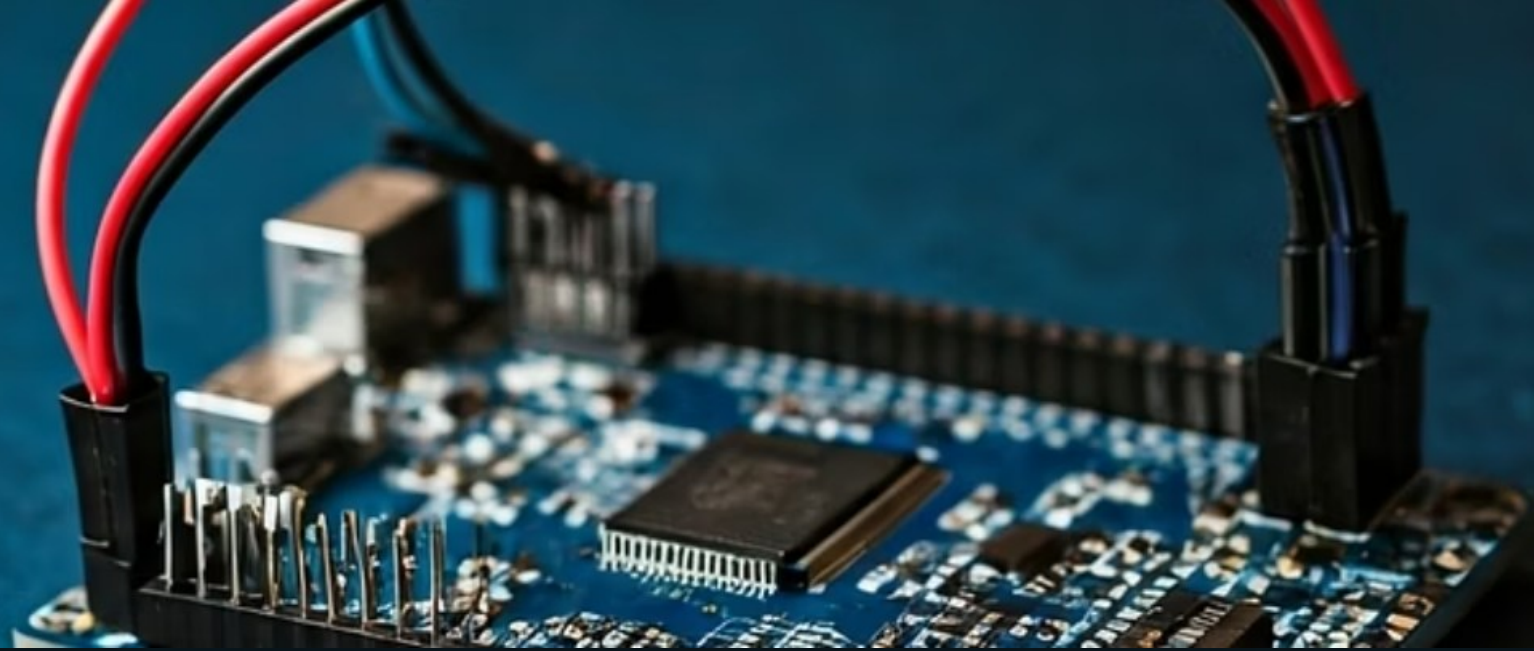


A modern interior wall with a wooden slat panel and a glowing square light fixture.

Smart Home Automation System using Arduino

This presentation explores an Arduino-based smart home automation system. It focuses on motion detection, light control, and security features.



Introduction to Smart Home Automation



Automating Basic Functions

Home automation improves daily living. It enhances comfort and safety.



Why Automate?

Automating lights, alarms, and sensors is important. It adds convenience and efficiency.



Our Arduino System

We aim to create an Arduino-based system. It uses sensors and actuators for automation.

Key Components Used

Core Microcontroller

- Arduino Uno

Detection Sensors

- PIR Motion Sensor
- LDR (Light Dependent Resistor)
- Ultrasonic Sensor (HC-SR04)
- Temperature & Humidity Sensor (DHT)
- Sound Sensor

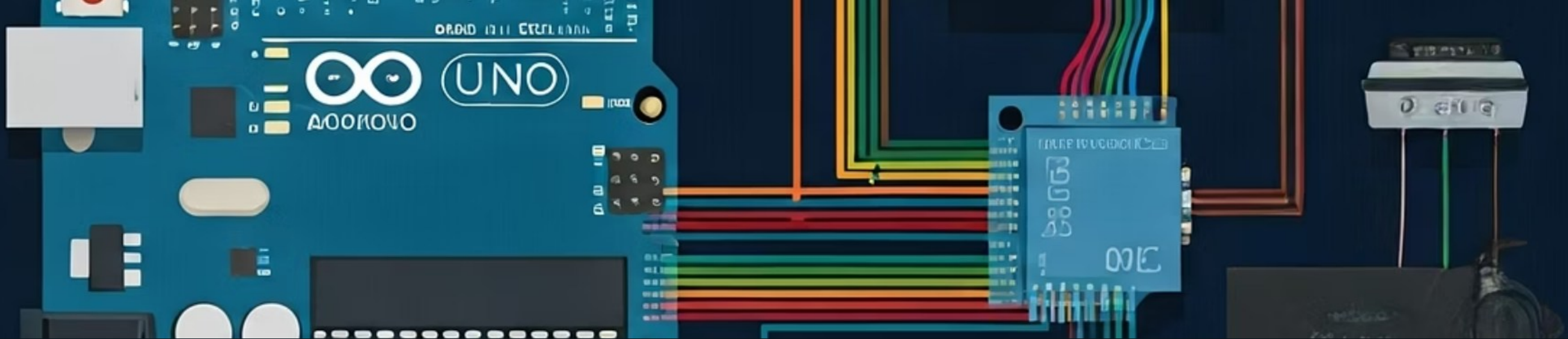
Actuators & Output

- Relay Modules
- Light Bulbs
- Servo Motor
- Buzzer

Power & Connectivity

- Power Source
- USB Cable





Circuit Diagram Overview



Power Connections

Ensure stable power supply to all components.



Sensor Wiring

Connect sensors to appropriate Arduino input pins.



Actuator Wiring

Relays and motors connect to output pins.



Color Coding

Wires are color-coded for clarity and ease of setup.

Working Principle of Components

Motion & Distance

- **Motion Sensor (PIR):** Detects human movement.
- **Ultrasonic Sensor:** Measures object distance.

Light & Climate

- **LDR:** Measures ambient light.
- **DHT Sensor:** Monitors temperature and humidity.

Control & Alert

- **Relays:** Switches light bulbs.
- **Servo Motor:** Simulates door lock.
- **Buzzer:** Sounds alerts.
- **Sound Sensor:** Detects loud noises.

Arduino Code Logic

Sensor Setup

Initialize all sensors in the setup() function. Define input and output pins.

Continuous Reading

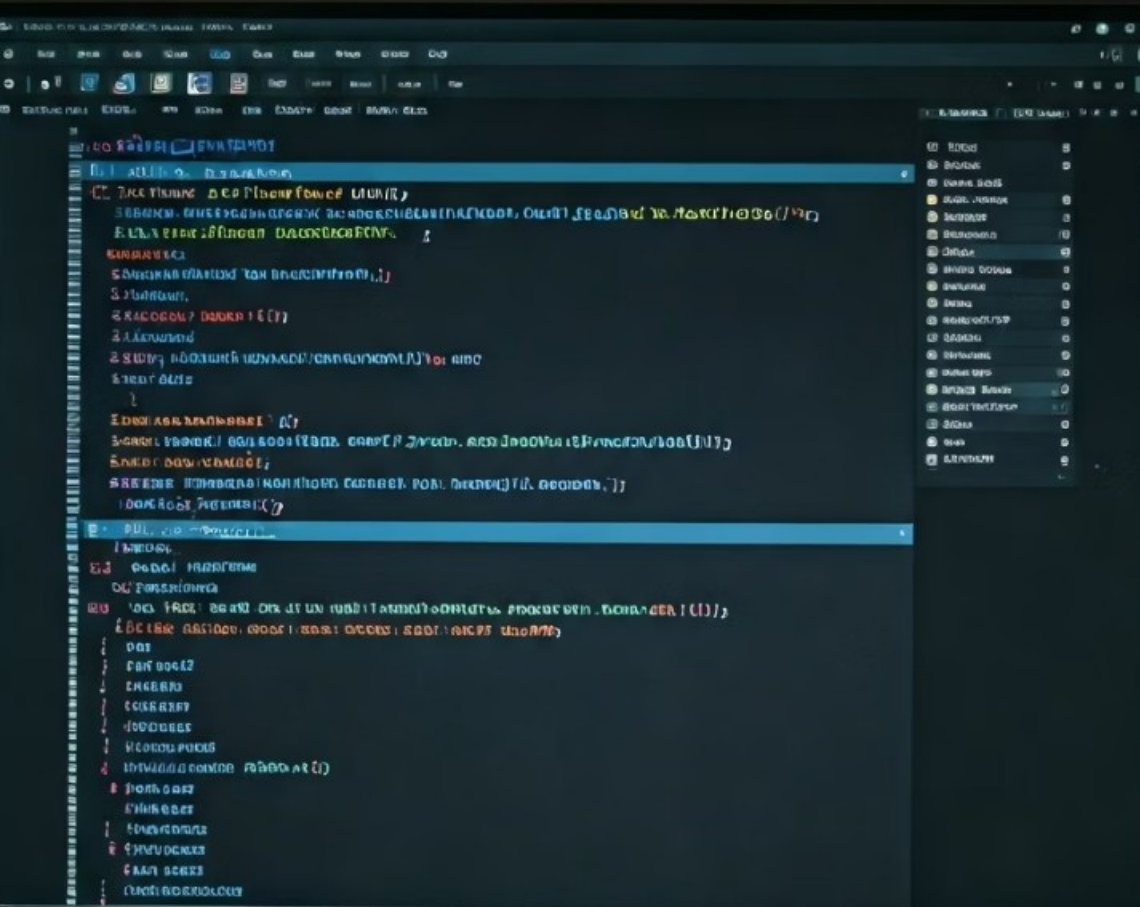
In loop(), constantly read data from all sensors. Update values.

Conditional Actions

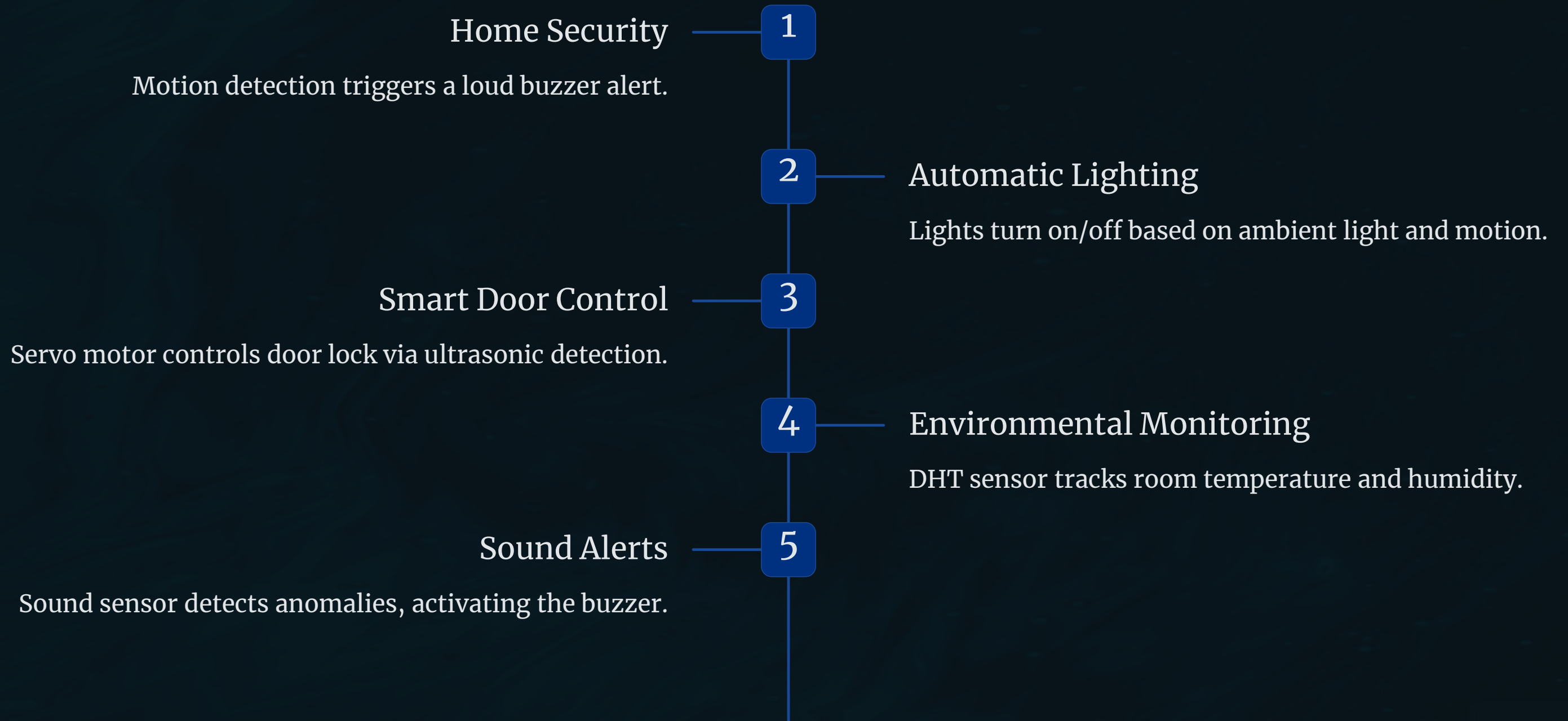
Execute actions based on sensor inputs. Turn lights on/off, trigger alerts, move servo.

Real-time Response

The system reacts immediately to changes. Ensures effective automation.



Application Scenarios





Benefits of Smart Home Automation

1

Energy Saving

Automated lighting reduces unnecessary power consumption.

2

Improved Security

Motion detection and alerts deter intruders effectively.

3

Enhanced Comfort

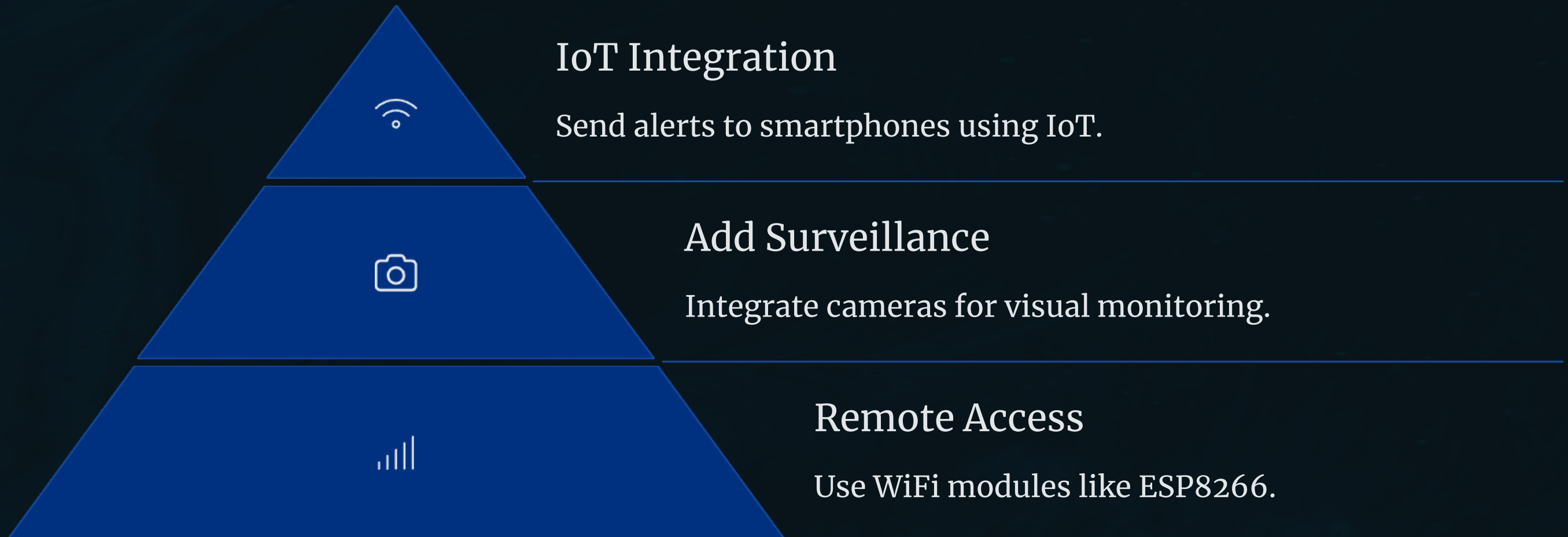
Automated functions provide convenience and ease.

4

Scalability & Customization

System is expandable and adaptable to needs.

Challenges & Future Improvements



Initial challenges include sensor calibration and false positives. Power management is also crucial. Future enhancements focus on advanced connectivity and security measures.

Conclusion: The Future of Smart Homes

Integrated Automation

System combines multiple sensors for smart control.



Enhanced Living

Automated homes offer security, comfort, and efficiency.

Future Growth

Smart homes and IoT development hold immense potential.