

Automatic Room Light Controller with Bidirectional Visitor Counter

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Abstract: This project presents a Smart Hall Automation System using the ATmega328 microcontroller, integrating IR sensors, a DS1820 temperature sensor, and an LCD display for real-time monitoring and control. The system is designed to count the number of persons entering and exiting a hall using two IR sensors. Based on the count, the system automatically controls lights and a fan, ensuring energy efficiency. Additionally, it continuously monitors the room temperature and displays both the count and temperature on the LCD screen. The power supply for the system is designed using a 12-0-12 center-tap step-down transformer, a rectifier circuit with 1N4007 diodes, and voltage regulation using a 7805 regulator. The relays for controlling the light and fan are driven by a relay driver circuit connected to the ATmega328. The logic ensures that lights are turned on when at least one person is inside the hall, and the fan is activated only if the room temperature exceeds 36°C. The automation process is implemented using an embedded C program, interfacing the IR sensors for person detection, the DS1820 sensor for temperature sensing, and the LCD for displaying system status. A buzzer is included for alerting when a person enters or exits. This project provides an efficient, low-cost automation solution suitable for classrooms, conference halls, and other enclosed spaces where automatic energy management is required.

Keywords: Smart Hall Automation System

