plantr.

TEAM

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PROBLEM AND SOLUTION OVERVIEW

Many people want to have plants in their home or workplace, but struggle with caring for their plants properly. Many plant owners know basic or even advanced plant care, but have trouble remembering to water and fertilize their plants. Lack of knowledge about plant's needs can lead to improper care and placement, harming the plant. In addition, diagnosing and dealing with plant diseases can be daunting for experts and non-experts alike.

Our solution to the troubles of plant care centers around a smartphone app that provides customers a way to proactively keep track of the health of their plants. A sensor unit installed in each plant reports the current soil and environmental conditions. Sensor data representing the moisture, temperature, and light exposure of plants allows Plantr to give users helpful hints for keeping houseplants healthy. Our chosen design focuses on anthropomorphizing plants to encourage users to develop a personal connection with their plants. Plantr is location-aware so that users are only reminded to care for their plants when they are near them.

TASK ANALYSIS QUESTIONS

Who is going to use the system?

Anyone who owns indoor plants is a potential user of Plantr, though some features may only supplement the knowledge of an advanced horticulturist. All of plant owners that we interviewed forgot to water their plants at some point regardless of age, experience, and background. Even Lucy, who spent most of her time at home because she worked from home, struggled with timely watering. Plantr's care schedule and reminder system will be useful to all indoor plant owners, since forgetting to care for plants is a widespread problem.

What tasks do customers now perform?

When people purchase a plant, they often look up information about the proper lighting and temperature conditions for their plants. Additionally, customers must find out how much and how

frequently to water and fertilize their plants. Customers have to perform these tasks somewhere between once a month to three times a week. Sometimes people encounter plants which have become diseased, and they want to find ways to help their plants survive.

What tasks are desired?

Customers want a way to remember to water and care for their plants. Forgetting to water plants was the most cited reason for plant death, and the only task that participants in our user study mentioned completing on a regular basis. Caroline, Lucy, and Jack all said that they had forgotten to water plants. Customers also want an easy way to get individualized care information for their plants. Lastly, customers want a way to easily get help when things go wrong with their plants. Jack had a plant that got sick and died. He did not contact a nursery or try to save the plant because it seemed too inconvenient and he was busy with other things.

How are tasks learned?

Most users learned how to take care of their plants through trial and error. Some users consulted the Internet, nursery staff, or friends for more information on plant care. Kacy, the horticulturalist, kept a bookshelf full of indoor plant information books. She consulted the books when new types of plants that she did not know how to care for came into the nursery.

Where are the tasks performed?

Tasks like watering and fertilizing are performed at the plant's location. Users keep plants in their workplace, like Jack, or at home, like Lucy and Caroline. Getting information about plant care was performed in a variety of places. Users who consult the Internet could be anywhere with a platform that supports web browsing and Internet access. Those who go to the nursery to talk to plant experts are required to go to a specific location to talk to someone in person. Customers who call a nursery have to be somewhere where they have the resources to look up a phone number and make a call.

What's the relationship between customer & data?

We identified three different types of data: plants' current state, information about plants, and data that reflects the user's plant care history. A plant's current state is data on the moisture level of its soil and the general appearance of the plant (color, stiffness/limpness of leaves, etc.). The customer uses this information to determine the plant's needs. Caroline and Lucy watered their plants when the soil felt dry or the leaves began to droop. Customers consulted various plant care information databases when they wanted to know how to care for their plants. Customers used their personal history of plant care to determine how to take care of plants. Caroline said that she used to underwater plants, but she learned from her mistake and now tries to water them more often. Customers also base their buying decisions based upon their plant care history. Caroline noted that she tries to buy plants that require minimal water.

What other tools does the customer have?

Caroline, Lucy, Jack, and Kacy all have smart phones and computers. Customers also have a water source, pots, and soil for their plants. Most customers probably have access to a nursery or library as well.

How do customers communicate with each other?

Plant owners communicate on online forums and message boards. Customers who happen to be in the nursery at the same time might talk to each other about plant care. Likewise, customers who have friends with indoor plants may share plant care tips.

How often are tasks performed?

Watering is performed with a frequency between twice a week (Jack) and twice a month (Caroline). Fertilizing is performed less frequently, between once every two weeks to once every three months. Customers did not consider fertilizing part of their regular plant care routine. None of the contextual inquiry participants said that they fertilized their plants as often as they watered them. Customers look up plant care information when something goes wrong with their plant or just after they have bought the plant. Getting help from a plant expert at a nursery or consulting the Internet for plant help are irregularly performed tasks. Plants do not become sick often enough to make a good estimate about how often customers try to get help.

What are the time constraints on the tasks?

Plants must be watered with some regularity, so if customers do not water their plants for long enough, the plants will start to die. Likewise, if plants are in need of attention for other reasons - pH imbalance, environment too dry - and they do not receive attention within some amount of time, they will die. Watering, caring, and learning how to care for a plant takes time. Customers who are very busy might not have the time or attention required for plant care.

What happens when things go wrong?

When plants became "sick", customers take action, seek help, or ignore the problem until the plant dies. Jack had a plant that had problems soon after he bought it. Not knowing what to do, he let the plant die. Caroline said that she usually did all she could to save a plant, like consulting resources and repotting, before giving up and letting the plant die. When customers forget to water plants, they usually notice that the plant needs water and give it water. Sometimes customers may not realize that a plant needs water until it is too late.

TASKS

Easy task - determining a plant's specific care needs

Most contextual inquiry participants learned to take care of plants via trial and error. Lucy and Caroline moved plants around until they found an environment that the plants thrived in. Kacy, the horticulturalist, noted that many people hurt their plants by "babying" them or over-watering and over-fertilizing. She also mentioned that orchid buyers often damaged their plants by placing them in drafty areas. This indicates that lack of knowledge with regard to a plant's specific needs can hinder proper plant care. Determining a plant's needs is a simple one-time task. It only requires retrieval of information about a specific plant.

Moderate task - noticing and remembering to care for a plant

None of the participants in our user study used a written or electronic scheduling aid to plan out plant care. Instead, participants used visual and tactile cues, like leaf color and dampness of soil, to determine when plants needed attention. Plants that are out of sight are difficult to care for because owners are not visually reminded of their needs. Jack had trouble remembering to water plants on the sixth floor of the CSE building because they were out-of-the-way. Additionally, these cues can be misleading or hard to pick up on. Lucy indicated that some of her flowers were particularly hard to care for because she was unable to tell whether they needed water. Visual cues are not always enough to remind plant owners to water their plants. Lucy cited forgetting to water the main cause of plant death, even though she spends most of her time at home. Caroline anticipated forgetfulness and bought plants that required minimum care in order to ensure their survival when she did not remember to care for them.

There are two key subtasks to frequent plant care tasks like watering: 1) noticing that the plant needs care and 2) giving the plant care. Plant owners struggled with both steps of the process.

Difficult task - identifying and managing causes of plant distress
Plant pathogens are an irregular but serious problem for plant owners. They can lead to plant death, and have potential to spread to nearby plants. Caroline mentioned having difficulties with a spider infestation on several separate occasions. She counteracted the spiders by repotting the infested plants, but said that she was unable to prevent some of the infested plants from dying. Jack had a plant that died for unknown reasons soon after he purchased it. He did not go to a nursery or call a nursery to seek assistance because he was not invested in the plant enough to warrant the extra effort required to get help. Diagnosing the cause of plant distress is necessary before proper treatment can be applied, but determining the cause of plant distress can be inconvenient. Owners often feel that they are not knowledgeable enough to handle the problem without additional help.
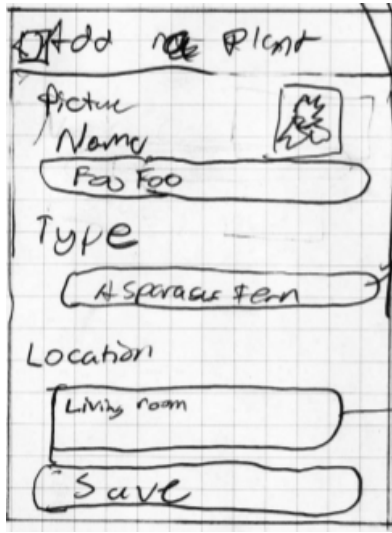
Customers need an easy way to get information to diagnose the plant, and a way to get information on how to treat the plant. The crux of the problem is not the lack of information, but that finding and accessing information is too difficult to be worth the time that it takes.
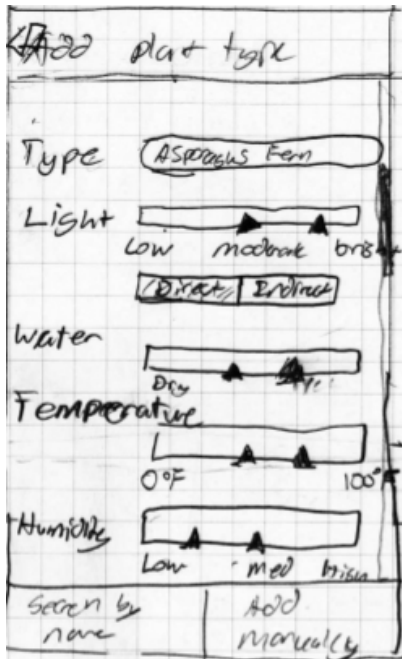
STORYBOARDS

The main screen "My Plants".

The basic "Add Plant" screen.

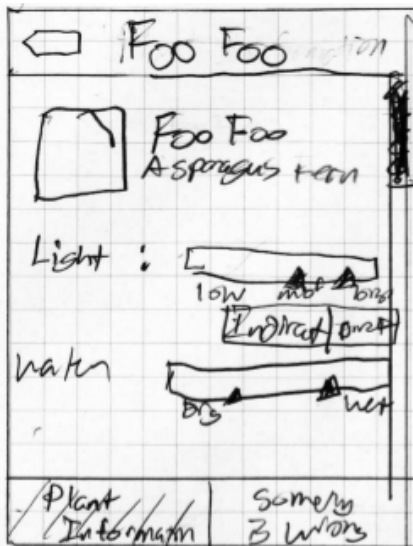Finding a plant in the plant database.

Adding a plant-type to the database manually.

A list of the latest "Alerts" that plants have shared.

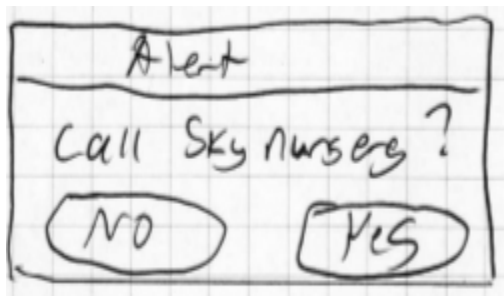The push-notification interface for these alerts.

Overview of a single plant's
health and environment.

Implementation of the plant
troubleshooting feature.
"Something is wrong"

The "Find an Expert" feature
of this design.

An example dialog confirming a call
to an expert.

Our group agreed that the strength of this design was its "Something is Wrong" feature, which allowed a customer to view common problems with a species of plant and call an expert if needed. The "add a plant manually" page was too complicated to be used without modifications and the single plant overview page had too few indicators. Having a mock-up of what the push notifications would look like is another useful piece of this design.
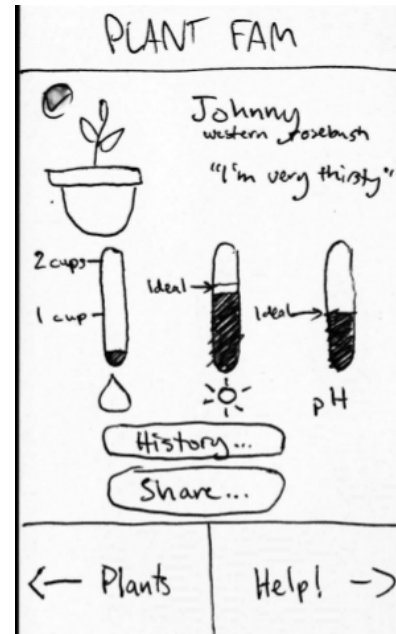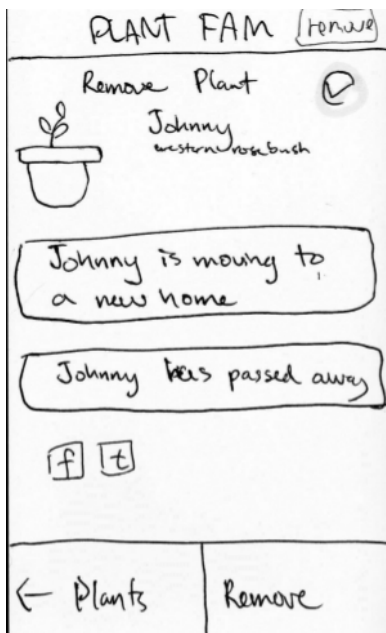
Design 2
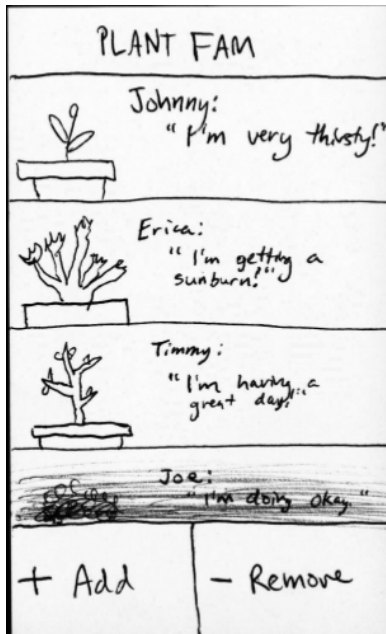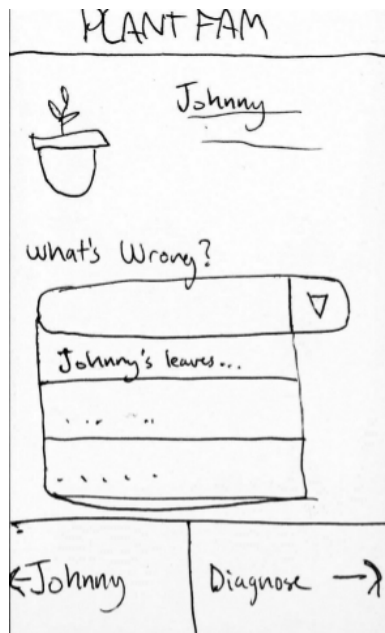

The main screen for this design.
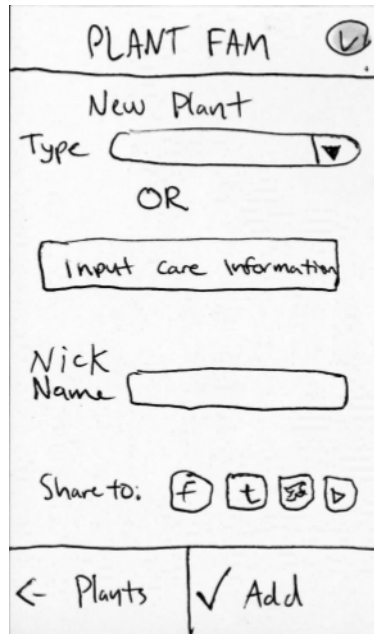
The add a plant screen.


An overview of a specific plant.

The "Remove a Plant" Screen.

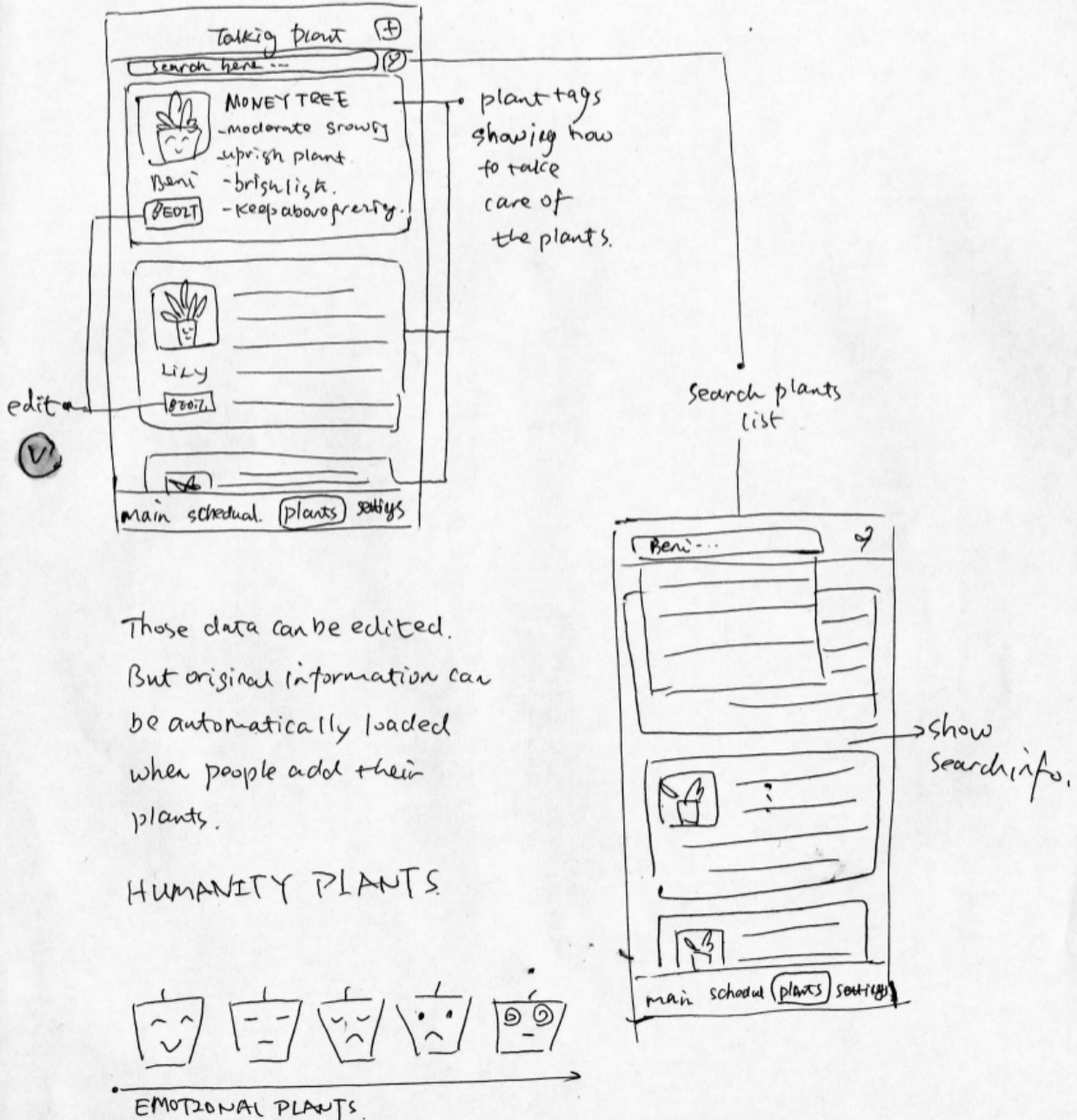The "Help" or "Something is wrong" screen.

Our group agreed that this design provided a more simplistic and less busy interface for most of the tasks. We preferred the start screen of this design to design 1 because of how centric each plants "feelings" are. We also valued the Social Media integration (Facebook and Twitter logos) as a useful feature which incorporated plant care into the user's identity and fostered a more personal relationship with plants. The intuitive plant status indicator as well as the plant removal feature were other notable features of this design.
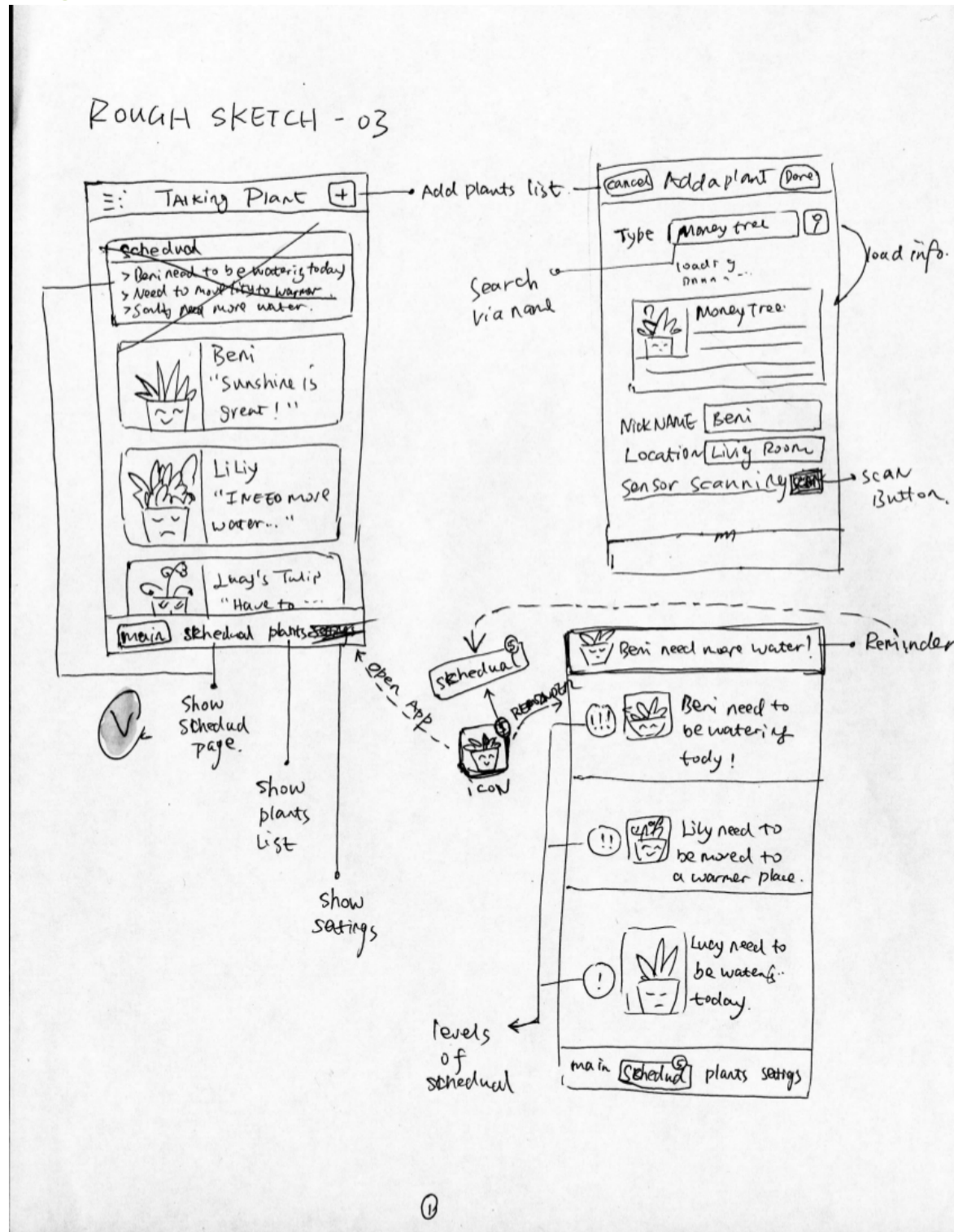
Our group really valued the menu bar at the bottom of this design's screen. Additionally, the changing graphics, representing plant "moods" were something we decided to keep in the chosen design.

ROUGH SKETCH - 03

Talking Plant

Search here ...

MONEY TREE
-moderate srowing
-uprigh plant.
-brishlight.
-keeps above preetty.

Beni

EDIT

LILY

EDIT

main schedual. (plants) settings

plant tags
showing how
to take
care of
the plants.

edit

Search plants
list

Those data can be edited.
But original information can
be automatically loaded
when people add their
plants.

HUMANITY PLANTS

Beni ...

show
searchinfo.

main schedual (plants) settings

EMOTIONAL PLANTS.

②

SELECTED INTERFACE DESIGN

Which Design

Our chosen design is a combination of all three of our original designs. We liked many parts of all of the designs, but chose the third set of sketches for the basis of our selected design. Since each design had a slightly different set of features, we tried to combine them all into a cohesive interface that conformed to what an iOS user interface might look like.

Functionality Summary

Our main objective was to aid the user in performing the tasks defined earlier. These include adding/placing a plant, reminding the user to water and fertilize, and providing a way to diagnose other issues related to the plant.

The first three sketches (a-c) show the home, schedule, and "My Plants" screens. All three of these allow the customer to view their plants at a glance in order to try and understand the individual needs of each. The home screen is centered on the "feelings" of the plants to encourage users to sympathize with their needs. The schedule screen provides an overview of what different plants will need in the near future, allowing the user to plan ahead if they wish. Finally, the My Plants screen gives users a location-categorized way to view their plants.
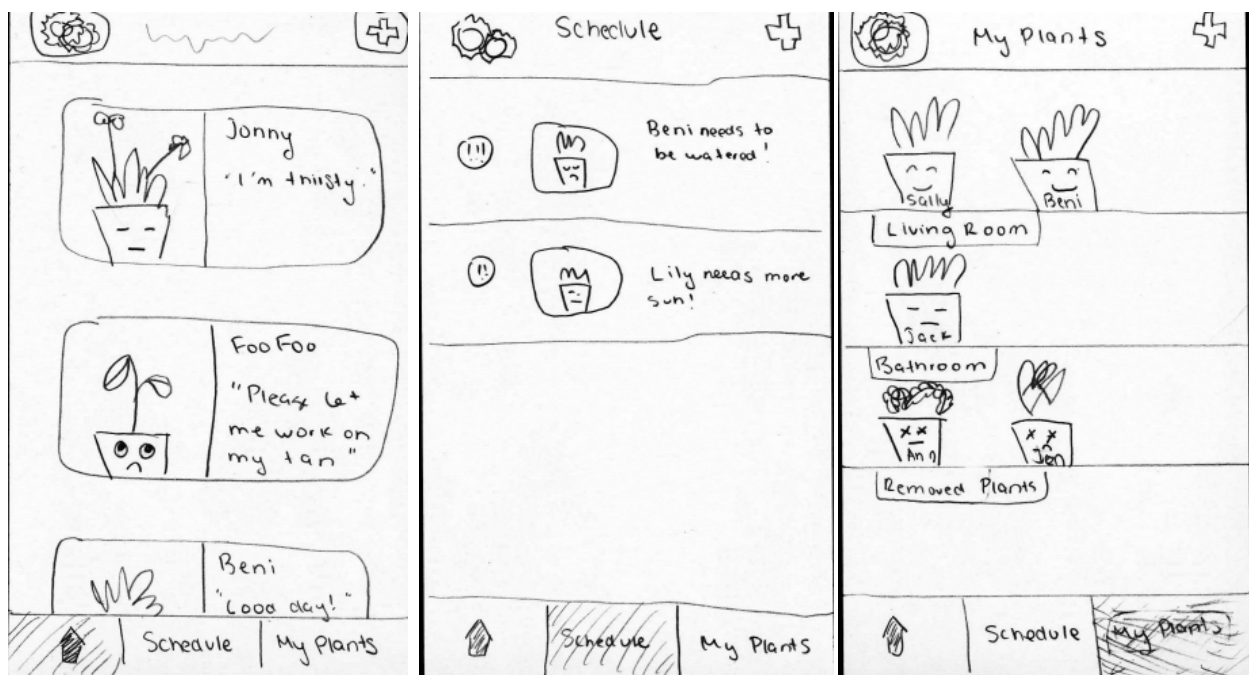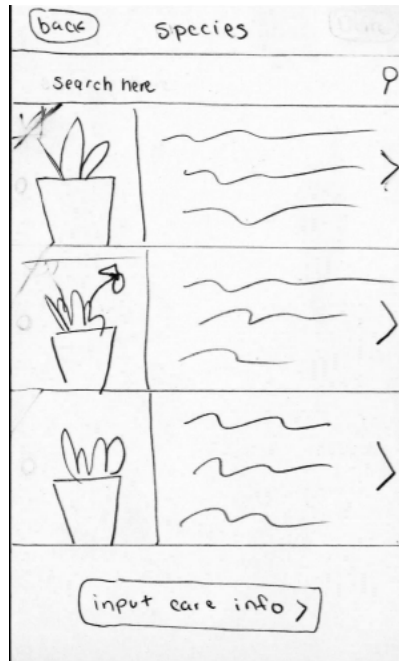

(a) The home-screen for Plantr. Displays each plant's latest emotion.

(b) Displays upcoming needs of plants before notifications are sent.
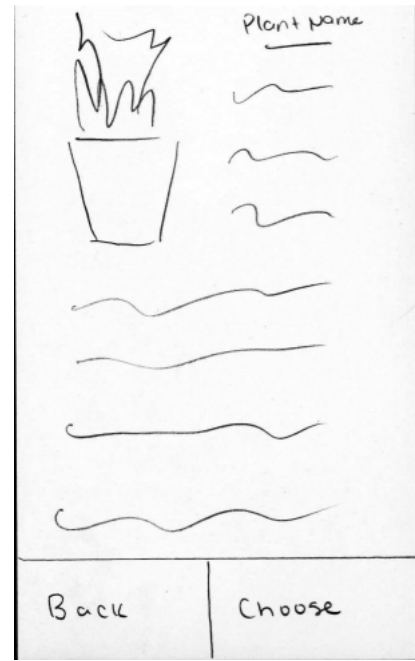
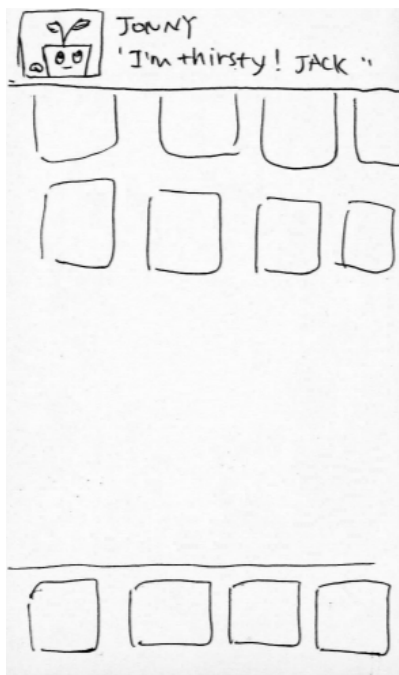(c) Groups plants by their locations to make the plants easier to see at a glance.
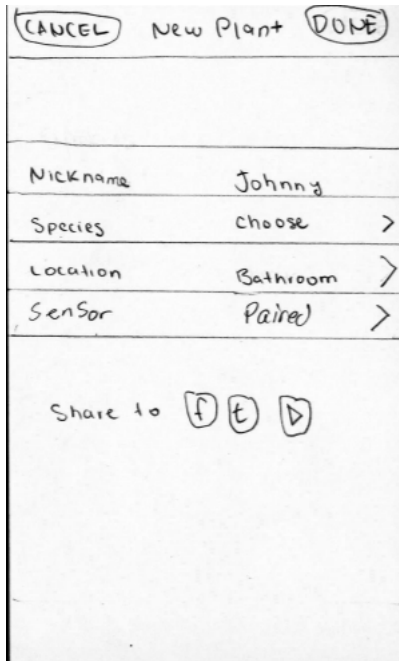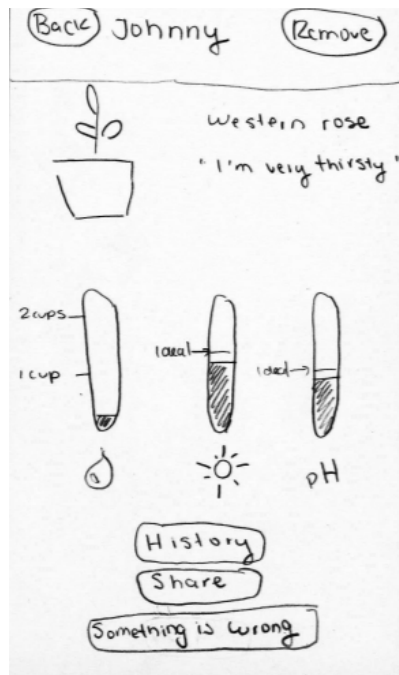
(d) The add a plant page.

(e) The Species Selector. Allows choosing a species from the database to associate with.
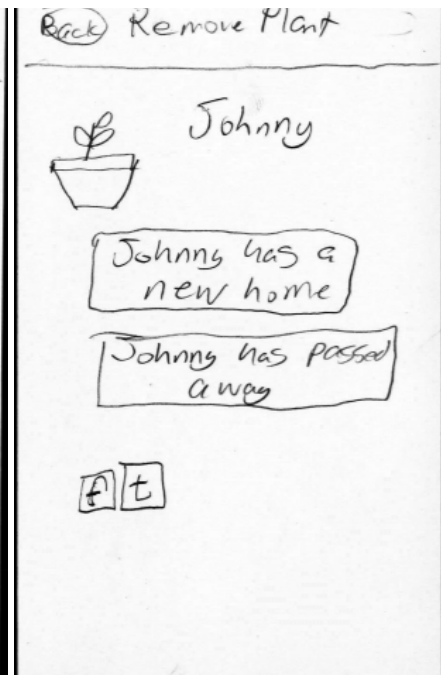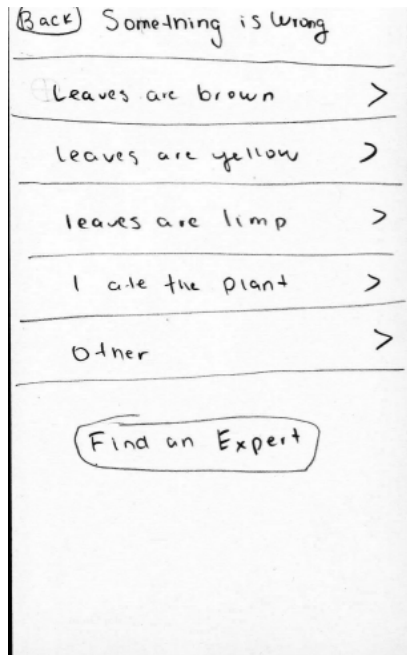

(f) The species detail page.

(g) An example of a push notification from a plant.

(h) The Plant Detail page.

(i) The "remove a plant" page.

(j) The "Something is Wrong"
Interface.

Sketches d-f show the process of adding a plant to the app. In order to add a plant, the user must specify a nickname, choose the species (e,f), enter the plant's location, and pair a sensor with the plant. On the species detail page, the customer can also find details about what the light and temperature requirements of the plant are, giving them a better idea of suitable locations.

Sketch g shows an example notification from a plant. Notification timing is both needs and relative-location based. For example, if a plant needs water sometime soon, but the customer's phone is on the other side of town, notifications will not appear until the customer is within the vicinity of the plant.

Sketch h shows a summary of the current state of one plant. This allows the customer to understand the current conditions that their plant is living in and how those compare with the plant's optimal conditions.

Sketch i shows how a plant can be removed from the system. In addition to removing the plant from Plantr, it also allows you to post to facebook that you killed or gave way your plant (encouraging public shaming).

Finally, sketch j shows the plant troubleshooting screen. If anything looks odd or if anything happens that is related to the plant, the user may press the "something is wrong" button and receive information about common plant diseases and toxicity, as well as contact an expert via phone.

SCENARIOS

Determining a plant's care needs

Novice plant owners often encounter problems due to lack of plant care knowledge. Jack buys a cactus from a nearby nursery store. He takes it back to his house and puts it in his desert-themed bathroom. He doesn't know how to take care of it (he has never owned a plant before), so he opens up Plantr on his smart phone. He presses the '+' button at the top to add a new plant. On the new plant screen, he inputs the nickname of his cactus ('Jonny'). He looks at the tag that came with Jonny, and types the species name into the search bar. Finding a picture and description that fits Jonny, he taps the picture. A screen with more information about Jonny pops up, Jack notes that the cactus needs 5-6 hours of direct sunlight and a temperature between 65 and 85 degrees Fahrenheit. This is no problem since Jack's bathroom has large frosted windows on two of its walls and is usually around 70 degrees. Jack taps the 'choose' button. The new plant screen is now showing, so Jack inputs Jonny's location ('bathroom'). Jack puts the sensor in Jonny's soil and scans the sensor's barcode with his smart phone. He presses the 'done' button. Plantr will automatically create a watering schedule and an icon on the 'my plants' page. Jack will be able to click on Jonny's icon to see his basic care information. soil-moisture level, light exposure, pH, and ambient temperature in real time.

Remembering to care for a plant

Lots of people forget to water their plants, especially when they have lots of plants at different locations. Two years after buying Jonny, Jack has discovered the joy of indoor plants and now has 15 plants in his house. Some of them are in the living room, some are in his bedroom, and some are in the bathroom with Jonny. Jack uses Plantr to manage his plant care schedule. Jack receives water and care reminders from his plants via pop-up messages at the top of his screen. When Jack passes by his cactus Jonny, Jonny will send a message to Jack saying 'Hi buddy! I am *sooo* thirsty, please give me some water!'. Plantr allows Jack to manage his many plants with ease.

Identifying and managing causes of plant distress

Many people feel it's so hard to care for their plants when something goes wrong. One day, Jack finds that Jonny's leaves are turning yellow. He opens Plantr and goes to Jonny's page to check the condition of his cactus. He reviews the list and still doesn't know what to do, so he presses the 'something is wrong' button and goes to the help page. He taps the 'find an expert' button and consults a map of nearby nurseries and their contact information. Jack calls the nursery and talks to an expert; he decides to take Jonny to the nursery to let the professionals help him.