Human Computer Interaction Project

Requirements Document

Master M1 MoSIG, Grenoble Alpes University

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Project Description:

Our Vision:

- Daily home tasks and chores can be considered to be time-consuming, monotonous, and inconvenient. Thus, sometimes, we opt to complete some of these jobs remotely. We will be contacting a wide range of France residents who are above the age of 18: university students, employees, housewives, retired individuals. Furthermore, the platform of use will be a smartphone application.

- The application is used to monitor and control household electrical equipment (light, locks, air conditioners, etc..). It will also generate reports containing data obtained from these devices (room temperatures, recorded videos by cameras, etc..)

- We chose to develop a Smart Home application to simplify interaction between the smart home system user and the smart house system by providing interactive touchpad interfaces that allow for the entry of instructions and user options, as well as the ability to preserve user input as needed. When necessary, it communicates with users by displaying pop-up notifications or modifying the state of the managed device.

*Questions***:**

1. Technology nowadays is present to make our lives easier. Hence, we came up with the smart home application as a way to ease the lives of people.
2. We are developing a mobile app because an app is accessible to almost everyone since all students have smartphones.
3. We will conduct the project during the Spring 2022 semester.
4. We will implement this project in University Grenoble Alpes
5. Our target group for this study consists of university students aged 18 to 24, who live in dorm rooms and want complete remote control over their home appliances .

Existing Solutions:

There are a lot of smart house applications available; however, according to several user reviews, these applications have numerous drawbacks. For example, Gideon Smart Home has a compatibility issue as the application does not operate on all mobile phones. Shc Smart Home should be more user-friendly, as it is now rather restricted. Samsung Smart Home is only available for Samsung products and has several internet connectivity concerns. Home Apple smart app has a bug in which Siri still fails to comprehend you. Furthermore, the most serious issue in any of these systems is security.

Below is a brief summary of what users wrote in the application review sections of the play/app store.

Application	Advantages	Disadvantages	Install	Rating	Total
Google Assistant App	- Best app for smart lights and to access basic home functions such as lights, speakers, and cameras - Set thermostat temperature	- Smart home capability is limited - Doesn't hear well from afar - Lack of control buttons - Not available in as many places as Amazon Echo	1B+	3.7	557K
Amazon Alexa	Access status of compatible devices	- Alexa cannot understand multiple accents - Perform multiple actions with one command	50M+	4.2	1M
SmartThins by Samsung	- Scenarios - Freindly Interface	- Samsung appliances only - Wi-Fi connection problems	500M+	4.4	880K

Loxone Smart	• Support multiple devices from different branches	• Needs to be more user friendly	100K+	4.2	3K
Home Apple Smart App	• Support multiple devices from different branches • Freindly interface • Voice-controlling	• Siri is still having trouble understanding you.	NA	3.3	NA
Honeywell Home	• Offers motion-triggered video clip recording • Provides indoor and outdoor camera offerings • Compatible with Amazon Alexa, Google Assistant.	• Doesn't offer professional monitoring plans • Has a limited number of devices in security system packages	1M	3.5	20K

Field Study

- Open questions:

  We had several questions in mind while building the major features and concepts for our app in order to uncover our target user's habits, challenges, and requirements.
  As a result, various questions arose:
  - How well are the users familiar with technology?
  - What are our users' accommodation types?
  - How do our users interact with his house?
  - What are the desires of our users?
  - What household chores irritate our users?
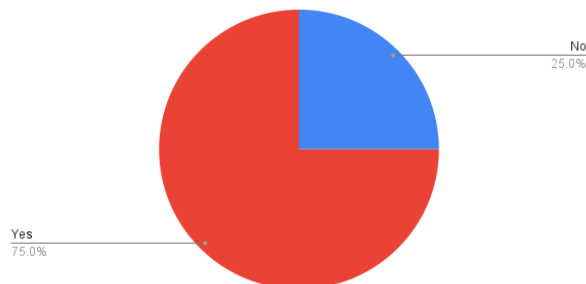 - What are the most time-consuming tasks for our users?

- Conducted Survey:

  We designed a survey to get further information regarding our open questions, and it is attached with the RD paper.
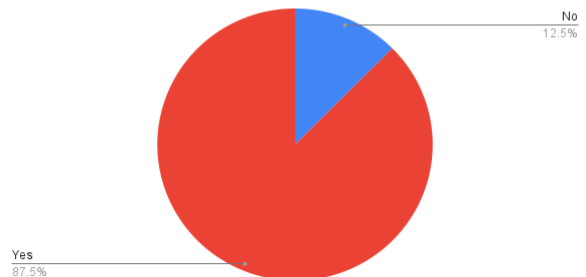
- Observations & Analysis:

  Based on the data collected from the survey, we extrapolated that the 2 most important variables in order to determine our target groups are: apartment size and familiarity with technology. For the first variable, we could visualize that individuals that live in rooms are more interested in full remote control over their home appliances (87.5%), rather than individuals living in houses (79.1%) and individuals living in apartments (75.9%). For the second variable, we could see that individuals that are familiar with technology are interested in full remote control over their home appliances (79.8%), rather than individuals that are not familiar with technology (68.4%). Furthermore, according to our survey, the age group that is most interested in implementing a smart home system is the group aged between 18 and 24 years. Thus, the target group of this study consists of university students aged 18 to 24, who live in dorm rooms and want complete remote control over their home appliances.
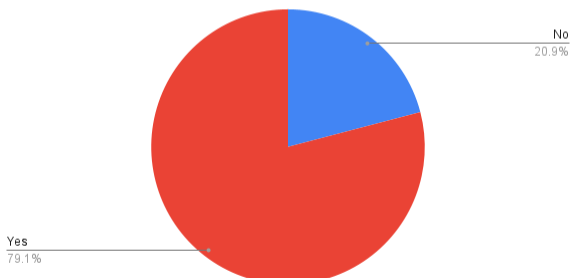
For the people who lived in apartment, would you like to have complete remote control of your home's facilities?
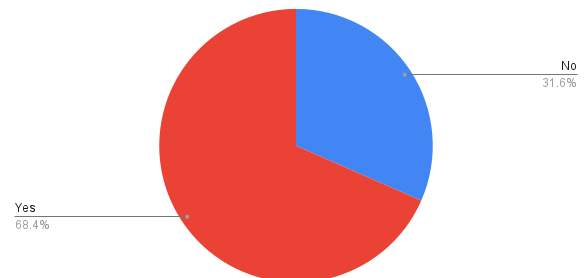
No
25.0%

Yes
75.0%

For the people who lived in Room, Would you like to have complete remote control of your home's facilities?
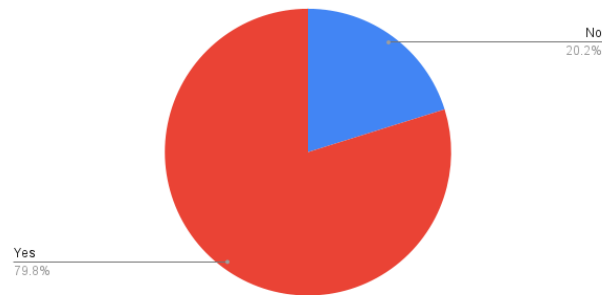
No
12.5%

Yes
87.5%

For people who lived in House, Would you like to have complete remote control of your home's facilities?

No
20.9%

Yes
79.1%

For the people who are not familiar with technology, Would you like to have complete remote control of your home's facilities?

No
31.6%

Yes
68.4%

For the people who are familiar with technology, Would you like
to have complete remote control of your home's facilities?

No
20.2%

Yes
79.8%

Conclusion

- ***Design goals***

  Our app will have visualized models of smart devices, a changing color feature according to temperature and time. Also, our app is going to contain voice recognition to help people with disabilities. In addition, to a customized control panel where the user puts the most important stuff and a map when he first opens the app to visualize the full dorm room. Lastly, our app provides efficient customized notifications (ex. pop-up messages, ringtone) to notify the user in case suspicious actions take place such as: putting invalid temperature. Furthermore, our software will integrate gesture-sensing radar technology to facilitate interaction between the user and the application, as well as a heat consumption monitor to stop the user from passing the consumption limit, and subsequently reducing the cost. As a result, we decided to develop a Smart Home application to simplify interaction between the smart home system user and the smart home system by providing interactive touchpad interfaces that allow inputting instructions and user options, as well as the ability to preserve user input when needed.

- ***Problem scenarios***

  scenario 1:

  It's late, you're exhausted, and you want to sleep, but you have chores to finish around the house first.

scenario 2:

You have plans to go out for the weekend, but you still want things to work as they should.

scenario 3:

If you spend your afternoons in the living room and need everything to be set up exactly how you left it the day before, you can utilize this app to figure something out.

scenario 4:

you are leaving for the weekend and you want the plants to have enough air and sunlight while you are go

- ***Personas***

    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, while using such an app, she will have the option to check what she needs to buy.

    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, if she has access to a remote control application, she could turn off the heater when she isn't home or to allow it to automatically turn on and off the heater according to the room temperature.

Annexes

- Find the questions of the survey in the attached pdf or via the link below:

    https://forms.gle/buXWR9yYr4nHscRt8

References

- https://play.google.com/store
- https://www.apple.com/app-store/