Smart Room Automation System using Arduino

Objective

To design and simulate a smart room system that automatically controls lighting, temperature, and safety using sensors and embedded logic.

Components Used

- Arduino UNO
- PIR Sensor
- LDR
- TMP36 Temperature Sensor
- MQ-2 Gas Sensor
- DC Motor (Fan)
- LED
- Buzzer
- Push Button
- 16×2 I2C LCD

Working Principle

The system operates primarily in automatic mode. The PIR sensor detects human presence. The LDR controls lighting based on ambient light conditions. The temperature sensor adjusts fan speed using PWM. Gas sensor has the highest priority and triggers an emergency alert by activating the buzzer and running the fan at maximum speed. A 16×2 LCD displays real-time system status.

Tools Used

- Arduino IDE
- Tinkercad

Conclusion

This project demonstrates practical application of embedded systems concepts such as sensor integration, PWM control, safety prioritization, and real-time monitoring.