© 2018 IJSRSET | Volume 4 | Issue 4 | Print ISSN: 2395-1990 | Online ISSN : 2394-4099
Themed Section : Engineering and Technology

Temperature Controlled Fan using IOT

G. Joga Rao[1], G. Satish[2], D. Abhinav[3], P. Mothi Manoj Nageswara Rao [4], P. Satish Ganesh[5]

[1] Associate Professor EEE Department, Raghu Institute of Technology, Visakhapatnam, India.

[2] Assistant Professor EEE Department, Raghu Institute of Technology, Visakhapatnam, India.

[3-5] B.Tech Student EEE Department, Raghu Institute of Technology, Visakhapatnam, India

ABSTRACT

This work is to implement automatic fan speed controller which controls the speed of the fan according to the environment conditions. In this work, arduino along with temperature sensor is used. Temperature sensor(LM35) is used to sense surrounding temperatures. The sensed signal is sent as voltage pulses to microcontroller ATMEGA 328P and converts into an electrical signal which is applied to microcontroller. The micro controller on ARDUINO drives the motor driver to control the fan and internet of things (IOT) is also used in this work to turn ON or OFF the fan from different places. ESP8266 is interfaced with arduino to switch the fan with mobile phone.

Keywords : LM35 Temperature Sensor, Arduino (AT MEGA 328P), ESP8266 Wi-Fi module.

I. INTRODUCTION

Nowadays, everyone is looking towards the new technologies by replacing the manual operations to automatic controlled devices. One of the basic requirements of the people during summer is a cooling fan. But, the speed of the fan can be controlled by manual operation using a manual switch i.e. fan regulator or dimmer. By turning the dimmer, the fan speed can be altered. It can be observed that during daylight temperature usually rises and during night the temperature falls. The users do not understand the difference in temperature. So to overcome the speed of the fan here is a solution to vary according to temperature. This concept is particularly applicable for the areas like where temperature changes radically during day and night time. This work will convert the manual fan into automatic fan. The automatic fan will change its speed according to the temperature in the room.

Automated systems that have less manual operation are flexible, reliable and accurate. Due to these demands every field prefer automated control systems especially in the field of electronics where automated systems are giving good result. Microcontroller is one of the major devices in the field of electronics.

II. DESCRIPTION

In this work we are designing the temperature based speed controlled fan. The surrounding temperature is sensed by LM35 sensor the sensed signal is sent as voltage pulses to microcontroller ATMEGA 328P and converts into an electrical signal which is applied to micro controller. The micro controller on arduino drives the motor driver to control the fan. ESP8266 Wi-Fi module is interfaced with arduino by using UBIDOTS free cloud storage website it is possible to switch the fan using mobile phone or laptop. Firstly when the supply is given to arduino, ESP8266 Wi-Fi module is connected to the specified network and by using mobile ,fan can be switched. When fan is turned ON using phone the fan starts running LM35 sensor senses the surrounding temperature and according to temperature it controls the speed of the fan as specified in the arduino program.

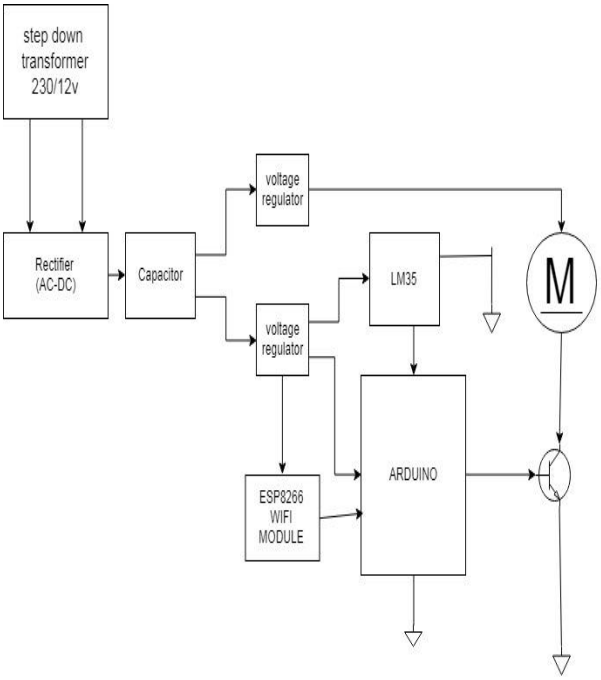

Fig.1: Block Diagram

A. LM35 TEMPERATURE SENSOR:

The LM35 series are accurate integrated-circuit temperature sensors, whose output voltage is linearly proportional to the Celsius (Centigrade) temperature with LM35, the temperature can be measured more accurately than with a thermistor. The LM35 does not require any external calibration to provide typical accuracies of ±1⁄4°C at room temperature and ±3⁄4°C over a full –55 to +150°C temperature range.

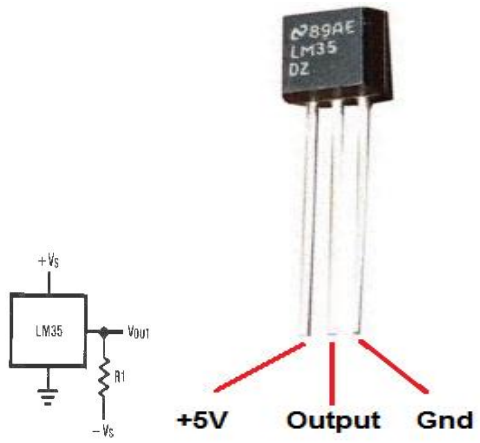

Fig.2: LM35 Temperature Sensor

B. ESP8266 WI-FI MODULE:

ESP8266 offers a complete and self-contained Wi-Fi networking solution, allowing it to either host the application or to offload all Wi-Fi networking functions from another application processor. In this work, the ESP8266 serves as a Wi-Fi adapter, adding wireless internet access to any microcontroller-based module through the UART interface. In this case we use an Arduino UNO. It has integrated cache to improve the performance of the system in such applications. Major fields of ESP8266 applications to Internet-of-things include home appliances, home automation, smart plug and lights, sensor networks, IP cameras.

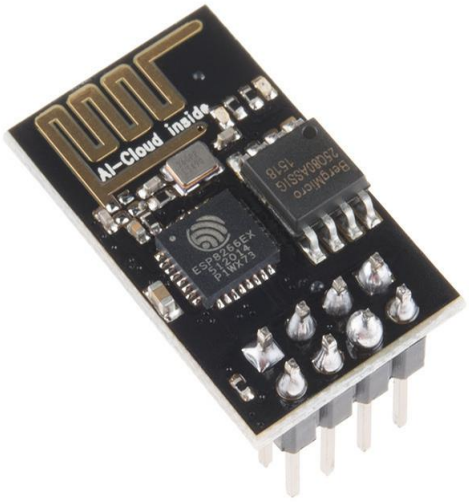

Fig.3: ESP8266 01 Wi-Fi module

C. HOW TO CONNECT ESP8266 AND ARDUINOUNO:

Pin diagram of ESP8266 is shown below in fig 4.

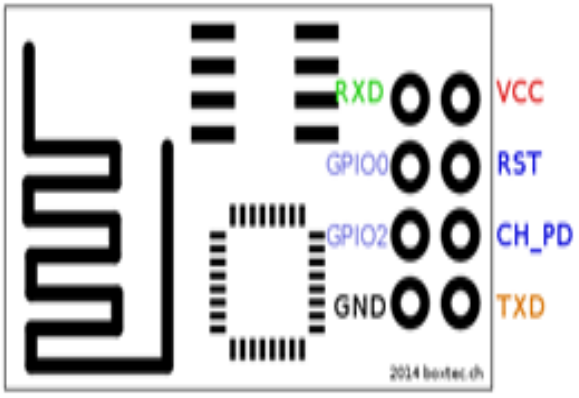

Fig.4: Pin diagram of ESP8266 01 Wi-Fi module

Connect arduino with ESP8266 as follows

Arduino —— ESP8266

- D2 ———> RXD
- D3 ———> TXD
- 3.3V ———> VCC
- 3.3V ———> CH_PD
- GND ———> GND

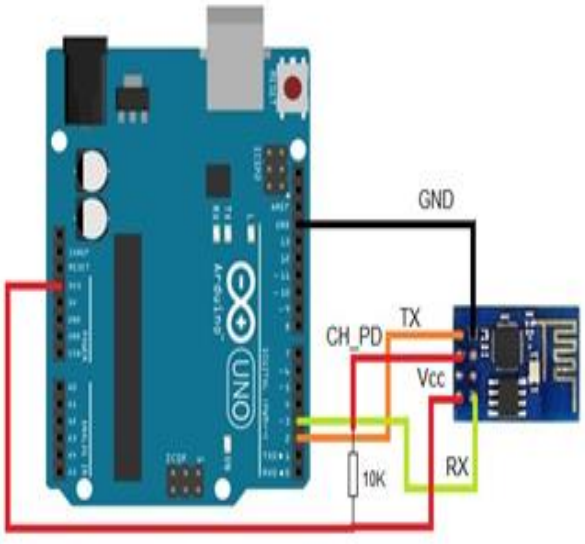

Fig.5 connecting Arduino and Esp8266.

By connecting Arduino and ESP8266 as shown in the above fig.(5) program can be dumped into the Wi-Fi module.

D. CIRCUIT DIAGRAM:

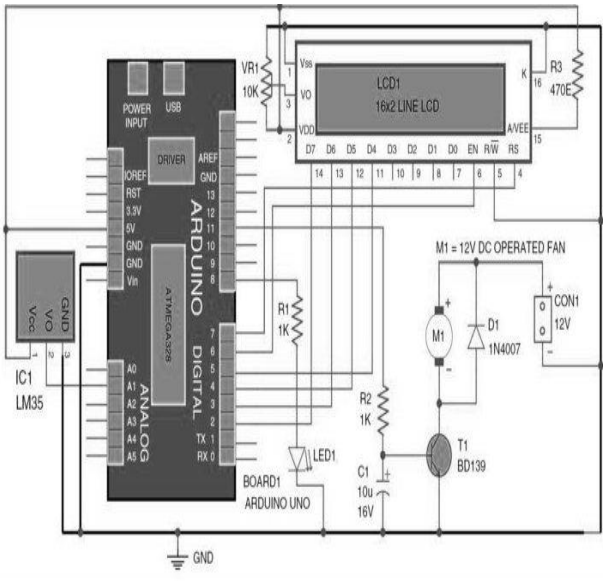

Fig. 6 Circuit Diagram

The main heart of this work is the program that we use. LED is used to indicate whether the circuit is active or not. The Arduino can only provide 40mA at 5V on its digital pins. Most motors require more current and/or voltage to operate. A transistor can act as a digital switch, enabling the Arduino to control loads with higher electrical requirements. The transistor in this work completes the motor's circuit to ground. In this work we used a BD139 transistor, which can switch up to 80V at 1.5A.

When PWMing a transistor, it's similar to pulsing an LED. The higher the PWM value, the faster the motor will spin. The lower the value, the slower it will spin.

Transistors have three pins. For Bipolar Junction Transistors (BJT), like the one used used in this work, the pins are called *base*, *collector*, and *emitter*. A small amount of current on the base pin closes a circuit between the collector and emitter pins. BJTs come in two different types, NPN and PNP. The BD139 is a NPN-type transistor, which means the collector will connect to the motor, and the emitter will connect to ground.

Diode is connected parallel to dc motor to protect the transistor from high currents that flow from dc motor due to back emf of the motor.

Proteus based circuit:

Proteus is the best software to test the circuit whether it will run in real time or not. After designing the circuit in proteus software the arduino program should be dumped into the arduino that is used in proteus. First compile the program in arduino and then hex file will be generated that hex file should be uploaded in proteus in that way the circuit in proteus will run and observe the results without conducting experiment practically.

Generally you cannot get arduino board in the proteus software internally. Arduino library for proteus to be downloaded from the internet and then it will be possible to use.

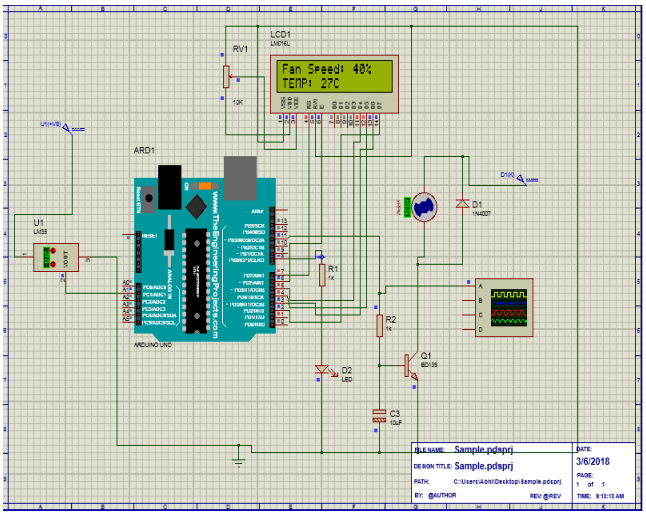

Fig.7 Proteus based circuit diagram

III. HARDWARE IMPLEMENTATION

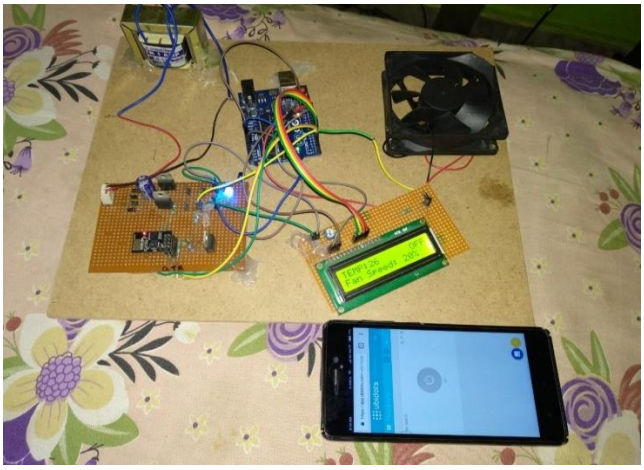

Fig. 8 Kit is switched ON

In figure 8 you can see the circuit has been supplied with 12v but the fan is not running this is because the fan is not switched from the phone.

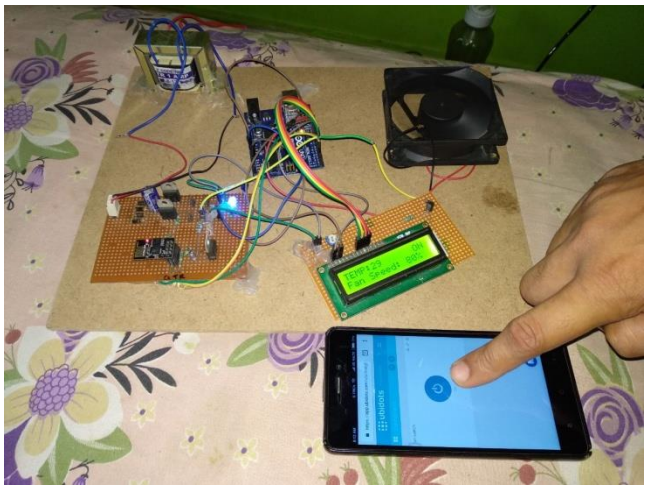

Fig. 9 Fan is switched using mobile phone

In figure 8 the fan in switched ON using mobile phone. The temperature on the LCD was 30° C and the fan is running at 80% of its speed. Fan speed is directly proportional to the temperature.

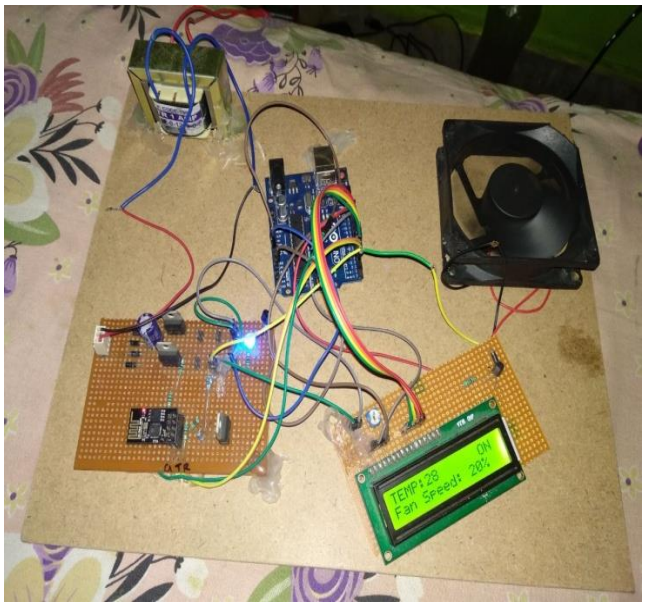

Fig. 10 Temperature 28° C and Fan running at 20% of its full speed.

In figure 10 and figure 11 we can observe that as the temperature is raising in the same way the speed of the fan also changing accordingly. In the arduino program we have kept minimum temperature is 28°C and maximum temperature of 35° C .So, the speed of the fan is changed according to the sensed temperatures.

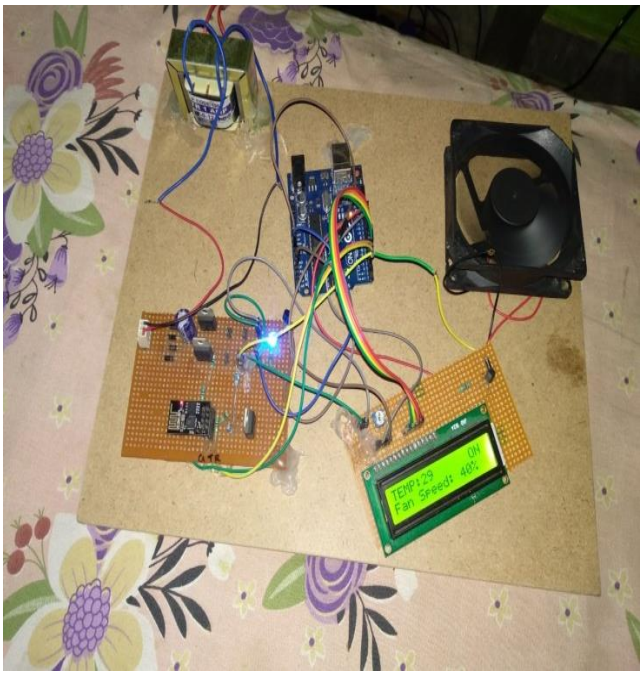

Fig.11 Temperature 29° C and Fan running at 40% of its full speed.

IV. RESULTS & CONCLUSION

This fan designed for reducing the manual operation of fan that is altering the speed of fan automatically. This fan can be switched from different places using mobile phones through IoT technology.

This fan is designed with low cost it is available for 1200 rupees. This fan works at different speeds according to the surrounding temperature.

V. ACKNOWLEDGMENT

We express our thanks to the support given by management in completing our work. We express our sincere gratitude & deep sense of respect to Dr. G. Joga Rao, HOD & Associate professor of the Electrical Department. We express our sincere thanks to our work guide Mr. G.Satish Assistant Professor for his support to completion of this work. We are thankful to the teaching and non-teaching staff of Electrical department for their direct as well as indirect help in our work.

VI. REFERENCES

[1]. R.Krishnan, "Electric Motor Drives Modelling, Analysis, and Control, Prentice Hall International Inc., New Jersey, 2001.

[2]. Surabhi, "Design and Fabrication of Temperature based DC Fan Speed Control System using Microcontroller and Pulse Width Modulation Technique", IJRSET Vol. 4, Issue 7, July 2015

[3]. Vaibhav Bhatia and Gavish Bhatia "Room Temperature based Fan Speed Control System using Pulse Width Modulation Technique" International Journal of Computer Applications (0975 – 8887) Volume 81 – No5, November 2013

[4]. J. Holtz, "Pulse width modulation: a survey," IEEE Trans. Industrial Electronics, vol. IE-39, no.5 pp.410-420, 1992.

[5]. Ghana Shyam Soren, Ram Ashish Gupta," Temperature Controlled DC Fan using Microcontroller ", National Institute of Technology Rourkela

[6]. Tabish,"A Operational Amplifier - IC 741 ",Jamia-Physics

[7]. Avinash Kumar Shudhanshu, Raj Kumar, Sadashiv Raj Bharadwaj, Gaurav Singh, Amit Garg,"Technology based Laboratory to Improve Science Learning ",Acharya Narendra Dev College, University of Delhi

[8]. Hongtai Cheng, Lina Hao, Zhong Luo, and Fei Wang,"Establishing the Connection between Control Theory Education and Application: An Arduino Based Rapid Control Prototyping Approach ",IEEE papers,2016