Clover

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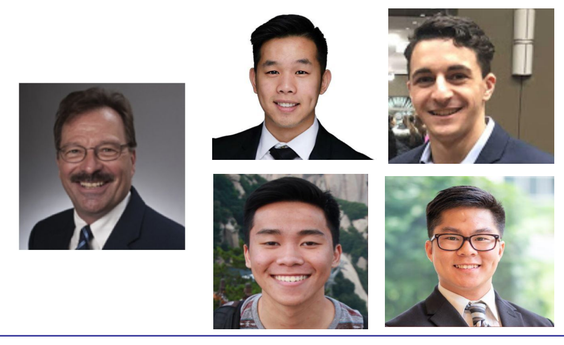
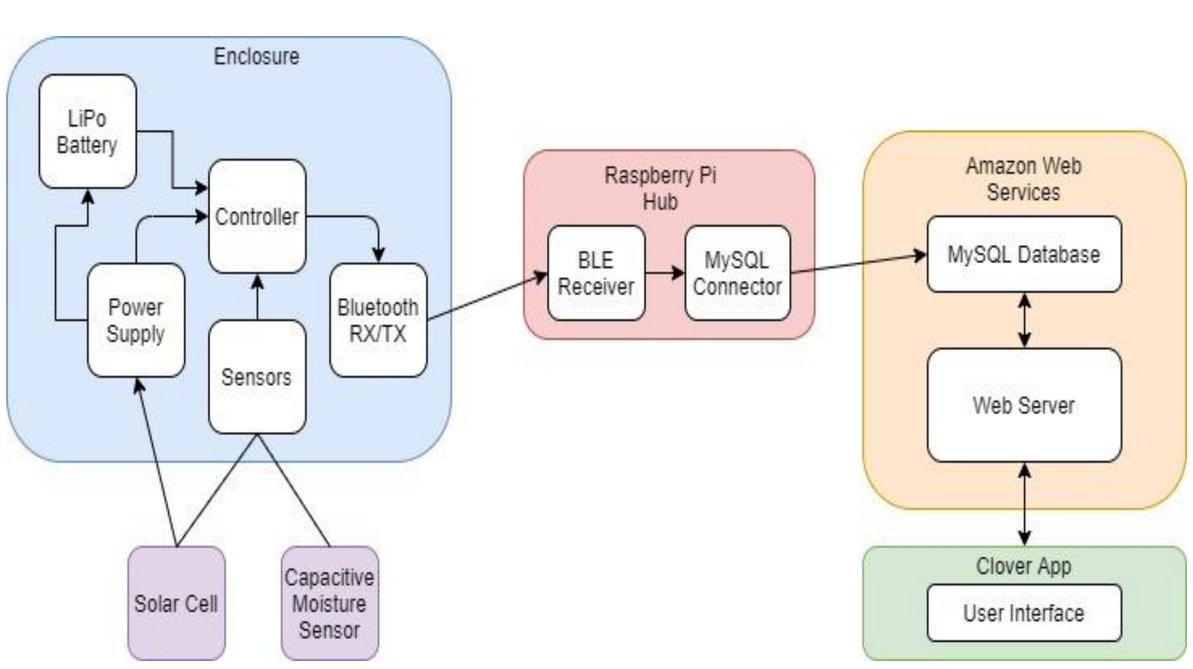


Abstract

Keeping indoor plants can have many benefits on the human condition such as increased positivity, reduced stress, and even increased focus. Not only are they beneficial to health, but they can also serve to decorate indoor spaces and beautify to their surroundings. One of the main barriers to owning an indoor plant is the knowledge and attention necessary to care for it. Plants can die because of too little water and sunlight, or too much. Our design features a compact sensor unit for plants that connect to a wireless hub enabling communication over the internet. Clover gives users the insight into a plant's needs through light and moisture sensors and will notify them via an app when and how to care for their plants.

Block Diagram



Specifications

1. Compact form factor fits into most plant enclosures.
   - 3 x 2 x 7 in
   - Portable
2. Low Power
   - Onboard battery is charged via solar cell
3. Product will notify users when the plant requires attention
   - Effective Bluetooth transmission range: 40m with 90% success rate
4. IP64 dust and water resistance rating
5. Programmable Plant Library
   - Tracks and stores records of active plants
   - Supports 10 different plant classes (flowering, palm, etc.)

System Overview

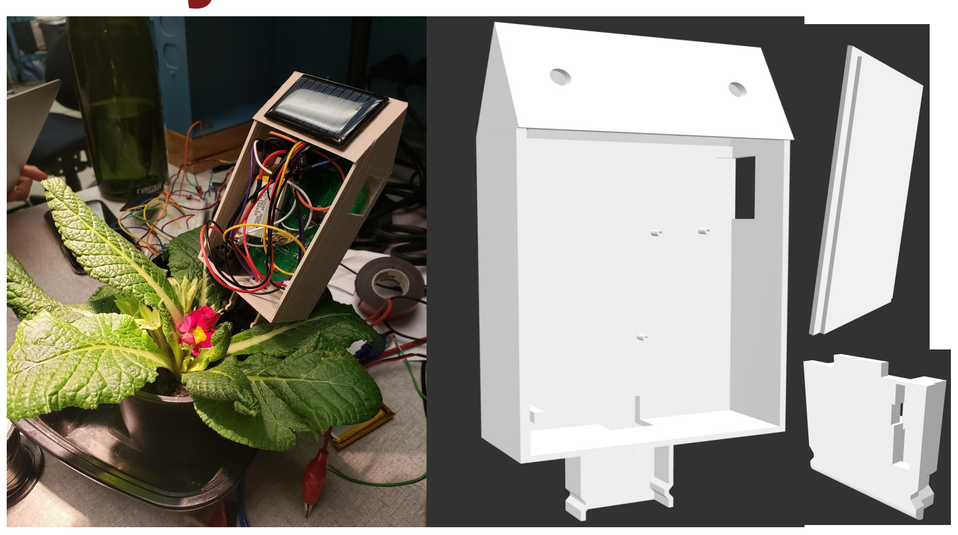


Figure 1: The real-world prototype of Clover, being tested under a halogen lamp in the SDP Lab (left image), and the enclosure 3D CAD designs (right images).

The moisture sensor used by Clover is placed into the soil of the plant being monitored, and also provides Clover with a point of support in order to stay upright (see figure 1, above). The solar panel faces the direction of sunlight, and serves both as a means to recharge Clover's onboard battery, as well as determine light intensity (see figure 2 in results, below).

Results

Team Clover ran a five day trial monitoring the light and soil conditions on a Primrose plant (figure 2, below), where Clover was able to log the light and soil data over the trial period. Clover notified the user when the Primrose lacked nutrients through the Clover smartphone app. Additionally, although the first prototype PCB had an area of 43.8 cm², a second prototype, which had a PCB footprint of just 15.4 cm², had been designed but not yet implemented.

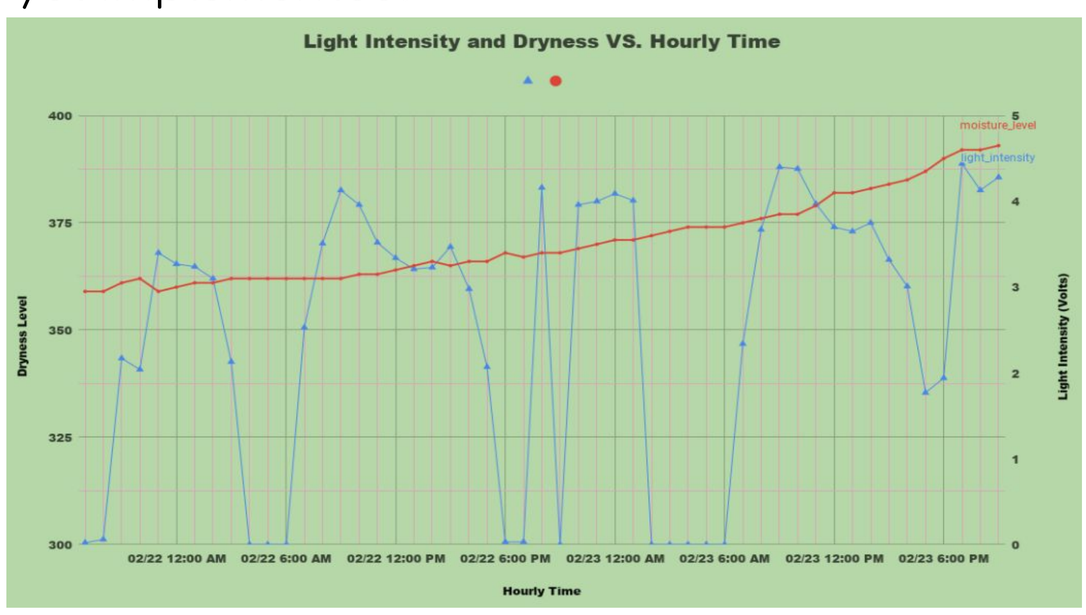


Figure 2: Hourly light intensity (blue) and soil dryness (red) readings provided by Clover over the course of a two-day period.

Acknowledgement

We would like to thank our advisor, Professor Hollot for his great advice and support. We also would like to thank the staff of M5 and our evaluators, Professor Xu and Professor Kundu for their constructive feedback.