



SafeTravels

INFO10003 – Tut 3 Gr 5 – Assignment 2

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Introduction

In this project, we seek to design a user interface for a smart home app that caters to users' demands while travelling. Decisions upon system requirements and functionalities of the app are made based on previously done user-involved research. The aim of this project is to produce an aesthetically pleasing and functional interface that provides easy navigation and essential systems for users.

The app is intended to be used primarily by travellers who frequently need to leave their home unattended during their trip. Its main functionalities can be split into two categories, which are security and maintenance. The security aspect of the app allows users to access devices such as cameras to monitor their home while they are away and get notifications in the case of emergencies. The maintenance aspect of the app enables users to manage plants, pets and other systems in their house that require human upkeep.

The app is based upon an assumption that users prepare and set up required hardware by themselves since research undertaken previously showed users prefer personal instalment of devices rather than professional instalment. However, we provide FAQ (frequently asked questions) and enquiry features in the app, which enables users with less technical knowledge to ask questions regarding the app. We also assume that technologies for all of its functionalities exist.

We started off this project by brainstorming system requirements and sketching some schematic design to conceptualise what the app is going to look like. In the process of improving the design of the app, we have undertaken online background research and user-involved research via other existing interfaces, surveying, interviewing and A/B testing to gain users' insight on advantages and disadvantages of specific functionalities and designs and to make changes based on their responses.

Background Work

As our App features were discussed previously in assignment 1, this section will involve predominantly design research.

Introductory Pages

Welcome

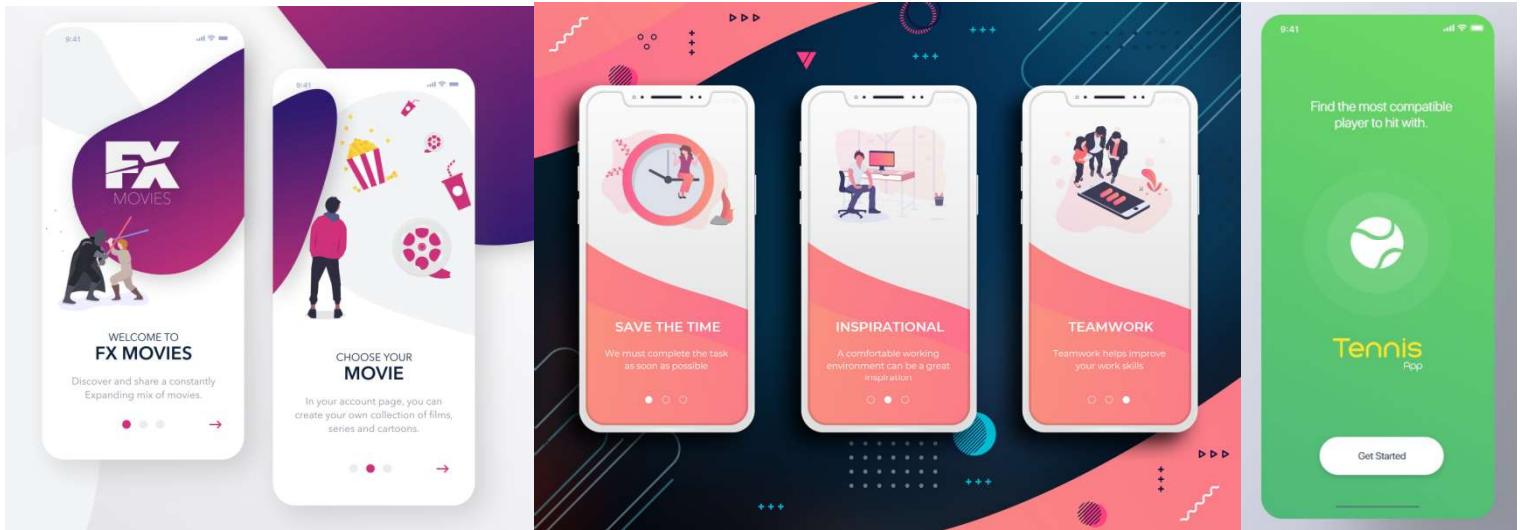


Figure 1: Welcome Pages

The welcome page typically features user-specific preference questions, product/company strengths, and a login option (figure 1). While we aim to showcase our app's advantages to users, it's crucial to maintain priority on simplicity and ease of use. Hence, the welcome page will simply feature the logo, slogan, and a login button.

Login

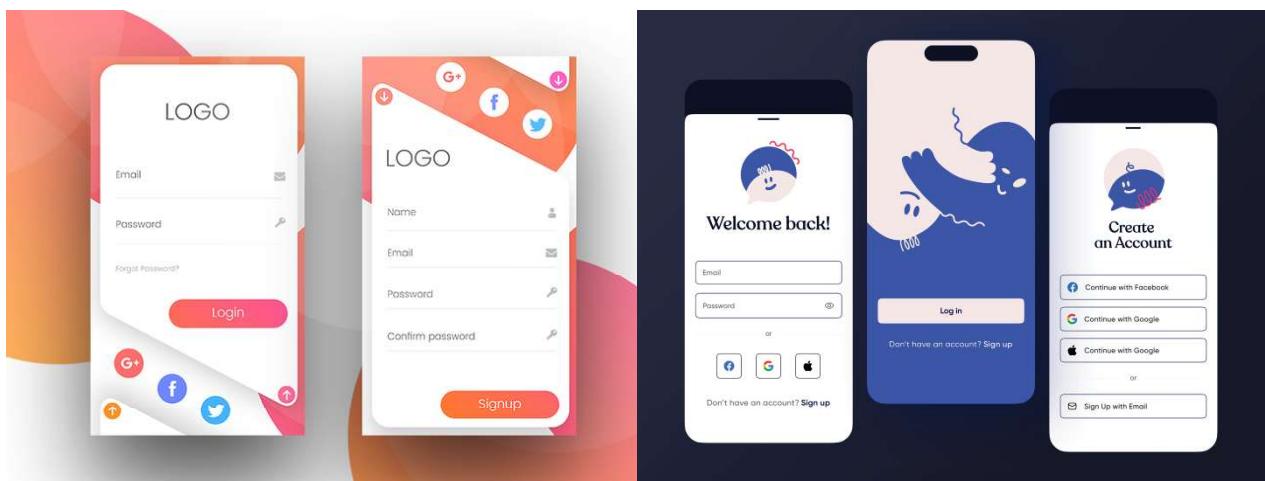


Figure 2: Login Pages

The login page commonly includes two user detail input fields, a sign-up link, additional sign-in options via Google and Apple, and a password retrieval feature. Additionally, the sign-up page features a “confirm password” precautionary input bar. In the examples (figure 2), the logo remains consistently visible as a page header, while additional login options are easily identifiable by their respective logos, enhancing user understanding. Such structure will be adopted in our design.

Functions

Homepage

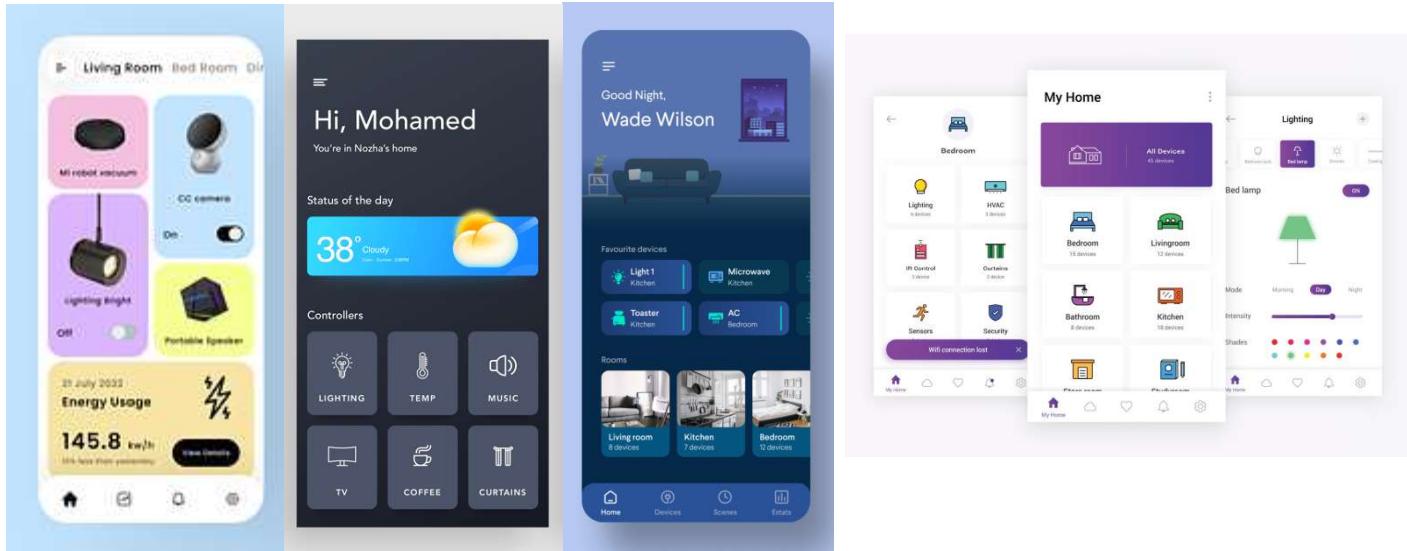


Figure 3: Homepages

Smart home App Homepage UI typically features a current-screen indication, a bottom navigation bar and icons linked to other rooms and remotely controllable devices. The navigation bar allows access to other main parts of the app, primarily including settings, notifications and usage analytics. The designs shown in (figure 3) encompass various styles, with a particular emphasis on minimalistic symbols. Therefore, our design will aim to minimise text on the homepage, favouring widely recognized icons for user communication.

Security

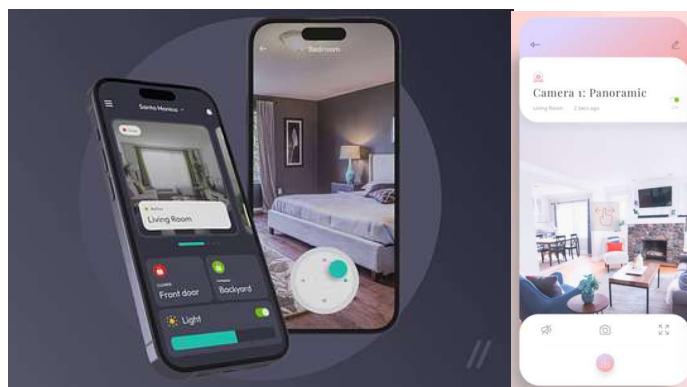


Figure 4: Security pages

Given the focus on security in this app, the UI for security devices including cameras must be intuitive. Camera pages typically include live footage, a recording button, and a microphone for direct communication. There is an additional option to adjust the camera view via a virtual joystick or a touchscreen (figure 4). While Virtual joysticks offer finer control for precise windowed camera movements, touchscreens are naturally more intuitive and straightforward for full screen usages. Hence, both will be implemented in our design.

Automation

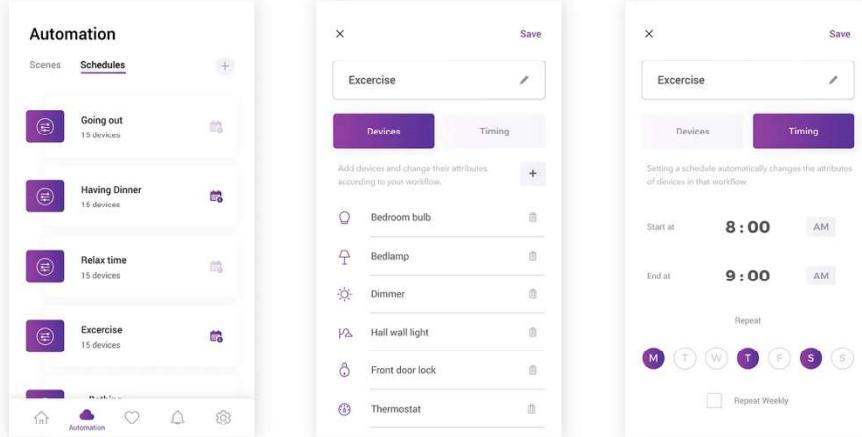


Figure 5: Automation Pages

Automation is another prominent feature in our app. Similar to (figure 5), each routine involves different actions on different devices, and can be scheduled or activated remotely. This feature primarily consists of an "activation panel" for triggering set routines and an "addition page" for creating new routines with duration, actions and chosen names. Given our App's travel focus, the routines will primarily cater users' automation needs during their travels, whether short or long-term. Different but taking inspiration from (figure 5), automation will be directly accessible through a homepage button titled "Travel" for user convenience.

User Preferences

Notifications

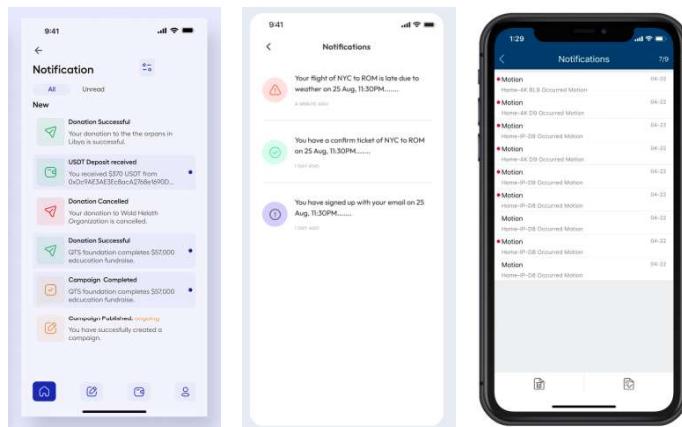


Figure 6: Notification Pages

To ensure home security, the notification page must be clear and well-organised, displaying a categorised list of past notifications. As shown above (figure 6), each notification is marked with a colour-coded urgency icon, date of occurrence and a brief event description. Additionally, new unread notifications are commonly highlighted or marked to ensure quick identification. This will be implemented in our design.

Profile

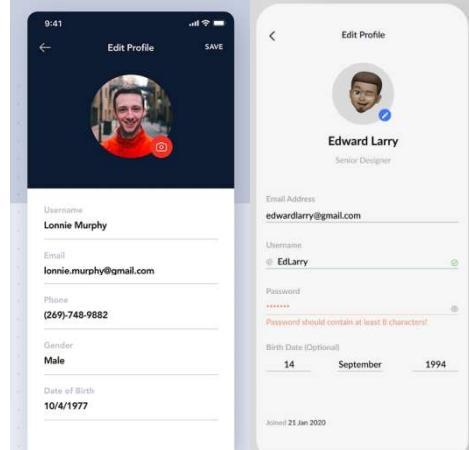


Figure 7: Profile Pages

Profile pages typically contain and allow the user to edit the main account information including username, email, phone, DOB and home address. The profile pictures are commonly displayed over user details as a personalised header, which can also be changed. Significantly, profiles can be visible in whitelists, blacklists or lists of trusted family members within a household. Hence, they should be easily identifiable and adjustable. The simplistic structure shown in (figure 7) will be implemented in our App to ensure that.

Settings

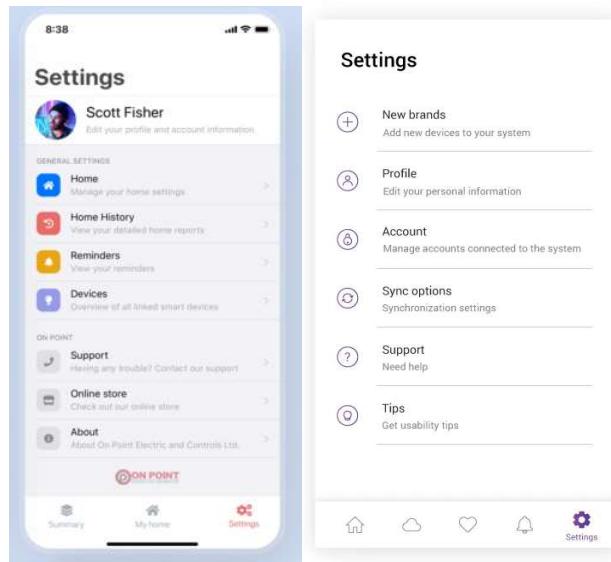


Figure 8: Settings Pages

As shown in (figure 8), Home security settings typically allow access to event history, online support, tips and whitelisted accounts. We will also implement App customisation in setting to enhance personalisation. For user-friendliness, distinct, related icons will mark each settings option. Like the examples, the listing of options provides a clear view of user actions, and therefore will be implemented.

Methods



Brainstorming

We started off our design by brainstorming ideas via a simple flow diagram (as seen in figure 9) which we created on Figma. The diagram is constructed from the app's rudimentary pages such as the login and home page as well as the features of which our app would specialise in such as the security and maintenance pages. The security section would feature certain devices such as lights, cameras, locks, and sensors which would allow the user to adjust or be notified of the devices' activities. Meanwhile, the maintenance section would focus on activities which would usually be human-aided such as cleaning, pet/plant care, controlling of air conditioners, and vacuuming.

We chose brainstorming as it allowed us to slowly visualise the eventual design concept of our application. Brainstorming allowed us to evaluate which features were fundamental to the functionality of the application and which could be excluded. We were able to conclude and address several challenges we faced earlier with our application.

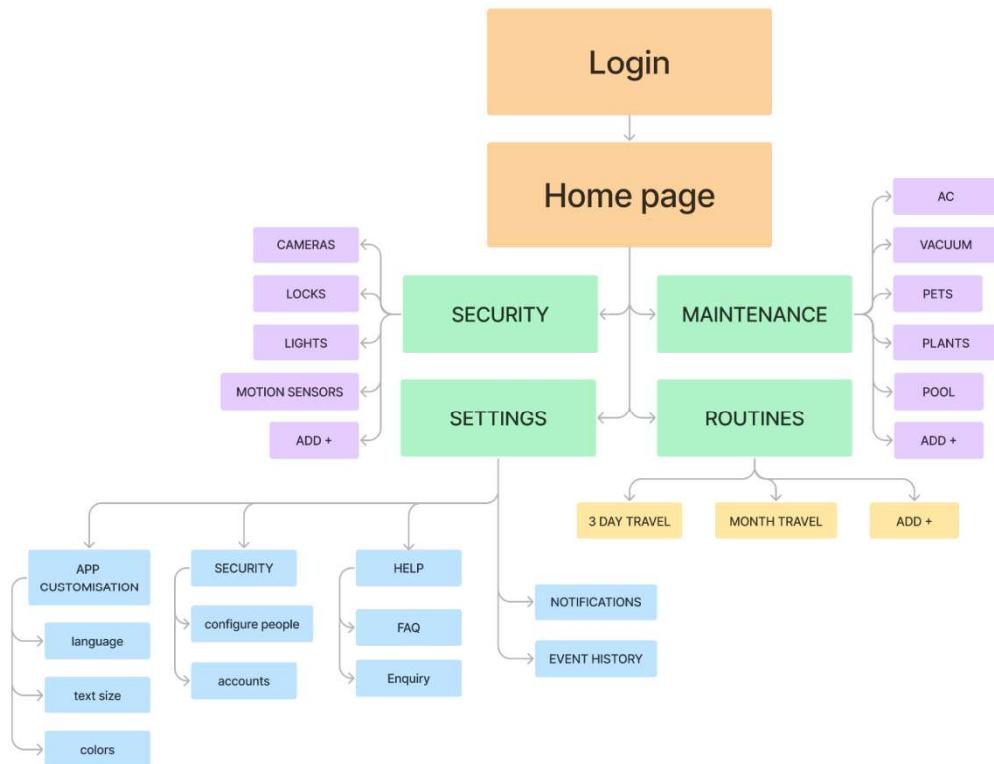


Figure 9: Brainstorm diagram

User Journey Mapping

With the aid of user journey mapping, we were able to further visualise descriptions of a potential user and their ideal experiences. We created a persona “Hannah Hunter” who would potentially match the demographic of our app and her sequence of actions following the installation of our app. This gave us deeper insight into the possible emotional perspectives of a user while utilising our app. Through observing that our person Hannah feels annoyed about the process of setting up the app, we were able to put more consideration into simplifying certain actions and thought of possible solutions.

User journey mapping allowed our team to comprehend the processes involved as a user is trying to approach their goal. We were able to further develop our understanding of how functional the app should be in regards to our target audience.

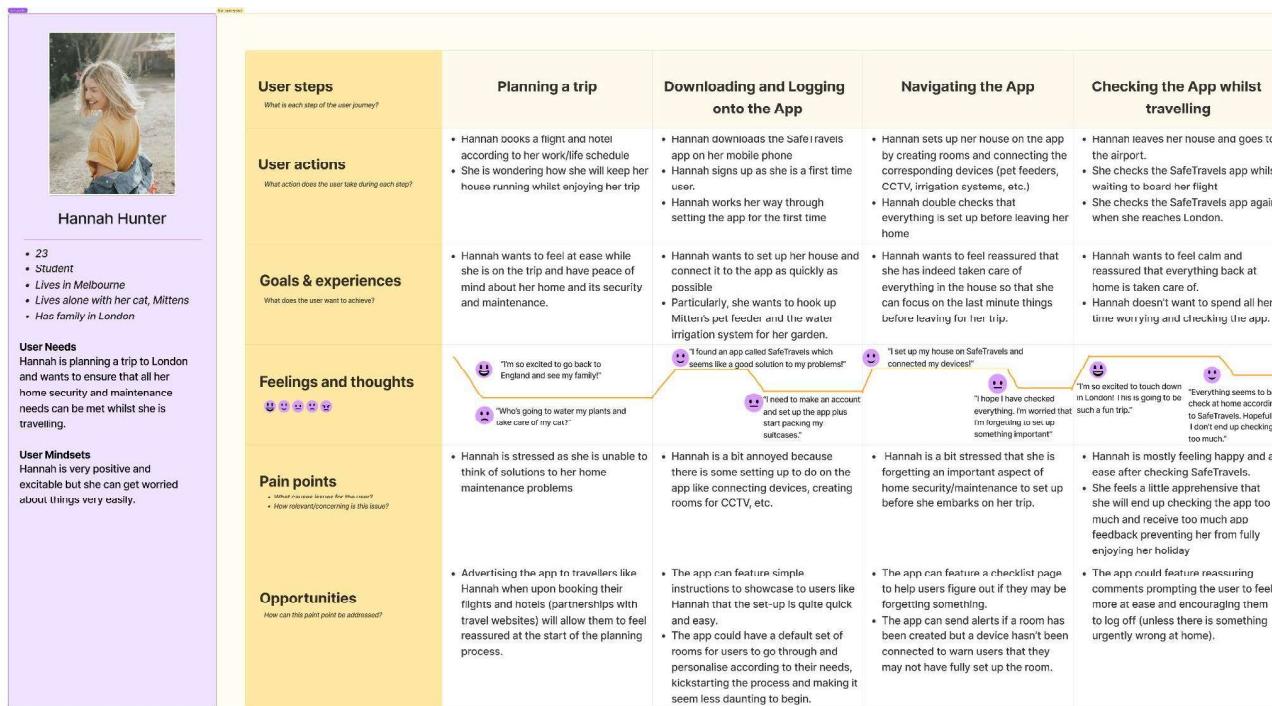


Figure 10: User Journey Mapping (created using Figma)

Prototype Testing

After finishing up our Figma app prototype, we selected a number of potential users to participate in testing. The 15 participants were able to interact with our prototype as intended, navigating through and exploring the unique features our app has to offer. We garnered mostly positive responses regarding the prototype, with some solid feedback in between. Some users encountered some bugs and human errors within our prototype, i.e. some buttons were not functioning properly and a TV device mistakenly added on the front yard page.

This method was crucial to our research as we were able to garner both positive and negative feedback on the design of our app while observing how users would interact with our app. We were able to repair bugs or errors that our testers pointed out to create a more cohesive prototype.



Figure 11: Prototype Homepage

A/B Testing

Our group felt that it was important to listen to those who would potentially use the app, therefore we decided to utilise A/B testing to gather the opinions of such people to help improve and adjust our app design. We selected some pages of our design and created a set of alternatives or chose from earlier versions of our design. These alternatives illustrated different functionalities, buttons, sizes, and layouts. Some were reflective in the evolution of the design, with some being more rudimentary versions such as the home page (figure 12), while others were more superficial such as the size of certain components (figure 12).

Using A/B testing, our group was able to dismiss certain design concepts in favour of what our participants preferred. This elimination method allowed us to narrow our design concepts and land on one that best suits our potential user's needs.

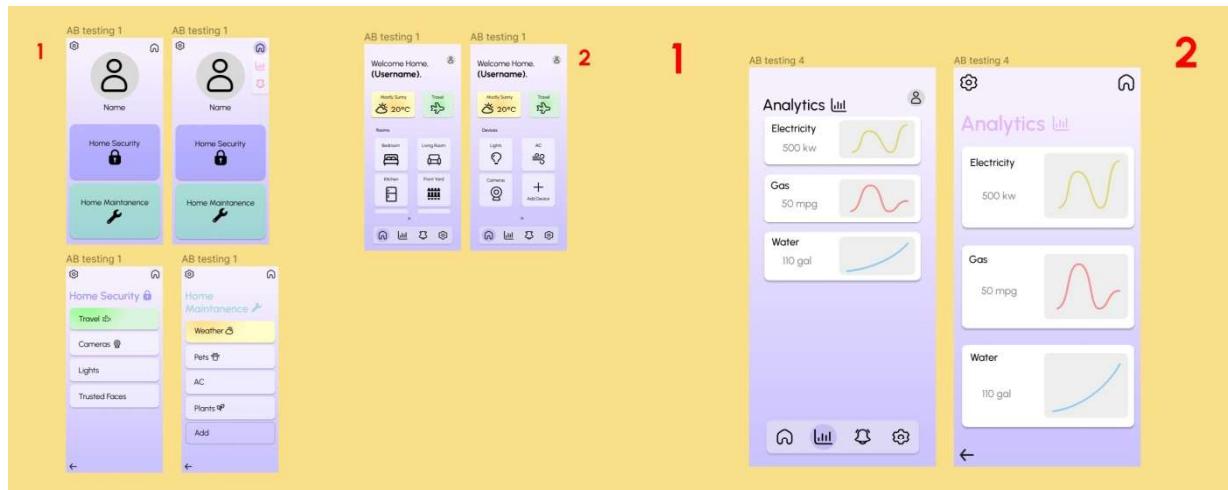


Figure 12: Login Pages

Survey

We invited our prototype testers to fill in a Google Form survey regarding our app prototype. The survey consisted of 11 questions, most of which are short and long-answer questions, relating to the functionality, aptitude, layout and overall design of our app thus far. Examples of this include questions such as "What could be improved..." and "What features do you think are designed well." The questions were designed to be user-centric and aimed to explore specific user needs. We were keen on understanding our app's strengths and weaknesses, being open to criticism and suggestions. Most participants were quite satisfied with the current design of our app but expressed that some features may be expanded or tweaked to better suit their needs. We have previously implemented this method for the first part of our assignment; however we utilised open-ended questions to gather more qualitative data.

By surveying our testers, we were able to achieve a broader understanding of what our potential users would like to experience as well as what they would want to avoid. This time, we were able to be more direct with our participants as the questions were catered to be more personal. Giving the users freedom to express themselves in sentences rather than being confined to a multiple-choice set enabled us to address certain features and issues first-hand.

Results



Sketches and paper prototypes

To visualise the potential style, look and layout of our app, we made some sketches (shown in [Figure 13] and [Figure 14]). This resulted in two distinct styles and layouts with their own benefits and drawbacks. We ended up proceeding with the first one.

1

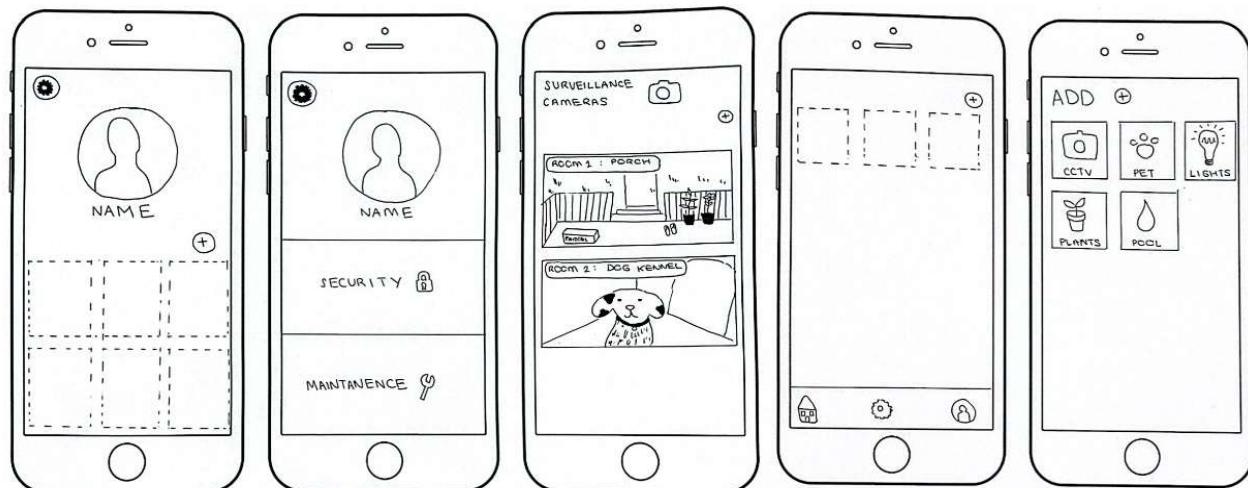


Figure 13: Sketch #1

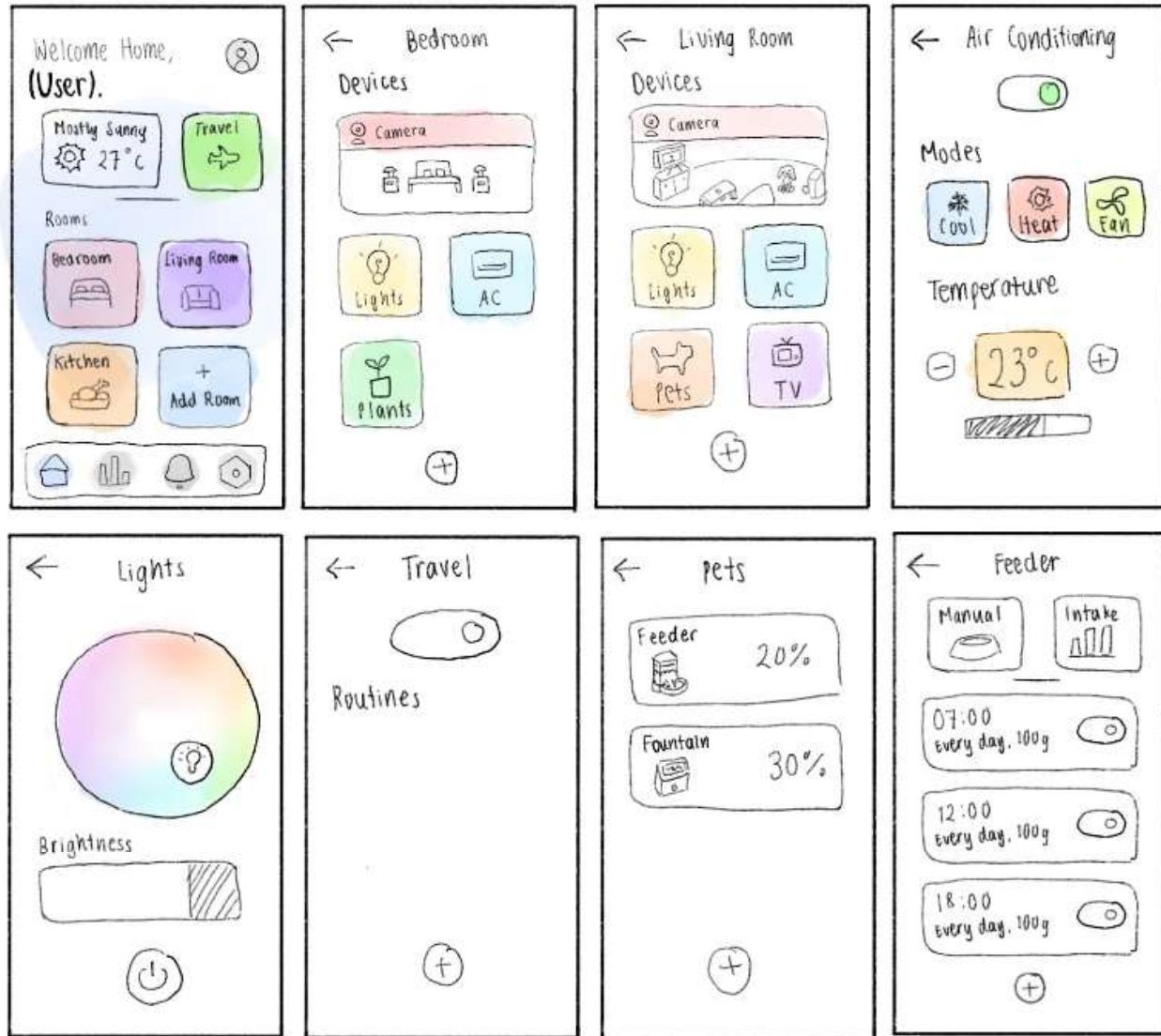


Figure 14: Sketch #2

Wireframes

Our group created a series of low (figure 15) and medium-fidelity (figure 16) wireframes in order to understand and fully conceptualise our app design. The wireframes consist of images navigating through the app, showing how it would potentially function.

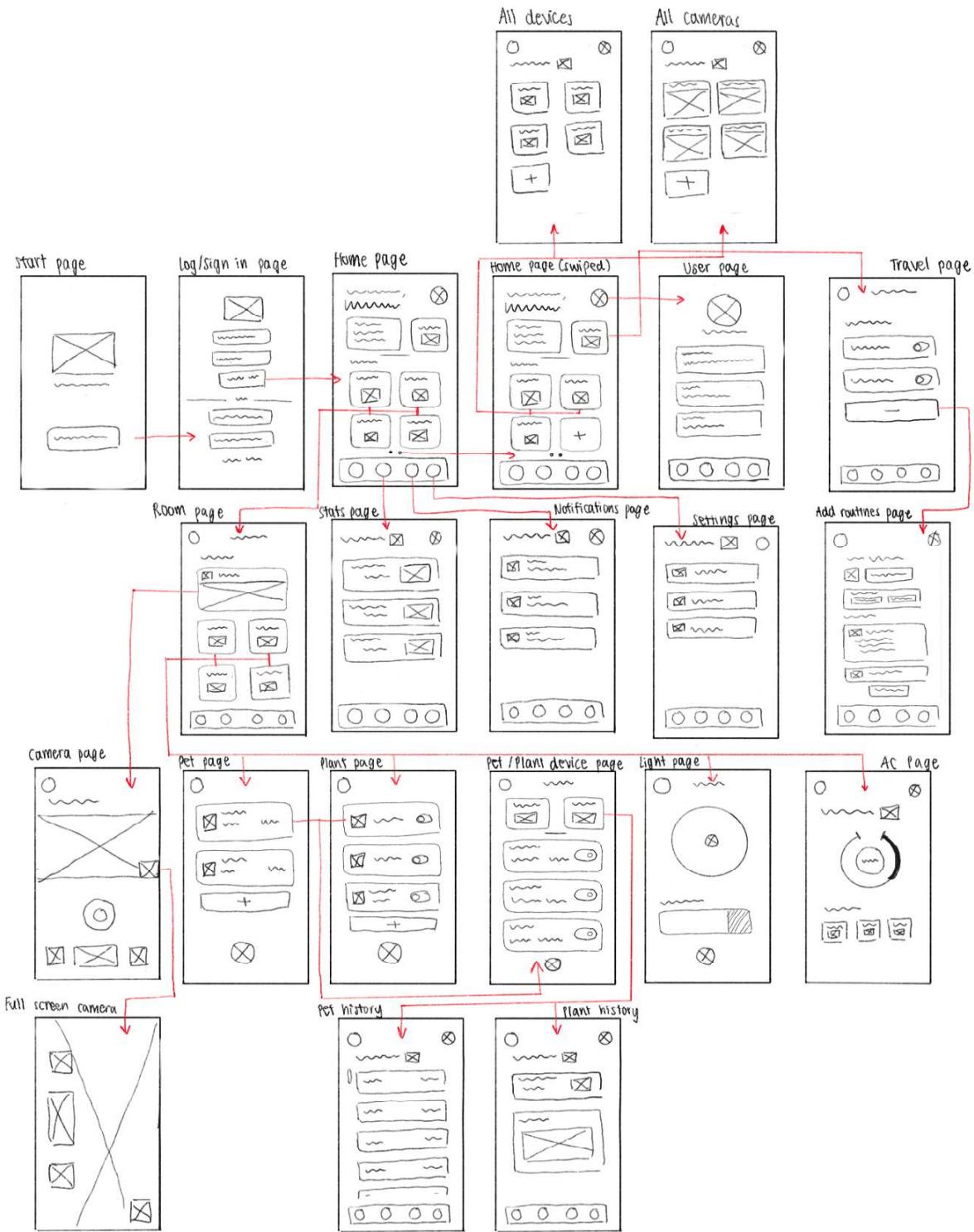


Figure 15: Wireframe #1

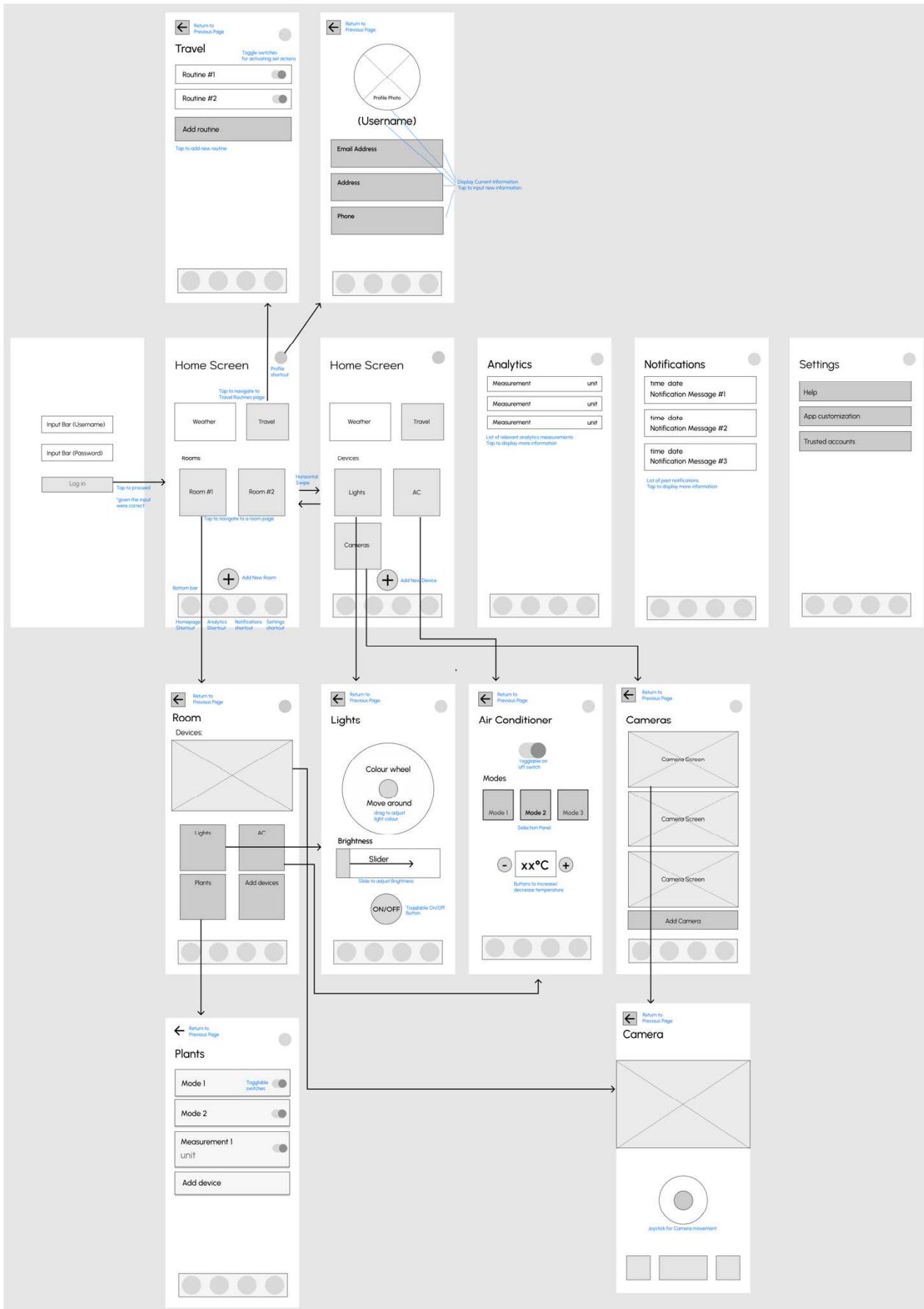


Figure 16: Wireframe #2

Prototype

Based on the first sketch and the wireframe we created a more fleshed out prototype. Complete with interactivity and different versions of specific pages, we went on to test it with users.

Introductory Pages

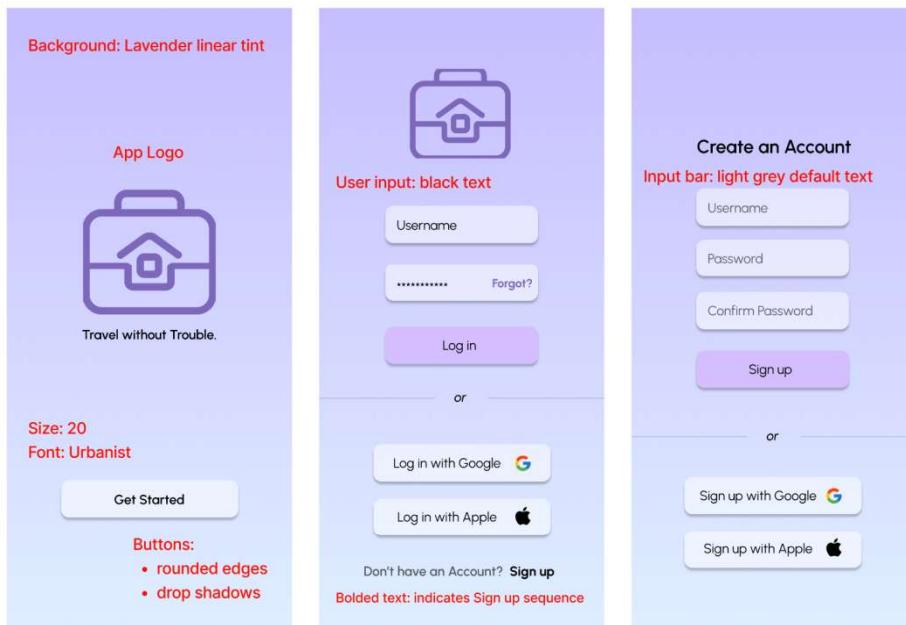


Figure 15: Introductory Pages

Main Pages

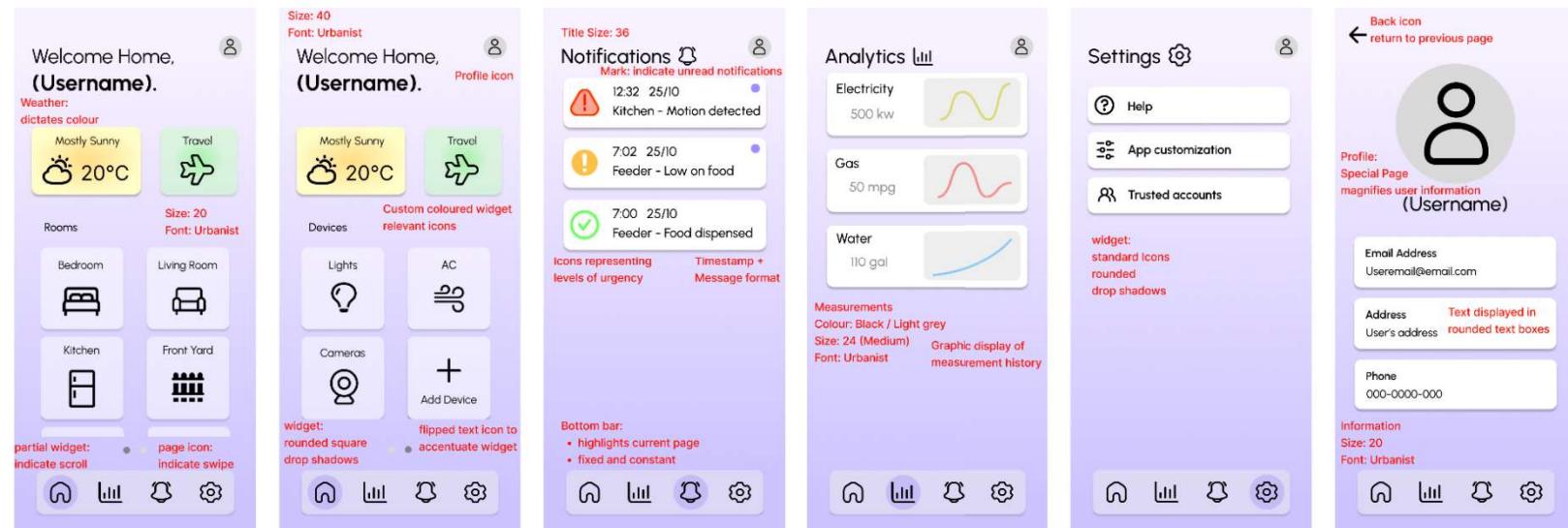


Figure 16: Main Pages

Room Pages

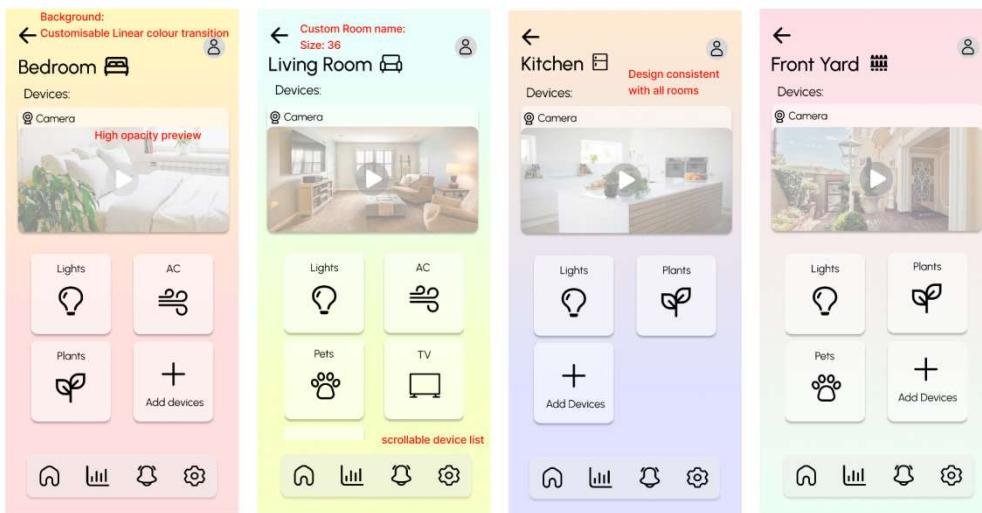


Figure 17: Room Pages

Configurations

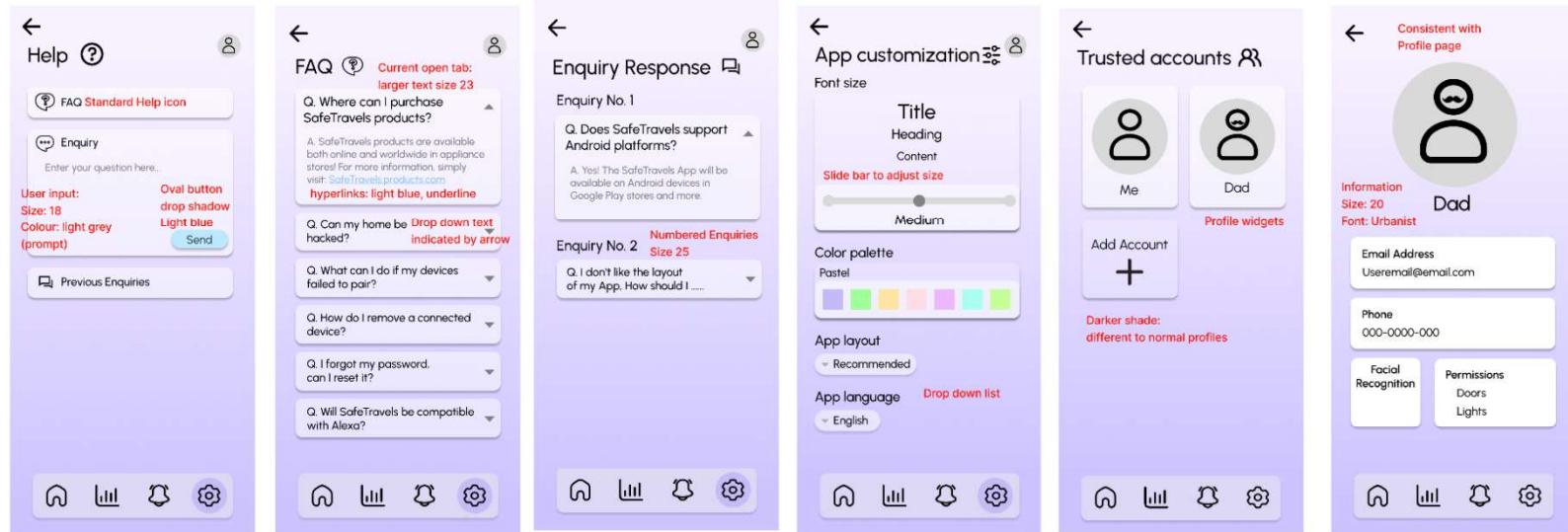


Figure 18: Configurations

Devices

Plants

Icons to represent function
Moisture 30%

Watering 1

Action Button
Manual +coml History

When tracker goes to 30% Measurements shown in light grey
200ml

Every 30 days 500ml

+ Add condition
Darker lavender consistent with addition widgets

Moisture tracker

Current moisture 40% Icon to indicate data acceptability

History Graphic display of measurements

Camera

Full Screen option
Joystick for camera movement
Buttons for main camera functions

Pets

Relevant icons Toggle devices
Feeder 20% Fountain 30%

Feeder

Consistent structure as plants page
Manual History

07:00 Specific settings in light grey Every day 100g
12:00 Every day 100g
18:00 Every day 100g

+ Add time

History

List of past operations
18:00 Added 100g
12:00 Added 100g
07:00 Added 100g
19:25 Coloured by operational state Refilled
18:05 Out of food
18:00 Added 100g

Lights

Interactive draggable colour selector
Brightness Draggable bar

Air Conditioner

20°C horseshoe draggable bar
Modes Cool Heat Fan
mode panel: colours relevant to function
Selected Mode is opaque

Camera UI Elements

- swipe icon, indicates touchscreen movement
- Exit Full screen

Oscillating Wave Animation

searching for devices.

Figure 19: Devices

Routine Function

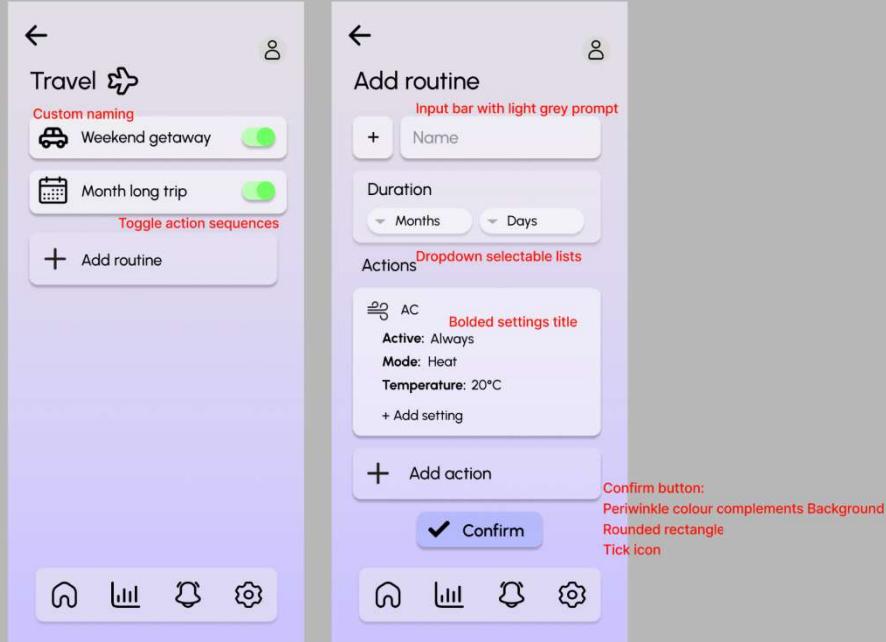


Figure 20: Routine Function

A/B testing

Test 1

The majority (9/10) preferred [Option 2], with arguments such as it being “easier to navigate”, “more aesthetically pleasing” and can “fit more content”, while [Option 1] was mostly described as being inconvenient to navigate.

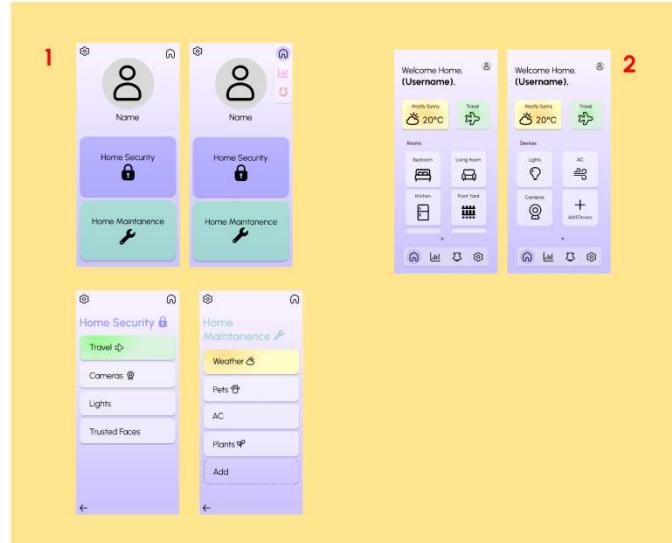


Figure 21: A/B Testing #1

Test 2

Due to similar designs, the votes were heavily contested. The main distinctions revolve around the navigation and appearance of multiple widgets. [Option 1] was the most popular (5/10), supported by its “cleaner look” and “easy-to-use” horizontal scrolling. A response conversely suggests that it would become “annoying” when more devices are involved. [Option 2]’s scrollbar which is “clearer” and “more common” takes second place (3/10), while [Option 3] voters (2/10) argue that other options add “unnecessary clutter” and “isn’t consistent with the Homepage”.

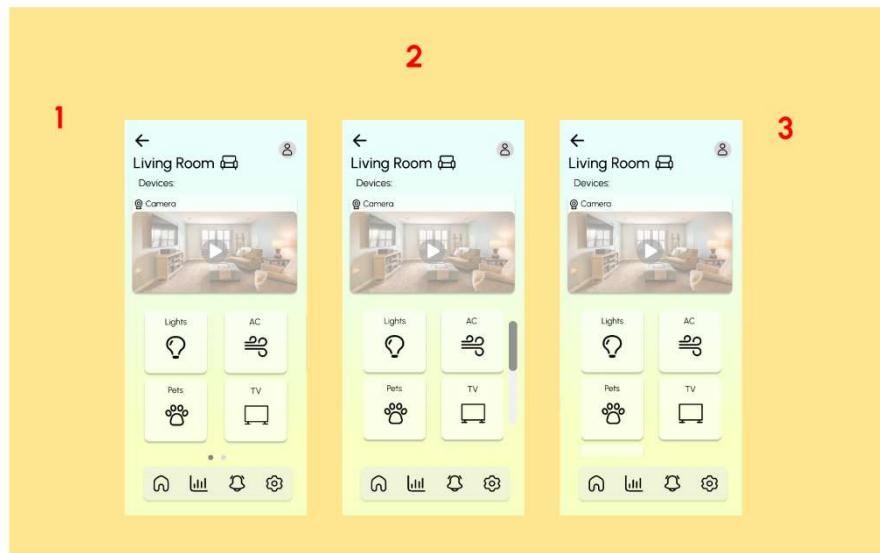


Figure 22: A/B Testing #2

Test 3

All respondents chose [Option 2] (10/10) because of its “efficient/intuitive/compact layout”, which provides necessary information in one page.

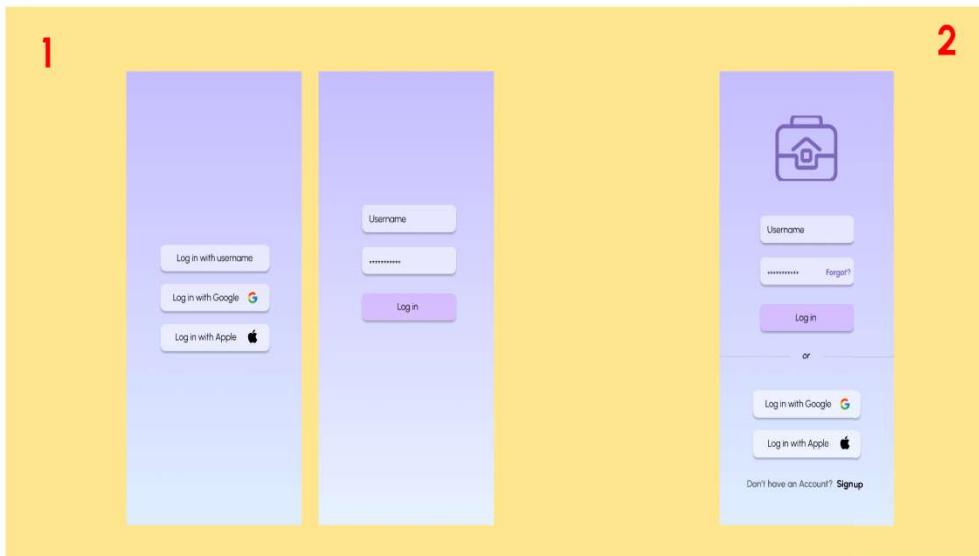


Figure 23: A/B Testing #3

Test 4

The majority chose [Option 1] (6/10) largely due to its bottom bar, while [Option 2] (4/10) presents data on a larger display but hinders navigation.

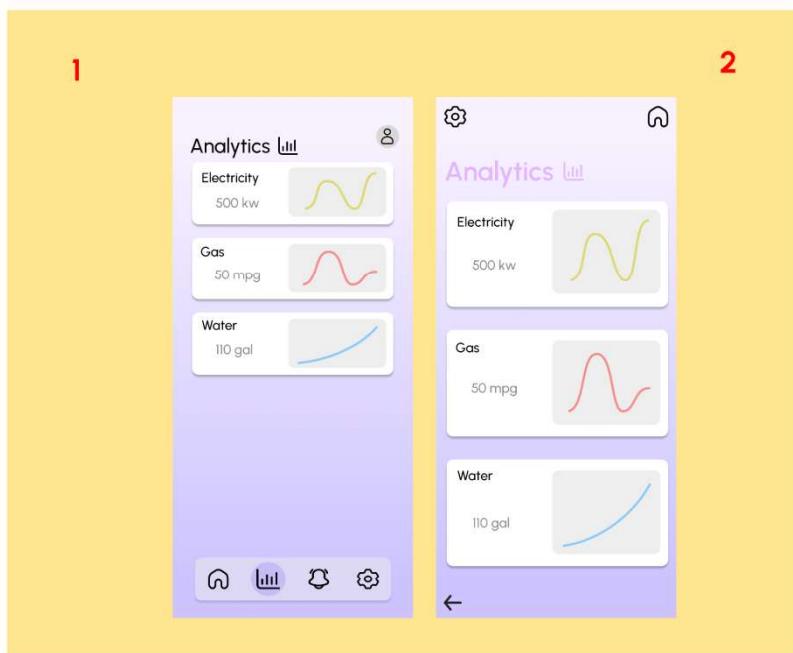


Figure 24: A/B Testing #4

Test 5

Similar to test 4, [Option 1] (7/10) which allows “easier navigation” was more popular. Some agree that [Option 2] (3/10) presents the information clearer, but is overall rejected for efficiency.

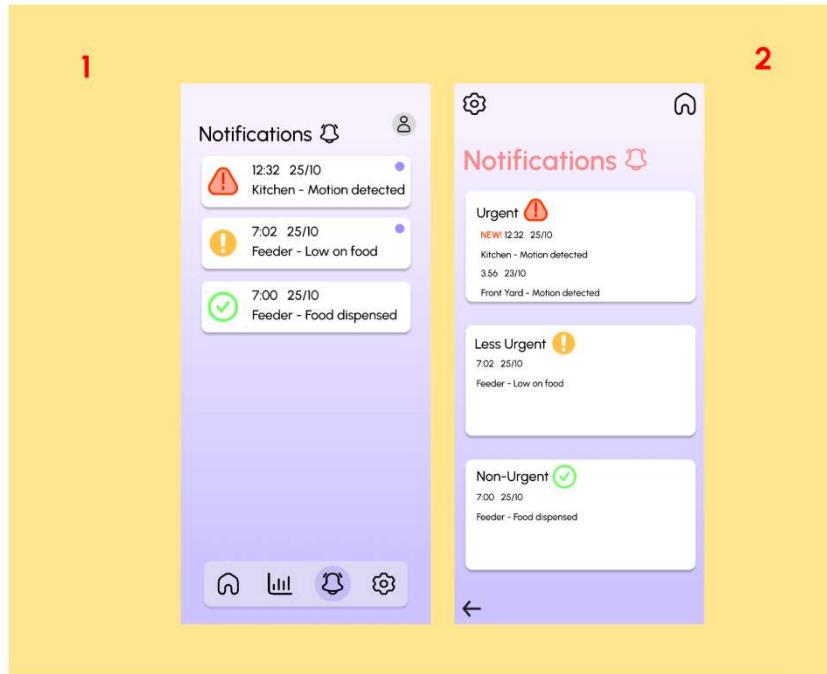


Figure 25: A/B Testing #5

Evaluation Analysis

We conducted an evaluation analysis of SafeTravels by recruiting volunteers who match our target audience (people who travel frequently and leave their house unattended). Our prototype test group consisted of 12 volunteers between the ages 19-48.

Observation & Interview

For a detailed assessment of our prototype, we conducted user observation and interviewing with half of our volunteers. Three evaluations were conducted in person and three online. For in-person evaluations, volunteers were given a mobile phone displaying our app prototype to best simulate how our app would be used if published. For online evaluations, users were provided with a link to the prototype. Before commencing, we provided the brief usage context and information regarding the procedure including observation and interviewing. We then asked them to navigate through the interfaces at their own pace. We observed their interactions externally through Figma's "Follow user" function. After giving them some time to peruse our app, we asked them for immediate error feedback as well as the following questions in order gather their thoughts on our latest prototype iteration:

1. How easy is it to use the SafeTravels app?
2. Would you use this App while on holiday and away from your house? Why/Why not?
3. Do you like the layout and aesthetic of the app? Why/Why not?
4. Do you have any suggestions for improvement to the app?

All six users said that the app was “very user-friendly” allowing us to infer that our app design may be considered “easy to use” by all ages. Users on the older end of our age spectrum commented that whilst they aren’t very ‘tech-savvy’, they were mostly able to navigate through our app interfaces easily.

Furthermore, all volunteers agreed that the App’s “wide range of information on [their] homes” would stop them from worrying about home during their trips. In terms of the layout and aesthetics, the users particularly enjoyed our colour scheme, simple icons and font choices as they are “easy on the eyes and attractive”. We received the most feedback on our app’s layout and aesthetics which communicated to us that visuals are very important for our user-base.

Through external observation and interviewing, a number of errors were found and were debugged real-time by our group members. The errors generally included:

- Navigation error (back arrow and certain icons didn't lead to the correct pages)
- Interaction error (malfunctions in scrolling, swiping, buttons, slider and draggable objects)
- Logic error (presenting infinite page loops, redundant information, confusing layouts)
- Appearance error (disappearing and glitching icons)



Figure 26: In-person Evaluation

It is important to note that some of our interfaces were not fully interactive, so users were not able to try out every single feature of our app. This could have prevented them from providing us with more feedback.

After conducting a rather small-scale evaluation analysis, we realised that we will need to conduct more prototype testing on a larger scale to receive more user feedback and truly uncover any issues with our system that we may not realise as designers.

Survey

All 12 volunteers were asked to complete the survey outlined in the Methods section after trying our prototype. From the responses, the prototype received a general average rating of 4.4/5 while the Intuitiveness of the App design was rated 4.6/5. All respondents agreed that the bottom bar and pages were well fitted and nicely laid out. In regards to the homescreen, many suggested a customisable layout or background colour. To implement that, we added an App customisation page which offers different layouts, colours, fonts and languages to help increase user satisfaction. Most respondents also agreed that our room pages are "well organised and easy to understand", while some suggested vertical scrolling for devices. To consider the input, we carried out A/B testing on that specific feature which concluded with the original horizontal swipe.

Except for some cosmetic issues, most participants found the "Routines" functionality helpful. They agreed that the travel page doesn't lack functionalities, but appears somewhat empty. To counter that, we added icons for set routines, which helps fill up space on the routine bar.

While most users found the navigation "perfectly intuitive", some suggested larger buttons and icons. An A/B testing regarding this issue was carried out where another page design featuring larger buttons were pitted against the original design, in which the original design proved to be more popular.

In the final suggestions, users agreed that the interactive features could be improved. While the Figma interface limits the scope of what could be included, we will strive for more functional interactive features in the next stage of App development.

Iterations

Throughout our App design process, most pages underwent iterations due to group decisions or external insights. Notable changes are detailed below:

Login Page

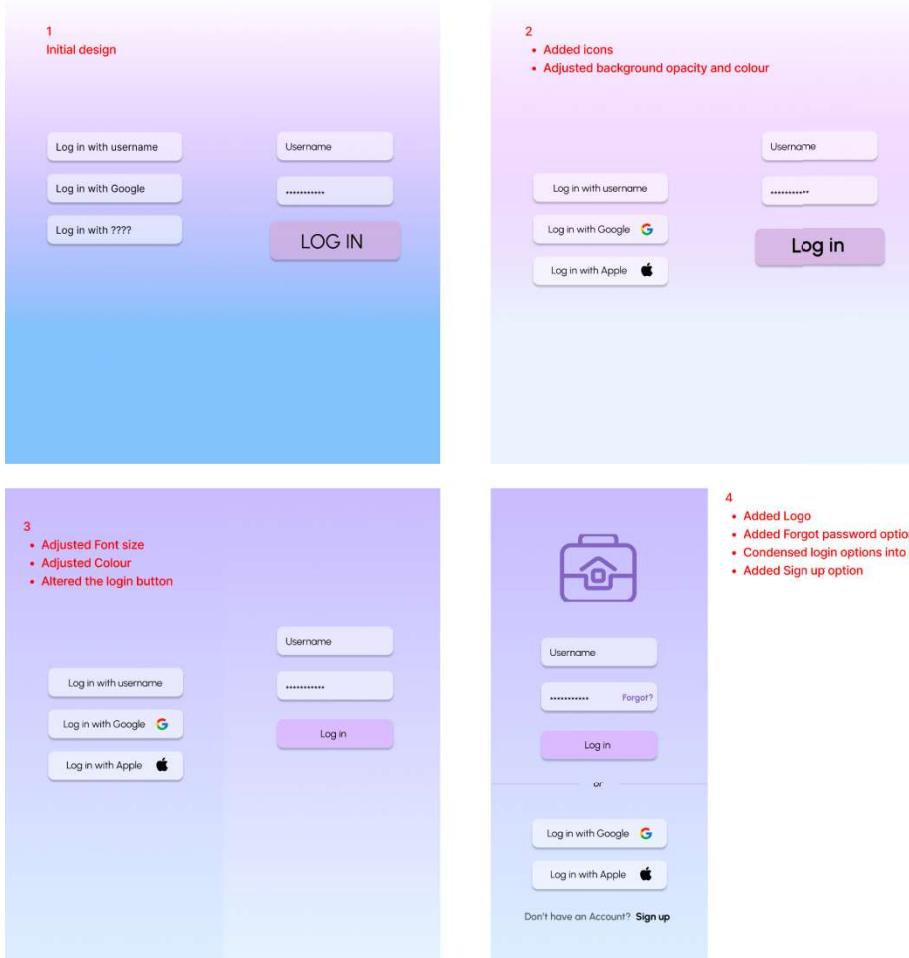


Figure 27:
Login Page Iterations

Analytics

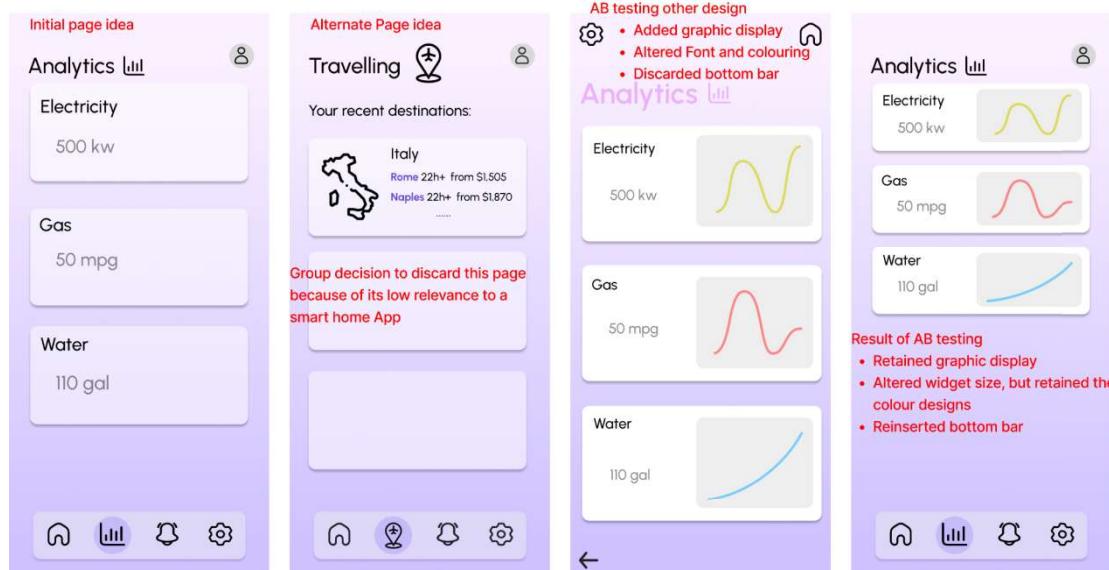


Figure 28:
Analytics Page Iterations

Settings

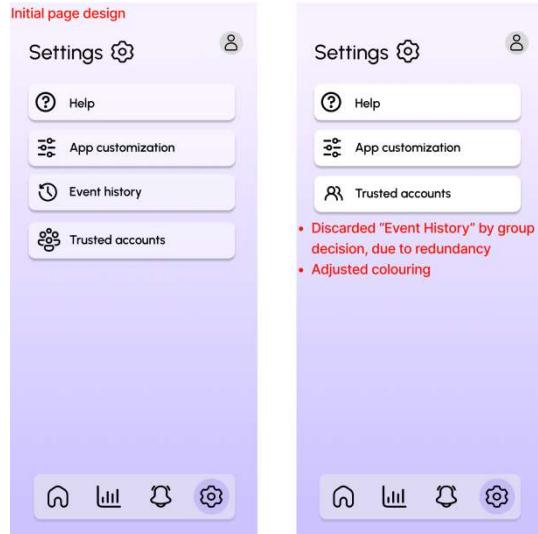


Figure 29:
Settings Iterations

Notifications

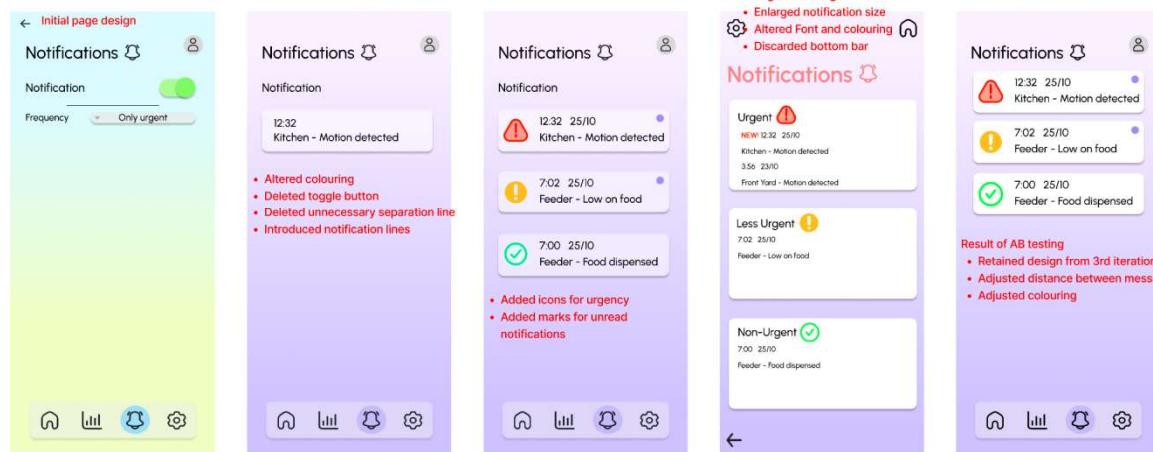


Figure 30:
Notifications Iterations

Lights

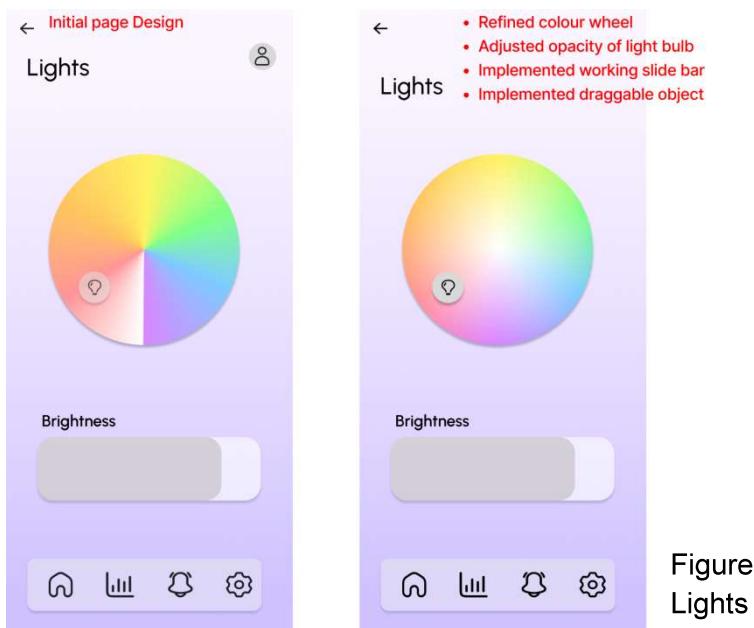


Figure 31:
Lights Iterations

Add Routine

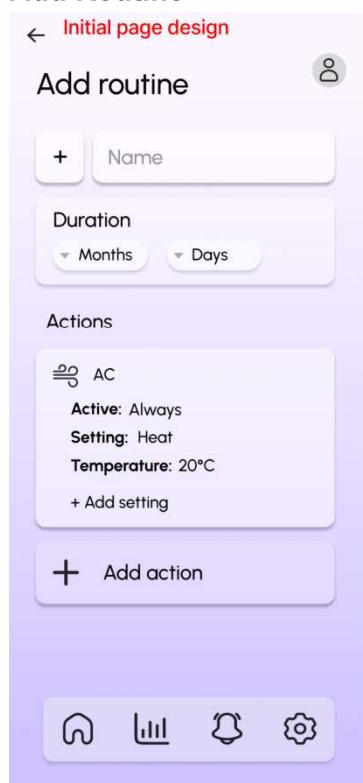


Figure 32:
Routine Page Iterations

Living Room (Room pages)

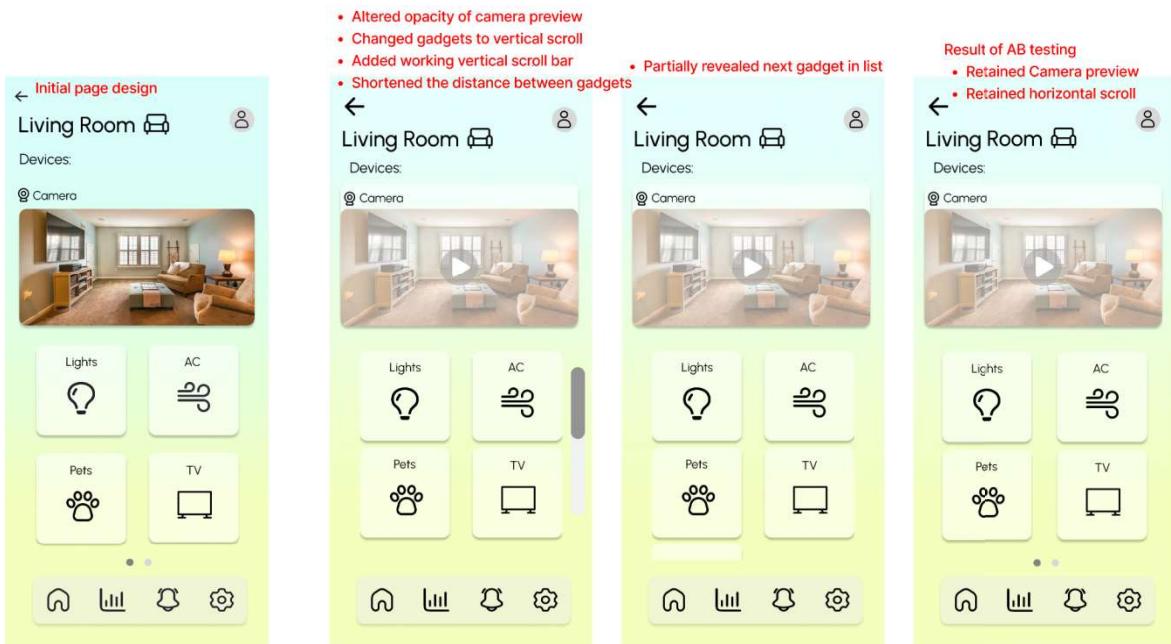


Figure 33: Living Room Iterations

Discussion



Development process

Throughout this project, we utilised different methods and software at every step of the way. The platform we used for our app prototype, Figma proved to be most crucial as it made it convenient to create the first iteration, test the pages and flow with users, and make desired changes. Out of all of the methods, prototype testing was the most useful as we were able to receive lots of feedback from the surveys/interviews. It allowed us to directly communicate with the potential users of our app, see things we might have been blind to as designers, get new ideas and fuel further development. The least utilised method of testing turned out to be A/B testing, mostly because we did not have time to conduct it properly. Instead of having two significantly different whole or at least partial versions of an app, we only created versions for a few specific pages. It did help us to decide on the best visual and functional designs of those pages, but we missed out on experimenting with vastly different overarching concepts for the app as a whole.

Problems

Whilst developing prototype interfaces, we noticed some complications in our design which could prevent users from having the best possible app experience. For example:

- Our travel page was very sparse despite our app's objective being to assist users in taking care of their house whilst travelling. To improve this page, it was suggested to us through the evaluation analysis that we should allow users to input more details like location and exact trip lengths (including weeks instead of just days and months). Furthermore, a day counter was suggested to allow users to track how many days they have spent away from home.
- The evaluation analysis testers also communicated to us that there is currently no way of deleting routines, rooms and other user-controlled additions. Our deletion concept was to have users long-press to delete but this is only implied and not directly stated.
- Despite planning to make our app more focused on security, we strayed from this goal while developing it. We did add the functionality of connecting and viewing security cameras, but we failed to add the ability for users to control the locks on their doors and windows whilst travelling and not.

Acknowledgements

Big thanks to everyone who participated in our research and experiment.

Relative contributions of team members

Chamathna Gunawardena	17%
Donata Snieskaite	17%
Natacha Rachelle Khendrajaya	27%
Kerui Huang	22%
Yuta Miyajima-Paterson	17%

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