

Automatic variable speed fan module controlled by arduino microcontroller

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Abstract: This paper use the arduino microcontroller design of automatic transmission fan module are analyzed in detail, giving the detail of the default fan control scheme, this paper proposes a new fan technology. More specifically, it involves a automatic transmission fan module with its distance, temperature and humidity conditions and its control method. The better results are obtained through the practice and summary.

KeyWords: arduino microcontroller; automatic transmission; intelligentize.

1. INTRODUCTION

Fans are important electrical appliances in daily life, not only bring people cool in the home, but also need fan ventilation and heat dissipation in many places such as greenhouse. The majority of fans are still only at the level of manual adjustment. If the fan can automatically stop and adjust the wind speed according to the ambient temperature and fan distance, it will not only liberate the manpower, but also save energy. At present, many homes use air conditioning, not only the electricity rate is too high, but also almost no ventilation possible. Traditional fans waste electricity, which is not conducive to saving resources. Based on the market information and various problems caused by fans, we design an automatic variable speed fan. It can detect temperature, humidity and fan spacing in real time, and adjust the wind speed to adapt to the current environment and solve the problem of manpower regulation.

2. ANALYZATION

2.1 Basic Structure

Including traditional fan 1, power adapter 2, control module 3, processor 4, human-computer interaction interface 5, human body induction module 6, temperature and humidity measurement module 7, ranging module 8;Described the control module 3, 5 human-computer interaction interface, body induction module 6, temperature humidity measurement module 7, ranging module 8, respectively, and processor 4 connection, form a logical processor 4 centered star structure; The control module 3 is connected to the power supply by the power adapter 2;The control module 3 is connected to the motor of the traditional fan.

Specifically, the traditional fan 1 includes the bracket 1.1, the rotating head mechanism 1.2, the motor 1.3, and the fan blade 1.4. Described in the control module 3 adopter L298N dc bridge, described the processor 4 uses the arduino microcontroller, the human-computer interaction interface may use

12864LCD screen, and through the input to a touch screen, the human body induction module 6 is the HC-SR501 infrared human body induction sensor, humidity measurement DHT111 temperature and humidity sensor module 7, 8 HC-ranging module SR04 ultrasonic ranging sensor. The structure of the automatic variable speed fan is shown in figure 1.

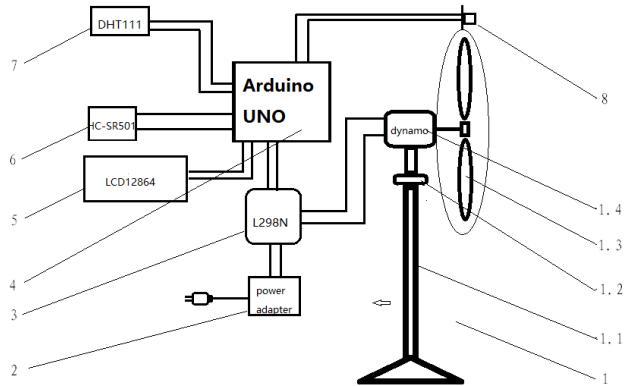


Figure 1. The structure of the automatic variable speed fan

2.2 Principle

Fan is turned on, turning a body through adjusting the direction of the fan blades, ranging module with turning a body swing, to ensure the real-time measuring blade direction of man-machine distance, so as to realize the real-time control of the wind speed.

A control method of automatic variable speed fan is proposed, which is characterized by the following steps:

- The preset several fan control scheme in the information processing module, the user can also through the human-computer interaction interface to add and storage personalized control scheme, the scheme expression is "if the man-machine distance for the x_1 , the fan speed to y ".
- Distance measurement module 8 automatically measures the man-machine distance x_1 and gives it to the processor 3.
- The processor 3 sends the control command to the control module 4, and the control module 4 controls the fan speed as y .
- If the body sensing module 6 detects no one in the room, the fan will stop.

According to the control method of the automatic variable speed fan described in claim “c”, the characteristics of the automatic variable speed fan include the following steps:

- The preset several fan control scheme in the information processing module, the user can also through the human-computer interaction interface to add and store personalized control scheme, the scheme for "if the man-machine distance for the x_1 , the fan speed to y ", a user setting scheme is displayed on the LCD screen.
- The ultrasonic ranging sensor measures a distance signal every 20 microseconds and sends it to a single chip.
- The single-chip microcomputer, based on the data sent by the ultrasonic ranging sensor, transmits the corresponding PWM signal and potential information to the direct current bridge through the function relationship.

- d). Meanwhile, the single-chip microcomputer converts the data sent by the ultrasonic ranging sensor to the distance value and displays it through the LCD screen. The wind speed set by the user that will be processed by the function is also displayed on the LCD screen.
- e). Direct current bridge can control the speed of dc motor according to the signal and potential information of single chip microcomputer to realize automatic control of fan speed. The fan goes into hibernation when the distance exceeds the range set by the selection function.
- f). If the body sensing module infrared sensor detects no one in the room, the fan will stop.

As the optimization scheme of the control method of the arduino microprocessor based on man-machine distance x_1 x_2 and indoor temperature and indoor humidity x_3 comprehensive situation to control fan speed y , namely "if man-machine distance for the x_1 , indoor temperature for x_2 , indoor humidity for the x_3 , the fan speed to y ".

As a further optimization scheme, the human sensor module can be activated separately. If someone enters the room, the fan will be activated. If everyone leaves the room, the fan will be turned off and the body sensor module will continue to be monitored. Users can also set "shut down the body sensing module while turning off the fan.

3. EXAMPLES

Now put forward a kind of according to the man-machine distance and temperature measurement temperature information after the temperature information is submitted to the information processing module, information processing module according to the man-machine distance and temperature of the fan speed based on the comprehensive control, which includes the following steps:

- a). The preset several fan control scheme in the information processing module, the user can also through the human-computer interaction interface to add and store personalized control scheme, the scheme for "if man-machine distance to x , then the fan speed to y ", the preset control scheme named "a little bit hot", "hot" and "very hot" in particular, in order to realize the user a key selection.
- b). The HC-SR04 ultrasonic ranging sensor measures a distance signal every 20 microseconds and sends it to the arduino single-chip microcomputer;
- c). According to the data sent by the HC-SR04 ultrasonic ranging sensor, the arduino MCU is converted into the corresponding PWM signal and potential information to the L298N dc bridge;
- d). At the same time, the arduino microcontroller converts the data sent by the HC-SR04 ultrasonic ranging sensor to the distance value and displays it through the 12864LCD screen. The wind speed set by the user with function processing is also displayed on 12864LCD screen.
- e). L298N control the dc motor speed according to the signal and potential information of arduino, and realize automatic control of fan speed. The fan goes into hibernation when the distance exceeds the range set by the selection function.
- f). If the human body induction module HC-SR501 infrared sensor detects no one in the room, the fan will stop.

Multiple sets of schemes can be preset for user selection, and users can modify and add by themselves.

Described above, the only way for the concrete implementation of the present invention is better, but the protection scope of the present invention is not limited to, any familiar with this technology in the field of technical personnel within the scope of the invention disclosed technology, according to the

technical scheme of the invention and inventive concept to equate to replace or change, should be covered within the scope of protection of the present invention.

4. CONCLUSION

The invention provides a more intelligent, advanced fan and control method to provide users with more detailed and humanized service. At the same time the fan and the control method and the use of relatively simple structure, low cost comparison, to some extent, it can reduce the power consumption of traditional fan, to cut down the cost of users, energy conservation and environmental protection.

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