**Software Construction CQI Task Submission by:**

|  |  |  |
| --- | --- | --- |
| **Group Members** | | |
| **S.No** | **Name** | **Enrollment** |
| 1 | Jawad Saleem | 02-131222-048 |
| 2 | Sarim Sheikh | 02-131222-075 |
| 3 | Anmol Zehra | 02-131212-060 |

**Vision Statement:**

**For** homeowners and residents **who** want convenience, comfort, and security, **the** Smart Home Automation System **is** an intelligent home management solution **that** lets users remotely control lights, fans, and A/C, monitor sensors, view live camera feeds, manage alarms, and automate routines via a mobile app with voice support. **Unlike** manual systems or isolated smart devices, **our product** provides unified, role-based, secure, and scalable control with real-time alerts and personalized automation.

**Project Definition:**

For homeowners and residents who want to manage their household devices more efficiently, the Smart Home Automation System is a centralized mobile application that enables users to control lights, fans, air conditioners, and security features, monitor environmental sensors, and automate routine tasks. Unlike conventional systems that require separate apps or manual controls for each device, this solution integrates all functions into a single, user-friendly platform. This saves users time, enhances convenience, and increases home safety by enabling remote access and real-time notifications.

**Functional and Non-Functional Requirements:**

**Functional Requirements (FR)**

1. **User Authentication and Authorization**
   * FR1: The system shall allow users to register and authenticate via username and password.
   * FR2: The system shall differentiate between user roles (Homeowner, Guest, Admin) with appropriate permissions.
2. **Device Control**
   * FR3: The system shall allow users to control smart devices (lights, fans, AC) remotely via a mobile app.
   * FR4: The system shall support turning devices on/off and adjusting device-specific settings (e.g., brightness for lights, temperature for AC).
   * FR5: The system shall allow scheduling automation rules for devices (e.g., turn on lights at sunset).
3. **Sensor Monitoring**
   * FR6: The system shall monitor environmental sensors such as temperature and motion sensors.
   * FR7: The system shall trigger automation or alerts based on sensor data (e.g., turn on lights if motion detected).
4. **Security System**
   * FR8: The system shall provide security features such as alarm activation/deactivation.
   * FR9: The system shall allow viewing live video feeds from home cameras via the mobile app.
5. **Notifications**
   * FR10: The system shall send notifications to users about device status changes, alarms, or security breaches.
6. **Voice Assistant Integration**
   * FR11: The system shall accept and interpret voice commands to control devices or query system status.
7. **Automation Management**
   * FR12: The system shall allow users to create, modify, and delete automation rules.
   * FR13: The system shall evaluate automation triggers and execute corresponding actions automatically.
8. **User Management**
   * FR14: Admin users shall be able to manage other user accounts, including access permissions.

**Non-Functional Requirements (NFR)**

1. **Usability**
   * NFR1: The mobile app interface shall be intuitive and easy to navigate for users of varying technical expertise.
   * NFR2: Voice command recognition shall have at least 90% accuracy in typical household environments.
2. **Performance**
   * NFR3: The system shall process user commands and reflect device state changes within 2 seconds.
   * NFR4: The system shall handle up to 100 simultaneous connected devices without degradation.
3. **Reliability & Availability**
   * NFR5: The system shall have 99.9% uptime.
   * NFR6: Critical security features (e.g., alarms) shall function correctly even during partial system failures.
4. **Security**
   * NFR7: All user data and communications shall be encrypted end-to-end.
   * NFR8: The system shall enforce strong password policies and session timeouts.
5. **Scalability**
   * NFR9: The system architecture shall support adding new device types and features without major redesign.
6. **Maintainability**
   * NFR10: The system codebase shall be modular and documented to facilitate future updates and bug fixes.
7. **Privacy**
   * NFR11: Video feeds and user data shall only be accessible to authorized users.
   * NFR12: The system shall comply with relevant data protection regulations (e.g., GDPR).

**UML Diagrams:**

**(On Next Page)**

**Use Case Diagram:**

**A diagram of a diagram

AI-generated content may be incorrect.**

**Class Diagram:**

**A screenshot of a computer

AI-generated content may be incorrect.**

**Activity Diagram:**

**A diagram of a system

AI-generated content may be incorrect.**

**Sequence Diagram:**

**A diagram of a diagram

AI-generated content may be incorrect.**

**Low Fidelity Prototypes:**

**A screen shot of a device

AI-generated content may be incorrect.(Home Page Prototype) (Settings Page Prototype)  
A screenshot of a phone

AI-generated content may be incorrect.**

**Balsamiq Link:** [**https://balsamiq.cloud/s47a000/pekciad**](https://balsamiq.cloud/s47a000/pekciad)

**High Fidelity Prototypes:**

**Screens screenshot of a phone

AI-generated content may be incorrect.**

**Figma Link:**

[**https://www.figma.com/design/N4s9YlF5GkPTbwXkssfXMt/Smart-Home-Automation-System---CQE\_Task?t=OFhbl4Yuh3665Zxk-1**](https://www.figma.com/design/N4s9YlF5GkPTbwXkssfXMt/Smart-Home-Automation-System---CQE_Task?t=OFhbl4Yuh3665Zxk-1)

**<<END>>**