AUTOMATIC ON/OFF OF A FAN USING ATMEGA328

Assistant.professor.S.Rathna prabha[1],A.Sivagurunathan[2], A.Valith[3], R.Vimal kumar[4]
[1]*Assistant Professor, Instrumentation and Control Engineering, Saranathan College of Engineering, Trichy, India*
[2,3,4]*Student, Instrumentation and Control Engineering, Saranathan College of Engineering, Trichy, India*

***Abstract*- The smart electric fan system controls the regulation of fan speed based on the temperature of the room and automatic ON/OFF of fan system also done based on the presence and absence of the human inside the room. The system is developed with the help of ATMEGA328 MICROCONTROLLER which can be used to control the speed of an electric fan based on the changes in temperature of its surrounding using temperature sensor LM35DZ .Its flexibility and reliable functioning controls the action of regulation without human intervention.**

Index Terms- **Temperature, Arduino, LM35, IR proximity sensor, automatic control, ATMEGA328.**

I. INTRODUCTION

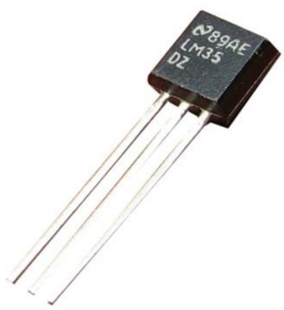
In recent years, the homeEnvironment has seen a rapid introduction of network enabled digital technology. ThisTechnology offers new and exciting opportunities to increase the connectivity of devices within the home for the Purpose of home automation. However, the adoption of home automation systems has been slow. So, this work is aStandard automatic fan speed controller that controls the speed of an electric fan according to our requirement. Use of Embedded technology makes this closed loop feedback control system efficient and reliable. Micro controller allowsDynamic and faster control. Liquid crystal display (LCD) makes the system user-friendly. The sensed temperature and fan speed level values are simultaneously displayed on the LCD panel. Micro controller is the heart of the circuit as it
controls all the functions. Visitor counting is simply a measurement of the visitor traffic
entering and exiting offices, malls, sports venues, etc. Counting the visitors help to maximize the efficiency and effectiveness of employees, floor
area and sales potential of an organization. Here is a low-cost microcontroller-based visitor counter that can be used to know the number of person at a place. All the components required are readily available in the market and the circuit iseasy to build. A buzzer is provided for audio indication of fan speed variation. Whenever the fan speed is increased / decreased, the system acknowledges by a short beep. The relays are used to operate the electrical fan or for operating any other electrical device. Normally the relays remain off. As soon as pin of the micro controller goes high, the relays operate. The system uses a compact circuitry built around ATMEGA328
Microcontroller Programs are developed in Embedded C. Flash magic is used for loading programs into Microcontroller.
These days switching of different level of speeds is achieved only with the help ofhuman support and it is not maintained properly according to the temperature of the surroundings .These results in unnecessary waste of useful energy, which is one of the highly required energy need to be saved a lot .This also includes unwanted participation of human in the regulation of speed. In order to overcome this situation we developed “THE SMART ELECTRIC FAN SYSTEM” which is controlled based on the temperature of the surroundings where it is used. Fan or air conditioner need not to be used during cold days. Air regulation should be needed as per our wish. This can be done only through manual effort.to avoid this inconvenience a sophisticated automatic control of the fan speed should be needed .for that the smart electric fan has been designed.

II. COMPONENTS USED

A system is constructed with a certain components that every component has its own function integrated to each other’s for completing the hole system to functioning. The components should have the input, controller and the output. In this system, the input is a temperature sensor, the controller is a microcontroller and the output is a AC motor and also LCD for status monitoring.IR sensor sensing the input signal give information to microcontroller to control the room light according to the human occupancy.

i. LM35:-

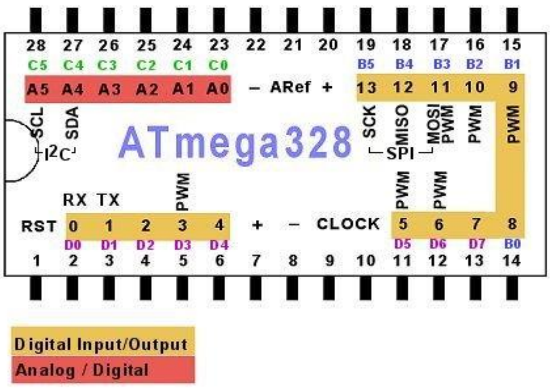
The LM35 series are precision integrated-circuit Calibrated Directly in degree Celsius (Centigrade) .Its Linear scale factor + 10 mV/°C .Its Ensured Accuracy is 0.1 degree Celsius .This will make it as an advantage over linear temperature. It is rated from −50°C to +150°C. It is more suitable for Remote Applications.



ii. ATMEGA328:-

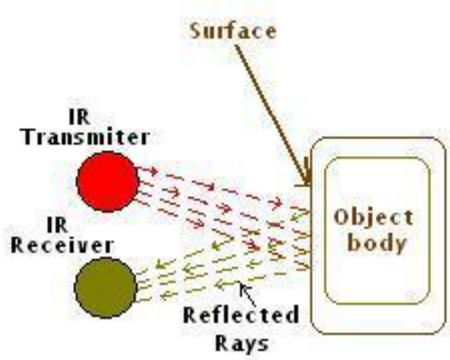
It is a 28 pin micro-controller Chip .It includes analog pins, digital pins, clock, receiver, transmitter and reset pin .Its act like intelligence. It can be easily reprogrammable so we can easily modify the

program as our wish.
It has PWM techniques.



iii. PROXIMITY SENSOR:-

A proximity sensor is a sensor able to detect the presence of nearby objects without any physical contact. A proximity sensor often emits an electromagnetic field or a beam of electromagnetic radiation(infrared, for instance), and looks for changes in the field or return signal. The object being sensed is often referred to as the proximity sensor's target. Different proximity sensor targets demand different sensors. For example, a capacitive or photoelectric sensor might be suitable for a plastic target; an inductive proximity sensor always requires a metal target. The proximity sensor module contains a IR LED and a photo transistor whose output is given to an operational amplifier IC like LM35 for proper amplification.



Calibrating the Proximity Sensor:-

After interfacing the proximity sensor with Arduino board upload the callibrate program.
Determine the threshold at which the arduino must switch on the light
The serial monitor will show the reading Front for the proximity sensor of the front side of the door and the back will show the reading of the proximity sensor of the backside of the door.

DRIVER CIRCUIT:-

L293D LOGIC TABLE:-

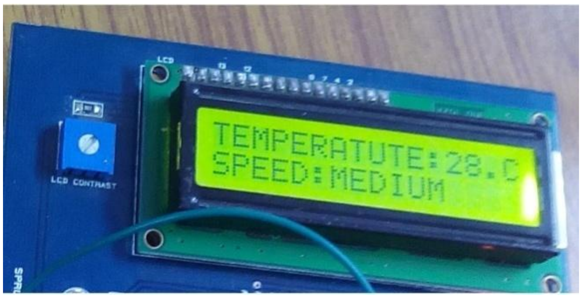
PIN 2	PIN 7	ROTATION
LOGIC 0	LOGIC 0	NO ROTATION
LOGIC 0	LOGIC 1	ANTICLOCKWISE
LOGIC 1	LOGIC 0	CLOCKWISE
LOGIC 1	LOGIC 1	NO ROTATION

DEVICE DESCRIPTION:-

L293D will be used as a motor driver. It means if we want to operate a motor at 9V then we need to provide a supply of 9v across VSS motor supply.

iv. LCD:-

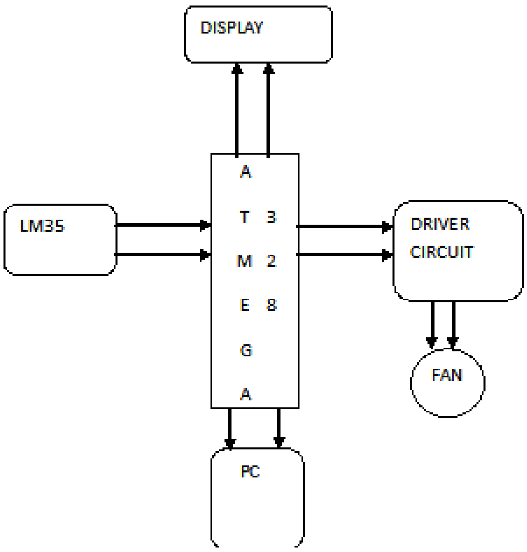
The display unit will shows the various temperature levels as well as the speed of the fan according to that temperature.



III.SOFTWARE DESCRIPTION

The language has been used here is ‘C’. The reason is that it is very compatible when working with Arduino .The program to control the fan speed automatically according to the various temperature levels was written on ATMEGA328 microcontroller chip using this ‘C’ language

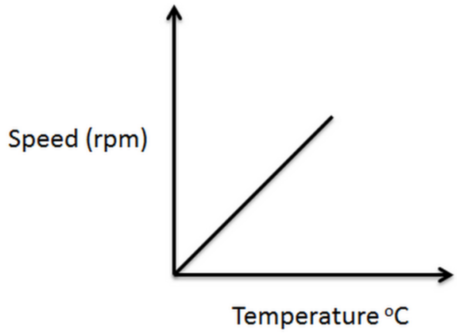
TEMPERTURE CONTROLLERCIRCUIT



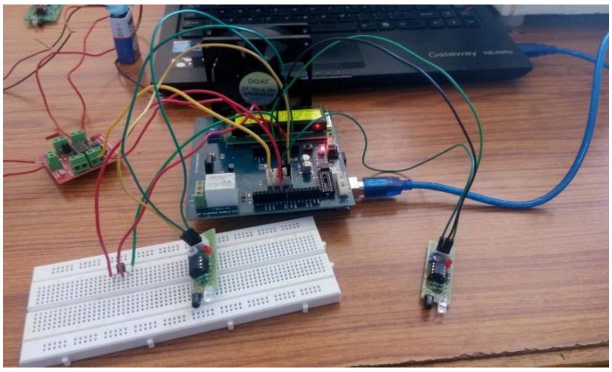
Accurate centigrade temperature is sensed using LM35 temperature sensor. LM35 sensor works on the basis of the common fact , as temperature increases, the voltage across a diode increases at a known rate. The IC has output of 10mv/degree centigrade. In theoretical experimentation when the temperature is 45 degree then the output of sensor will be 450mv or 0.45v .The sensed temperature will be the input for the microcontroller ATMEGA328.The microcontroller is programmed using AURDINO software. Based on the program the driver circuit will rotate the fan wings. The rotational speed of the fan and the room temperature will displayed using LCD.

V. WOKING OF AUTOMATION

Here we are using two IR sensors to run the automation process. They are numbered as 1 and 2 respectively and act as the entry and exit sensors. When a person crosses both the sensors the counting gets started. This is displayed in the Arduino program. The counting will increase by a count of one depending on the number of persons entering. A fan is triggered on automatically as soon as a person passes through both the sensors. The same thing applies for a person exiting from the sensors (2, 1) respectively. Hence the count automatically starts decreasing. When all the persons leave the exit area and no one is remaining inside then the fan is turned off



automatically.



VI. EXECUTION AND RESULT

When temperature is below 20 degree Celsius the fan will rotate in a slow motion .the respective speed will be displayed in a LCD. Likewise for particular ranges of temperature the respective speed of the fan will be displayed in LCD.

The graph will tells about the relationship between the speed and temperature. Clearly it shows the fan speed get increase when the temperature will increase.

VII. CONCLUTION

We have successfully programmed the micro-controller to control the fan speed based on the surrounding temperature conditions. The output speed of the fan and temperature of the room has been displayed in LCD.And also done an automatic ON/OFF control system of fan based on the presence of people inside the room**.**

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