Smart Home Automation System

"Empower Your Living Space with Seamless Automation"

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Project Title: Smart Home Automation System

Project Webpage: https://github.com/gkellogg124/FinalProject/tree/main

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Project Overview

The **Smart Home Automation System** allows users to monitor, control, and automate home devices seamlessly. It provides an intuitive interface for homeowners, technicians, and admins to interact with smart devices like lights, thermostats, and motion sensors.

Key Features

1. Device Management

- Add, remove, and monitor devices (lights, thermostats, etc.).

- Toggle device statuses (ON/OFF) and view their current states.

2. Device Grouping *(New)*

- Group devices into categories (e.g., Living Room, Kitchen).

- Control entire device groups with a single action.

3. Schedule Actions

- Schedule devices to turn ON/OFF at specific times.

- Create automation workflows based on user preferences.

4. Automation Rules *(New)*

- Create custom automation workflows based on triggers (e.g., **"If motion sensor activates, turn on lights"**).

5. Run Diagnostics

- Technicians can run diagnostics on devices to check their health.

- Displays device issues (e.g., battery low, disconnected).

6. Alerts Management

- View all alerts (e.g., "Motion Detected," "Battery Low").

- **Critical Alerts** are highlighted for immediate attention.

- Acknowledge and mark alerts as "read."

7. Activity Logs *(New)*

- Track user activities, including device toggles, rule creation, and diagnostics runs.

8. Energy Analytics *(New)*

- Display energy consumption data for devices.
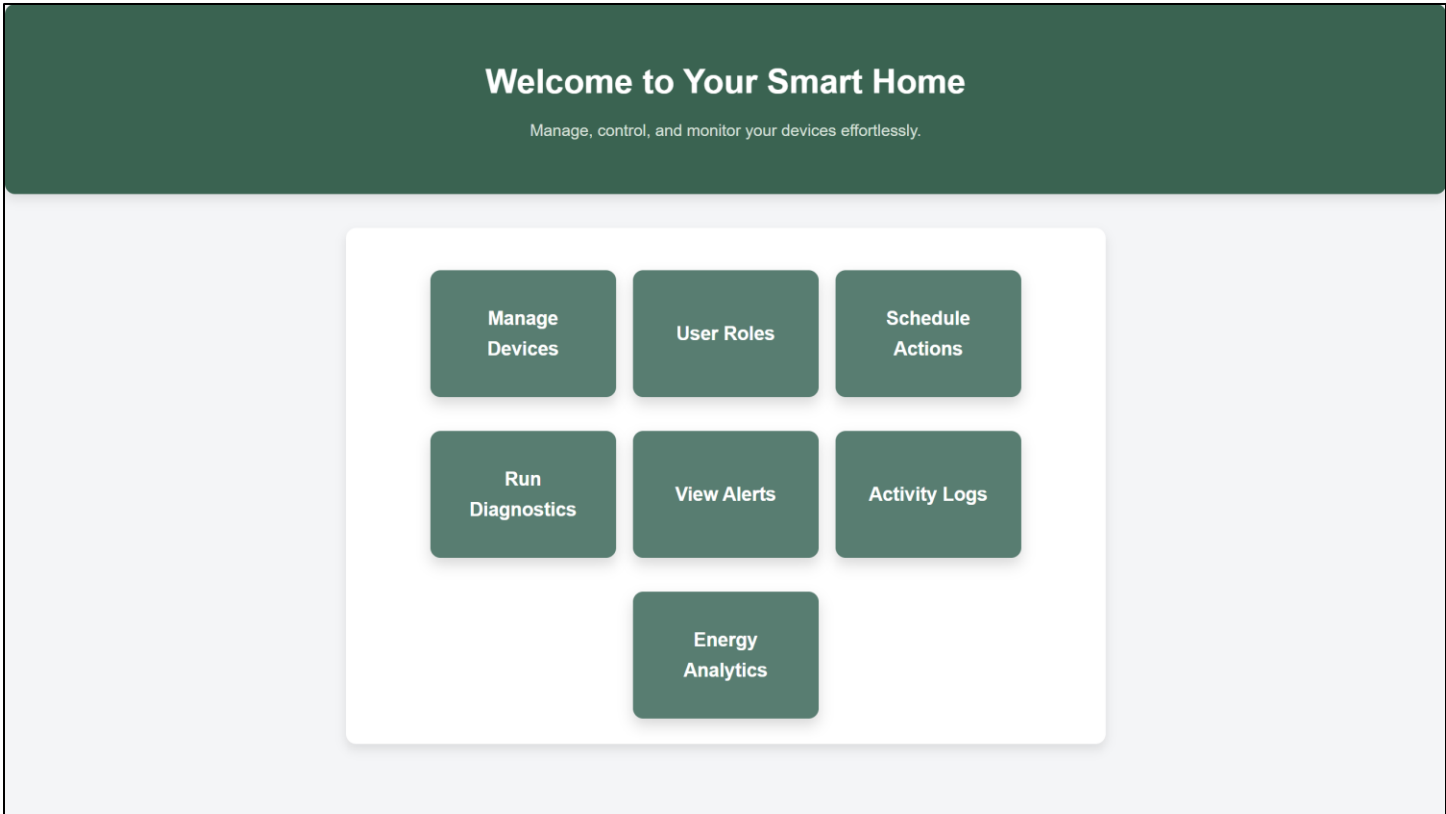
- Helps homeowners optimize energy usage.

9. User Role Management

- Admins can modify roles: Admin, Homeowner, Technician.

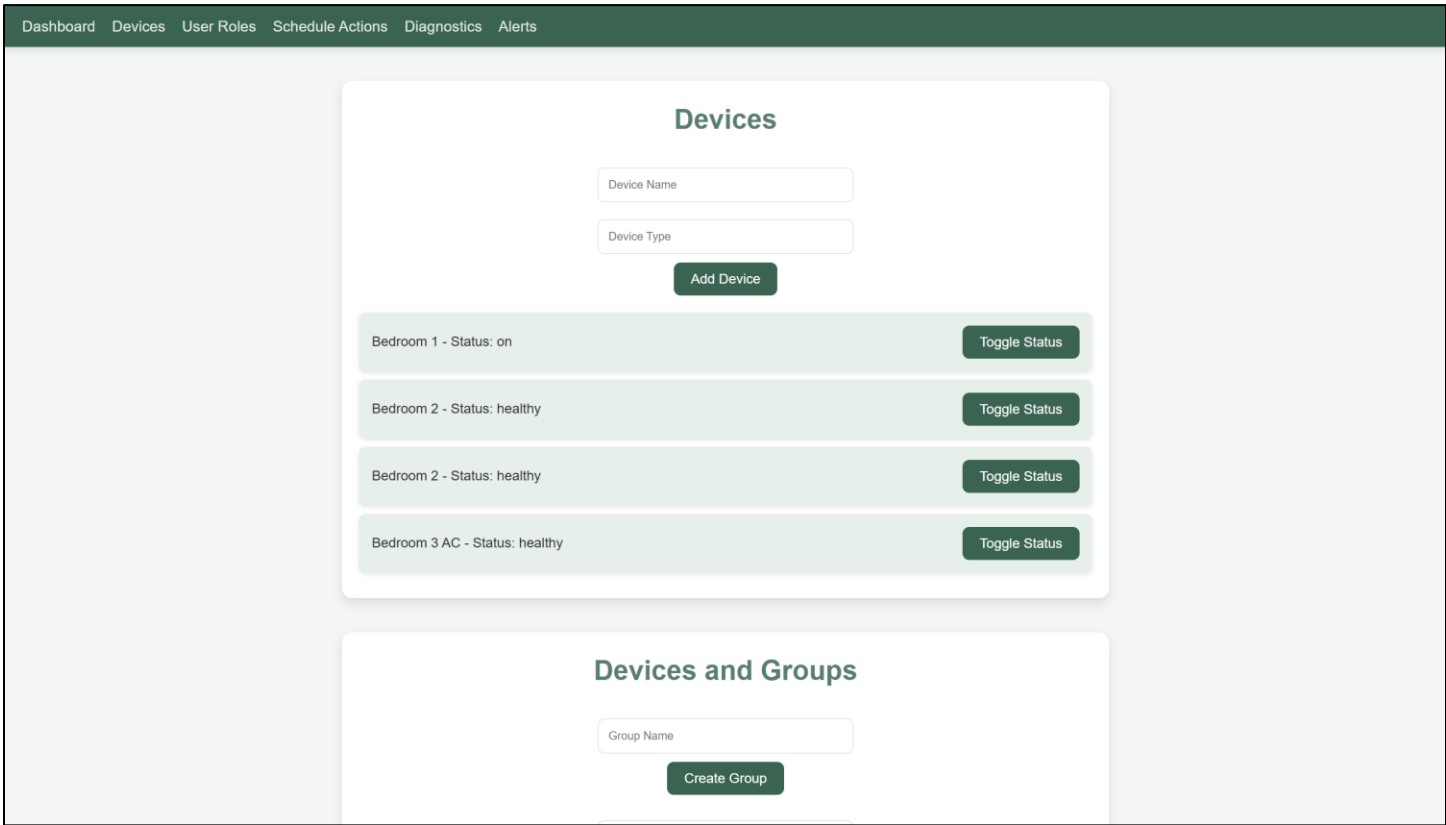- Role-based access control for secure system operations.

System Requirements

- **Hardware:**

  o Server: Any machine with Node.js installed.

  o Client: Modern web browser (e.g., Chrome, Firefox).

- **Software:**

  o Node.js and Express.js

  o SQLite3 for lightweight database management.

Screen Snapshots

1. Dashboard

Welcome to Your Smart Home

Manage, control, and monitor your devices effortlessly.

| Manage Devices | User Roles | Schedule Actions |

| Run Diagnostics | View Alerts | Activity Logs |

| Energy Analytics |

2. Device Management

Dashboard   Devices   User Roles   Schedule Actions   Diagnostics   Alerts

Devices

Device Name

Device Type

Add Device

Bedroom 1 - Status: on   Toggle Status

Bedroom 2 - Status: healthy   Toggle Status

Bedroom 2 - Status: healthy   Toggle Status

Bedroom 3 AC - Status: healthy   Toggle Status

Devices and Groups

Group Name

Create Group

3. Automation Rules

Schedule Actions

Bedroom 1 ⌄

Turn On ⌄

yyyy-mm-dd --:-- -- 🗓

Add Schedule

Bedroom 2 - Turned Off at 7:42 PM

Bedroom 2 - Turned On at 7:45 PM

Bedroom 2 - Turned Off at 7:47 PM

Bedroom 3 AC - Turned Off at 1:14 PM

Automation Rules

Bedroom 1 ⌄

Bedroom 1 ⌄

Turn On ⌄

4. User Roles

Dashboard   Devices   User Roles   Schedule Actions   Diagnostics   Alerts

Modify User Roles

Alice - Role: Technician

Technician ⌄

Update Role

Bob - Role: Homeowner

Homeowner ⌄

Update Role

Charlie - Role: Admin

Admin ⌄

Update Role

5. Diagnostics

Diagnostics

Bedroom 1 - Status: on   Run Diagnostics

Bedroom 2 - Status: healthy   Run Diagnostics

Bedroom 2 - Status: healthy   Run Diagnostics

Bedroom 3 AC - Status: healthy   Run Diagnostics

6. Alert View

Alerts

Motion detected in Living Room - read

Thermostat temperature adjusted - read

Smoke detected in Kitchen - read

Device Battery Low: Door Lock - read

Critical Alerts

All Alerts

Motion detected in Living Room - read

Thermostat temperature adjusted - read

Smoke detected in Kitchen - read

Device Battery Low: Door Lock - read

7. Activity Logs

Activity Logs

User:	Admin		Action:	Added a device		Time:	2024-12-17 10:00 AM
User:	Technician		Action:	Ran diagnostics		Time:	2024-12-17 10:15 AM
User:	Homeowner		Action:	Scheduled lights		Time:	2024-12-17 11:00 AM

8. Energy Usage Analytics

Energy Usage Analytics

Device:	Living Room Light		Consumption:	10 kWh
Device:	Thermostat		Consumption:	25 kWh
Device:	Kitchen Light		Consumption:	8 kWh

Summary

The **Smart Home Automation System** combines robust device management, advanced automation, energy analytics, and user-friendly controls to enhance your smart home experience. This project showcases cutting-edge features with an intuitive interface, providing an all-in-one solution for homeowners, technicians, and admins.