Design of Multifunctional Intelligent Security Robot Based on Single Chip Microcomputer

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Abstract: This paper mainly introduces the intelligent robot with security function to analyze the advantages of the single-chip microcomputer and the security, and the combination of the two to the robot. Through the design and analysis of the multi-function intelligent security robot home version of the single-chip microcomputer, this paper presents the advantages of the multi-function intelligent security robot of the single-chip microcomputer.

1. Introduction
With the advancement of society, the computer technology industry, the control technology industry, and the development of information processing technology and sensor technology have made a qualitative leap. Intelligent robots have been used from a few high-end companies to consume and use them, whether they are industrial or electronic, or some commercial areas, and play an extremely important role. This is also the trend of artificial intelligence research and development. Through years of in-depth research, senior experts have made new breakthroughs in the field of robotics, especially the voice control. It has been able to integrate the continuous hidden Markov model perfectly with digital signal processing to help people control the robot through voice. In sensor ranging, intelligent robots with multiple sensors to quickly measure the distance between obstacles not only have convenient voice control and recognition functions, but also have intelligent recognition obstacles.

2. Microcontroller Overview
The single chip microcomputer is a chip with an integrated circuit, which can refine the ultra-large type integrated circuit, and the components of the single chip are composed of an arithmetic unit, a controller, a memory, and an input and output device. The process of executing the program command by the single-chip microcomputer is to complete the process of issuing the command by the staff. This process is formed by the step-by-step transfer of the instructions from the initial coding to the instructions in the system. One command is equivalent to a basic operation, and the instruction executed by the single-chip microcomputer is executed. That is, all the basic operations are completed. Different MCUs will have different characteristics, and there must be some changes in the command. If you want the MCU to complete the special instructions of the staff, you need to arrange the instructions in advance. These well-arranged instructions are all gathered together. It is a program. These programmed programs need to be pre-stored in a hard disk with savings function, which we call memory. The memory is also composed of a large number of storage units. These units are like the households of a household in the building. Each household room has a corresponding command stored in it. The address number is the house number of the room. Find the corresponding storage unit. When the MCU works, it passes these instructions, then finds the address number first, then transfers the
address number to the system to start the system operation related content.

3. Intelligent Security Application

Intelligent security mainly refers to the informationization, image transmission and fast storage methods presented after the service upgrade. With the rapid development of society, the gap between intelligent security technology and network information technology has gradually disappeared. The rapid development of intelligent security technology is obvious to all, especially in various corporate residences and some commercial uses. In addition, in recent years, the state has encouraged the promotion of digital intelligent security. In order to make the promotion of intelligent security more smooth, the Ministry of Construction and the Ministry of Public Security have successively signed a number of relevant documents to strengthen the intelligence of enterprises and residential communities. Security facilities.

Since the beginning of the new century, our country has begun to implement the "Technology and Innovation" project, and the most important one of them is to make the security and tranquility of enterprises and residential communities strengthen the intelligence of enterprises and residential communities with scientific and technological means. Construction of safety and security facilities. Intelligent security showed the world its usefulness in 2003. A SARS in 2003 can be said to be unprepared for China. From the beginning of several cases to hundreds of cases, in order to reduce the spread of SARS, the relevant government called for everyone to go out as little as possible, staying in the air at home. Staying at home all day and night is naturally boring and powerless, but with the help of a digital network, people can “see” at home, get news from all over the world, and even shop and learn online. Community forums like Weibo and Weibo need to operate security facilities inside the community, build defense systems, and handle problems and alarms for problems that may be discovered. Through this SARS incident, people are more aware of the importance of security robots and the development of related intelligent security information. It can be said that this time SARS has played an important role in promoting intelligent security advancement. Later, the 2008 Beijing Olympic Games made people realize the importance and convenience of intelligent security.

4. Single-chip Multi-function Security Robot

According to the researchers, unlike a human security officer, this safety patrol robot is like a moving electronic eye. Through infrared thermal imaging technology, it can observe some video monitoring dead angles, or the abnormal situation of the place can not be seen by the naked eye, and can judge the external temperature, in the anti-theft, anti-fire, the ability is very prominent.

At the 2016 Shenzhen High-Tech Fair, the exhibition of various robots constantly refreshed people's traditional cognition. Coupled with the rapid development of single-chip multi-functional security robots in recent years, slowly single-chip multi-function security robots have also entered the lives of ordinary people, such as the “Security Patrol Robot” organized by Shenzhen Zhongzhi Kechuang Robot Co., Ltd. In order to let security personnel better understand and master the single-chip multi-function security robot, Zhike Chuang Robot Co., Ltd. specially held this event, hoping to show the arrival of the era of "robot and security”.

The traditional "human defense + physical defense" security system actually has common loopholes. For example, the fixed camera has a blind spot for monitoring. At night or during low visibility and rainy season, the camera often has problems, and the maintenance work is not convenient. In addition, the labor costs are increasing every year, the cost of security personnel is getting bigger and bigger, many security personnel are reluctant to work in the same unit for too long, the mobility of personnel is increasing, and the recruitment of personnel is becoming more and more difficult. However, the new era of single-chip multi-function security robots has arrived. The single-chip multi-function security robot has solved these problems very well. After the new concept of "robot + security" has landed, it not only affects the security industry, but also makes people realize the robot. In fact, it can be linked to our daily lives. The single-chip multi-functional security robot has transformed the traditional security system into modern intelligent security, which also indicates
another major advancement in China's security.

Zhongzhike is a subsidiary of China Security Technology Co., Ltd., relying on the parent company's years of exploration and security in the security field, accumulating the mature technology and deep security system operation service foundation, first proposed "robot + security" in China. The modern science and technology intelligent security concept, and take the lead in spending a lot of manpower and material resources to carry out related research and development, the hard work pays off, finally developed on the basis of cloud technology, has been affirmed by various domestic industries, and also received strong support from the government. Its self-developed security patrol robot realizes the intensive development of mobile robots, multi-sensing technology and cloud security platform, and is at the forefront of the industry.

Zhongzhike has created a new security solution for industry customers by building a “dynamic and static” three-dimensional security system. It can be combined with the traditional security system and manpower security to form a security operation mode that combines dynamic and static, 360-degree audio monitoring and autonomous patrol. It can also complete a series of three-dimensional security functions such as environment awareness, intelligent alarm, face recognition, etc., to assist security personnel to perform patrol tasks.

The security patrol robot was unveiled at several large-scale exhibitions. Double-creation week, high-tech fair, and Anbo.... In September 2016, it was promoted to the GITEX exhibition in Dubai. It was appreciated by the Dubai Chief Mohammed who came to the exhibition.

At present, the security patrol robot has taken the lead in the "job" work of Huawei Putian Industrial Park, combined with the original security system, to build a dynamic and static intelligent security monitoring system to achieve all-weather, all-round, full-autonomous unattended patrol of the park. The management of personnel, vehicles and services provides three-dimensional guarantee without dead ends, effectively reducing the labor intensity of security personnel, reducing operating costs, improving response speed, and improving the automation and intelligence level of security inspections in the park.

5. Design of Multifunctional Intelligent Security Robot for Single Chip Microcomputer

The following article will take the home-type MCU multi-function security robot as an example to analyze the design of MCU multi-function security robot.

5.1 Design principle

In order to integrate home smart security functions with home service functions, robot manufacturers
have developed a home service robot that can provide security indoors while meeting the simple needs of people in their daily lives. The multi-function intelligent security robot of the home version of the MCU can use the moving wheels at the bottom of the robot to move freely indoors. Because the intelligent security system has been installed inside the robot, the installed security system is combined with the electronic home access control, electronic window grid, infrared sensor and other external home service equipment in the multi-function intelligent security robot of the single-chip microcomputer. Functional intelligent security robots can replace people's better indoor hygiene, while also providing a safe and comfortable environment for the host.

5.2 Serial communication parameter setting

The serial communication device function used by the intelligent security software mainly sets the serial port number, data bit and check digit used by CccmmSet-t ingDlg, and automatically saves the settings in the registry. There are two main storage methods, one is joining the global function to complete the relevant registry to improve the reading and writing work within the communication parameters. Another method is to add a message such as IDOK control, transfer the sent message to the function through the control, and fill in the registry to summarize.

5.3 Real-time monitoring

In order to ensure that the alarm signal of the arming trigger is obtained, the timer is set in the program setting. The setting time of the timer cannot be too long, and it can be several tens of milliseconds or several seconds. Try not to be too short or too long, because if the fixed timing is too short, the computer may not be able to accept and process the response quickly. If the set time is too long, it will directly affect the capture of the specific aging dynamics of the event. In order to ensure that the set timing time can be accurate, it can be set by the SETIMER function, and the robot can be monitored and set by the SETIMER function.

5.4 Real-time alarm

In the event that an indoor alarm is required, the alarm of the home service robot is divided into a multi-function intelligent security robot installed by the single-chip microcomputer. The alarm sounds the alarm sound to scare off the intruder and the multi-function intelligent security robot of the single-chip microcomputer uses the serial port to link the GSM mobile phone to the owner. Send a message to remind the owner of the alarm.
6. Principles to Be Followed Before And After Design

6.1 Rationality principle
It ensures that intelligent machine equipment can have reasonable design from internal system to external assembly, and can meet the special needs of users. It can be fine-tuned for different industries of different users, and has open software and hardware interfaces, which is convenient for users to self-simple. The external information is connected.

6.2 The principle of advancement
The current computer and communication technology is developing at a high speed. The requirements for computers are not simply at this stage. It is also necessary to continuously carry out relevant explorations, and constantly explore the space that can be developed, so that the single-chip microcomputer can go further and further.

6.3 Principle of practicality
Unity, practicality, and sustainability.

6.4 Reliability and stability principles
TV monitoring room is currently a large-scale retail shop, community and school's favorite security system, can run 24 hours a day, while the storage space for a certain time range is to save video recording, so that people can turn Check the previous video. In particular, it is convenient for investigators to obtain surveillance videos to find prisoners.

6.5 The principle of scalability
Scalability is mainly manifested in the ability to develop horizontally and vertically at the same time in one thing. Horizontally, the security monitoring system can continuously expand the output capacity to meet the needs of personnel, but it does not affect people's normal operation. The vertical expansion is mainly manifested in the compatibility of the security monitoring system, and can be used for secondary development of the customer to facilitate the operation of the customer.

6.6 System security and confidentiality principles
The problem of the security of the TV monitoring system is the problem that needs to be considered in the security industry at present. The whole system data needs to be safe and error-free and can be managed according to the level. It is necessary to carry out special hierarchical protection of key data, and it also needs to be done well. Relevant operation records are convenient for later personnel to find. Like the public security department, it is necessary to protect the image transmission and do a good job of confidentiality. At present, the rapid development of computer and communication technology makes the design of the system not only to take full advantage of the current state-of-the-art technology, but also to consider that with the further development of technology, new technologies can be continuously incorporated into the system, so that the system is always full of vitality. Always maintain technological advancement.

7. Conclusion:
In order to use the multi-function intelligent security robot of the single-chip microcomputer, it is necessary to develop the technology of security and single-chip microcomputer to the best, and to pave the way for the combination of the two through the common place between the two. In designing single-chip multi-functional intelligent security robots, we must adhere to the sustainable development route, and take into account the follow-up green energy development of single-chip multi-functional intelligent security robots. Only with long-term vision can the single-chip multifunctional intelligent security robots go further and further.
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