SMART HOME

Project Proposal Presentation

User Interface Design Project

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1. Introduction

This project documentation explores the concept of Smart Homes through the lens of a contemporary Romanian family. Smart Homes have gained considerable attention from individuals and businesses, prompting us to take a closer look at how they impact the daily lives of a typical Romanian family. This family consists of two young children, a teenager, their parents, and two grandparents.

2. Application domain

The project problem domain contains the kinds of users that will use the interface, why, in which contexts and why the app is relevant today. It will address the challenges than the user may face and how we plan to solve them.

2.1.User identification

The types of users are: parents, children, teenagers and elders. They differentiate from each other by their age and the types of privileges they have when using the app.

- Parents
  - Experienced with technology (phones, tablets)
  - Highest level of responsibility with household issues (temperature, kids' TV time)
  - No special user requirements
- Teenage Girl
  - Experienced with technology
  - Moderate level of responsibility – responsible with her own room and belongings
  - No special user requirements
- Children
  - Not very experienced with technology – need explanations from parents
  - Lowest level of responsibility
  - Cannot read – need special interface
- Elders
  - Not very experienced with technology – need instructions within the app and friendlier interface
  - Moderate level of responsibility
  - Bad vision – special interface

2.2.Use Context

The context of use relevant to the project could include the following aspects:

- Home environment: different rooms of the house may require different use cases.
- User Interruptions: Given that the family consists of various members, there may be frequent interruptions in the usage of smart devices. Family members may need to interact with these devices while doing other things, such as work, school, or household chores.
- Daily Routines: Understanding the daily routines and activities of the family members is crucial. For instance, the context might involve the automation of tasks like lighting, heating, or security that should seamlessly integrate into the family's daily life.

2.3.Challenges

Some of the challenges that the user may face when using the app:

- Vision issues – elders
- Reading issues – the children can’t read yet
- Usability and complexity – for users inexperienced with technology
- Integration of devices – heating system, air conditioning, lighting
- Cost and budget constraints – expensive smart devices

2.4.Solutions

We plan on solving vision issues for elders by increasing font size for them. For the children, the app will have icons on its interface instead of text. Another solution could be using text to speech.

The issue of usability and complexity could be solved by introducing “help” signs on most pages that contain instructions for using the app. We will also focus on making the application as straightforward and simple as possible.

The problem of device integration and costs is solved by the fact that the app lets you select which devices you already own in your household and cater only to those. And, if the family decides to extend their collection of smart devices, they can be added to the application later. Thus, a family doesn’t need to invest into everything all at once (smart lights, smart thermostat, smart TV, smart everything) and use what they already own.

3. Task Analysis

3.1.Task: Modifying Room Temperature in a Smart Home

Starting Point: Authenticated users (parents, grandparents, adolescent) are at the home screen or in the dedicated 'Climate Control' section of their smart home mobile app or voice-activated device interface.

Users:

- Parents: Adjust the temperature in their own bedroom or common areas (kitchen, living room...)

- Grandparents: Adjust the temperature in their bedroom.

- Adolescent: Adjust the temperature in their bedroom.

What They Are Doing: Users are using the app to change the thermostat settings to modify the temperature in specific rooms.

Why They Are Doing It:

- Users want to ensure a comfortable temperature in their respective bedroom or common rooms, balancing personal preferences and energy efficiency.

Most Common Context:

- Time of Day: increase temp in the morning for waking up, decrease in the evening for bedtime, and periodically during the day for comfort.

- Seasonal Changes: Adjustments in hot summers or cold winters.

- Activities: cooking in the kitchen - lower temp, watching TV in the living room - increase temp.

3.2.Task: Sending and receiving notifications

Starting Point: Authenticated users (parents, grandparents, adolescent) are at the home screen or in the dedicated 'Send notification' section of their smart home mobile app or voice-activated device interface.

Users:

- Parents: Receive notification

- Grandparents: Send notification.

What They Are Doing: The elders send a notification to the adults if they need anything(water etc.)

Why They Are Doing It:

- If the grandparent is immobilized at bed and they require special care they send a notification

3.3.Task: Setting Up Customized Lighting Scenes

Starting Point: Authenticated users are in the 'Security' section of the app.
Users: Parents, Grandparents

What They Are Doing: Users configure security settings like door/window sensors, cameras, and alarm systems.

Why They Are Doing It:
- Ensure the safety of the home and receive alerts for any security breaches.

3.4.Task: Monitoring Children's Screen Time

Starting Point: Authenticated users are in the 'Parental Controls' section of the app.

Users: Parents
What They Are Doing: Parents set limits and monitor screen time for the children's devices.

Why They Are Doing It: Promote healthy screen habits and manage children's device usage.

3.5.Task: Integrating a New Smart Device

Starting Point: Authenticated users are in the 'Device Management' section of the app..
Users: Any

What They Are Doing: Users add a new smart device to the system.

Why They Are Doing It: Expand the smart home ecosystem with additional devices.

3.6.Task: Creating Voice Commands for Smart Devices

Starting Point: Authenticated users are in the 'Voice Control' section of the app.

Users: Any

What They Are Doing: Users program voice commands for specific smart devices.

Why They Are Doing It: Enhance hands-free control and convenience.

3.7.Task: Checking Energy Consumption Trends

Starting Point: Authenticated users are in the 'Energy Management' section of the app.

Users: Parents

What They Are Doing: Users review and analyze energy consumption trends for different devices.

Why They Are Doing It: Optimize energy usage and identify potential savings.

3.8.Task: Troubleshooting Connectivity Issues

Starting Point: Authenticated users are in the 'Support' or 'Help' section of the app.
Users: Any
What They Are Doing: Users troubleshoot and resolve connectivity issues with smart devices.

Why They Are Doing It: Ensure seamless operation and connectivity of smart devices.

3.9.Task: Setting Up Guest Access

Starting Point: Authenticated users are in the 'Access Control' section of the app.

Users: Parents
What They Are Doing: Users configure temporary access codes or permissions for guests.

Why They Are Doing It: Allow guests limited access to specific smart devices or areas in the home.

3.10. Task: Turning Off All Lights

Starting Point: Authenticated users are in the 'Lighting Control' section.
Users: Parents
What They Are Doing: Users turn off all smart lights in the house with a single command.

Why They Are Doing It: Save energy and ensure all lights are off before leaving home or going to bed.

3.11. Task: Checking Daily Schedule

Starting Point: Authenticated users are in the 'Daily Overview' section of the app.

Users: Any

What They Are Doing: Teenagers review their daily schedule and set reminders for tasks.

Why They Are Doing It: Stay organized and be aware of upcoming activities and responsibilities.

3.12. Task: Dispensing Pet Feeder Schedule

Starting Point: Authenticated users are in the 'Pet Care' section of the app.

Users: Adolescent

What They Are Doing: Users set and manage the schedule for the automatic pet feeder.

Why They Are Doing It: Ensure that pets are fed consistently and on time, even when the family is away.

4. User scenarios

4.1.Voice command

Starting point: Homepage

Steps:

- User clicks on Voice Command button from menu.
- User is redirected to Voice Command page.
- User clicks on mic icon then says the command.

Success scenario: Command is displayed on screen as text. The command is executed by system (e.g. Lights on)

Fail scenario: Command is not recognized by system. Error message is displayed. User tries again. The app suggests adding a new command.

4.2. Turn on all Lights

Starting point: Homepage

Steps:

- User clicks on Lights button from menu.
- User is redirected to Lights page.
- User clicks on “Turn on all lights” button.

Success scenario: All lights are turned on.

Fail scenario: Lights are turned off in some rooms. The power is out, or some light bulbs are burnt out. The system displays an error message.

Alternate scenario: User gives a vocal command to turn on the lights from the Voice Command feature.

4.3. Change room temperature.

Starting point: Homepage

Steps:

- User clicks on Temperature button from menu.
- User is redirected to Temperature page.
- User uses slider to modify temperature.

Success scenario: The temperature is set.

Fail scenario: The set temperature is not received by the heating devices.

Alternate scenario: User gives a vocal command to set the temperature using the Voice Command feature.

4.4. Send Help Notification

Starting point: Homepage

Steps:

- User clicks on Notifications button from the menu.
- User is redirected to the Notifications page. User clicks on “Ask for help” button.

Success scenario: A popup appears that says “Help notification was sent”. The dedicated caregiver receives the notification on their phone.

Fail scenario: No new notifications are received, or there is a technical issue preventing the display of notifications.

Alternate scenario: The user asks for help using voice command.

4.4. Send Emergency Notification

Starting point: Homepage

Steps:

- User clicks on Notifications button from the menu.
- User is redirected to the Notifications page. User clicks on the red “Emergency !!!” button.

Success scenario: A red popup appears that says “Emergency reported. All family members have been notified.”. All family members receive the notifications on their phones.

Fail scenario: No new notifications are received, or there is a technical issue preventing the display of notifications.

Alternate scenario: The user reports an emergency using voice command.

4.5. Turn on individual lights

Starting point: Homepage

Steps:

- User clicks on Lighting Control from the menu.
- User is redirected to the Lighting Control page. User turns the light on or off for a specific room.

Success scenario: Lights turn on for the specified room.

Fail scenario: The customization fails, or the scenes do not apply as intended. An error message is displayed.

Alternate scenario: User creates a voice command to activate a specific lighting scene using the Voice Command feature.

4.6. Monitor Children's Screen Time

Starting point: Homepage

Steps:

- User clicks on Parental Controls from the menu.
- User is redirected to the Parental Controls page.
- User sets screen time limits for each child's device.

Success scenario: Screen time limits are successfully set, and parents can monitor their children's device usage.

Fail scenario: The settings are not applied, or there is a glitch preventing the monitoring of screen time..

Alternate scenario: User creates a voice command to activate a specific lighting scene using the Voice Command feature.

4.7.Create Voice Commands for Smart Devices

Starting point: Homepage

Steps:

- User clicks on Voice Control from the menu..
- User is redirected to the Voice Control page.
- User selects the option to add a new voice command.
- User records the voice command and assigns it to a specific smart device.

Success scenario: Success scenario: The voice command is successfully recorded and activates the assigned smart device.

Fail scenario: The recording fails, or the voice command is not recognized. An error message guides the user on troubleshooting steps.

Alternate scenario: Us User edits an existing voice command through the Voice Command feature.

4.8.Integrate a New Smart Device

Starting point: Homepage

Steps:

- User clicks on Device Management from the menu.
- User is redirected to the Device Management page.
- User selects the option to add a new device.
- User follows the on-screen instructions to integrate the new device.

Success scenario: The new smart device is successfully added and integrated into the system.

Fail scenario: The integration fails, or the device is not recognized. An error message guides the user on troubleshooting steps.

Alternate scenario: User sets up a voice command for the new device using the Voice Command feature.

4.9.Check Energy Consumption Trends

Starting point: Homepage

Steps:

- User clicks on Energy Management from the menu.
- User is redirected to the Energy Management page.
- User reviews the energy consumption trends for different devices.

Success scenario: Clear visualization of energy consumption trends is displayed, helping users optimize energy usage.

Fail scenario: The data fails to load, or there is a technical issue preventing the display of energy consumption trends.

Alternate scenario: User receives a notification when a device is consuming more energy than usual.

4.10. Set Pet Feeder Schedule

Starting point: Homepage

Steps:

- User clicks on Pet button from menu.
- User is redirected to then Pet page.
- User clicks on “Set Schedule” button.

- User inputs at what time to feed the pet.

Success scenario: Pet feeder turns on every day at the selected time.

Fail scenario: Pet feeder doesn't work. It is out of food, in which case it will display a notification to fill the pet feeder.

Alternate scenario: User initiates a voice command for the pet schedule using the Voice Command feature.

4.11. Troubleshoot Connectivity Issues

Starting point: Homepage

Steps:

- User clicks on Support or Help from the menu.
- User is redirected to the Support page.
- User selects the device experiencing connectivity issues.
- User follows the troubleshooting steps provided.

Success scenario: Connectivity issues are resolved, and the smart device operates seamlessly.

Fail scenario: The troubleshooting steps do not resolve the issue, or there is a broader system problem. Additional support options are presented.

Alternate scenario: User initiates a voice command for troubleshooting assistance using the Voice Command feature.

5. Walkthrough Evaluation Report

5.1. Voice command

Step 1 – User is on homepage and clicks on Voice Command button from menu.

Will the user be trying to produce the effect?

Yes, if the user wants to give a voice command.

Will the user see the correct control?

The user will see the button in the menu, called “Voice Command”.

Will the user see that the control produces the desired effect?

Yes, the user will see that they are now on the “Voice Command” page.

Is there another control that the user might select instead of the correct one?

The user might select a different option from the menu.

Will the user understand the feedback to proceed correctly?

The user will see that they are on the wrong page and should go back to the menu.

Step 2 – User is on Voice Command page. User clicks on the microphone shaped button to start recording.

Will the user be trying to produce the effect?

Yes, the user is on Voice Command page.

Will the user see the correct control?

Yes, the button is shaped like a microphone and is placed under a label that says “Say something”.

Will the user see that the control produces the desired effect?

Yes, the user will see that sound waves appear under the microphone button. The sound waves suggest that sound is being recorded. Also, a text will appear that confirms that the desired command was executed.

Is there another control that the user might select instead of the correct one?

The user might click on “Add a new command” button.

Will the user understand the feedback to proceed correctly?

The user will see a popup that reads “click to record a new command”. The user will figure out that this is not what they want.

5.2. Turn on all the lights.

Step 1 – User is on homepage and clicks on Lights button from menu.

Will the user be trying to produce the effect?

Yes, if the user wants to turn on all the lights.

Will the user see the correct control?

The user will see the button in the menu, called “Lights”.

Will the user see that the control produces the desired effect?

Yes, the user will see that they are now on the “Lights” page.

Is there another control that the user might select instead of the correct one?

The user might select a different option from the menu.

Will the user understand the feedback to proceed correctly?

The user will see that they are on the wrong page and should go back to the menu.

Step 2 – User is on Lights page. User clicks on “Turn on all the lights” button.

Will the user be trying to produce the effect?

Yes, if the user wants to give a voice command.

Will the user see the correct control?

The user will see the button in the menu, called “Turn on all the lights”.

Will the user see that the control produces the desired effect?

Yes, the user will see a label that reads “All lights are turned on”. The user will also see that all the lights are turned on in the house.

Is there another control that the user might select instead of the correct one?

The user might click on “Turn of all the lights” button.

Will the user understand the feedback to proceed correctly?

The user will see a label that reads “All lights are turned off”, which is not the desired action. They will also realize that the lights turned off in the room.

5.3.User scenario – Change room temperature

Step 1 – User is on homepage and clicks on Temperature button from menu.

Will the user be trying to produce the effect?

Yes, if the user wants to modify temperature.

Will the user see the correct control?

The user will see the button in the menu, called “Temperature”.

Will the user see that the control produces the desired effect?

Yes, the user will see that they are now on the “Temperature” page.

Is there another control that the user might select instead of the correct one?

The user might select a different option from the menu.

Will the user understand the feedback to proceed correctly?

The user will see that they are on the wrong page and should go back to the menu.

Step 2 – User is on Temperature page and uses the slider to increase or decrease the temperature.

Will the user be trying to produce the effect?

Yes, the user is on Temperature page.

Will the user see the correct control?

Yes, there will be a slider that is currently set at the current temperature of the room. The slider is also colored from blue (cold) to red (hot).

Will the user see that the control produces the desired effect?

Yes, the user will see that the displayed temperature on the screen increases or decreases as the user moves the slider.

Is there another control that the user might select instead of the correct one?

The user might click on “Turn off” button.

Will the user understand the feedback to proceed correctly?

The user will see a label that reads “Thermostat is turned off”. The user will figure out that this is not what they want and see the button that reads “Turn thermostat on”.

5.4.User scenario – Check Energy Consumption Trends

Step 1 – User is on Home page and clicks on Energy button from menu.

Will the user be trying to produce the effect?

Yes, if the user wants to see energy consumption.

Will the user see the correct control?

The user will see the button in the menu, called “Energy”.

Will the user see that the control produces the desired effect?

Yes, the user will see that they are now on the “Energy” page.

Is there another control that the user might select instead of the correct one?

The user might select a different option from the menu.

Will the user understand the feedback to proceed correctly?

The user will see the Energy page.

Step 2 – User is on Energy page and presses a button to the device they want to see Energy consumption levels.

Will the user be trying to produce the effect?

Yes, the user tries to see the energy consumption.

Will the user see the correct control?

Yes, the energy levels will appear.

Will the user see that the control produces the desired effect?

Yes, the graphs with energy levels.

Is there another control that the user might select instead of the correct one?

No, the user will only see the graphs.

Will the user understand the feedback to proceed correctly?

Displayed graphs will show the energy levels.

5.5.User scenario – Troubleshoot Connectivity Issues

Step 1 – User is on Settings and clicks on Troubleshoot button from menu.

Will the user be trying to produce the effect?

Yes, if the user wants to troubleshoot.

Will the user see the correct control?

The user will see the button in the menu, called “Troubleshoot”.

Will the user see that the control produces the desired effect?

Yes, the user will see that they are now on the “Troubleshoot” page.

Is there another control that the user might select instead of the correct one?

The user might select a different option from the menu.

Will the user understand the feedback to proceed correctly?

The user will see the Troubleshoot page.

Step 2 – User is on Troubleshoot page and presses a button to the device they want to troubleshoot.

Will the user be trying to produce the effect?

Yes, the user tries to see the available devices to troubleshoot.

Will the user see the correct control?

Yes, all the devices will appear.

Will the user see that the control produces the desired effect?

Yes, the user will see all the devices.

Is there another control that the user might select instead of the correct one?

No, the user will select the desired device for troubleshooting.

Will the user understand the feedback to proceed correctly?

Troubleshooting starts.

5.1.User scenario – Monitor children’s screen time

Step 1 – User is on Home page and clicks on Children TV button from menu.

Will the user be trying to produce the effect?

Yes, if the user wants to check the screen time.

Will the user see the correct control?

The user will see the button in the menu, called “Children TV”.

Will the user see that the control produces the desired effect?

Yes, the user will see that they are now on the “Kids TV” page.

Is there another control that the user might select instead of the correct one?

The user might select a different option from the menu.

Will the user understand the feedback to proceed correctly?

The user will see the Kids TV page.

Step 2 – User is on Kids TV page and presses a resset button

Will the user be trying to produce the effect?

Yes, the user tries to reset the kids tv time.

Will the user see the correct control?

Yes, the reset button will appear.

Will the user see that the control produces the desired effect?

Yes, the time will be reset.

Is there another control that the user might select instead of the correct one?

Yes, the user might select another button instead.

Will the user understand the feedback to proceed correctly?

The time will be reset.

5.2.User scenario – Integrate a new device

Step 1 – User is on Home page and clicks on settings button from menu.

Will the user be trying to produce the effect?

Yes, if the user wants to use the settings.

Will the user see the correct control?

The user will see the button in the menu with the settings icon.

Will the user see that the control produces the desired effect?

Yes, the user will see that they are now on the “Settings” page.

Is there another control that the user might select instead of the correct one?

The user might select a different option from the menu.

Will the user understand the feedback to proceed correctly?

The user will see the Settings page.

Step 2 – User is on Settings page and presses the integrate a new device button

Will the user be trying to produce the effect?

Yes, the user tries to integrate a new device.

Will the user see the correct control?

Yes, the new device button will appear.

Will the user see that the control produces the desired effect?

Yes, the New device page will load.

Is there another control that the user might select instead of the correct one?

Yes, the user might select another button instead.

Will the user understand the feedback to proceed correctly?

The new device page will display.

Step 3 – User is on New device page and presses a button corresponding to their device

Will the user be trying to produce the effect?

Yes, the user tries to integrate a new device.

Will the user see the correct control?

Yes, the device buttons will appear.

Will the user see that the control produces the desired effect?

Yes, the device will be connected.

Is there another control that the user might select instead of the correct one?

Yes, the user might select another button instead.

Will the user understand the feedback to proceed correctly?

The new device will connect sucessfully.

6. Heuristic evaluation report

6.1. Modifying Temperature

a. Visibility of System Status:

Compliance: The current temperature setting is prominently displayed on the main screen.

Example: The current temperature is visible on the home screen, and users can easily locate and modify it.

b. Match between System and Real World:

Compliance: Temperature settings use familiar symbols and units (e.g., degrees Celsius or Fahrenheit).

Example: Users can set the temperature by tapping on intuitive icons for cooler or warmer.

c. User Control and Freedom:

Compliance: Users can easily adjust the temperature settings and revert changes if needed.

Example: The app provides a straightforward way to undo temperature adjustments.

d. Consistency and Standards:

Compliance: Temperature controls follow a consistent layout and design.

Example: The format for adjusting the temperature is the same across different rooms.

e. Error Prevention:

Compliance: The app prompts users to confirm temperature changes to avoid accidental adjustments.

Example: A confirmation dialog appears when users attempt to set a significantly higher/lower temperature.

f. Recognition rather than Recall:

Compliance: Temperature settings are visible, and users don't need to recall values.

Example: Users can directly see the current temperature without having to remember it.

g. Flexibility and Efficiency of Use:

Compliance: Power users can quickly modify temperature settings using shortcuts or gestures.

Example: Swiping up or down on the temperature icon allows for rapid adjustments.

h. Aesthetic and Minimalist Design:

Compliance: The temperature control interface is visually clean and minimalist.

Example: Icons and buttons related to temperature control are simple and uncluttered.

i. Help Users Recognize, Diagnose, and Recover from Errors:

Compliance: Error messages are clear and provide guidance on resolving temperature-related issues.

Example: If the app cannot communicate with the thermostat, it provides a helpful error message with troubleshooting tips.

j. Help and Documentation:

Compliance: A help section or tutorial guides users on how to modify temperature settings.

Example: The app includes a tutorial on adjusting temperature and FAQs accessible from the settings menu.

Problems Identified and Proposed Solutions:

Problem: Some users find it challenging to discover the swipe gesture for rapid temperature adjustments.

Solution: Add a brief onboarding tutorial or tooltip that highlights the swipe gesture during the first use.

Improvement Plan:

Implement user testing to identify additional pain points and gather feedback.

Iterate on the interface design based on user feedback to enhance intuitiveness.

Continuously monitor user interactions and address emerging usability issues.

6.2.Sending notifications

a. Visibility of System Status:

Compliance: Notification status (sent, pending, or failed) is visible in the notification center.

Example: Users can see a notification history with timestamps.

b. Match between System and Real World:

Compliance: Notifications use clear and concise language.

Example: Users receive a "Device Offline" notification instead of a technical error code.

c. User Control and Freedom:

Compliance: Users can customize notification preferences and choose to mute certain alerts.

Example: The app provides a "Do Not Disturb" mode for notifications.

d. Consistency and Standards:

Compliance: Notifications follow a consistent visual style and placement.

Example: All notifications appear in a unified notification center.

e. Error Prevention:

Compliance: The app confirms important notifications to prevent accidental dismissals.

Example: A confirmation prompt appears when attempting to dismiss a security-related notification.

f. Recognition rather than Recall:

Compliance: Users can review past notifications without needing to remember.

Example: The notification center displays recent alerts with clear icons.

g. Flexibility and Efficiency of Use:

Compliance: Power users can quickly access notification settings from the home screen.

Example: A long press on the notification icon provides direct access to notification preferences.

h. Aesthetic and Minimalist Design:

Compliance: Notification design is visually clean, with brief and informative content.

Example: Notifications use simple icons and concise text.

i. Help Users Recognize, Diagnose, and Recover from Errors:

Compliance: Error messages related to failed notifications include troubleshooting suggestions.

Example: If a notification fails to send, the app suggests checking the device's internet connection.

j. Help and Documentation:

Compliance: A help section outlines how to manage and troubleshoot notifications.

Example: Users can access a "Notification Guide" from the settings menu.

Problems Identified and Proposed Solutions:

Problem: Users sometimes dismiss critical notifications accidentally.

Solution: Implement an undo option for dismissed notifications or a notification history section for retrieval.

Improvement Plan:

Gather user feedback on notification preferences and customize options accordingly.

Conduct usability testing to identify any confusion in the notification setup process.

Periodically update notification features based on user suggestions and changing needs.

6.3.Turning on/off the lights in every room

a. Visibility of System Status:

Compliance: The current status (on/off) of lights in each room is visible on the home screen.

Example: Users can quickly check which lights are currently turned on without navigating into each room.

b. Match between System and Real World:

Compliance: Light controls use intuitive icons, resembling physical light switches.

Example: Tapping a light bulb icon turns the light on, mirroring a real-world switch.

c. User Control and Freedom:

Compliance: Users have direct control to turn lights on/off individually or collectively.

Example: Long-pressing on a room allows users to toggle all lights in that room simultaneously.

d. Consistency and Standards:

Compliance: Light controls follow a consistent layout and behavior across different rooms.

Example: The same light bulb icon is used in all rooms for turning lights on/off.

e. Error Prevention:

Compliance: Confirmation prompts appear for critical actions, preventing accidental light toggles.

Example: A confirmation dialog appears when users attempt to turn off all lights in a room.

f. Recognition rather than Recall:

Compliance: Users can see the current state of lights without having to remember.

Example: The home screen displays an icon next to each room indicating whether lights are on or off.

g. Flexibility and Efficiency of Use:

Compliance: Power users can quickly toggle lights in multiple rooms using a centralized control.

Example: A dedicated "All Lights" button allows users to turn off all lights at once.

h. Aesthetic and Minimalist Design:

Compliance: Light controls are visually simple, with clear on/off indications.

Example: The light control interface in each room is uncluttered, displaying only essential information.

i. Help Users Recognize, Diagnose, and Recover from Errors:

Compliance: Error messages, such as failed light commands, provide guidance for resolution.

Example: If a light fails to turn on, the app suggests checking the device's connectivity.

j. Help and Documentation:

Compliance: A help section explains how to troubleshoot common light control issues.

Example: Users can access a "Light Control Guide" from the settings menu.

Problems Identified and Proposed Solutions:

Problem: Some users find it confusing to differentiate between rooms with similar icons.

Solution: Enhance room icons with subtle visual cues or colors to aid quick differentiation.

Improvement Plan:

Collect user feedback on the intuitiveness of the light control interface.

Conduct usability testing to identify any challenges users face when managing lights.

Iteratively refine the interface based on user insights to improve the overall user experience.

6.4.Monitor Children’s TV time.

a. Visibility of System Status:

Compliance: The current TV time status for each child is visible in the parental control section.

Example: Parents can quickly check how much TV time each child has consumed for the day.

b. Match between System and Real World:

Compliance: TV time controls use familiar symbols like a clock or hourglass to represent time.

Example: Parents set daily time limits using a simple slider interface.

c. User Control and Freedom:

Compliance: Parents have control to set, adjust, or override TV time limits for each child.

Example: A parent can extend TV time for a specific child for educational purposes.

d. Consistency and Standards:

Compliance: TV time controls follow a consistent layout and design.

Example: The same controls are used for setting time limits for each child.

e. Error Prevention:

Compliance: The app prompts parents to confirm when setting or modifying TV time limits.

Example: A confirmation dialog appears when a parent reduces a child's TV time.

f. Recognition rather than Recall:

Compliance: Parents can see the current TV time usage for each child without having to remember.

Example: The parental control dashboard displays a visual representation of TV time usage.

g. Flexibility and Efficiency of Use:

Compliance: Power users can set default TV time limits for all children or customize for each.

Example: A "Set Default Limits" option is available for parents with multiple children.

h. Aesthetic and Minimalist Design:

Compliance: TV time controls are visually clear and straightforward.

Example: Icons and labels associated with TV time are simple and uncluttered.

i. Help Users Recognize, Diagnose, and Recover from Errors:

Compliance: Error messages related to TV time limits include guidance on resolving issues.

Example: If TV time settings conflict with an ongoing schedule, the app suggests adjusting the schedule.

j. Help and Documentation:

Compliance: A help section explains how parents can effectively manage and monitor children's TV time.

Example: Parents can access a "Parental Controls Guide" from the settings menu.

Problems Identified and Proposed Solutions:

Problem: Some parents find it cumbersome to set TV time limits for multiple children.

Solution: Introduce a bulk editing feature that allows parents to adjust TV time limits for all children at once.

Improvement Plan:

Solicit feedback from parents on the TV time monitoring features.

Conduct usability testing to identify any challenges parents face in managing TV time.

Regularly update the parental control features based on user insights and emerging needs.

6.5. Integrate new device.

a. Visibility of System Status:

Compliance: The status of the device integration process is visible in the integration wizard.

Example: A progress indicator shows the current step in the device integration process.

b. Match between System and Real World:

Compliance: The integration steps use language and visuals that align with the physical setup of the new device.

Example: Instructions guide users to press a physical button on the new device during pairing.

c. User Control and Freedom:

Compliance: Users have control to initiate, pause, or cancel the device integration process.

Example: A "Cancel" button allows users to abort the integration at any point.

d. Consistency and Standards:

Compliance: Device integration follows a consistent process across different types of devices.

Example: The same steps are used to integrate both lights and smart plugs.

e. Error Prevention:

Compliance: Users are prompted to confirm critical actions during the device integration process.

Example: A confirmation dialog appears when a user attempts to remove an existing device by mistake.

f. Recognition rather than Recall:

Compliance: Users can refer to on-screen prompts during the integration process without needing to remember steps.

Example: The integration wizard displays contextual tips for each step.

g. Flexibility and Efficiency of Use:

Compliance: Experienced users can skip certain steps in the integration process.

Example: An "Advanced Setup" option allows users familiar with device pairing to skip detailed instructions.

h. Aesthetic and Minimalist Design:

Compliance: The device integration interface is visually clean, focusing on essential information.

Example: Visual cues, like animated arrows, guide users through the pairing process.

i. Help Users Recognize, Diagnose, and Recover from Errors:

Compliance: Error messages during device integration provide clear instructions for resolution.

Example: If the app fails to detect the new device, the error message suggests checking the device's connectivity and power.

j. Help and Documentation:

Compliance: A help section explains common issues and troubleshooting steps during device integration.

Example: Users can access a "Device Integration Guide" from the settings menu.

Problems Identified and Proposed Solutions:

Problem: Some users find it confusing to determine whether the device is successfully integrated.

Solution: Implement a visual and audible confirmation, such as a checkmark and a sound, when the integration is successful.

Improvement Plan:

Collect user feedback on the device integration process, especially from users with various levels of technical expertise.

Conduct usability testing to identify any pain points during device setup.

Iteratively refine the integration process based on user insights to enhance user satisfaction and ease of use.

6.6. Add new user.

a. Visibility of System Status:

Compliance: The status of the new user addition process is visible in the user management section.

Example: A loading spinner indicates that the system is processing the new user creation.

b. Match between System and Real World:

Compliance: The language and steps for adding a new user align with real-world concepts of user registration.

Example: Users are prompted to enter a name, email, and password for the new user.

c. User Control and Freedom:

Compliance: Users have control to initiate, edit, or cancel the new user creation process.

Example: A "Cancel" button allows users to abort the user creation if they change their mind.

d. Consistency and Standards:

Compliance: Adding a new user follows a consistent process, similar to industry standards for account creation.

Example: The same steps are used to add both adult and child users.

e. Error Prevention:

Compliance: Users are prompted to confirm critical actions, like sending an invitation to the new user.

Example: A confirmation dialog appears when a user attempts to invite the new user.

f. Recognition rather than Recall:

Compliance: Users can see the progress and required information for adding a new user without memorizing steps.

Example: The user creation form includes placeholders and labels for each required field.

g. Flexibility and Efficiency of Use:

Compliance: Experienced users can expedite the process by inviting multiple users simultaneously.

Example: An "Add Another User" option allows users to streamline the creation of multiple accounts.

h. Aesthetic and Minimalist Design:

Compliance: The user creation interface is visually clean, focusing on essential information.

Example: Unnecessary form fields are avoided, keeping the registration form concise.

i. Help Users Recognize, Diagnose, and Recover from Errors:

Compliance: Error messages during user creation provide clear instructions for resolution.

Example: If an email address is already associated with an existing account, the error message suggests using a different email.

j. Help and Documentation:

Compliance: A help section explains the requirements and common issues during user creation.

Example: Users can access a "User Management Guide" from the settings menu.

Problems Identified and Proposed Solutions:

Problem: Users sometimes struggle to create passwords that meet the app's requirements.

Solution: Implement real-time password strength feedback to assist users in creating strong and secure passwords.

Improvement Plan:

Collect user feedback on the user creation process, particularly focusing on any confusion or challenges faced.

Conduct usability testing with new users to identify potential bottlenecks.

Continuously update the user creation process based on user insights and industry best practices to optimize user experience.

6.7. Troubleshoot activity

a. Visibility of System Status:
Compliance: Users are shown real-time status updates during the troubleshooting process.
Example: A progress bar indicates the steps being executed in the troubleshooting sequence.

b. Match between System and Real World:
Compliance: Troubleshooting steps use everyday language and correspond to the physical aspects of the device.
Example: Instructions describe common physical symptoms (like blinking lights) and their meanings.

c. User Control and Freedom:
Compliance: Users can start, pause, or stop the troubleshooting process at any time.
Example: Options to 'Retry' or 'Cancel' are available at each step of troubleshooting.

d. Consistency and Standards:

Compliance: Troubleshooting follows a uniform approach across various devices.
Example: Similar steps are used for diagnosing connectivity issues in different devices.

e. Error Prevention:
Compliance: The system confirms with users before performing any resets or data deletions during troubleshooting.
Example: A confirmation dialog appears before the system restores factory settings.

f. Recognition rather than Recall:
Compliance: On-screen guidance is provided, reducing the need for users to remember troubleshooting steps.
Example: The interface offers hints and tips relevant to the current step in the troubleshooting process.

g. Flexibility and Efficiency of Use:
Compliance: Skilled users have access to advanced troubleshooting options.
Example: An 'Expert Mode' allows experienced users to directly access deeper system diagnostics.

h. Aesthetic and Minimalist Design:
Compliance: The troubleshooting interface is clear and uncluttered, emphasizing essential steps.
Example: The interface uses intuitive icons and animations to guide through the troubleshooting process.

i. Help Users Recognize, Diagnose, and Recover from Errors:
Compliance: Clear, actionable advice is provided for identified issues.
Example: If a device is not responding, the system suggests checking the power source and connectivity.

j. Help and Documentation:
Compliance: A dedicated help section is available for common troubleshooting scenarios.
Example: Users can consult a 'Troubleshooting Guide' accessible from the help menu.
Problems Identified and Proposed Solutions:

Problem: Users often overlook basic checks like power and connectivity.
Solution: Implement a guided checklist at the start of the troubleshooting process to cover these basics.

k. Improvement Plan:

Gather user feedback specifically on the troubleshooting process, focusing on ease of understanding and effectiveness.

Conduct targeted usability testing to identify common errors or misunderstandings during device troubleshooting.
Regularly update the troubleshooting guide and process based on user feedback and emerging device issues.

6.8 Checking family schedule

a. Visibility of System Status:
Compliance: Users receive clear, visual indications of schedule updates and changes.
Example: Notifications or visual cues (like color changes) indicate new events added to the family schedule.

b. Match between System and Real World:

Compliance: The scheduling interface uses familiar, everyday language and symbols.
Example: Calendar views resemble physical calendars; days with events are highlighted or marked.

c. User Control and Freedom:

Compliance: Users can easily navigate through different views of the family schedule.
Example: Options to switch between daily, weekly, and monthly views are readily accessible.

d. Consistency and Standards:

Compliance: The design and operation of the schedule checking feature follow common calendaring conventions.
Example: Standard symbols for adding, editing, and deleting events are used.

e. Error Prevention:

Compliance: The system helps prevent double-booking or scheduling conflicts.
Example: Automatic alerts for overlapping events or reminders for upcoming commitments.

f. Recognition rather than Recall:

Compliance: Essential information about events is displayed prominently, reducing the need for memory.
Example: Hovering over an event shows details like time, participants, and location.

g. Flexibility and Efficiency of Use:

Compliance: The calendar offers features for both novice and expert users.
Example: Quick add features for experienced users; guided event creation wizards for new users.

h. Aesthetic and Minimalist Design:

Compliance: The calendar interface is clean, with a focus on essential elements.
Example: A clutter-free design showing only relevant information for each day's schedule.

i. Help Users Recognize, Diagnose, and Recover from Errors:

Compliance: The system offers suggestions or corrections for scheduling errors.
Example: If a user tries to schedule an event in the past, a prompt suggests the next available time slot.

j. Help and Documentation:

Compliance: A help section or guide for effectively using the family calendar.
Example: A tutorial or FAQ section explaining how to synchronize schedules, set reminders, etc.

k. Problems Identified and Proposed Solutions:

Problem: Family members miss updates or changes in the schedule.
Solution: Implement a real-time sync feature and push notifications to alert family members of any schedule changes.
Improvement Plan:

Collect feedback from families on the usability and effectiveness of the schedule checking feature.
Conduct usability tests with families to identify potential issues and areas for improvement.
Continuously refine the schedule interface and features based on family feedback and emerging needs.

6.9 Set pet feeder schedule

a. Visibility of System Status:

Compliance: Users receive immediate feedback on the status of the pet feeder.
Example: Indicators show the current food level, last feeding time, and next scheduled feeding.

b. Match between System and Real World:

Compliance: The pet feeder interface uses language and visuals familiar to pet owners.
Example: Icons of pets and bowls are used to represent feeding status and portions.

c. User Control and Freedom:

Compliance: Users have the ability to manually override automatic feeding schedules.
Example: Options to dispense food immediately or adjust feeding times as needed.

d. Consistency and Standards:

Compliance: The user interface and functions are consistent with common device interfaces.
Example: Consistent button placement and terminology across the app or device.

e. Error Prevention:

Compliance: The system helps prevent overfeeding or missed feedings.
Example: Confirmation requests before changing feeding schedules or portion sizes.

f. Recognition rather than Recall:

Compliance: Critical information about feeding schedules and quantities is readily available.
Example: The main screen displays the next feeding time and portion size without needing to navigate through menus.

g. Flexibility and Efficiency of Use:

Compliance: The interface caters to both new users and those familiar with the device.
Example: Simple setup for new users and shortcuts or customizable settings for experienced users.

h. Aesthetic and Minimalist Design:

Compliance: The interface is uncluttered, focusing on key functionalities.
Example: A clean layout showing only essential information about feeding times and quantities.

i. Help Users Recognize, Diagnose, and Recover from Errors:

Compliance: Guidance is provided in case of errors or malfunctions.
Example: If the feeder is jammed or empty, the user receives clear instructions on how to rectify the issue.

j. Help and Documentation:

Compliance: Accessible support and guidance for using the pet feeder.
Example: An in-app help section or manual detailing setup, troubleshooting, and maintenance tips.

k. Problems Identified and Proposed Solutions:

Problem: Users are unsure if the feeder is functioning when they are away.
Solution: Implement a feature to send real-time notifications or a daily summary to confirm feedings.

l. Improvement Plan:

Gather feedback from pet owners on the usability and functionality of the pet feeder.
Conduct usability testing to identify any difficulties in interacting with the feeder, especially in remote operation scenarios.
Regularly update the pet feeder's software to enhance user experience based on the feedback and evolving user needs.

6.10 Add voice command

a. Visibility of System Status:

Compliance: Users receive clear feedback when a voice command is recognized or processed.
Example: Visual or auditory cues indicate when the system is listening, processing, or has completed a command.

b. Match between System and Real World:

Compliance: Voice commands use natural language and familiar terms.
Example: Commands like "Turn off the living room lights" mirror everyday speech.

c. User Control and Freedom:

Compliance: Users have the ability to easily correct or cancel voice commands.
Example: Options to say "Cancel" or "Undo" to reverse a command.

d. Consistency and Standards:

Compliance: The system's responses and actions are consistent for similar voice commands.
Example: Standard responses for turning on/off devices, regardless of the specific device.

e. Error Prevention:

Compliance: The system confirms critical or ambiguous commands before execution.
Example: For a command like "Delete all my messages," the system asks for confirmation.

f. Recognition rather than Recall:

Compliance: Users are not required to remember specific phrasings for commands.
Example: The system understands varied phrasings for the same command, such as "Switch on the light" and "Turn on the light."

g. Flexibility and Efficiency of Use:

Compliance: The system accommodates both novice and expert users.

Example: Novice users get guided instructions, while expert users can use shortcuts or combined commands.

h. Aesthetic and Minimalist Design:

Compliance: Any visual elements associated with voice command functionality are simple and intuitive.
Example: A minimalistic microphone icon indicates when the system is ready to receive a command.

i. Help Users Recognize, Diagnose, and Recover from Errors:

Compliance: The system provides helpful feedback when it doesn't understand a command.
Example: If a command is not recognized, the system suggests alternative phrasings.

j. Help and Documentation:

Compliance: Easy access to a list of common commands and troubleshooting tips.
Example: A voice command like "Help" brings up a guide or suggestions for commands.

k. Problems Identified and Proposed Solutions:

Problem: Users sometimes struggle to remember the exact phrasing for specific commands.
Solution: Implement an AI-driven suggestion feature that learns from user interactions to suggest or auto-complete commands.

l. Improvement Plan:

Collect user feedback on the voice command feature, focusing on ease of use and understanding.
Conduct usability testing to identify natural language patterns and common phrases used by different users.
Continuously refine the voice recognition system and command list based on user feedback and evolving language models.

6.11. Execute voice command
a. Visibility of System Status:

Compliance: Users receive immediate and clear feedback when a voice command is executed.
Example: Audible confirmation or a visual indicator on the device shows that the command has been understood and is being acted upon.

b.Match between System and Real World:

Compliance: The system acknowledges voice commands in a way that mimics natural human conversation.
Example: Responses such as "Turning off the lights" or "Setting an alarm for 7 AM" mirror human communication styles.

c. User Control and Freedom:

Compliance: Users have the ability to easily stop or reverse actions initiated by voice commands.
Example: Commands like "Stop" or "Reverse the last action" to quickly undo actions.

d. Consistency and Standards:

Compliance: The system's responses to voice commands are consistent across different contexts and devices.
Example: Similar voice commands result in similar actions, regardless of the device being controlled.

e. Error Prevention:

Compliance: The system seeks clarification or confirmation for commands that are unclear or have high stakes.
Example: For a command like "Erase my schedule," the system asks for confirmation before proceeding.

f. Recognition rather than Recall:

Compliance: The system is designed to understand and respond to a variety of phrasings for the same command.
Example: Recognizing different commands for the same action, such as "Increase volume" and "Turn up the sound."

g. Flexibility and Efficiency of Use:

Compliance: Accommodates both inexperienced and experienced users with different interaction options.
Example: Novice users can use simple commands, while experts can use more complex or chained commands.

h. Aesthetic and Minimalist Design:

Compliance: Any associated visual interfaces are uncluttered and intuitive.
Example: A simple animation or icon appears when the system is listening or processing a command.

i. Help Users Recognize, Diagnose, and Recover from Errors:

Compliance: When a command is not executed correctly, the system provides helpful feedback.
Example: If a command fails, the system explains why and suggests how to correct it.

k. Help and Documentation:

Compliance: Users have access to guidance on how to use voice commands effectively.
Example: A voice command like "Help me with voice commands" triggers a tutorial or list of common commands.

l. Problems Identified and Proposed Solutions:

Problem: Users may not know all the commands available or how to phrase their requests.
Solution: Implement a feature that allows users to ask, "What can I say?" to get examples of commands.
m. Improvement Plan:

Collect feedback specifically on the execution of voice commands, focusing on accuracy and user satisfaction.
Conduct usability tests to understand common voice commands and user expectations in various scenarios.
Continuously update and refine the voice command system based on user interactions, feedback, and advancements in voice recognition technology.

6.12. Check Energy Consumption

a. Visibility of System Status:

Compliance: Users are provided with real-time updates on their energy consumption.
Example: A dynamic dashboard or display shows current energy usage and trends over time.

b. Match between System and Real World:
Compliance: The energy consumption data is presented in familiar units and formats.
Example: Usage is displayed in kilowatt-hours (kWh) and compared to everyday examples, like lightbulb usage.

c. User Control and Freedom:
Compliance: Users can easily navigate through different views of energy consumption data.
Example: Options to view detailed breakdowns by device, time of day, or historical comparisons.

d. Consistency and Standards:
Compliance: The presentation of energy data follows standard conventions for data display.
Example: Consistent use of colors and symbols in charts and graphs for easy interpretation.
Error Prevention:

Compliance: The system helps in identifying unusual patterns or spikes in energy usage.
Example: Automatic alerts or notifications for sudden increases in energy consumption.

e. Recognition rather than Recall:
Compliance: Key information is displayed directly, reducing the need to remember past usage.
Example: The main interface shows a summary of recent changes and trends in energy use.
Flexibility and Efficiency of Use:

Compliance: The system offers features for both novice and expert users in energy management.
Example: Novice users get simplified overviews, while experts can access detailed analytics and reports.

f. Aesthetic and Minimalist Design:
Compliance: The interface focuses on essential data, avoiding unnecessary information.
Example: A clean, streamlined dashboard highlights key metrics like current usage and cost estimates.

g. Help Users Recognize, Diagnose, and Recover from Errors:
Compliance: Guidance is provided for interpreting and acting on unusual energy usage patterns.
Example: Tips or suggestions are offered for reducing consumption when high usage is detected.

h. Help and Documentation:
Compliance: Easy access to information on understanding and optimizing energy consumption.
Example: An FAQ or help section explains how to read the data and take actionable steps to save energy.

i. Problems Identified and Proposed Solutions:
Problem: Users may not understand how their activities impact energy consumption.
Solution: Implement feature that correlates activities or devices with energy usage spikes, offering insights into how different actions affect consumption.

j. Improvement Plan:
Gather user feedback on the energy consumption checking feature, focusing on clarity, usefulness, and actionability of the information provided.
Conduct usability testing to identify potential areas of confusion or improvement, especially in how data is visualized and interpreted.
Regularly update the energy monitoring system based on user feedback and emerging trends in energy management and sustainability practices.