN, which are converging nodes and distributed nodes. Each node can realize the communication connection between each other, self-organized into a mesh structure and connected to the aggregation node in a multi hop way [25]. For larger networks, we can divide it into several blocks or regions. Each region is called a cluster, and a cluster head is selected in each cluster, which is responsible for the communication between clusters. There is a path between each cluster head and the aggregation node. The path between all cluster heads and the aggregation node is connected to form a backbone network. Each cluster head collects all nodes in the cluster to collect data the collected information is sent to the aggregation node through the backbone network, and finally the aggregation node transmits the current information to the data center for centralized processing through the Internet or satellite network. Generally speaking, WSN architecture should include distributed sensor nodes, aggregation nodes, Internet and monitoring center.

We assume that the density of competing nodes in the network is \( \rho \). When the transmission radius of the node is \( r \), then the number of competing nodes in the communication range of the node \( n \) is:

\[
 n = \rho \pi r^2
\]  

(1)

When the back off index is be, the probability of node collision is:

\[
P(BE) = \frac{1}{2^{BE} - 1}
\]  

(2)

Then, after this fallback, the probability of no collision is:

\[
P(BE) = (1 - P_d(BE))^n
\]  

(3)

That is to say, the probability that the node detects that the channel is idle is PC. If the node detects that the channel is not idle, according to CSMA / CA algorithm, the node will carry out B = MAC Max comeback off fallback times to determine the transmission failure, then the probability of channel success after B fallback is:

\[
P = \sum_{i=0}^{b-1} P_c(BE(i)) \prod_{j=0}^{i-1} (1 - p(BE(j))
\]  

(4)

\[
BE(i) = \min(macMinBE + i, macMaxBE)
\]  

(5)
For the convenience of analysis, we make MAC min be = MAC Max be, so the be value will not change with the fallback. Therefore, the probability of channel success after B fallback is:

\[ P = \sum_{i=1}^{b} P_i(1 - P_e(1 - P_e))^{i-1} \quad (6) \]

The average number of fallback times \( s \) of an attempt to send a data frame is:

\[ S = (1 - P_s) + \sum_{i=1}^{b} iP_e(1 - P_e))^{i-1} \quad (7) \]

The average time of each fallback is represented by a function \( T \) about be as follows:

\[ T(\text{be}) = \frac{2\text{BE} - 1}{2} \quad (8) \]

\[ T = \text{aUnitBackoffPeriod} \quad (9) \]

Every time a busy channel is detected in the fallback, the value of be is increased by one until he is equal to MAC Max be, and the required fallback time \( t \) for an attempt to send is equal to the time \( t \) for each channel detection plus the time for each fallback.

\[ T = S(T_{\text{cca}} + T_{\text{bo}}(\text{BE})) = S \left( T_{\text{cca}} + \frac{2\text{BE} - 1}{2} T_{\text{bop}} \right) \quad (10) \]

The average number of attempts \( t \) required to successfully send a data frame is:

\[ t = \frac{1}{P_s} \quad (11) \]

Therefore, the average time required to successfully send a data frame is \( T \):

\[ T = tT_{\text{bop}} = \frac{s}{P_s}(T_{\text{cca}} + \frac{2\text{BE} - 1}{2} T_{\text{bop}}) \quad (12) \]

**IV. EXPERIMENTS**

**A. ESTABLISHMENT OF EXPERIMENTAL SYSTEM**

1) SMART HOME SYSTEM BASED ON ZigBee WIRELESS NETWORK

The research object is an intelligent system for senior housing. The system uses ZigBee technology to complete the indoor wireless sensor network (WSN) layout. Due to the low power consumption, high data rate, low cost, and support for multiple network topologies, ZigBee network makes it very suitable for use in the house; the external network is realized by GSM technology, which can send emergency help signals to the guardian’s mobile phone. Considering that the service object of the system is the elderly, it will be different from the general smart house in some details. Therefore, the monitoring should be designed according to the regulations of home care. As shown in Table 1, the host computer software connected to the gateway node monitors the operation status of the nodes in the network, controls the nodes by sending commands or issues query commands, so as to achieve the purpose of monitoring.

**TABLE 1. Packet format.**

| Frame header | Command | Data high | Data low | Checksum | End of frame |
|--------------|---------|-----------|----------|----------|-------------|
| 1 byte       | 1 byte  | 1 byte    | 1 byte   | 1 byte   | 1 byte      |
| 0xEF         | CMD     | DH        | DL       | Sum      | 0xFE        |

**TABLE 2. Command type.**

|            | Device connection | Temperature | Lamp status | data collection | parameter |
|------------|-------------------|-------------|-------------|-----------------|-----------|
| 0xC0       | 0xC1              | 0xC2        | 0xC3        | 0xC4            | 0xC5      |

The frame header of the data packet is represented by 0xEF, CMD is the command sent by the host computer to the gateway node, DH is the high bit of the data, DL is the low bit of the data, and the command information to be sent. Command, data high bit and data low bit make up the checksum. The data packet is mainly composed of commands and data, and the command types mainly include the following.

As shown in Table 2, the data packet is mainly composed of commands and data. The command types are: reset command: 0xC0, which is used to reset the sink node; connect the command to the device; 0xC1, the host computer sends a connection to each network node Command, the node receives the correct reply and the connection is successful, thus judging whether the network is connected normally; temperature value upload command: 0xC2, the host computer notifies the node to upload the temperature value by issuing this command; lamp status upload command: 0xC3, the host computer notifies the node through the command Upload lamp status information; data collection / control node parameter setting command: 0xC4, the host computer sets the network data collection node parameters through this command; unknown node parameter setting command: 0xC5, the host computer sets the required environmental parameters for positioning through this command.

2) NETWORK NODE DESIGN PRINCIPLES

The hardware design of the intelligent system of the old-age residence mainly includes the choice of the chip used by the node, the hardware design of the sensor layer node, the hardware design of the network layer node, the hardware design of the sensor layer node is mainly the design of the function node, and the hardware design of the network layer is the design of the gateway node. According to the function of the nodes, the sensing layer nodes are composed of data acquisition nodes and equipment monitoring nodes. The design of data acquisition node includes the hardware design of environmental monitoring node, fall monitoring and emergency help node. According to the function of nodes in the positioning system, the sensing layer nodes are divided into unknown nodes and reference nodes. Among them, the reference node is a fixed node arranged indoors, while the
unknown node is a mobile node worn on the elderly, which can realize fall monitoring, emergency help and positioning functions. The design of the network node of the intelligent system of the old-age housing is mainly considered from the following points: (1) network mode. According to the analysis of network topology, ZigBee network can be divided into star network, tree network and mesh network. Considering the data transmission rate and equipment utilization, the mesh network is selected for the system. Choosing the mesh network can reduce the burden of communication between the parent node and the child node, increase the flexibility of the network and provide the security of the system. (2) data stability. Wireless data is easy to be disturbed in the process of transmission. In order to increase the stability of the system, on the one hand, the system parameters should be adjusted according to the different use environment, on the other hand, each component of the node should be able to adapt to the environmental changes within a certain range, including temperature, humidity, air flow and other conditions. (3) Low cost. The cost of network design is one of the main problems to be considered. The level of cost has a direct impact on its application scope. To reduce the network cost, not only the complexity of each module should be reduced, but also the number of network nodes should be controlled. If the network nodes are large-scale, the cost is also considerable. (4) Low power consumption. The problem of power consumption is a standard to measure the quality of wireless sensor networks. Generally, nodes are powered by batteries, and they are all arranged in places that are not easy for people to access, so it is hoped that nodes can work for a long time. In the design process, on the one hand, we need to use the low power consumption mode provided by ZigBee technology, on the other hand, we need to reduce the peripheral circuit of the node to control the unnecessary power consumption.

B. EXPERIMENTAL CONTENT

1) FALL TEST
Based on wearable fall detection system, small sensors are put into wearable devices, and the system can achieve real-time monitoring. Its working principle is to judge whether a fall occurs through human motion parameters. The main advantages of wearable system are: it is easy to integrate small-scale sensor devices into portable medical monitoring devices; with high accuracy and measurement precision the cost is lower. In order to test the effectiveness of the fall test, it needs to be tested through the experimental program. In order to protect the experimental personnel, the experiment was completed on a thick cushion. Considering the convenience of practical use and the accuracy of the test, the sensors used in the test were all worn at the waist. The fall detection experiment was conducted in six groups: normal walking, sitting, front falling, back falling, left falling and right falling. The false alarm rate of the system was tested by simulating daily activities and falls. Each group of experiments was carried out 50 times.

2) NETWORK PERFORMANCE TEST
For the built wireless network, in order to test the communication distance between the two nodes and the reliability of data transmission, the relevant network performance test must be carried out. The main test method is to connect the central coordinator with the computer by using the serial port line, and then put the terminal nodes in the network at different distances to send data to the coordinator regularly, and check the relationship between the number of successful data transmission and the communication distance. The whole test is divided into indoor test and outdoor test: indoor test is mainly to check the communication performance between nodes when there are obstacles and strong electromagnetic interference; outdoor test is mainly to test the communication performance between nodes when there are no obstacles and small electromagnetic interference.

3) POWER SAVING TEST
In the smart home system based on ZigBee wireless sensor network, the terminal nodes in the phase of data acquisition basically use batteries for power supply, so in order to make the function nodes can be used continuously for a long time, the power consumption of each node must be low. In this section, we mainly test the power consumption of each terminal node, and then estimate the battery life under this node. The power supply used by the terminal data acquisition node is generally two 1.5V dry batteries, and the voltage value that the node can work normally and reliably needs to be greater than 2.5V. In the test, temperature and humidity acquisition node, light acquisition node, combustible gas detection node and infrared intrusion detection node are selected to test the power consumption.

V. DISCUSSION
A. FUNCTION ANALYSIS OF THE TERMINAL MODULE OF THE INTELLIGENT SUITABLE OLD FURNITURE
All kinds of operations in ZigBee network need to be completed by using primitive operations provided by each layer of protocol stack. The implementation process of primitive operation often needs to initiate a primitive operation at the next level and judge the next primitive operation to be executed through the operation results returned by the lower level. The data service function that the physical layer can provide is to contact with the transceiver and receive and send data from the radio channel. The physical layer management service is responsible for maintaining the database related to this layer. An important task of the physical layer is to allocate channels. At present, there are three frequency bands that can be used for data transmission.

As shown in Table 3, there are certain differences in data transmission rate and modulation mode among the three frequency bands. The data transmission rate of 868mhz is 20kbit /s, 915MHz is 40kbit /s, and 2400mhz is 250kbit /s. In the three frequency bands, 28 physical channels are defined, including one channel in 867mhz, 10 channels in 914mhz and 17 channels in 2.4GHz.
The unknown nodes in the sensing layer of intelligent elderly care housing mainly perform fall monitoring, emergency help, indoor positioning and wireless communication control functions. In case of an emergency, the system will start the positioning service, save the coordinate value of the reference node in the network by communicating with the sensing layer data acquisition/control node in the network, get the location of the unknown node by using the set positioning algorithm, and finally send the calculated location and help information to the monitoring interface and the mobile terminal of the guardian. In the experiment, the acceleration vector amplitude method is used to judge the fall of human body. The acceleration values of X, y and Z orthogonal directions detected by sensors can reflect the intensity of human motion. By setting the corresponding threshold value for the vibration data, the system can be considered as falling after exceeding the set threshold value.

As shown in Figure 1, the fall process of human body is mainly divided into the following parts: (1) Weightlessness process, the human body is in the process of free fall during the fall process, the acceleration will continue to decrease, and the duration is related to the height of the fall. For general fall conditions, weightlessness will not be particularly obvious. The acceleration value should be about 1G in the stable state, and the acceleration value will be less than 1G in the fall process, which is the first detection process in the fall detection. (2) In the process of impact, after weightlessness, the human body will collide with the ground or other objects, and a relatively large resultant acceleration value will appear, which is the second judgment basis for fall monitoring. (3) Static process: after the impact, there will be a short-term or long-term static state due to the inability to stand up immediately. At this time, the sum acceleration value will tend to be stable. This process can be used as the third judgment basis for fall monitoring.

As shown in Figure 2, the number of normal walking tests is 50, the number of alarms is 0, and the accuracy rate is 100%; the number of sitting tests is 50, the number of alarms is 1 and the accuracy rate is 98%; the number of sitting tests is 50 and the number of alarms is 1 Times, the accuracy rate is 96%; the number of frontal fall tests is 50, the number of alarms is 48, and the accuracy rate is 96%; the number of back falls is 50 times, the number of alarms is 48, and the accuracy rate is 100%; the number of left fall tests is 50, alarms The frequency is 50 times, the accuracy rate is 100%; the right side falls test times 50 times, the alarm frequency is 50 times, the accuracy rate is 100%. Under the experimental conditions, the fall and fall recognition rate in each case was above 96%. The false alarms in the test occurred when sitting down, falling down on the front and back. The false alarms when sitting down are due to the rapid acceleration of the tester and the excessive acceleration caused the system to cause false alarms. There will be no similar to the normal life of the elderly. Happening. The fall on the front and back is due to the over-thickness of the mat that protects the tester, resulting in an underreport caused by insufficient spike acceleration. In addition, the system’s false alarm rate for daily events is relatively low at about 0%, and it can detect most human fall events that may have serious consequences. It can be found through experiments that the fall detection system used in this paper can detect a variety of human fall methods, and the system will not issue a fall alarm during normal walking and sitting down.

Multiple tests were performed indoors and outdoors. In each test, after the ZigBee terminal node joined the network, data was sent to the central coordinator every 5 seconds for a total of 100 times. And each time the distance between the terminal node and the coordinator is increased according to the actual situation. After each test is completed, the packet loss rate at different distances and different environments is calculated.

As shown in Figure 3, ZigBee node data transmission reliability is higher in the open and undisturbed outdoor environment than in the indoor environment with greater obstacle interference. Outdoors, when the transmission distance of a node is 300 meters, the packet loss rate is still very low, but when the communication distance is greater than 340 meters, the packet loss rate begins to increase sharply. Indoors, when the transmission distance is greater than 160 meters, the packet loss rate increases significantly.
B. RESEARCH AND ANALYSIS OF INTELLIGENT SUITABLE OLD FURNITURE BASED ON WIRELESS SENSOR NETWORK

During the power consumption test, let the temperature and humidity collecting node and the lighting collecting node collect data every 20 seconds and send the data to the central coordinator, while the combustible gas detection node and infrared intrusion detection node are set to detect only when the alarm information is sent will the alarm information be sent to the central coordinator. According to ZigBee’s two modes: working mode and sleep mode, the power consumption in these two states can be correctly reflected during the test to reflect the node’s power consumption.

As shown in Figure 4, when the ZigBee terminal data collection node is in normal operation, it takes 0.4 seconds to complete a data collection and data transmission. During the test, set the temperature, humidity, and light intensity data collection nodes to every 20 seconds. When a data set is sent, its working time is 0.4 seconds, and the idle time is 19.6 seconds. Set the combustible gas and thermal infrared intrusion detection node to send data once every 30 seconds, then their working time is: 0.4 seconds, idle time is: 29.6 seconds.

The smart home system based on ZigBee wireless network has fast response, low power consumption, stable data transmission, convenient operation, strong practicability, etc., and has high application and promotion value. But the satisfaction of the elderly is the important criterion to measure its effectiveness. Therefore, the satisfaction of the three modes of the smart home system based on the ZigBee wireless network, the system less elderly living alone, and family care is compared horizontally.

As shown in Figure 5, after using the ZigBee wireless network-based smart home system, compared with the family care model satisfaction, the satisfaction of the elderly is more than 50%, which is significantly higher than the satisfaction of the elderly living alone. This shows that the smart home system of ZigBee wireless network can apply the special needs of the elderly through intelligent adjustment, make up for the deterioration of the physical skills of the elderly due to age, so that the elderly can improve their self-care ability and enjoy more. For a comfortable and safe life in old age.

VI. CONCLUSIONS

(1) The research background of this paper is facing the aggravation of population aging and the negative impact of aging society. The emergence and development of intelligent pension products have brought new solutions to the pension problem. Intelligent home products can help the elderly live well, for example, through appropriate intelligent functions, so as to improve the elderly’s home life problems caused by physical limitations. Therefore, the research of intelligent furniture has become an important development direction to understand the life needs of the elderly. Therefore, it is necessary to actively carry out the function matching research of smart aging furniture terminal module based on wireless sensor network.

(2) The purpose of this paper is to discuss the function matching research of intelligent aging furniture terminal module based on wireless sensor network, list the tension of pension situation, and clarify the abbreviation of wireless sensor network WSN, through the deployment of various integrated micro sensors to real-time monitoring, real-time perception and real-time collection of various environment and monitoring target information, will collect the information for a series of operation processing, and finally the information will be transmitted to the user terminal through the wireless network definition.

(3) Experimental data shows that the number of normal walking tests is 50, the number of alarms is 0, and the accuracy rate is 100%; the number of sitting tests is 50, the number of alarms is 1 and the accuracy rate is 98%; the number of sitting tests is 50 and the number of alarms 1 time, the accuracy rate is 96%; the number of frontal fall tests is 50 times, the number of alarms is 48 times, and the accuracy rate is 96%; the number of back fall tests is 50 times, the number of alarms is 48, and the accuracy rate is 100%; the number of left side
falls tests is 50, the number of alarms is 50, and the accuracy rate is 100%; the number of right side falls tests is 50, and the number of alarms is 50, and the accuracy rate is 100%.

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