Development and application research of intelligent drying wardrobe based on single chip microcomputer control

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Abstract: Intelligent drying closet is the product of the combination of artificial intelligence technology and traditional drying needs, which provides users with intelligent and convenient drying services, which is loved by consumers and has great market potential. Single-chip microcomputer control technology is the core technology of intelligent drying wardrobe, but at present, there are still some technical problems in the development of intelligent drying wardrobe based on single-chip microcomputer control, which affect the operation of intelligent drying wardrobe system and user operation experience. This paper analyzes the problems encountered in the development of intelligent drying wardrobe based on single-chip microcomputer control, expounds the development strategy of intelligent drying wardrobe based on single-chip microcomputer control, and puts forward the application strategy of intelligent drying wardrobe based on single-chip microcomputer control, in order to provide guidance for the design of intelligent drying wardrobe and promote the development of intelligent drying wardrobe market.

Key words: Single chip microcomputer control; Intelligent drying wardrobe; Development strategy; Application strategies

Introduction:

The intelligent drying wardrobe realizes intelligent control through the single chip microcomputer, which is convenient for users to select the drying time on the control interface, automatically recover the drying clothes, help users free their hands and save clothing storage space. According to the user's home design style, it can adjust the appearance and color to meet the user's aesthetic needs, which has broad market prospects. At present, most of the intelligent drying wardrobe on the market use single chip microcomputer control system, the programming language is more concise, the operation interface is relatively simple, and online monitoring can also be carried out to find the problems existing in the process of system operation in time, so as to improve the user experience. At the same time, enterprises should actively promote the intelligent drying wardrobe, use big data to analyze customer needs, optimize the design of intelligent drying wardrobe, marketing with the help of platforms such as TikTok and Taobao, improve the market share of intelligent drying wardrobe, increase investment in research and development, and constantly improve the design and research and development level of intelligent drying wardrobe, so as to provide users with more quality services.

1. The development problem of intelligent drying wardrobe based on MCU control

1.1 Selection of microcontroller, sensor and actuator

The single chip microcomputer is the core of the intelligent drying wardrobe control system and the core of maintaining the normal operation of the wardrobe. Technicians should analyze the performance, interface and energy consumption of different types of single chip microcomputers to design the intelligent drying wardrobe system, and design relevant operation instructions to ensure the accuracy of the execution of the instructions such as drying and storage of the intelligent drying wardrobe. Research and development personnel should also flexibly select sensors according to the design requirements, such as humidity and temperature sensors, accurately perceive the clothing drying environment, and return the data to the control system, so as to carry out intelligent drying and clothing storage operations. In addition, research and development personnel should also select sensors and actuators according to the needs of intelligent drying wardrobe to ensure their sensitivity, accuracy and durability, which can meet the needs of drying in different regions and environments, which is also one of the core technical problems to be solved.

1.2 Optimization of programming language and algorithm

The main problems to be solved in the development of intelligent drying wardrobe are programming language selection, algorithm optimization and system stability, so as to ensure that intelligent drying and storage can be realized, and provide users with more convenient and humanized services. Once the microcontroller programming language is too cumbersome, it will increase the difficulty of user operation, and will also affect the subsequent maintenance of the intelligent drying wardrobe system. Research and development personnel should constantly optimize the intelligent drying wardrobe control system algorithm, accurately analyze the drying time, route, etc., improve the system response speed, reduce the system energy consumption, so as to improve the user's intelligent drying wardrobe experience.

1.3 Optimization of interface design and operation simplicity

Intelligent drying wardrobe is an important part of smart home products, which has a huge user group covering users of different age levels. In order to improve the user experience, research and development personnel should reduce the difficulty of intelligent drying wardrobe operation. On the one hand, it is necessary to simplify the control system interface to make it more universal and simple. For example, the use of short words to describe the function module is convenient for middle-aged and elderly people to operate. On the other hand, we should design humanized

operation guidance, operate through voice broadcast, text guidance and other ways to solve the problems of intelligent drying wardrobe operation and interface design, better promote this smart home product, and provide consumers with better smart home services.

2. The development strategy of intelligent drying wardrobe based on MCU control

2.1 Select the MCU and peripheral equipment according to the functional requirements

Research and development personnel should choose the microcontroller model and peripheral equipment according to the functional requirements of the intelligent drying wardrobe to meet the performance, stability and energy consumption requirements of the intelligent drying wardrobe. First of all, research and development personnel should understand the functional requirements of different groups for the intelligent drying wardrobe, and select the microcontroller model according to the requirements to ensure the accuracy of the algorithm and the stability of the system. For example, for the intelligent drying wardrobe with high computing power requirements, developers can choose the ARM Cortex series or ESP32 series of microcontrollers to optimize the system algorithm, improve the system response speed, ensure the fluency of the whole control system, shorten the equipment response time, facilitate real-time monitoring of the drying environment, and facilitate users to control the intelligent drying wardrobe in real time. Secondly, research and development personnel should also select peripheral equipment according to the interface of the MCU control system, energy consumption and the functional requirements of the intelligent drying wardrobe, mainly to optimize the selection of sensors and actuators to ensure that they are compatible with the MCU control system, so as to ensure the stability of the intelligent drying wardrobe control system. For example, designers can choose DHT22 temperature and humidity sensor to accurately measure indoor temperature and humidity with fast response speed and provide accurate temperature and humidity data for the system. Select the wind and rain sensor to monitor the outdoor environment in real time, once the monitoring of excessive wind and more precipitation, automatic recovery of drying clothes, realize intelligent drying and recycling, and improve the performance of intelligent drying wardrobe.

2.2 Modular programming is used

The research and development personnel should divide the intelligent drying wardrobe MCU control system into independent modules, each module is responsible for specific functions, improve the reusability of the control system code, and arrange a research and development personnel for each module, so that they can concentrate on developing their own responsible module code, and improve the research and development efficiency of the MCU control system. Modular programming can make the code of the intelligent drying wardrobe single-chip control system simpler, improve the applicability of the code, simplify the system operation steps, so as to provide users with more convenient operation services. In addition, the research and development personnel should ensure the readability and stability of the MCU control system, operate according to the modular programming specification, simplify the control code of each function module, refine the functional comments, help the research and development team members understand the code logic, and lay a good foundation for the subsequent debugging and optimization of the intelligent drying wardrobe control system.

2.3 Simplify the operation process and user interface

The user group of intelligent drying wardrobe is relatively wide, which requires R & D personnel to pay special attention to user experience, simplify the operation process and user interface, so that users can set the relevant parameters of intelligent drying wardrobe according to their own drying needs, help them skillfully operate the control system, and let them truly enjoy the convenience brought by smart home products. First of all, research and development personnel should clarify the functional requirements and operation requirements of the intelligent drying wardrobe of the middle-aged and young people, optimize the human-computer interaction design program, and meet the operation needs of different groups. For example, researchers can design “one key drying” and “one key storage” functions, which is convenient for middle-aged and elderly users to operate with one key, simplify the operation difficulty of the intelligent drying wardrobe control system, and facilitate users to use the intelligent drying wardrobe conveniently. The “one-key drying” function is designed for young people. When the system detects that the air humidity is too high, the drying function can be turned on to accelerate the speed of drying clothes and improve the user experience. In addition, research and development personnel should also design a simple and easy to operate interface, reasonable design of ICONS, indicators and text, set up standardized drying and early warning modules, so that users can timely understand the working state of the intelligent drying wardrobe, help them quickly understand each function, and improve user satisfaction.

2.4 Optimize the system test function

The application frequency of intelligent drying wardrobe in home life is very high, and the requirements for system stability are relatively high. In order to ensure the use effect of the intelligent drying wardrobe, R & D personnel should design the automatic detection function of the system to help users test and calibrate the intelligent drying wardrobe control system, find and solve problems in time, and ensure the normal operation of the whole system. For example, research and development personnel can simulate the drying scene of rainy and windy days, test the automatic drying, storage and drying function of the intelligent drying wardrobe, and set the relevant parameters combined with the test data. Once the system reaches the alert value, the system will send a safety alert to the user to help them repair the control system problems in time, reduce the failure rate of the intelligent drying wardrobe, and provide users with quality services.

3. Application strategy of intelligent drying wardrobe based on MCU control

3.1 Precise positioning of consumer groups, clear product market positioning

The market prospect of intelligent drying wardrobe is huge. Enterprises should clarify the needs of different consumer groups and develop intelligent drying wardrobe with different functions and prices, so as to better meet the needs of users and expand the market share

of products. Enterprises should analyze the target group, analyze their consumption characteristics and use needs, and divide it into two markets: basic and high-end intelligent drying wardrobe. They should organize research and development personnel to design different types of intelligent drying wardrobe to meet the needs of different groups, so as to improve the competitiveness of the product market. For example, for housewives, to design a cost-effective intelligent drying wardrobe, set up a key drying, drying and other functions to improve product practicability; For the middle-aged and elderly people to design basic functions, enlarge the control panel, simplify the operation process; Design fashionable appearance for young people, design intelligent operation panel and remote mobile phone operation APP, so that they can remotely operate the intelligent drying wardrobe at home, truly meet the needs of different groups, and win the trust of users.

3.2 Constantly iterate on product functions to improve market competitiveness

Enterprises should constantly upgrade the function of intelligent drying wardrobe, speed up product iteration, improve research and development and innovation capabilities, make products stand out in the fierce market competition, and improve their own market competitiveness. First of all, enterprises can try to integrate artificial intelligence, big data, Internet of things and other technologies into the design of intelligent drying wardrobe, and integrate the intelligent drying wardrobe into the whole house smart home design, improve the level of intelligence, attract more consumer attention, and expand market share. Secondly, enterprises should upgrade the intelligent drying wardrobe system, collect user feedback, optimize the control system according to their suggestions, improve the smoothness of the system operation, win a good reputation of users, stimulate their desire to buy this brand of intelligent drying wardrobe again, and improve the economic efficiency of enterprises.

3.3 Improve the after-sales service system and improve user satisfaction

Enterprises should establish a perfect after-sales service system, do a good job in the maintenance of intelligent drying wardrobe, product design and other services, improve user satisfaction, create a good brand image, so as to improve their own market competitiveness. First, enterprises can establish a combination of online and offline after-sales service system, set up after-sales service department, online answer users about intelligent drying wardrobe system upgrade, equipment maintenance and other issues, offline after-sales is to cooperate with business super, timely provide local users with intelligent drying wardrobe maintenance services, win a good reputation from users, and lay a good foundation for expanding sales. Second, enterprises should also establish a user feedback mechanism, collect user feedback through after-sales visit, understand their suggestions on the function, operation process and appearance design of intelligent drying wardrobe, and adjust the design and appearance design scheme of intelligent drying wardrobe control system in a targeted way to attract more loyal users of the brand.

3.4 Carry out multi-channel marketing to improve the market share of products

The market competition of intelligent drying wardrobe is becoming increasingly fierce. Enterprises should develop diversified marketing channels, expand brand influence and audience groups, increase product exposure, and improve publicity and marketing effects. For example, enterprises can seize the opportunity of live broadcast with goods, live broadcast on major e-commerce platforms, demonstrate the functions of different models and different prices of intelligent drying wardrobe in detail, and introduce preferential policies in the broadcasting room, create a “hunger marketing” atmosphere, actively interact with the fans in the broadcasting room, and promote online orders. In addition, enterprises can also use social media such as Tiktok and Weibo to interact with consumers, actively promote brand culture, research and development stories of intelligent drying wardrobs, push different models of intelligent drying wardrobs, and launch online likes, lucky draw and other activities, so that users can automatically forward short brand videos to improve the sales of intelligent drying wardrobs.

4. Conclusion

In short, the application of single-chip microcomputer control technology in intelligent drying wardrobe is more and more widely, which effectively improves the operation stability of intelligent drying wardrobe system and promotes the development of smart home industry. Research and development personnel should choose MCU and peripheral equipment according to functional requirements; Adopt modular programming; Simplify the operation process and user interface; Optimize the system test function, improve the design and development level of intelligent drying wardrobe. Enterprises should accurately locate consumer groups and clarify product market positioning; Increase investment in scientific research and constantly iterate product functions; Improve the after-sales service system; Carry out multi-channel marketing to improve the sales volume and brand influence of intelligent drying wardrobe.

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