



INTRODUCTION

Have you ever tried taking care of a plant? Some of them require extensive care and knowledge to successfully grow due to the vast amount of environmental variables that exist. Attributes such as temperature, moisture, and sunlight exposure are all important factors when it comes to plant growth.

PROBLEM STATEMENT

Current planters do nothing more than holding a plant. While the growing experience has not gotten any easier or any more interactive. The numerous variables one needs to control to keep a plant alive makes taking care of a plant not only hard and time consuming but also dull and boring.

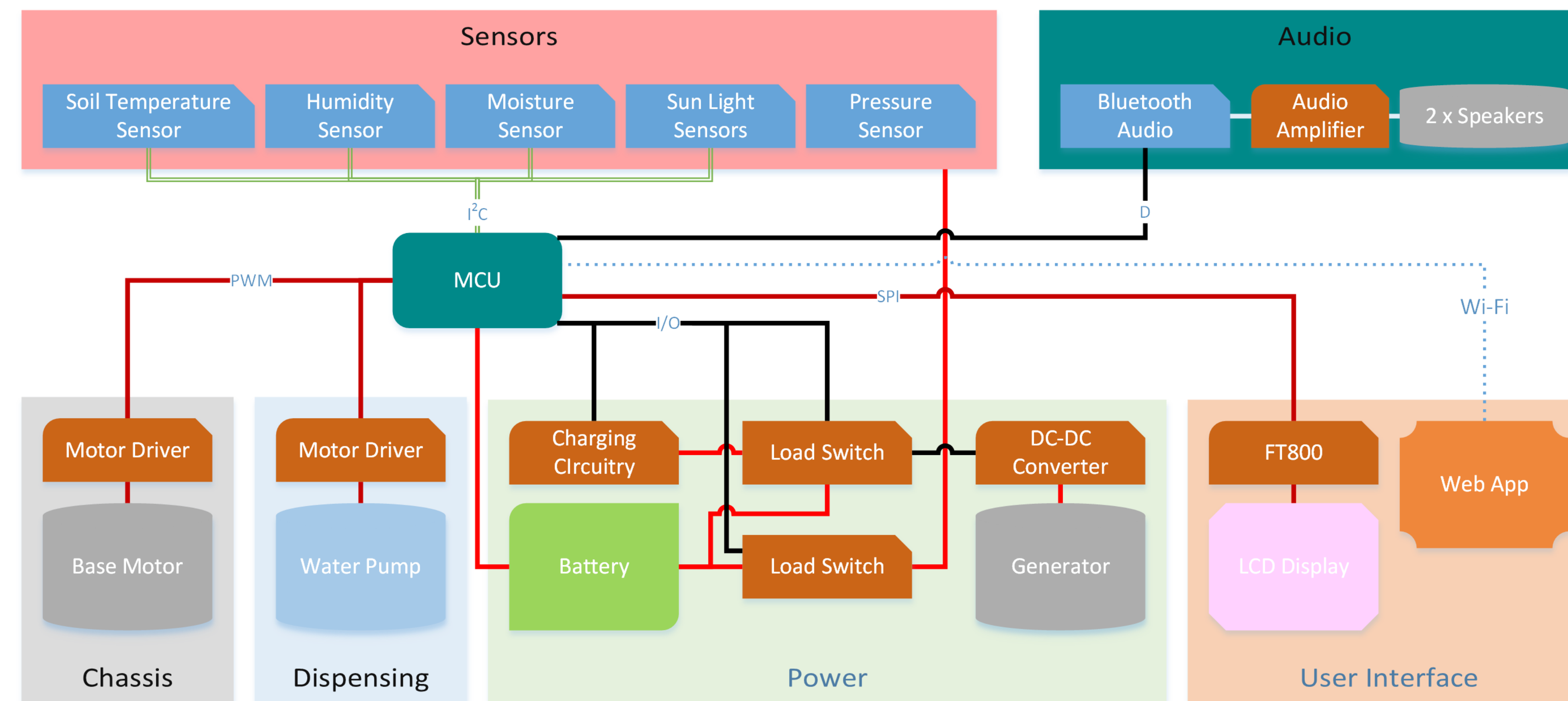
PROTOTYPE DESIGN

Our solution is to create an automated planter capable of helping users keep track of variables such as temperature, moisture, sunlight, to make the plant growing experience less stressful and more exciting.

IMPLEMENTATION

In our implementation of the design, we focused on the hardware aspect and software aspects ensuring that a user-friendly and customizable planter was achievable. Using a wireless microcontroller, we were able to collect data from the numerous sensors and actuate the actuators. With the collected sensor data, the health of the plant can be conveyed to the user. The plant reacted in different manners based on its health, sometimes watering the plant and other times saying it is cold and asking to be moved to a warmer location. The system can be powered off a generator or by the built in rechargeable battery.

CYBER-PHYSICAL ARCHITECTURE



HARDWARE

Processing

Particle P1
Custom PCB

Sensing

TSL2591 HDR Light Sensor
BME280 Temp., Humidity, and Press. Sensor
DS18B20 Temperature Sensor
Chirp Soil Moisture Sensor

Audio

CSR8630 Bluetooth Audio
1 x TS2012 Audio Amplifier
2 x 4Ω 2W 87dB Speakers

Feedback

FT800 Display Controller
4.3" LCD Display

Actuation

2 x Brushed Motor Driver
Brushed High Micro Metal Gearmotors
Peristaltic Pump

Power Management

Brushless Generator
LMZ14202 Step Down Regulator
BQ2421 Charging Circuit
18560 Li-ion Cell
3.3V Low-Dropout Regulator
TPS2012 Load Switch
TPS22929 Load Switch

SOFTWARE

Back-end

The server logs data from the planter periodically depending on the users settings and uses that data to get the health status of the plant.

Web app

The web app provides an easy to use user interface allowing user to customize their settings for their planter, control their planters, and get an update on their health of their plant. Such as plots showing the temperature of the plant throughout the day and features such as switching the plant to sleep mode.

UNIVERSAL DESIGN

- Accommodates a large variety of plants.
- Lets plants tell owners that they are uncomfortable and react if needed
- Senses temperature in the soil, outside of the soil, measures humidity, measures sunlight, measure the pressure, and measures the moisture of the soil
- Waters the plant, rotates the plant, and plays music to the plant to induce further growth, and builds a stronger relationship with the plant
- Logs data so it can be used in comparing the needs of each plant based on their environment

CONCLUSION

While there are other smart planters, they have never been effective at keeping a plant alive and making taking care of a plant more intimate. The main purpose of this project is to develop a automated planter which helps us keep track of the health of our plants. With the success of this project, we would be able to save the lives of more plants and collect more data to bring an age of eco-friendly pet plants.

