# Automatic Fan Speed Controller Using Temperature Sensor

**Kamlesh Kishore[1], Tanushree Kumari[2], Suraj Kumar[3], Rahul Kumar[4]**
[1,2]Assistant ProfessorRTC Institute of Technology, Anandi, Ranchi, Jharkhand, India
[3,4]B.Tech Scholar,RTC Institute of Technology, Anandi, Ranchi, Jharkhand, India

***Abstract-****This project proposes an automatic room temperature controller, which uses the difference between the outside and inside room temperature. The difference is assumed to affect the compressor speed in order to achieve the desired set point. The frequency of the speed compressor is also taken into account. The project involves finding the mathematical model of an air conditioning system, designing a controller and performing a simulation to analyse the performance of the designed controller using Simulink.*

*The above discussed problems can be avoided by implementing the speed control mechanism of the fan in automatic way. A sensor is placed in the room to sense the room temperature in degree centigrade. According to detected temperature a control circuit will control the speed of the fan. If the room temperature is more, then the speed of the fan will increase. If the room temperature is less, then the speed of the fan will automatically decreases by the control circuit.*

## I. INTRODUCTION

A soft error is a "glitch" in a semiconductor device. These Nowadays, the air conditioning is widely used especially in warm countries including Malaysia. Usually the conventional air conditioning is always cooling the room depending on the fixed temperature setting and is not automatically adjusted for the comfort of the users. In the central air conditioning control field, excellent real-time, high reliability, and good intelligence are proposed by many researchers. The traditional PID algorithm is, in fact, still playing a main role in the control process. The air conditioning system has becoming a field to be researched to improve the user convenience by applying intelligent system such as temperature sensor controller.

While the enhanced air conditioning system is being designed, the consideration of the type of control system must be included in a modeling design. In particular the controller must be able to avoid the inefficiency of having the air conditioning operate all the time. Several control options were considered at presence sensing circuit, which would turn the air conditioning off when people are not in the room with the air conditioning and a temperature sensor input, which would change the "air conditioning operation depending on room temperature"[1] . Based on the observation of the using the present conventional air conditioning application, it always working all the time without a systematic control. Therefore, the control of the air conditioning is adjusted through a feedback control system to monitor and maintain a constant temperature based on the data input from the sensor.

This project presents an air conditioning temperature control by using the current temperature in the room as well as outside temperature. The difference between the two temperature sensors will affect to compressor speed to achieve the desired point. Only when the difference between indoor and outdoor temperatures is small or zero, and the indoor temperature exceeds a predefined threshold does the controller run the air conditioner. This research focuses only on main component, which is the compressor system, in air conditioning that significantly affects the temperature change.

## II. DESIGN METHODOLOGY

I.Power Regulator: Usually, we start with an unregulated power supply ranging from 9volt to 12volt DC. To make a 5volt power supply, KA8705 voltage regulator IC as shown in Fig. 2 has been used.

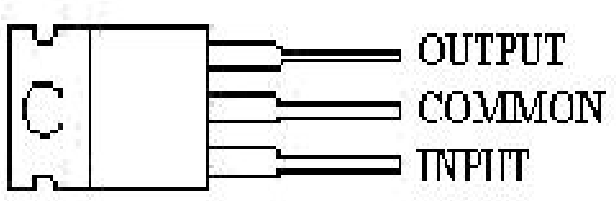



Fig.2:- Power supply regulator

"Pin description of power regulator"[2]

| Pin No | Function | Name |
|---|---|---|
| 1 | Input voltage (5V-18V) | Input |
| 2 | Ground (0V) | Ground |
| 3 | Regulated output; 5V (4.8V-5.2V) | Output |

II. Temperature Sensor(LM35): This project uses IC LM35 as a sensor for detecting accurate centigrade temperature[9]. Linearity defines how well over a range of temperature a sensor's output consistently changes. Unlike thermistor,

Linearity of a precision IC Sensors are very good of 0.5°C accuracy and has wide temperature range. its output voltage is linearly proportional to the Celsius (Centigrade) temperature.

"The LM35 is rated to operate over a -55° to +150°C temperature range"[3]. It draws only 60 µA from its supply, it has very low self-heating, less than 0.1°C in still air. LM35 Operates from 4 to 30 volts.

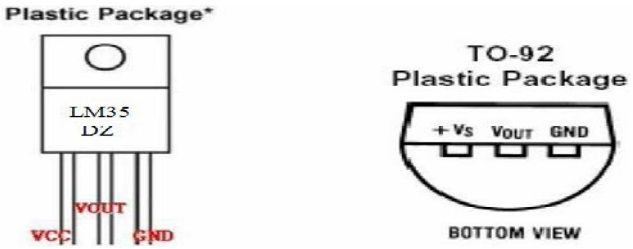



Fig.3.- sensor LM35

III. Variable Resistor

IV. A variable resistor is a device that is used to change the resistance according to our needs in an electronic circuit. [4] It can be used as a three terminal as well as a two terminal device. Mostly they are used as a three terminal device. Variable resistors are mostly used for device calibration.


Fig.4- Variable Resistor

V. ARDUINO: ARDUINO is an open source computer [5] hardware and software company project and user community that design and manufacture microcontroller based kit for building digital discusses and interactive object that can sense and control objects that can sense and control object in the physical world.

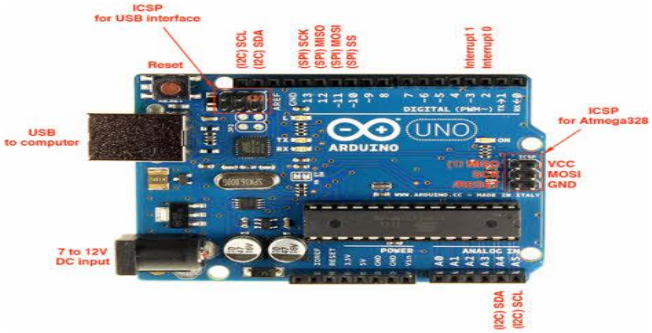



Fig.5- ARDUINO

VI.ADC (Analog-to-Digital Converter): Stands for "Analog-to-Digital Converter." Since computers only process digital information, they require digital input. Therefore, if an analog input is sent to a computer, an analog-to-digital converter (ADC) is required. This device can take an analog signal, such as an electrical current, and digitize it into a binary format that the computer can understand. A common use for an [12]ADC is to convert analog video to a digital format. For example, [7] video recorded on 8mm film or a VHS tape is stored in an analog format. In order to transfer the video to a computer, the video must be converted to a digital format. This can be done using an ADC video conversion box, which typically has composite video inputs and a Firewire output. [8] Some digital camcorders that have analog inputs can also be used to convert video from analog to digital.

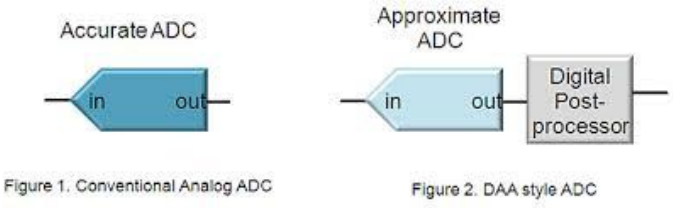



Fig.6- Analog-to-Digital Converter

## III. SIMULATION RESULT

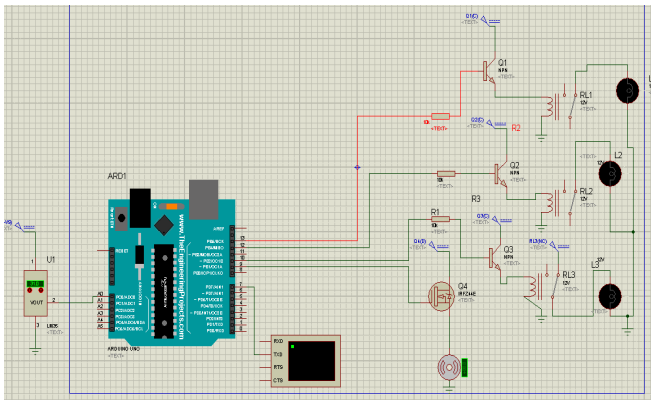
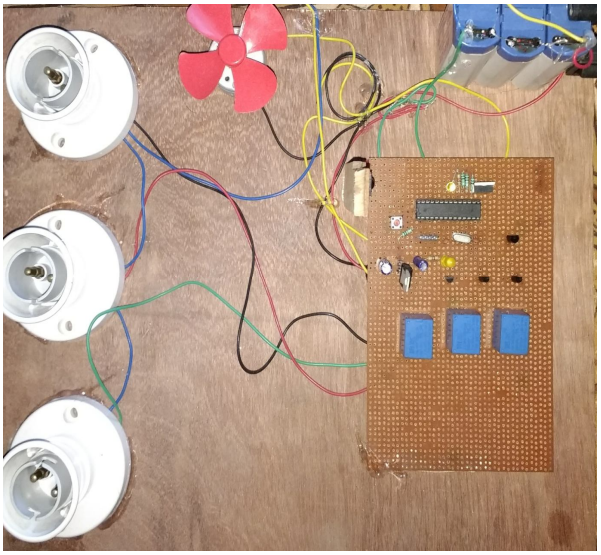


Fig: simulation circuit



## IV. CONCLUSION

In conclusion, the process in developing this innovative circuit is successfully done. The hardware implementation and its operation is functioning accordingly and smoothly following the procedure. High priority has been given to make the circuit simple but efficient with high reliability. Some slight of modifications have been made from the current and existing technology features to improve its performance such as using[10] TRAIC instead of relay, speed change with one degree temperature change. The circuit has fulfilled the main objective, which to control the speed of fan using the temperature controller with microcontroller [11]. Various graphs have been plotted to show the varying relationships between different parameters. This circuit is really practical to be applied, especially in real life applications.

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