



FAN SENSOR

Authors: -KISHAN KUMAR, SAGAR SHARMA, VINOD KUMAR, SHUBHAM KUMAR

College: -IIMT COLLEGE OF POLYTECHNIC GREATER NOIDA

Guide: Mr AWADHESH KUMAR

ABSTRACT

Nowadays, there are almost of all the houses in the world especially in Southeast Asia have at least a ceiling fan. It has become very popular among people in recent years. The ceiling fans objectively build to control the room temperature to appropriate condition. There are several advantages of using ceiling fan. For example, people prefer to use ceiling fan instead of using the air conditioner due to it easy to install, cheap in maintenance and also it is really the suitable equipment to control the room temperature in South East Asia area. In fact, the ceiling fan also can be used to blow wind and act as an agent to dry up the clothes.

Key Words:- Sensors, Ceiling Fans, Air conditioner

1. PROBLEM STATEMENT

The basic idea behind the project is to exploit loss electrical energy in fan motor at ceiling fan operation. Losses of electrical energy will develop too much serious problem especially on the safety of the user. So, why the automatic ceiling fan controller must be invented?

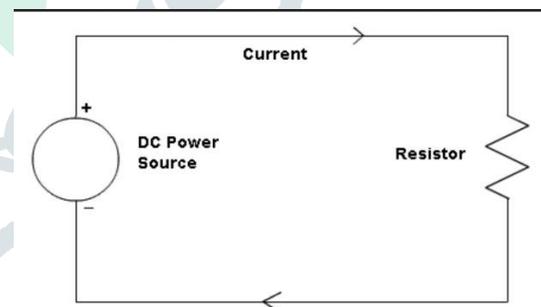


Fig.1 Power Loss

There are a lot of concerns when dealing with “traditional” ceiling fan especially in the operations of the fans. The real support for this problem is due to the inability of the user to define the most appropriate temperature room. The user cannot sense the room temperature

directly by their skin. This process can be beneficial by providing an effective way in controlling ceiling fan mechanism monitor the room temperature automatically. Switching problems is also a factor towards ceiling fan operation. For information, ceiling fan operation like on/off or speed change mechanism required switching operation. Problem arrived especially among the new arriving occupants. When new arriving occupants enter to new room and darkened rooms, they have to search for hard to find wall toggle switches to turn on the ceiling fan. Warm or stuffy rooms can be very uncomfortable to newly arriving occupant, who would have to wait for the rooms to cool down and circulate airflow. Further, turning on and off fans in home or building is often so inconvenient the fans are left on. Another problem is regarding the usage for electricity.

2. OBJECTIVES

- 1) To build an automatic fan controller based on temperature sensor.
- 2) To create detection system that aims to detect human's motion appearance
- 3) To implement a controller based model to count number of persons visiting particular room
- 4) Keypad controller for user purpose

3. COMPONENTS

Arduino Uno

The Arduino Uno is a microcontroller board based on the ATmega328 (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. It features the Atmega8U2 programmed as a USB-to-serial converter.



Fig 2 Arduino Uno

DHT 11 Humidity & Temperature Sensor

DHT11 Temperature & Humidity Sensor features a temperature & humidity sensor complex with a calibrated digital signal output. By using the exclusive digital-signal-acquisition technique and temperature & humidity sensing technology, it ensures high reliability and excellent long-term stability.

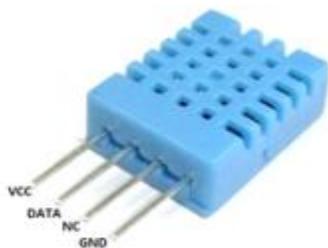


Fig 3 DHT 11 Humidity & Temperature Sensor

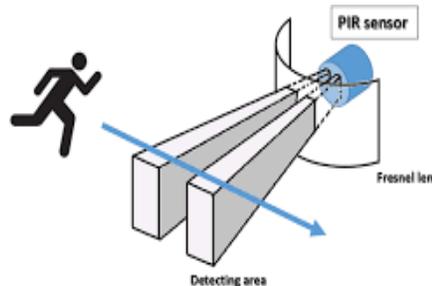


Fig 4: Pin sensor

ULTRASONIC SENSOR

This sensitive ultrasonic motion detector circuit uses a quartz crystal to lock the detector frequency for maximum stability and reliability.

4. METHODOLOGY

TRANSMITTER

The ultrasonic transmitter uses a 555 based actable multivibrator. It oscillates at frequency of 40 to 50 kHz. This circuit is used to transmit ultrasonic waves through air, which are intended to be picked up by a matching ultrasonic receiver.

RECEIVER

The circuit works based on the ultrasonic transducer when sensing ultrasonic signals. The signal by amplified by selectable transistor. Then the amplified signal are rectified and filtered.

PIR SENSOR

The PIR (Passive Infra-Red) Sensor is a pyro electric device that detects motion by measuring changes in the infrared levels emitted by surrounding objects.

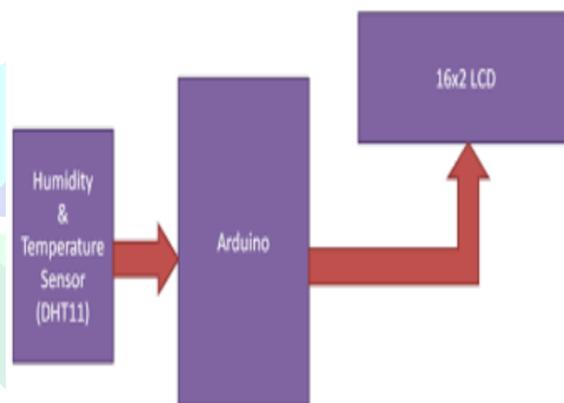


Fig 5 Flow of project

5. RESULT AND DISCUSSION

The fabrication process managed to work on schedule. Here a list of result: DHT11 LCD display DC motor PIR sensor & Ultrasonic Sensor Counter approach via LED Keypad routine & AC motor DHT11 functionality check Goes with the principle, 10 mv output value is actually equivalent toward 1 degree. Here, there are 2 sample results for DHT11 functionality check

- DHT11 using oscilloscope
- The result is based on Voltage peak to peak that been display in oscilloscope. Yield a reasonable result around 220 mv which equivalent to 22 degree. The reading been taken in air-conditional room (Lab EE).

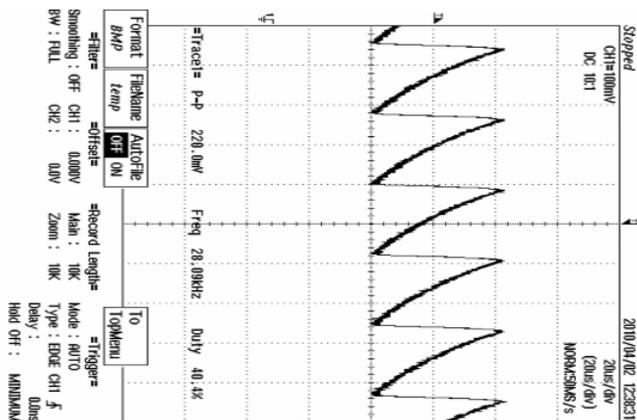


Fig 6: DTH11 Oscilloscope result

Figure shows result about LCD result capturing actual temperature using DHT11.

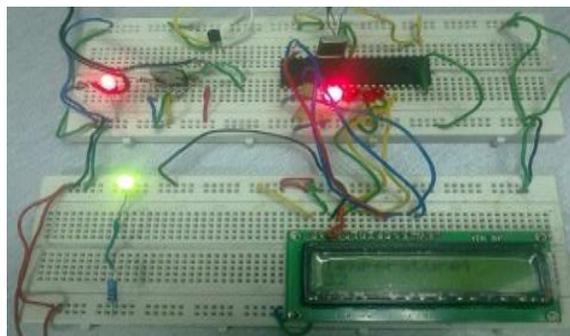


Fig 8 : LCD Result

Counter Down Figure 51 show about count down operation routine – Counter value equal to zero. Count down or reduce counter approach explain about the condition when the human leaving the room. Just be stated earlier, in Counter mechanism, the system will only off if the count equal to zero.

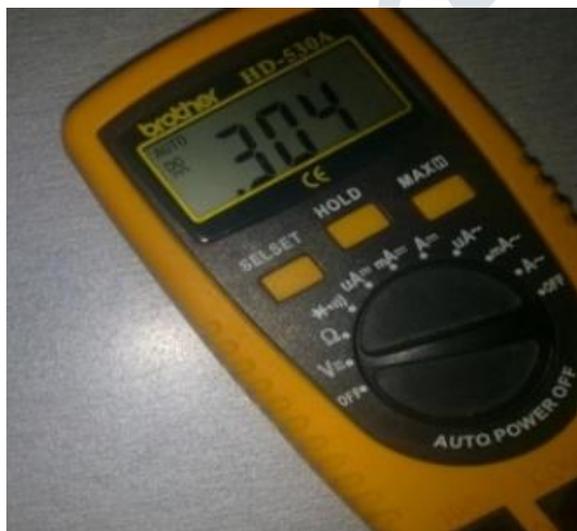


Fig 7 Voltmeter reading

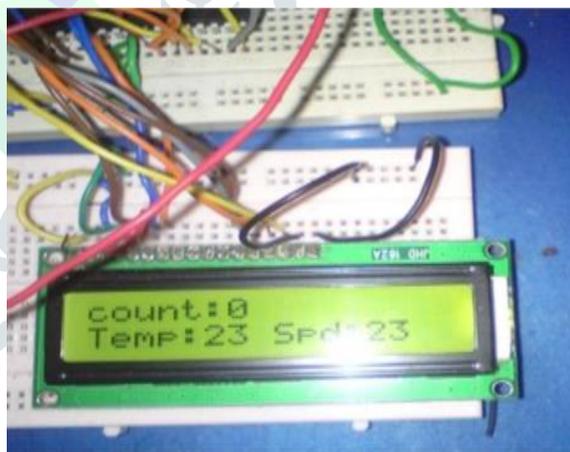


Fig 9: Counter result

LCD component purposely aim to display the detected temperature of DHT11. The LCD operate based on the instruction that been programmed in Arduino uno chip. The code (Appendix D) consist the explanation of usage of LCD driver.

CONCLUSION

This project needs a very careful study and consistent work. Based from the result, the prototype managed to be finished on time set. There will be many obstacle that need to be

handled in accomplished the task. The result proves out the capabilities the entire sensor like DHT11 sensor, Ultrasonic sensor and Passive Infrared Sensor (PIR) by using C programming on ARDUINO UNO. This PIC controlled fan project will be the stepping-stone for the future UTP undergraduates to develop much flexible system. Implementing knowledge gained from classed will be different from knowledge of hand-on experience.

Recommendation

Recommendation of this project can base on 2 things:

- User friendly features
- Neat design

Weakness of the project, due to limited of time and budget, the speed mechanism of AC motor can be improved by using phase angle technique to provide variety of fan speed needed like greater than 5 speeds. Detection of animal like cat or dog can be prevent if PIR sensor being used as main sensor (avoid false alarm). However, for ultrasonic motion, it totally detects any motion that appears around the detection area.

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