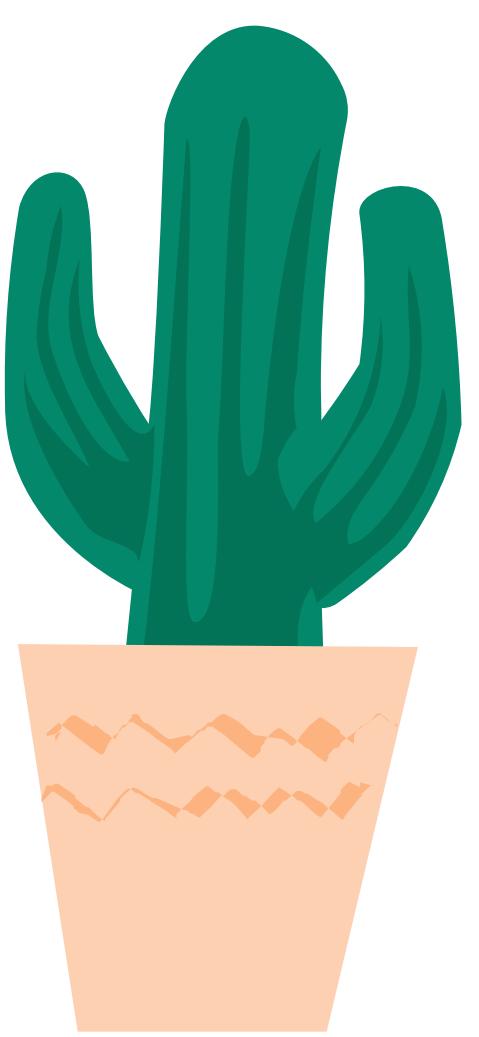




Plant Parenthood

Our goal is to provide education and assistance for basic home plant-care.



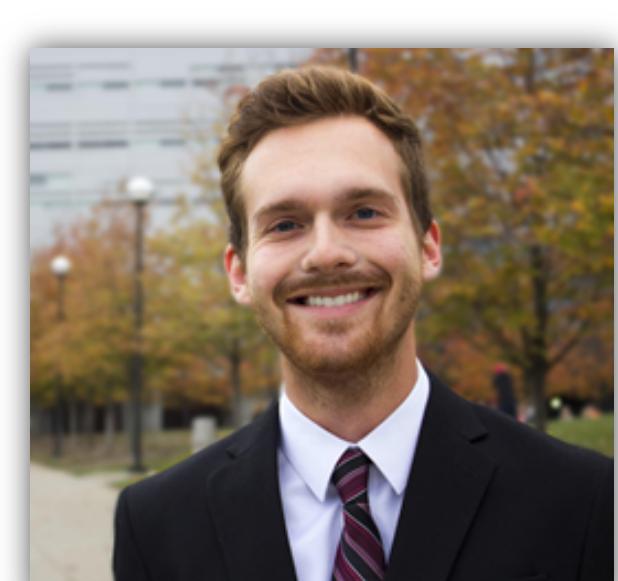
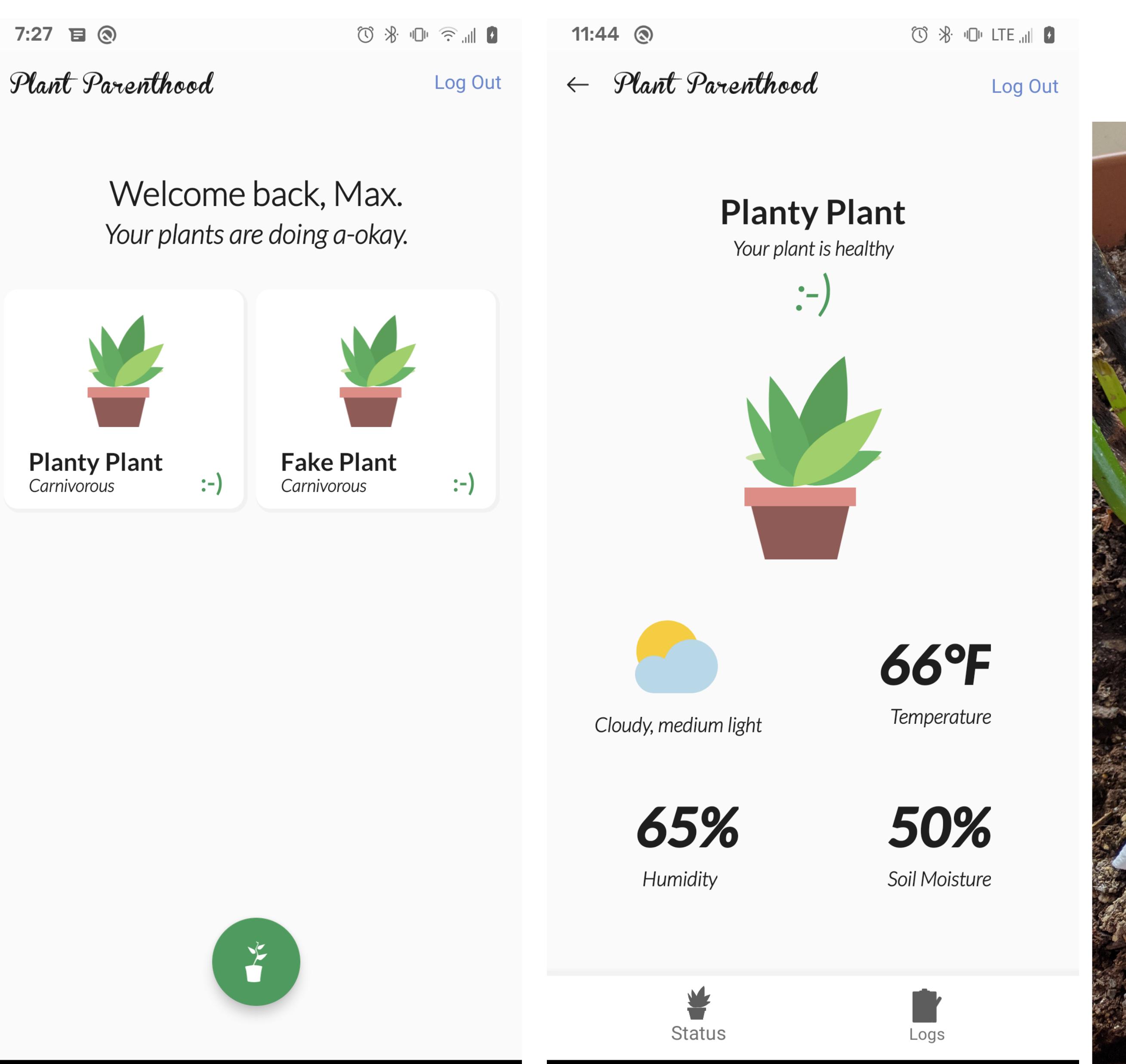
Problem Statement

To our knowledge, there does not exist a cheap and affordable means of monitoring plant health and providing appropriate plant care in a flexible, teachable, and intelligent manner.

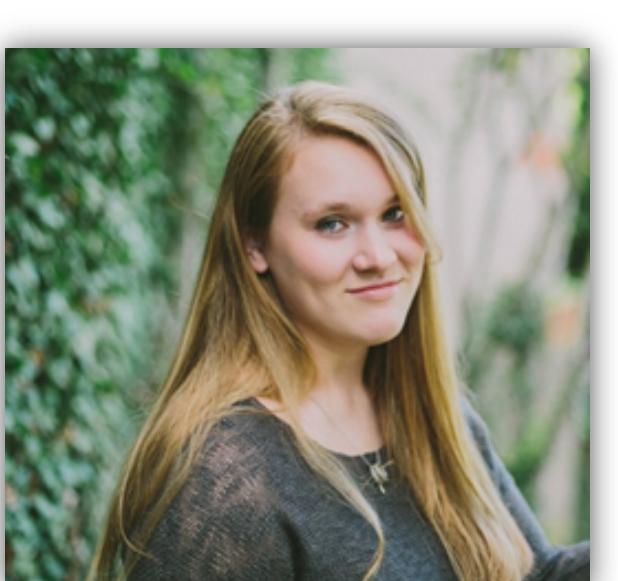
We seek to develop a solution that makes plant care enjoyable & easy - one that informs the user of ways to improve on the care they provide for their plants and in some ways manages that care on its own for the benefit of the user.

Objective

We expect to create at the least a means of monitoring & applying care to plants in the form of a hobbyist computer (Arduino / Raspberry Pi), accompanied by an application that holistically maps out plant care for a user with little to no knowledge of plants - including plant identification, plant status, and notifications for necessary user interaction in plant care.



Maximilian
Frisch



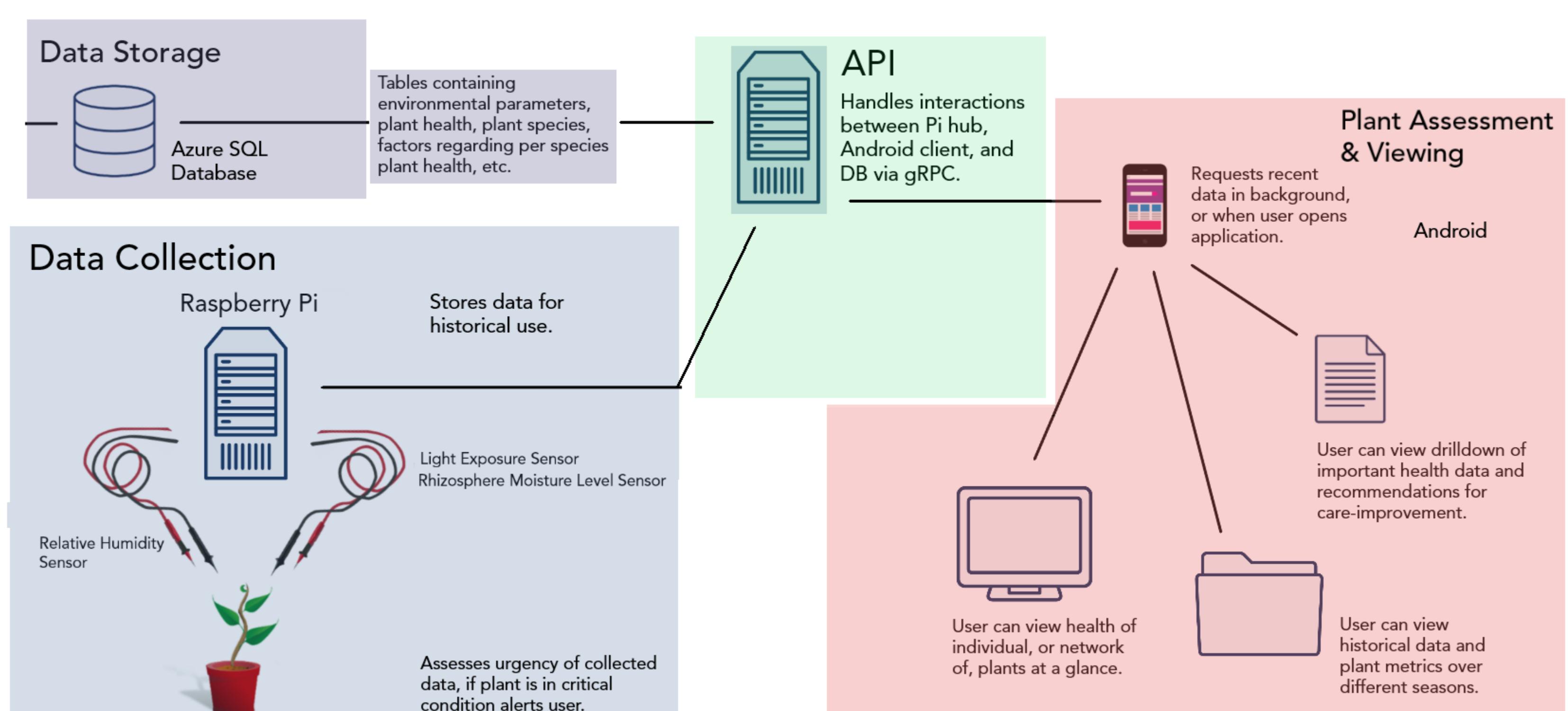
Rachael
Chandler



Professor
James Hansel

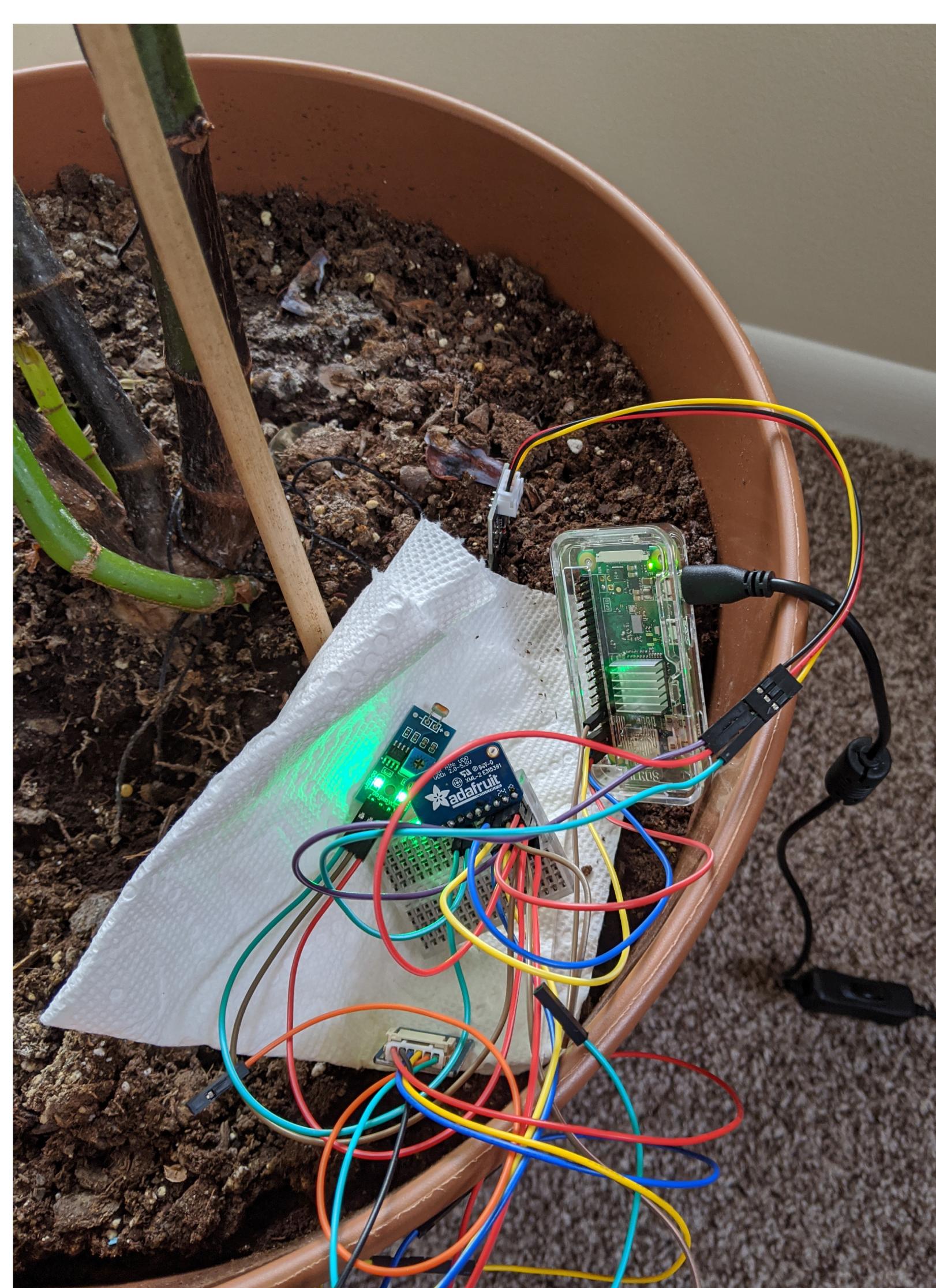
The Group

Design



Achievements

We have successfully created a Pi hub, that measures various plant factors (soil moisture, humidity, light exposure, temperature, and air pressure) accurately, and interacts effectively with a server that is able to store data in the DB and relay information to an Android client - providing a convenient and useful way to monitor and facilitate successful plant growth.



Technology Used

We implemented a variety of new technologies to accomplish our objective. To handle server / client interactions we utilized gRPC and created an API that served as a middle-tier between our Pi hub, Android client, and the database.

The database is an Azure SQL Database, connected to our API through Entity Framework. The API server was written in C#, the Android client was written in Kotlin, and the Pi has a server / client written in Python.

We decided to use gRPC because the Protobuf language that defines the protocol for server/ client interactions is language agnostic and quick, with interactions typically finishing in under a second.

Challenges

One challenge we faced was that much of the equipment ended up costing more than we initially planned for, which was difficult because one of our primary goals was to create an affordable home solution. For instance, a Soil pH sensor cost \$80 minimum, and we had to drop it from the project despite being a valuable factor in plant growth.

Additionally there was much to learn, particularly in assembling a project that spanned multiple languages and devices.

Future Plans

We have yet to implement functionality that allows for pairing of the Pi hub and the application, due to the difficulty of it.

The application supports multiple hubs, and we intend to implement the functionality in the future, which will be quite beneficial for application in greenhouses.