Product Requirements Document

Smart Home Automation System

1. Project Overview

This document outlines the requirements for developing a comprehensive Smart Home Automation System that allows users to control and monitor their home devices remotely through a mobile application and web dashboard.

2. Problem Statement

Homeowners struggle to manage multiple smart devices from different manufacturers using separate apps. There is a need for a unified platform that integrates various IoT devices and provides centralized control, automation, and energy monitoring.

3. Target Users

- Homeowners with smart devices (lights, thermostats, cameras, locks)
- Property managers overseeing multiple units
- Tech-savvy users interested in home automation
- Energy-conscious consumers tracking usage

4. Core Features & Requirements

4.1 Device Management

- Add and configure smart devices (lights, locks, thermostats, cameras)
- Support for 50+ device types from major manufacturers
- Real-time device status monitoring
- Group devices by room or function
- Device health monitoring and alerts

4.2 Automation & Scenes

- Create custom automation rules (if-then logic)
- Time-based scheduling (daily, weekly routines)
- Trigger-based automation (motion, temperature, presence)
- Pre-configured scenes (Good Morning, Away, Night, etc.)
- Support for complex multi-device automations

4.3 Remote Access

- Control devices from anywhere via mobile app
- Web dashboard for desktop access
- Real-time notifications and alerts
- Live camera feeds with recording
- Voice control integration (Alexa, Google Assistant)

4.4 Energy Monitoring

- Track energy consumption per device
- Historical usage analytics and graphs
- Cost estimation based on local electricity rates
- Energy-saving recommendations
- Monthly and yearly consumption reports

5. Technical Requirements

Platform: iOS 14+, Android 10+, Web (Chrome, Safari, Firefox)
Backend: Cloud-based architecture with edge computing support
Database: Time-series database for sensor data, relational DB for user data
Security: End-to-end encryption, OAuth 2.0, two-factor authentication
Protocols: MQTT, Zigbee, Z-Wave, Wi-Fi, Bluetooth LE
Performance: - App load time under 2 seconds
- Device command response under 1 second
- Support 100 devices per home
- 99.5% uptime SLA

6. Constraints & Limitations

Budget: $150,000 development budget
Timeline: 9 months from kickoff to launch
Team: 2 backend developers, 2 mobile developers, 1 IoT engineer, 1 UI/UX designer
Compliance: GDPR compliant, CCPA compliant for US users
Network: Must work on standard home networks (no special hardware required)

7. Expected Deliverables

- iOS mobile application
- Android mobile application
- Web dashboard (responsive)
- Backend API and microservices
- Admin panel for system management
- User documentation and setup guides
- API documentation for third-party integrations

8. Success Metrics

- 10,000 active users within 6 months of launch
- Average 15+ devices connected per home
- 4.5+ star rating on app stores
- Less than 2% crash rate
- 70% user retention after 30 days