



L&T Technology Services



Document History

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CASE STUDY ON HOME AUTOMATION SYSTEM

ABSTRACT

The consumption of electrical energy is highly increasing now -a- days due to our day -to- day requirements. This will create a huge demand on electrical supply. This project describes the design and construction of fan speed control according to the room temperature, light control according to light intensity and turned on/off control automatically with the human detection. The temperature sensor was carefully chosen to gauge the room temperature, LDR sensor was chosen to check the intensity of light and IR sensor was chosen for detect the human. Depending upon the detection of human the system will work which is controlled by the Atmega328.

INTRODUCTION

We built an IOT based system which can automatically switch ON room lights and fan when at least one person presents in the room. If the room is empty, the lights and fan will automatically get switch OFF. It also displays count of persons present in the room. We build the system using Atmega328 and IR sensor module.

In our country especially in rooms switching ON or OFF electrical fans is still commonly made by manual switches. Hence, people are becoming so busy that they forget to turn off switches after leaving the room. The world temperature is increasing rapidly so a new technology is required to adapt to this varying temperature.

The need for automatic system is the concern of today's technology. The sensor would observe an interruption and provide an input to the controller increment or decrement depending on entering or exiting of the person. The counting and temperature are displayed on 16*2 LCD through the Atmega328.

REQUIREMENTS

High level requirements:

- ❖ If any person entering the room should be detected by the first IR sensor module, persons counting is recorded and the circuit automatically turns ON.
- ❖ According to the room temperature detected by LM35 sensor and the intensity of the light detected by LDR sensor the DC fan run and LED light glow controlled by the relay.
- ❖ If the last person leaving the room detected by the second IR sensor module, the circuit should automatically turn OFF controlled by the Atmega328 Controller.

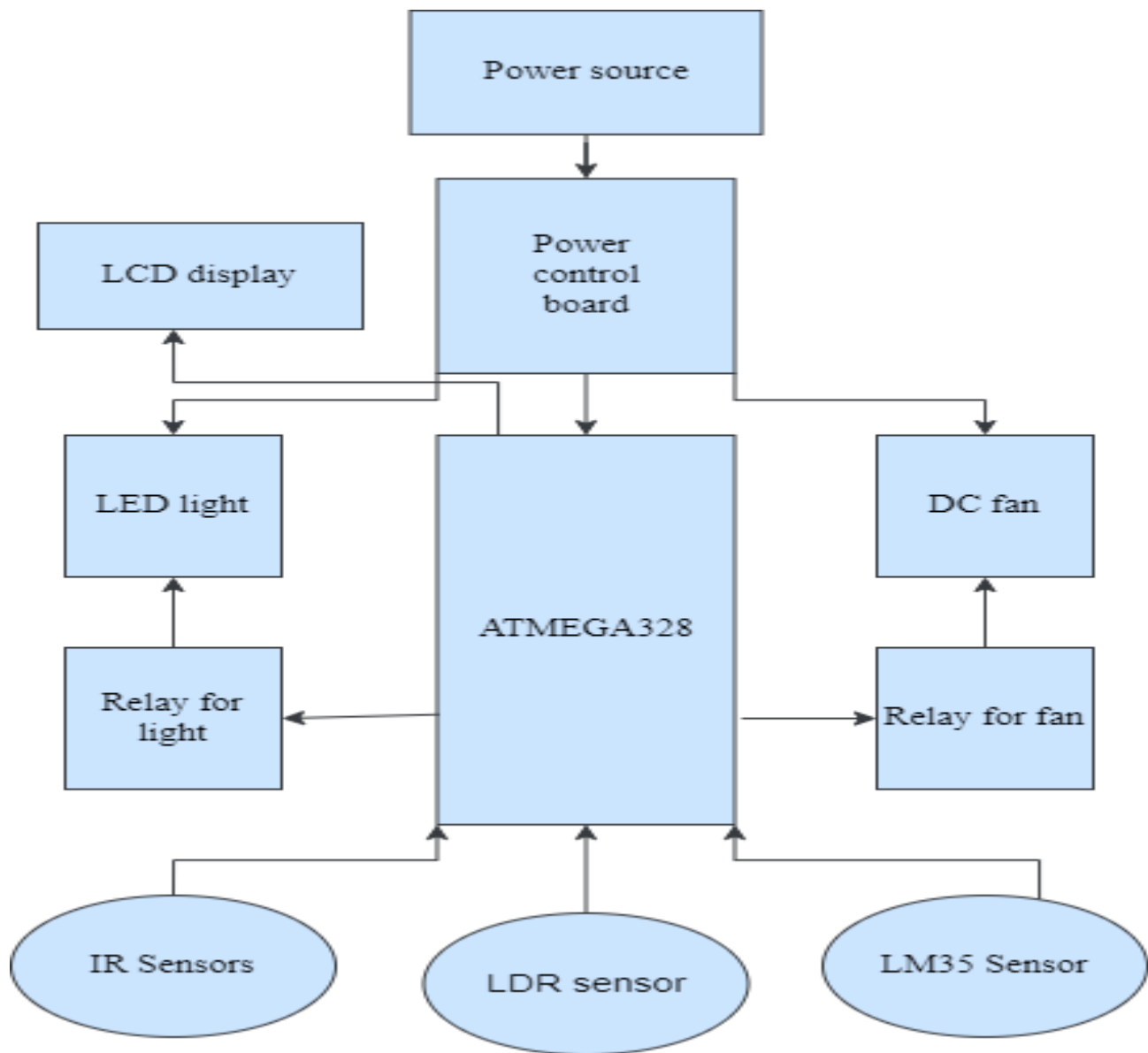
Low level requirements:

- ❖ The requirement is to turn ON or OFF the light and fan in a room with human detection controlled by the Atmega328 Controller.
- ❖ This project describes the design and construction of fan speed control according to the room temperature, light control according to light intensity and turned on/off by Atmega328 which controls automatically with the human detection.

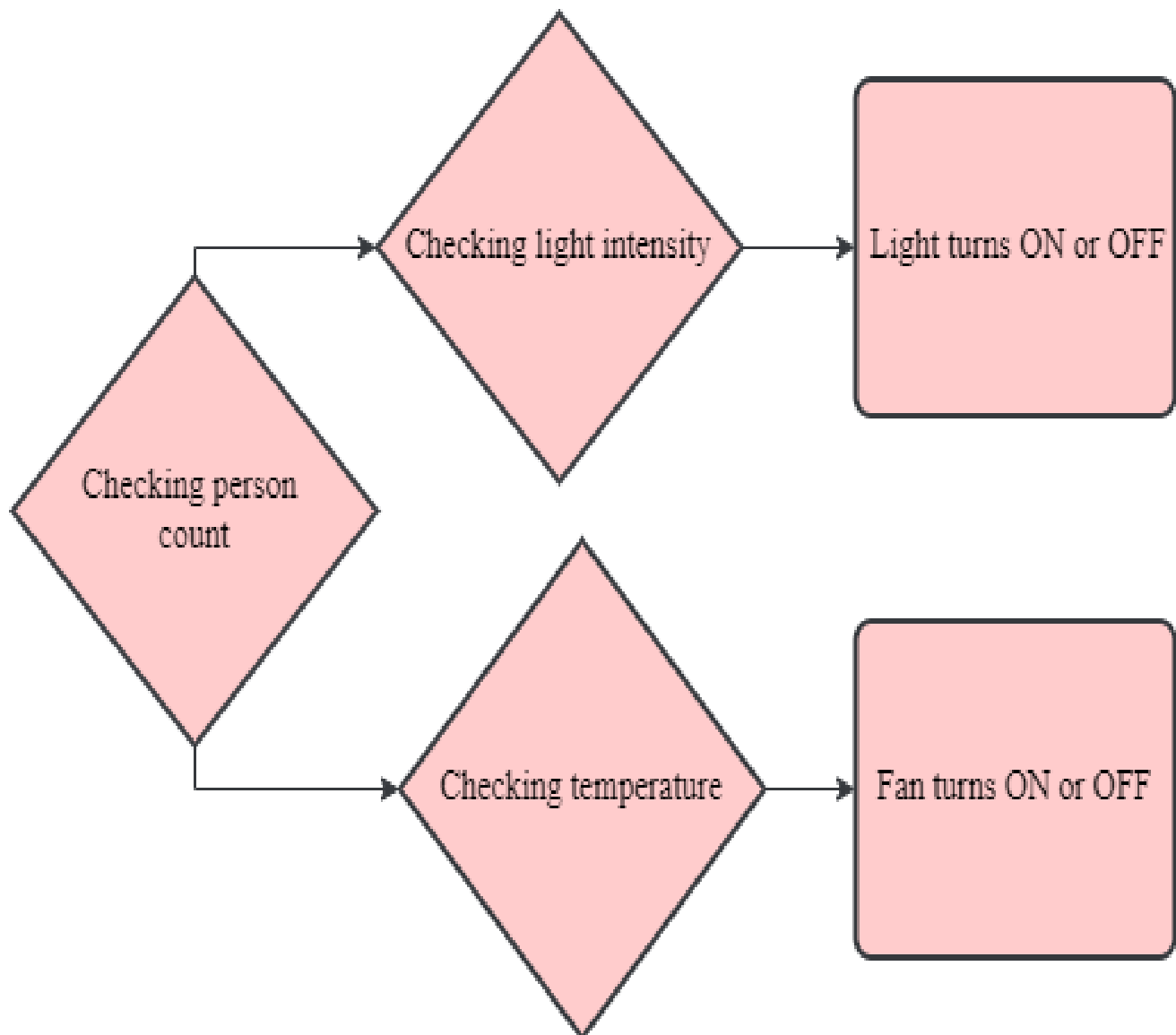
COMPONENTS REQUIRED:

- Atmega328 controller
- Power control board
- LCD screen (16*2)
- IR sensor (Infrared sensor)
- LDR sensor (Light Detecting Sensor)
- Temperature sensor (LM35)
- Relay board
- LED light
- DC fan

BLOCK DIAGRAM



FLOW CHART



WORKING

In this project Power source connected to a power supply board with a switch that controls the flow of current in the electric circuit whenever we need that system.

The power supply board consists of bridge rectifier, voltage regulators, capacitors, and resistors. Bridge rectifier provides the output for either polarity of input to prevent the circuit from damage. Voltage regulator (IC 7805) connected to the Atmega328 which requires 5V and regulator (IC 7812) connected to the relay board which requires 12V.

The Atmega328 is connected with LCD screen, IR sensor, LDR sensor, LM35 sensor and relay module. The outputs of the sensors are the analog inputs of the Atmga328. The output of the Atmega328 connected to the relay modules. The temperature, person counting, and fan speed are displayed in the LCD screen that gets information from the Atmega328. IR Sensor used to detect the person entering and leaving the room, LDR sensor used to detect the intensity of the room and LM35 sensor used to detect the temperature of the room. After supplying the voltage to the Atmga328 the system starts to work.

When there is movement in the room is detected by the IR sensor the system begins, LDR sensor detects the intensity of the room if the room is dark then the LED bulb glow that is controlled by one relay module, LM35 sensor detects the temperature and for different temperatures the DC fan run in different speeds that is controlled by another relay module gets signals from Atmega328 loaded with the program. The Atmega328 controls the relay module to make the circuit opened or closed.

ADVANTAGES AND DISADVANTAGES

ADVANTAGES

- ❖ This system controls the light and fan automatically, so it reduces manpower.
- ❖ This project can be implemented in industries, where they fail to switch off the fans and lights.
- ❖ It is very economical and easy to handle by the user.
- ❖ It is very helpful to disabled people.
- ❖ Save energy by slowing down its speed in low temperature.
- ❖ The fan designed in this project can also be used in small scale industries for cooling the electrical/mechanical equipment.
- ❖ The circuit can be used for car engine to reduce the heat

DISADVANTAGES

- ❖ Due to temperature variation, after sometimes its efficiency may decrease.
- ❖ Atmega328 is the heart of the circuit. If controller is damaged the whole system will interrupt.

CONCLUSION

In this project, the Atmega328 can successfully controlling the DC fan and LED light using relay. Atmega328 was programmed using C language to compare temperature with standard temperature, detect the light intensity, set fan speed, and made light ON with their values displayed on the LCD. Moreover, the fan speed will be increased or decreased automatically based on the room temperature and light ON when room become dark. As Conclusion, the system which designed in this work will perform very well, for any temperature, light intensity and classified as automatic control. The total effective cost of proposed system is very low as compared to existing system for home and industries, so this project can be brought into a commercial product beneficial to the society.