Smart Home

External Specification Document

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I Methodology

Following a review of the information acquired in the requirements document and an analysis of the survey results. We determined that our target audience consists of university students who live in dorm rooms and want complete control over their housing utilities. As a result, we began to concentrate on meeting the demands outlined in the previous sections. This paper will handle the external specification of the design and behavior of the interactive system. As a result, we will show our application design choices, the core design, external specifications, interaction scenarios, and a self-evaluation.

II Main design decisions

For this application, we have two primary design options. The first design choice is to incorporate a speech recognition capability into our program. Many smart home apps now contain a voice recognition feature in which the computer program recognizes speech. Digital voice assistants as part of a smart home setup have been a real game changer, where a voice command may effortlessly operate lights, appliances, and other necessary equipment. The second design choice is sense gesturing. The sixth sense technology has linked the physical and digital worlds. It is a combination of numerous existing technologies such as hand gesture recognition, picture capture, processing, manipulation, and so on. It overlays the digital world on top of the actual world.

After much deliberation, we chose to go with the second design option as our primary design option for our smart home application. Based on the survey results and the fact that this new technology is still in its early stages and is being approved by a wide spectrum of people.

III External specifications

A Descriptions

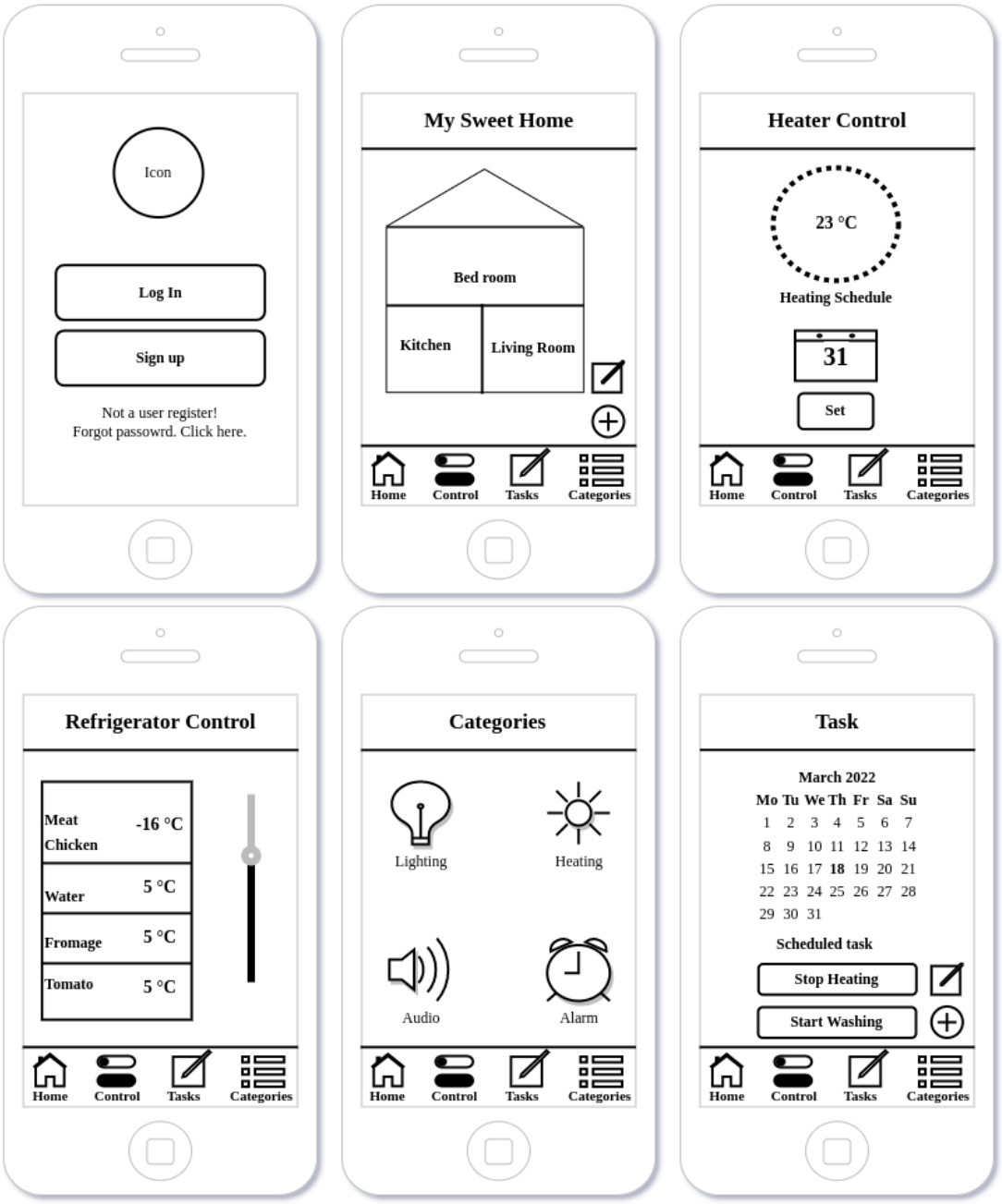

Figure 1: Smart Home Multiple Interfaces

B Justifications

B.1 Task Tree

This diagram illustrates the tasks found in our smart home application. The user first logs into his account, or if he is a new user, he makes a new account by signing up. The user is subsequently routed to the application's home page, where he or she has three major options. The first step is to design and personalize his house map. The second option is control, in which the user may select to control his rooms or devices and an

approval message is issued to approve the start of his control. The third and last option is to add a new room, task, or device. You can also stop or cancel the added commands.

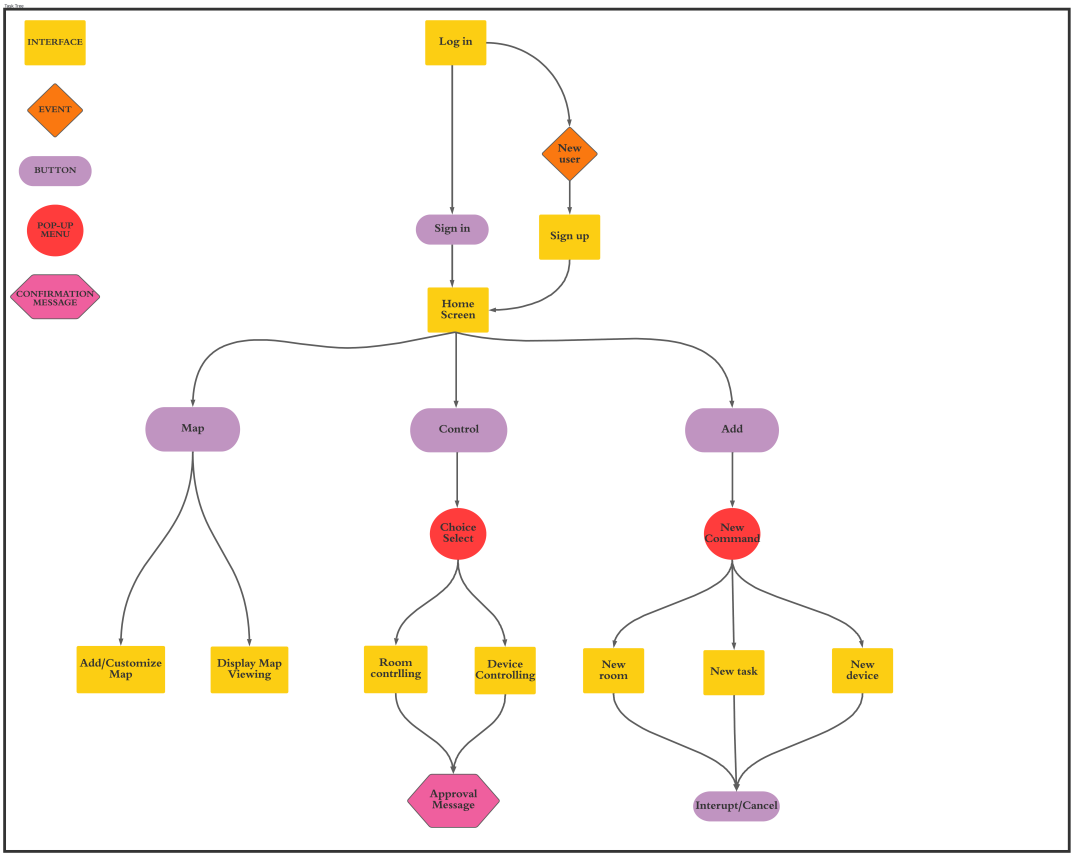

Figure 2: Smart Home Task Tree

B.2 Ergonomics

After reviewing all of the available data, we determined the most important functional and nonfunctional requirements for our application, which are listed in the ergonomics below.

1. **Guidance**

   1.1 Grouping

      1.1.1 Grouping by location

         1.1.1.1 Include a map view of the entire house.

         1.1.1.2 Favorite display screen(by frequency of use, alphabetical order, etc..)

2. **Immediate Feedback**

   2.1 Display an advisory message in the event alerting the user that the system has reverted to its former state.

   2.2 Provide an auditory or visual indication signifying the starting/completion of a given job.

3. **Workload**

   3.1 Minimal actions

      3.1.1 Minimize the number of steps required to select a room or an appliance from an ordered list.

4. **Explicit Control**

   4.1 Explicit user action

      4.1.1 Always obtain the user's approval before doing a suggested or necessary action.

5. **Adaptability**

   5.1 Flexibility

      5.1.1 When user needs are unknown, provide users some flexibility over display configuration.

      5.1.2 The user has the option of using gesture-sensing radar technology to operate their appliances.

6. **Error Management**

   6.1 Error protection

      6.1.1 Protect field labels from accidental change by users.

      6.1.2 Display an advice message seeking user consent when a user asks LOG-OFF and if any current job will not be performed appliances.

   6.2 Quality of error message

      6.2.1 Make sure that the error messages are as precise as possible.

      6.2.2 Make your error messages succinct yet informative.

IV Interaction scenarios

A First Scenario

Anna, a 22 years old university student, has a full day schedule. Thus, she always leaves first thing in the morning and returns in the evening. Therefore, she never has time to check if she has lacking items in her pantry and often buys groceries in excess, thus wasting both her time and energy. However, when she opens the app, she will have the option to enter her room, select the refrigerator, and then check the list of missing items. As a result, she knows exactly what she needs to get.

B Second Scenario

Nadine, a 25 years old PhD student, who is always cold, and thus keeps her heater on even when she is far way from home. This typically causes her power bill to go up dramatically. However, while using this application she can directly access her home appliances remotely, choose the heater, she could check the status of the heater, turn off the heater when she isn't home or to allow it to automatically turn on and off according to the room temperature.

V Self-Assessment

Although the main limitation in our smart home application is Wireless security. Almost all smart devices depend on some type of wireless communication (Wi-Fi or Bluetooth). Wireless communications, like all digital communications, have the potential for hackers to intercept and utilize to get access to your smart home appliances. However, our design has a lot of advantages. To begin with, our application is easy to use and offers user-friendly interfaces. Then there's the convenience of being able to add additional devices and appliances at any time. Furthermore, a user can link all of his home's technologies through a single interface. Additionally, adopting a new technology such as gesture sense is still in its early phases and is gaining widespread acceptance.