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Requirements Dataset:

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### Functional Requirements for a Smart Home Application

1. The system must allow users to add and remove smart devices from the home network through a user-friendly interface.
2. Each connected device must provide real-time status updates, including operational state, connectivity, and performance metrics.
3. Users must be able to manually control individual devices through the application using on/off toggles, sliders, or other appropriate controls.
4. The system must support secure user authentication through at least one method, such as passwords, biometrics, or two-factor authentication.
5. Users must be able to create multiple accounts with role-based access control, allowing different permission levels for administrators, residents, and guests.
6. The application must allow users to manage access rights for individual devices and automation settings, restricting unauthorized changes.
7. Users must be able to define automation rules that trigger device actions based on specific conditions such as time, sensor input, or user location.
8. The system must support the creation of multi-condition automation rules, allowing users to specify multiple triggers and corresponding actions.
9. Users must be able to modify, enable, or disable automation rules at any time without affecting other system functionalities.
10. The application must support Wi-Fi, Bluetooth, Zigbee, and Z-Wave protocols to ensure compatibility with a wide range of smart devices.
11. The system must automatically detect newly connected compatible devices and prompt the user to configure them.
12. Users must be able to integrate the application with third-party voice assistants such as Alexa, Google Assistant, and Siri for voice control.
13. The system must allow users to connect their smart home application to external cloud services for data backup and remote access.
14. Developers must have access to an API that enables integration with additional third-party applications and services.
15. The application must track the energy consumption of connected devices and display real-time and historical usage data.
16. Users must receive periodic reports and recommendations on how to optimize energy consumption based on past usage patterns.
17. The system must allow users to schedule energy-intensive appliances to operate during off-peak hours to reduce electricity costs.
18. The application must support smart locks, enabling users to lock and unlock doors remotely through the app.
19. The system must integrate with security cameras and motion sensors, providing real-time monitoring and alerts for suspicious activities.
20. Users must receive instant notifications for potential security threats, such as unauthorized access attempts or unusual movements detected by sensors.
21. The system must allow users to remotely view live and recorded security footage through the mobile application.
22. Users must be able to control smart home devices remotely via a mobile app or web interface.
23. The application must send real-time notifications for critical system events, including device malfunctions, automation execution, and security alerts.
24. Users must be able to customize notification preferences, choosing between push notifications, SMS, or email alerts.
25. The system must use artificial intelligence to learn user behavior and suggest automation rules based on observed patterns.
26. AI-driven scheduling must optimize device operation for energy efficiency, security, and user comfort.
27. Users must be able to review and approve AI-suggested automation before they are applied to the system.

Prompt for mapping:

You are AI assistant for requirements analysis. You will help to identify dependencies among the following functional requirements and the specified categories.

The functional requirements are:

1. The system must allow users to add and remove smart devices from the home network through a user-friendly interface.

2. Each connected device must provide real-time status updates, including operational state, connectivity, and performance metrics.

3. Users must be able to manually control individual devices through the application using on/off toggles, sliders, or other appropriate controls.

4. The system must support secure user authentication through at least one method, such as passwords, biometrics, or two-factor authentication.

5. Users must be able to create multiple accounts with role-based access control, allowing different permission levels for administrators, residents, and guests.

6. The application must allow users to manage access rights for individual devices and automation settings, restricting unauthorized changes.

7. Users must be able to define automation rules that trigger device actions based on specific conditions such as time, sensor input, or user location.

8. The system must support the creation of multi-condition automation rules, allowing users to specify multiple triggers and corresponding actions.

9. Users must be able to modify, enable, or disable automation rules at any time without affecting other system functionalities.

10. The application must support Wi-Fi, Bluetooth, Zigbee, and Z-Wave protocols to ensure compatibility with a wide range of smart devices.

11. The system must automatically detect newly connected compatible devices and prompt the user to configure them.

12. Users must be able to integrate the application with third-party voice assistants such as Alexa, Google Assistant, and Siri for voice control.

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27. Users must be able to review and approve AI-suggested automation before they are applied to the system.

Analyze these requirements from the perspective of an expert requirements engineer. Based on your understanding of different types of requirements and potential interaction points, you will be looking for dependencies (positive or negative dependency) across the following categories:

1. Personalizable – The system must allow users to customize settings, automation rules, and interface preferences to match their individual needs and lifestyle.

2. Safety – The application must ensure that all connected devices operate within safe limits, prevent hazardous conditions (e.g., overheating, electrical overloads), and provide emergency alerts when necessary.

3. Cultural and Regional Sensitivity – The system must support multiple languages, regional settings (e.g., time zones, measurement units), and adapt to cultural norms and regulatory requirements of different locations.

4. Ease of Use – The interface must be intuitive, requiring minimal effort to navigate, configure devices, and execute common tasks, ensuring accessibility for users of all technical skill levels.

5. Accuracy – The system must provide precise data for device status, energy usage, automation execution, and sensor readings, minimizing errors and false alerts.

6. Accessibility: Requirements focused on making the application usable by students and educators with disabilities..ù

7. Flexibility: Requirements that enables the system to adapt to changes in requirements, environments, or usage conditions with minimal effort.

8. Invisibility: Requirements that enables merging of technology in the user environment or the decrease in the interaction workload.

9. Usability: Requirements aimed at ensuring the application is intuitive, efficient, and engaging for diverse users.

10. Privacy: Requirements ensuring the protection of user data and maintaining confidentiality in compliance with applicable standards.

Map the functional requirements to one or more of these categories. Mark which dependency are positive and which are negative. If a functional requirement cannot be mapped to any of the above categories, do not provide a false mapping. Here are some examples for your reference

Requirement: The system must provide captions for all video-based lectures.

Category: Accessibility

Requirement: The interface should allow educators to set up a new course within five minutes.

Category: Usability

Requirement: The platform should integrate seamlessly with widely used learning management systems (LMS).

Category: Privacy

Requirement: The application should load all content within two seconds for users with a stable internet connection.

Category: Flexibility

Requirement: The system shall allow administrators to configure custom user roles and permissions without requiring code changes.

Category: Invisibility

Requirement: The application shall automatically save user progress every 30 seconds without disrupting their workflow.

Category: Personalizable

Requirement: A user can set custom automation rules, such as adjusting the thermostat to 22°C when they arrive home, and choose between light and dark mode in the mobile app.

Category: Safety

Requirement: If a smart smoke detector detects high levels of carbon monoxide, the system immediately shuts off the gas supply and sends an emergency alert to the user’s phone.

Category: Cultural and Regional Sensitivity

Requirement: The app allows users in the U.S. to display temperature in Fahrenheit while users in Europe can select Celsius, ensuring familiarity and ease of understanding.

Category: Ease of Use

Requirement: A new user can add a smart light bulb to the system within three steps: scanning a QR code, selecting a Wi-Fi network, and naming the device.

Category: Accuracy

Requirement: A smart meter in the home provides real-time energy consumption data with a 99% accuracy rate, ensuring that billing calculations and energy-saving recommendations are reliable.

FR-NFR Mapping:

1. The system must allow users to add and remove smart devices from the home network through a user-friendly interface.

- Category: Ease of Use (Positive)

- Category: Usability (Positive)

2. Each connected device must provide real-time status updates, including operational state, connectivity, and performance metrics.

- Category: Accuracy (Positive)

- Category: Usability (Positive)

3. Users must be able to manually control individual devices through the application using on/off toggles, sliders, or other appropriate controls.

- Category: Ease of Use (Positive)

- Category: Usability (Positive)

4. The system must support secure user authentication through at least one method, such as passwords, biometrics, or two-factor authentication.

- Category: Privacy (Positive)

- Category: Safety (Positive)

5. Users must be able to create multiple accounts with role-based access control, allowing different permission levels for administrators, residents, and guests.

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- Category: Privacy (Positive)

- Category: Safety (Positive)

6. The application must allow users to manage access rights for individual devices and automation settings, restricting unauthorized changes.

- Category: Privacy (Positive)

- Category: Safety (Positive)

- Category: Personalizable (Positive)

7. Users must be able to define automation rules that trigger device actions based on specific conditions such as time, sensor input, or user location.

- Category: Personalizable (Positive)

- Category: Usability (Positive)

- Category: Flexibility (Positive)

8. The system must support the creation of multi-condition automation rules, allowing users to specify multiple triggers and corresponding actions.

- Category: Personalizable (Positive)

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- Category: Usability (Positive)

9. Users must be able to modify, enable, or disable automation rules at any time without affecting other system functionalities.

- Category: Flexibility (Positive)

- Category: Usability (Positive)

- Category: Personalizable (Positive)

10. The application must support Wi-Fi, Bluetooth, Zigbee, and Z-Wave protocols to ensure compatibility with a wide range of smart devices.

- Category: Flexibility (Positive)

- Category: Ease of Use (Positive)

11. The system must automatically detect newly connected compatible devices and prompt the user to configure them.

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- Category: Personalizable (Positive)

- Category: Accuracy (Positive)

- Category: Safety (Positive)

27. Users must be able to review and approve AI-suggested automation before they are applied to the system.

- Category: Personalizable (Positive)

- Category: Usability (Positive)

- Category: Safety (Positive)

Prompt for emotion identification:

You are AI assistant for requirements analysis.Your task is to predict the likely emotional responses of different user demographics to a given functional requirement for a healthcare software system.}

Carefully consider the provided functional requirement as user query. Understand its purpose, functionality, and potential impact on users. The FR will be provided in the following format:}

Evaluate the FR from the perspective of the following user demographics. Consider their specific needs, goals, technical expertise, and potential frustrations.}

Demographic 1: Individuals with technical background

Demographic 2: Novice Individuals from non technical background

Access the provided contexts to find relevant examples of past user feedback, reviews, and emotional responses to similar features of a different healthcare application system.

Generate the emotional response with respect to different user demographic into one or more of the following category of emotions-

1. Satisfaction

2. Independence

3. Sense of being cared

4. Sense of Control

5. Insecurity

6. Sense of Confusion

7. Sense of obstruction