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Automatic Temperature Based Fan Speed Controller Using Arduino

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Abstract:
This project is a oneway automatic fan speed controller that controls the speed of the electric fan as needed using the electrical current produced by the Arduino board. Using the latest technolog y makes the closed loop feedback control system efficient and reliable. Since the Arduino board i s very advanced in all control circuits, we use the Arduino board to control the fan speed. The pr oposed system is designed to determine the temperature of the room and send this information to the Arduino board. Meanwhile, the Arduino board makes the difference between the current tem perature and the temperature according to the program created in Arduino.

Keywords: Arduino, fan speed controller, temperature sensor, liquid crystal display (LCD), etc.

I. Introduction

As technology advances, smart machines are introduced every day. Everything becomes more co mplex and easier to understand. The demand for technology and smart electronics continues to in crease. Microcontrollers, which are the brain of the system, play an important role in the develop ment of smart systems. Today, microcontrollers are widely used in many areas of life to perform automated tasks more accurately. Electric fans are one of the most popular electrical devices due to their coseffectiveness and low power consumption. The fan can be turned on and off from the body of the switch. Currently the change in temperature does not cause any change in fan speed. Therefore, automatic temperature control technology is needed to control the fan speed accordin g to temperature.

2. objective

We want to make people's lives comfortable in the electronic world. That's why home automatio n system is very necessary. Fan speed controls are an important part of your home automation sy stem. The main aim of the project is to create a lowcost, userfriendly automatic thermostatic fan r egulator that reduces energy consumption and helps physically disabled or elderly people control the speed of fans in their field.

3. System Design

Temperaturebased fan speed control and monitoring using Arduino and LM35 temperature senso r. While the microcontroller controls the speed of the electric fan as needed, making the control s tronger and faster, the LCD screen makes the user comfortable. Temperature (Celsius) and fan sp eed (percentage) are displayed simultaneously on the LCD panel. The project is very compact an

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d uses only a few things. This project will help save electricity/electricity. It can be used in many applications such as air conditioners, water heaters, snow melters, ovens, heat exchangers, mixer s, ovens, incubators, spas and veterinary operating tables.

A. Methodology

The temperature-based fan speed control and monitoring scheme is shown in Figure 1. Built around Arduino Uno board (Board1), 16×2 LCD (LCD1), LM35 temperature sensor (IC1).) and others. Arduino is the heart of this circuit because it controls all functions.

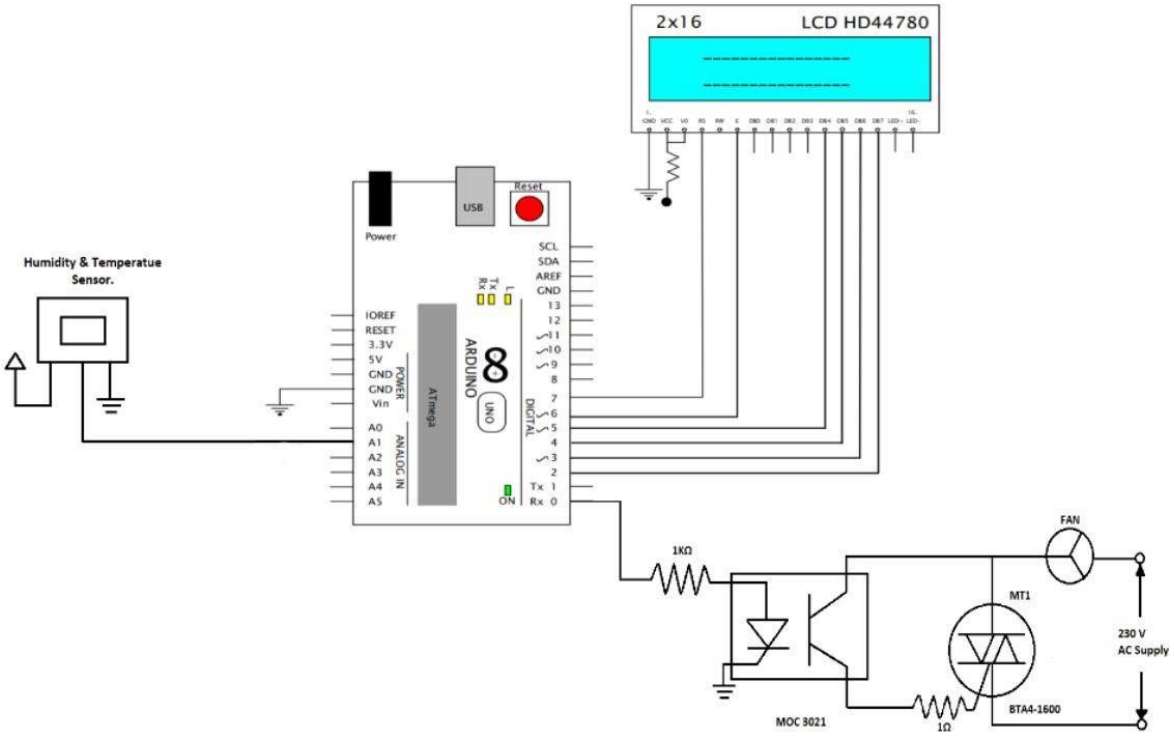

Figure 1: Circuit Diagram

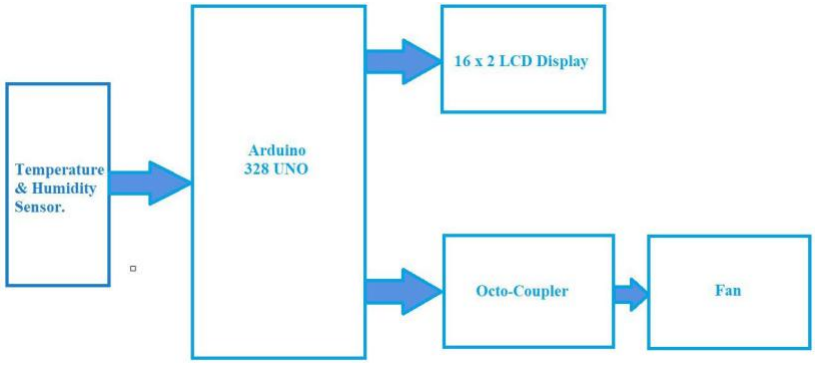

Figure 2: Block Diagram.

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Block diagram of the concept Figure 2 above represents the block diagram of the proposed conce pt. The temperature sensor interacts with the Arduino to get temperature data in the room. If the t emperature is cold, more data will be processed, if the temperature is cold, the fan speed will be l ower. Additionally, if the temperature drops below the threshold, the fan will be turned off. Tem perature data; Fan speed displayed on LCD for user interaction. Use the PWM pins on the Ardui no to control the fan speed based on temperature.

B. Software

The software of the automatic thermometer and power meter is written in the Arduino programm ing language. Arduino Uno uses Arduino IDE software for programming. Arduino Uno's ATmeg a328P comes with a preinstalled bootloader that allows users to upload new code without using a n external programmer. Connect the Arduino board to the PC and select the correct COM port in the Arduino IDE. Write the program (draft). Then select the correct board from the Arduino IDE' s Board menu and send the sketch to the Arduino via a standard USB portFour. List of names

A. Arduino

Arduino is an open platform for creating electronic projects. Arduino consists of a physical progr ammable circuit board (often called a microcontroller) and a software or IDE (Integrated Develo pment Environment) that runs on the computer and is used to write computer code and send it to the physical board. Unlike most programmable circuit boards of the past, the Arduino does not n eed a separate device (called a programmer) to load new code onto the board; You just use one U SB cable. Additionally, the Arduino IDE makes it easy to learn programming using a simplified version of C++.

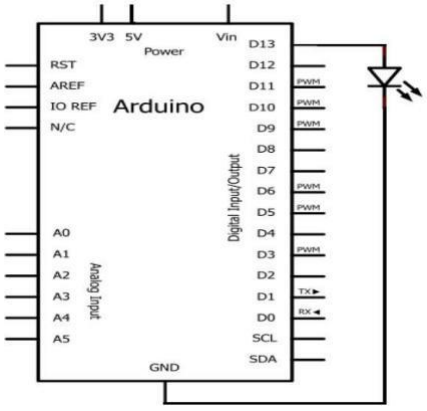

Figure 3: Pin Diagram of Arduino

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Specifications:

☆ Microcontroller: ATmega328

☆ Operating voltage: 5V

☆ Input voltage (recommended): 7-12V

☆ Input voltage (limited): 6-
< br> br> br> Digital I/O pins: 14 (6 of which provide PWM output)

Analog input pins: 6 DC

™ Current for I/O pin: 40 mA
<br™< b="" style="margin: 0px; padding: 0px;"></br™<>3.3V pin current: 50 mA

B. DHT11 Temperature and Humidity sensor

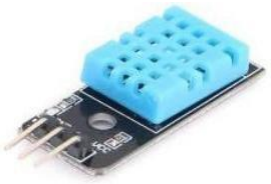

Figure 4: DHT 11 Temperature and Humidity sensor

This DHT11 temperature and humidity sensor has calibrated signal output and temperature and humidity sensor function. It integrates a highperformance 8bit microcontroller. Its technology guarantees reliability and excellent quality for a long time. The sensor has a protective material and a sensor for wet NTC temperature. It has the advantages of excellent, fast response, strong anti-interference and high performance.

Technical Specifications:

☆ Operating voltage: 3.5V - 5.5V.

âOperating current: 0.3mA (measurement) 60uA (standby)

Output: sequence data.

Temperature range: 0°C to 50°C.

III Humidity range: 20% to 90%

III Resolution: Both temperature and humidity are 16 bits.

III Accuracy: ±1°C and ±1%

C. triac

The bidirectional controllable silicone switch has three terminals, main terminal 1 (MT1), main terminal 2 (MT2) and gate (G), as shown in the picture. If MT1 is forward biased with respect to MT2, current flows from MT1 to MT2. Similarly, if MT2 is equity term with MT1, the flow flows from MT2 to MT1.

D. Optocoupler specifications:

Input diode forward voltage: 1.25V

Collector-emitter voltage: 80V (max)

Collector current: 50mA (max) < br>
> Cutoff frequency: 80 kHz

Rise time: 18 us

Fall time: 18 us

• Available in 4-pin DIP or without hole and in SMT package
<br< b="" style="margin: 0px; padding: 0px;"></br<>> TO.

LCD Display (Liquid Crystal Display)

This product is specifically designed for use with a microcontroller; This means it cannot be us ed by standard IC circuits. It is used to display different messages on a small LCD screen. It ca n display two sentences of 16 characters each. It can display all alphabets, Greek letters, symbo ls, numbers and more. Figure 3 shows the LCD (2 x 16 characters) and its connections.

Technical Specifications:

Operating voltage 4.7V - 5.3V

Current consumption 1mA without backlight

III Alphanumeric LCD module, Text and Text can display

III consists of two lines, 16 characters can be printed on each line.

- Each character is made from a 5 x 8 pixel box

- Works in 8 bit and 4 bit format

F. Stepdown Transformer (230V -12V)

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Figure 5: Stepdown Transformer (230V -12V)

Where NP is the number of primary winding turns = 30000

NS is the number of secondary winding turns = 150

VP is the voltage of the primary winding of the transformer = 240V< br>
VS is the voltage of the transformer Secondary=< br>
VS=(VP*NS)/NP=240*150/3000=12V

G. Voltage Regulator

Figure 6: Voltage Regulator
Specifications:

nput voltage range 7V-35V

Rated current Ic = 1A
Output voltage range VMax = 5.2V, VMin = 4.8V

H. DIODE (1N 7007)
Specifications:

Maximum reverse cycle peak voltage 1000V.

Maximum RMS voltage 700V.

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Maximum DC blocking voltage 1000V.

Average forward voltage and current: 1.0A.

III Peak surge current: 30A.

III Maximum current forward voltage: 1.0V.

V. operation

Temperature Sensor DHT11 Temperature and humidity sensors convert the temperature into an electrical (analog) signal used for the ATMega328 microcontroller on the Arduino UNO board . Analog values
are converted to digital values. Thus, the feeling of temperature and speed of the fan is displaye d on the LCD screen. The fan starts to rotate when the temperature exceeds 30°C. It uses a low-frequency pulse width modulation (PWM) signal to adjust fan speed by varying the duty cycle. Cheap, disposable, small transistors can be used here. The pass transistor is very efficient becau se it acts as a switch.

Figure 7: Harrdware implementation of the proposed concept.

VI. CONCLUSION

The version of this model is V2. Most of the formatting instructions in this document were com piled from IEEE LaTeX style filler by Causal Productions. Causal Productions offers standard A4 and US Letter templates for LaTeX and Microsoft Word. The LaTeX template is based on t he IEEEtran.cls and IEEEtraan.bst files, while the Microsoft Word template is standalone.

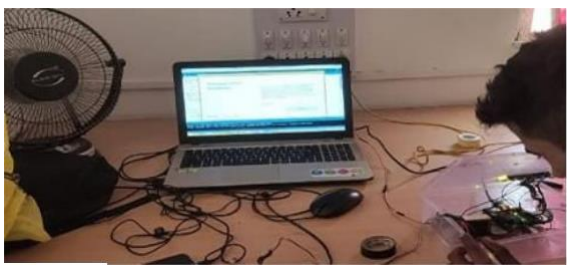

Figure 8: Result

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References

[1]. M. Sathishkumar, S. Rajini, Smart surveillance system using PIR sensor network and GSM , International Journal of Advanced Research in Computer Engineering and Technology (IJAR CET) Volume 4 Issue 1, January 2015.

[2]. J. Breckling, editor, Directional time series analysis: Applications to wind speed and directi on, series.

Statistical Information. Berlin, Germany: Springer, 1989, Vol. 61.

[3] a. K.A Akpado1, C.O Ezeagwu2, A. Ejiofor3, A.O Nwakeke.Vol. 2, Issue 7, July 2013, Mo deling and simulation of microcontroller-based temperature control in ventilation systems.

[4]. Operation of Single Phase SPWM Inverter; By Bijoyprakash Majhi Prof. Somnath Maity d id not fulfill the requirements for the Bachelor of Science in Electrical Engineering degree.

[5]. Surabhi1, Upendra Prasad2, Vivek Kumar Jain3, Vol. 4, Issue 7, July 2015, Design and pro duction of temperature-
based DC fan speed control system using microcontroller and pulse width modulation technolo gy.

[6]. 6th International Conference on Electrical, Electronics and Electrical Engineering (ICEEC E'2014) 27-
28 Cape Town (South Africa) 2014 Automatic fan speed control system using Mustafa Saad, H ossam Abdoalgader and Muammer Mohamed microcontrollers.

[7]. S.Verma, A.Das, S.Dey, P. Chowdhury, Automatic temperature control fan using thermisto r, ISSN: 2321-
1156 International Journal of Innovation Research in Technology and Science (IJIRTS) July 20 16.

[8]. M. Saad, H. Abdoalgader and M. Mohamed, Automatic fan speed control system using mic rocontroller, 6th International Conference on Electrical, Electronics and Civil Engineering (ICE ECE'2014) Cape Town (Güney Afrika) 27-28 2014 ntawm.

[9]. Z. I. Rizman, K. Ho Yeap, N. Ismail, Design of Automatic Electric Heating System Using PIC

Fan, International Journal of Science and Research (IJSR), India Online ISSN: 2319-
7064 Volume 2, Issue 9, September 2013. <br< b="" style="margin: 0px; padding: 0px;"></br<>>
[10] V. Bhatia, G. Bhatia, Room temperature sensor based on fan speed control using pulse wi dth modulation technology, International Journal of Computer Applications (0975 – 8887) Vol ume 81 – Issue 5, 2013 November of the year.

[11] K. Singh, M. Dhar, P. Roy, Automatic Fan Speed
Control System Using Arduino, ISSN: 2456-
4184 International Journal of New Research and Development (IJNRD) 4 April 2017.