

Smart Energy Management System - Requirements

Overview

The system manages energy consumption and distribution for a smart home, including energy sources like batteries, solar panels, and grid power. A user-friendly interface allows users to control devices, monitor energy usage, and manage energy sources efficiently.

Key Features

1 Energy Source Management

- Add, remove, and update energy sources (e.g., Solar, Grid, Battery).
- Monitor energy availability and capacity.
- Recharge battery-based sources (e.g., Solar with integrated batteries).

2. Device Management

- Register, remove, track, and control smart devices.
- Retrieve device statuses and perform actions on all or specific devices.

3. Smart Devices

- Devices consume energy from an energy source (Battery, Solar, Grid).
- Devices can be turned on/off via the UI, affecting energy consumption.

4. Energy Distribution

- The system manages energy distribution from sources to devices.
- Energy consumption is recorded.

5. Simultaneous Recharge and Usage

- Solar-powered devices with integrated batteries can recharge while powering devices.
- Recharge is independent and runs concurrently with energy consumption.

6. Configuration and Initialization

- System reads initial settings upon startup and applies them to configure the energy sources and devices.

7. UI Interface

- User Interface to control device on/off state.
- Display energy usage and status of all energy sources and devices.

8. Simulation Requirements

- Adjustable simulation rate for each devices
- Random the amount of energy consumption within a defined range

9. Logging

- Provide clear log levels: FINE for debugging, INFO, WARNING, SEVERE for standard and error events.
- Print out log to log file in file system