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# Automation System Using Pir, Ldr, And Temperature Sensors With Ardunio

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**Abstract**

In recent years, home automation has emerged as a significant area of research and development due to the increasing demand for energy-efficient and intelligent living environments. This paper presents a Smart Room

Automation System developed using an Arduino UNO and basic /oT components such as a PIR sensor, LOR, and TMP36 temperature sensor. The system is designed to automatically control appliances such as lights, fans, and alarms based on real-time environmental data, including motion, light intensity, and temperature. The objective is to reduce energy consumption while enhancing comfort and security. The proposed solution is cost- effective, easy to implement, and well-suited for both residential and educational applications.

Keywords - Arduino UNO, PIR Sensor, LDR, TMP36, Smart Automation, loT, Home Automation

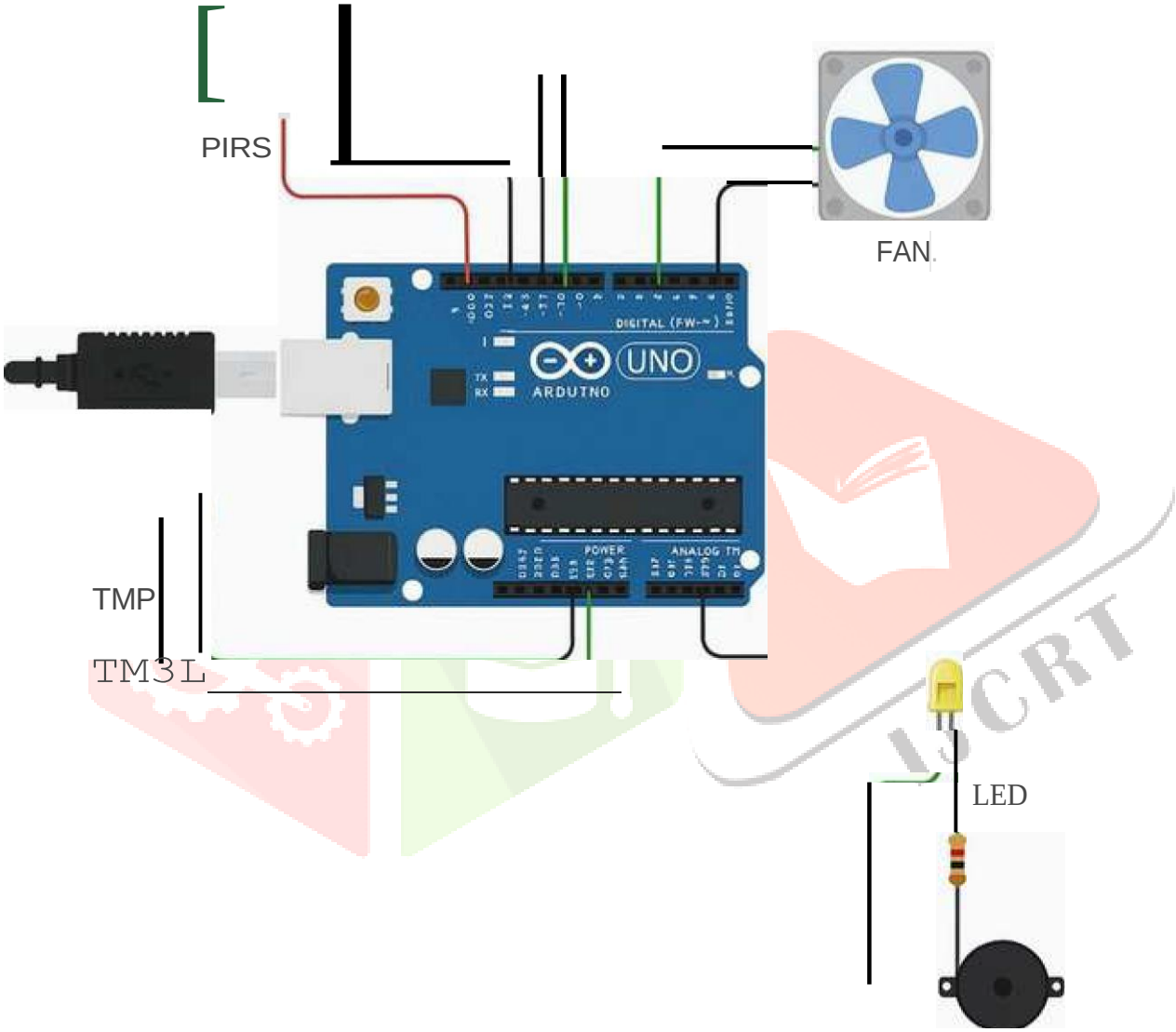
## INTRODUCTION

"This research focuses on developing a Smart Room Automation System that responds to human presence, ambient light, and temperature using affordable, readily available components."

The system consists of a **PIR** (Passive Infrared) sensor to detect motion, an LDR (Light Dependent Resistor) to measure ambient light, and a TMP36 sensor to monitor room temperature. These inputs are

processed by an Arduino UNO microcontroller, which controls connected devices such as lights, fans, a servo motor, or a buzzer.

This paper describes the design, implementation, and testing of the system using Tinkercad simulations and real-time Arduino code. The project not only demonstrates a practical application of embedded systems and IoT but also aligns with sustainable energy practices by automating the use of electrical appliances.

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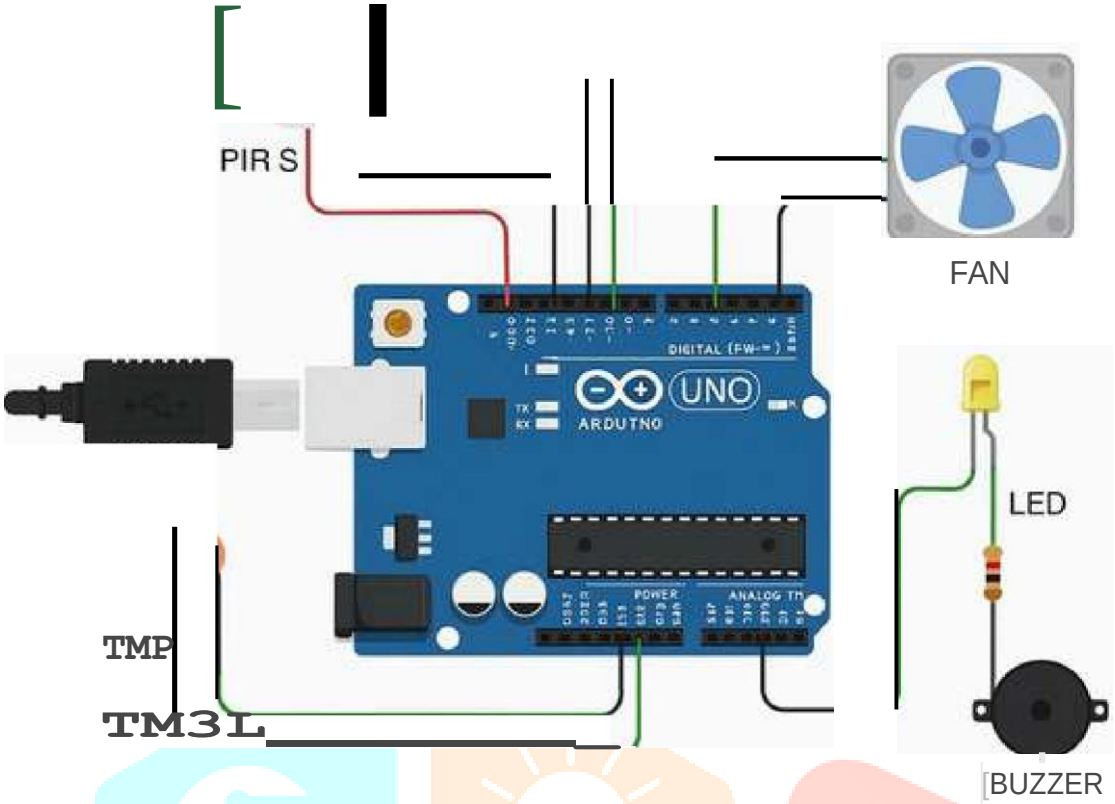


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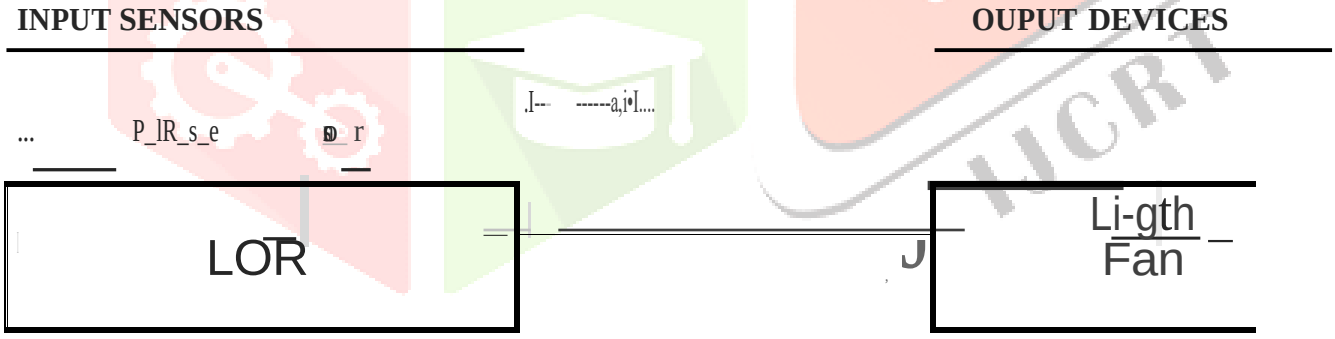


I **MICROCONTROLLE** .....--- .....▶... 1 Servo Motor

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METHODOLOGY

The Smart Room Automation System was developed using a combination of input sensors, output devices, and a central microcontroller, all integrated and tested using Tinkercad simulation. The system is

programmed to make real-time decisions based on sensor data and perform corresponding actions to maintain comfort and energy efficiency in the room.

> The following components are used:

Input Sensors

**PIR** Sensor: Detects motion or human presence in the room.

LDR (Light Dependent Resistor): Measures ambient light intensity to determine whether artificial lighting is needed.

TMP36 Temperature Sensor: Monitors the ambient temperature of the room.

Microcontroller

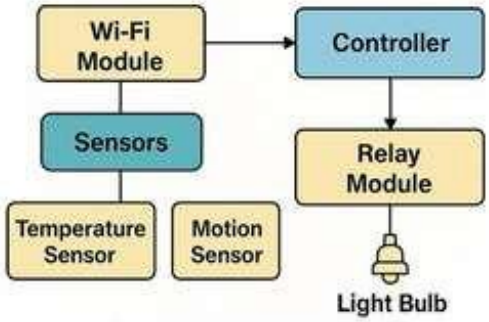
Arduino **UNO:** Serves as the central controller that receives data from the sensors, processes it, and activates the appropriate output devices.

Output Devices

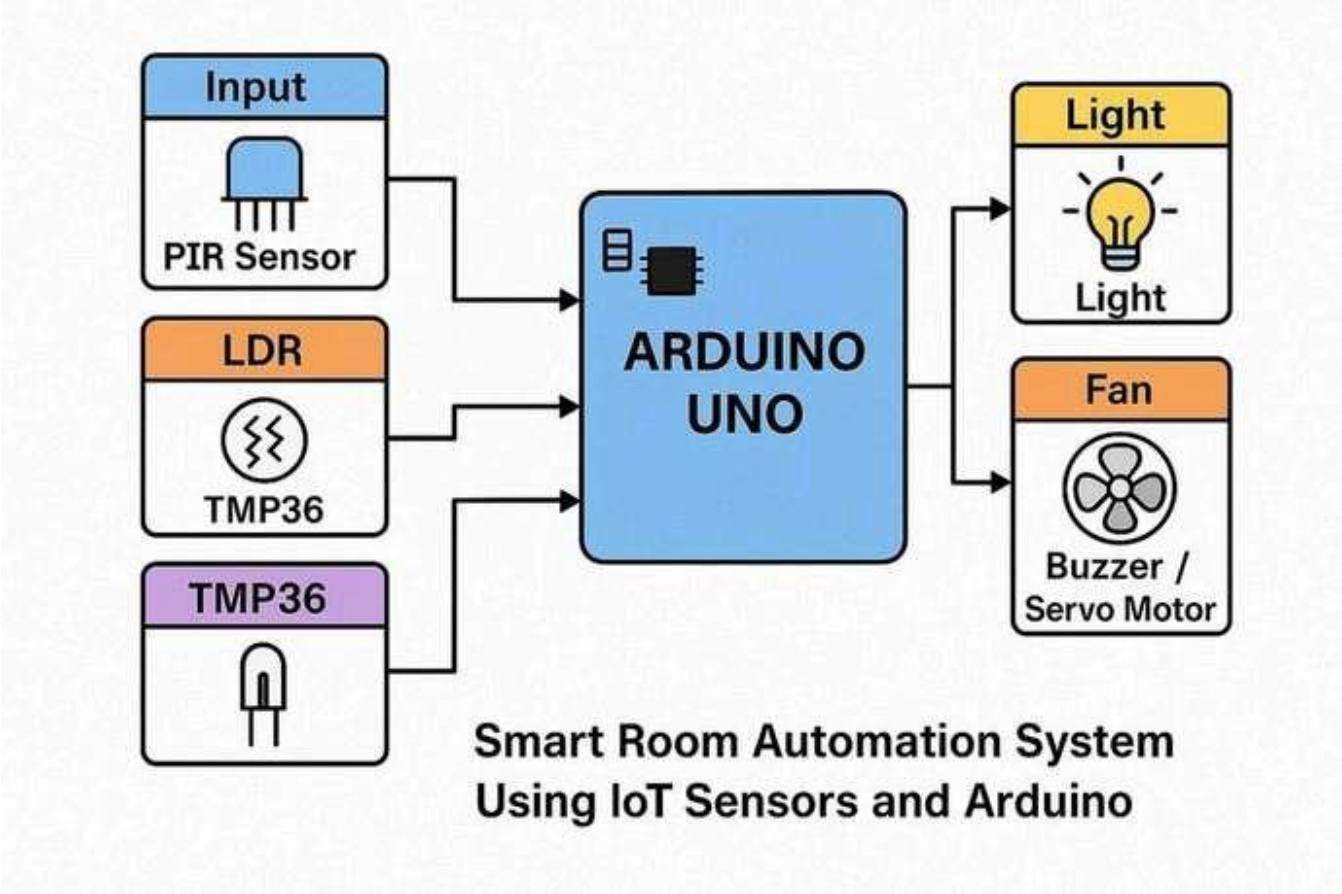
LED or Light Bulb: Automatically turns on when motion is detected and the light level is below a predefined threshold.

Fan or Servo Motor: Activates when the temperature exceeds 30°C to improve air circulation.

Buzzer: Used to alert users under specific conditions, such as motion detection during unauthorized hours




Smart Room Automation System Architecture




## RESULTS

The Smart Room Automation System was tested under various simulated environmental conditions using Tinkercad. The results confirmed that the system responded accurately to the programmed thresholds and sensor inputs.

Specifically, when motion was detected and the light intensity was below the preset threshold, the LED light automatically turned on. Similarly, when the temperature exceeded 30°C, the system activated a fan or servo motor to regulate the room temperature. In scenarios where no motion was detected for a predefined period (e.g., 15-30 seconds), all output devices were automatically turned off to conserve energy.

The simulation validated the functionality and efficiency of the automation logic. Overall, the system performed as exl?ected and demonstrated significant potential for reducing unnecessary power consumption in mdoor environments.

## CONCLUSION

This project successfully demonstrates the implementation of a cost-effective and energy-efficient Smart Room Automation System using Arduino and basic IoT components. The system accurately responded to environmental conditions such as motion, light intensity, and temperature, enabling intelligent control of lights, fans, and alerts. By leveraging simple sensors and actuators, the solution contributes to energy conservation and enhanced comfort in indoor spaces.

Future enhancements may involve incorporating wireless communication modules (e.g., **Wi-Fi** or Bluetooth), smartphone-based control interfaces, or integration with voice-controlled virtual assistants like Amazon Alexa or Google Assistant to expand functionality and usability.

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