Design of High Trust Embedded Operating System Based on Artificial Intelligence

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Abstract: With the rapid development of information technology, the concept of "all the Internet" is becoming more and more popular, and the requirements of people for artificial intelligence equipment need to be solved urgently. Therefore, it has become an important research direction of intelligent home system to realize intelligent monitoring of home environment from the user's needs. Through the research of artificial intelligence system, the traditional home monitoring system has a single function, low efficiency, high false alarm rate and high maintenance cost. It is difficult to combine with Internet technology well, make family and environment at ease, and make family environment safer. Comfort and convenience. In order to solve these problems, taking the family living environment as the application background, a practical solution of artificial intelligence remote monitoring system is provided. Users can monitor home information through web browser at any time to meet the needs of comfort and safety of users in the home environment.

1. Introduction

With the rapid development of information technology, the Internet of things technology began to mature. As a highly integrated technology and concept, it realizes the expansion of communication between people, the expansion of objects, the objects of objects, "all the Internet"[1]. At the same time, the fast-paced modern lifestyle can make people concentrate on their work. People urgently need to improve their family environment to manage their daily life. Therefore, a variety of home intelligent devices began to appear in people's lives. The concept of family is becoming more and more popular. The so-called artificial intelligence is the home automation network platform for remote control and monitoring. This is the application platform as the home living room environment, the use of comprehensive layout, network communication, video, voice and other processing technologies, and the integration of various copyrights related to family life as a powerful family management system. With the maturity of things technology on the Internet, developers combine all kinds of facilities in the home, efficiently and intelligently combine these devices to provide environmental monitoring, lighting control, multimedia control, etc. for the home environment[2]. Today, in the intelligent home, the indispensable condition for people's living environment, not only contains adaptive control, dynamic conversion tools home system, reasonable overall management of all kinds of equipment, living environment, rapid development of intelligent concept. The continuous innovation of Internet technology affects the development direction of many artificial intelligence industry enterprises. In recent years, the development technology of intelligent hardware has been mature. Major domestic and foreign enterprises began to develop artificial intelligence industry. Artificial intelligence industry develops rapidly. It can be said that now it has entered the state of extrusive development. At present, the artificial intelligence industry is gradually growing, new design solutions are emerging, and the trend of home products towards diversification and intelligent development is. As consumers with high-quality life needs, people are no longer limited to the surface of artificial intelligence. It is recognized that under the influence of various news advertisements, we began to plan how to better design our home living environment, and the AI layout industry also rose quietly.

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2. Research Status at Home and Abroad

AI technology began in the United States and was limited to the intelligent technology developed at that time. Only air conditioning, elevators and other large-scale equipment in the building are monitored. The next year, some developed countries, such as the United States and Germany, came up with the idea of centralized monitoring of home devices, began to participate in the research of home intelligence, and developed many practical and reliable home intelligence technologies[3]. At this stage, the level of information technology in various countries has been improved rapidly, and AI enterprises have gradually introduced AI related technologies and solutions. In 2016, Google, an American control 4 technology company, introduced the artificial intelligence core processing system Google home at the 2016 I / O conference. This system is a pre designed solution for the future smart home[4]. In order to realize the artificial intelligence system, it depends on Google's huge information search system. Coordinated control improves the intelligence of artificial intelligence system, and brings convenience for the safety maintenance of artificial intelligence system.

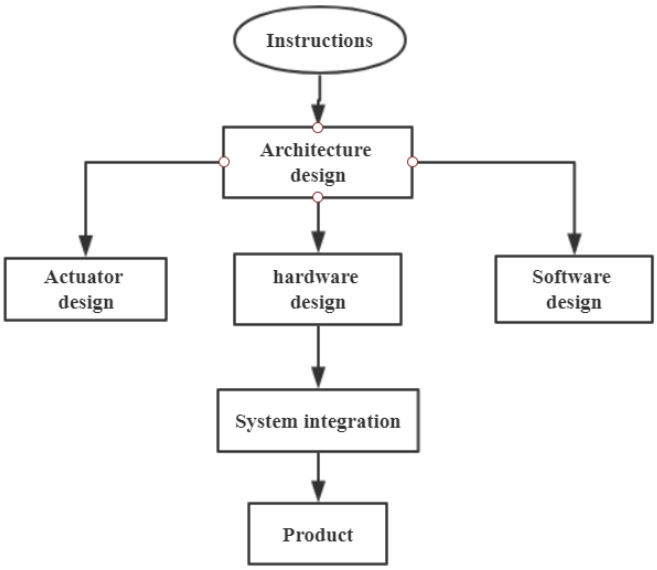

Figure 1 Design flow of embedded system

3. Domestic Labor Development

In China, the popularity of early AI concepts is not as good as that of developed countries. For the sake of the people, it can not be widely promoted, but the domestic artificial intelligence industry has broad development prospects and improvement space. With the progress of technology, people's consciousness of intelligent life is gradually enhanced[5]. The domestic market is committed to the development of artificial intelligence, hoping to be widely used in people's lives as soon as possible. Today, the artificial intelligence industry has a huge market development space. Major traditional manufacturing companies began to produce smart TVs, smart refrigerators and other home appliances. At the same time, they have attracted strong participation from various industry giants. In recent years, domestic Internet enterprises have accelerated their industrial layout. In February 2015, LETV established rich Intelligent Technology Co., Ltd. and began to transform to the artificial intelligence industry. After that, a research solution is established in the direction of smart home appliances. In early 2015, Xiaomi released home robots at home[6]. At present, the industrial value is occupying the future market. The huge market share promotes the real-time exchange of information. In February 2017, baidu was fully authorized by raven technology to appoint Lu Yi, the founder, as general manager of Baidu smart home hardware. In addition, the pace of occupying the intelligent industry is also accelerating. The opportunity came. During the two national meetings, Xiaomi technology president again proposed to accelerate the

implementation of the national strategy of artificial intelligence. He firmly believes that the technology standardization of artificial intelligence industry is imminent, and smart phones will become the core of artificial intelligence system.

4. The Overall Scheme Design of Artificial Intelligence Remote Monitoring System

4.1. Functional Requirements Analysis

In view of the current development trend of AI system, this paper provides a set of AI remote monitoring system solution with complete functions and simple operation. According to the practical application requirements, the home environment detection can collect the environmental information (temperature, humidity, etc.) in the home through sensors, realize the exchange and processing of all known information, and monitor the home environment[7]. The remote control of household appliances is to control the exchange of various household appliances through the browser client, to realize the remote point-to-point control and achieve the effect of real-time data communication. Home security monitoring home security monitoring the abnormal information detected in the main room, users can display them, they can handle the abnormal activity table in the database at any time, while giving intelligent control and functions. When the sensor detects abnormal environmental information (such as combustible gas leakage), the system starts the buzzer alarm and immediately informs the user of the event information through SMS[8]. Then, a reminder message is sent to the user. Remote visual surveillance remote surveillance is a web client designed to visually monitor the home environment. Users, this is through the web page login activities and other detailed information can display the abnormal situation of the family environment. In order to understand the real-time family dynamics of users in the remote, in order to understand that the web page is displayed through the camera according to the collected video information.

4.2. Overall System Design

Based on the analysis of the above functional requirements, this paper designs a set of remote monitoring system based on Embedded Web for artificial intelligence[9]. According to different module functions, it can be divided into three layers: ontology service layer (Embedded Gateway), perception layer (Zig Bee terminal node and camera) and user layer (web client). The intelligent home remote monitoring system mainly realizes four main modules, including acquisition control module, embedded gateway module, video monitoring module and remote client module. Zig Bee is adopted for acquisition control module

4.3. Wireless Sensor Network

The technology of obtaining the information of home environment (temperature, humidity, etc.) and controlling the switch of home appliance machine can collect image information through web camera at the same time. The process provides web-based monitoring and management services for remote monitoring, and the video monitoring module cooperates with SMS alarm sub module to complete real-time monitoring of home invasion in unmanned mode[10]. At the same time, the video information collected by H 264 is encoded and sent to the web client through the RTMP protocol game; the remote client is mainly designed for the user interface. In addition, in order to let users manage the home environment intuitively through remote operation, the browser is used for monitoring.

5. Analysis of Embedded Gateway

Choosing appropriate software and hardware development platform as the central processing device of home gateway is the key to realize the intelligent home system. As the function of the embedded gateway, the zig - Bee master node is connected to realize the interaction with the control command and sensor information of the sub node terminal device. Second, it drives the selected video monitoring equipment to complete the intrusion detection function. Users provide video service functions, and finally, they are also responsible for remote communication with browsers

through the Internet, so as to realize the customer's visual monitoring of the home environment. ARM processor is widely used in many embedded systems because of its comprehensive functions, rich development resources and short development cycle. Based on ARM processor, it has specific computing power and can be used as the data processing center of artificial intelligence system. The power consumption is relatively small, which conforms to the concept of family energy saving. So far, the software and hardware of the arm products can be adjusted, and the peripheral devices have become very rich and scalable. An important part of embedded software is the operating system. Choosing the right operating system is the basis of developing service layer program. Linux is an open source UNIX library operating system [19]. The source code package can be downloaded from the official website, and the network learning resources are also very rich. In terms of application, Linux has the wealth of drivers and applications supporting various mainstream embedded hardware platforms. In terms of function, it supports multi-user, multi task operation and comprehensive operation instructions. Users can easily manage files and peripherals. Based on the above analysis, Linux operating system is selected as the software platform to develop and use the embedded gateway program.

6. Conclusion

It mainly tests the functions of zig - bee wireless sensor network module, embedded gateway module and system remote client module, and integrates the whole system into the test. After the test, the function of the intelligent home remote monitoring system is realized, the operation is normal and stable, and the expected results are achieved.

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