

EE / CprE / SE 491 Weekly Report

April 10 - April 16

sddec24-16

Designing a Smart Plant Nurturing System Enabled by IoT Technology

Faculty Advisor / Client: Md Maruf Ahamed

Team Members:

- Tejal Devshetwar - Frontend
- Holden Brown - Frontend/backend
- Blake Hardy - Backend
- Cameron Jones - Backend
- Cayden Kelley - Hardware
- Chase O'Connell - Hardware

Weekly summary:

A backend server using Node.js was developed on Render to allow team members to access RESTful endpoints remotely instead of using a local host. The MongoDB database has been configured to store an array of plants inside of the UserSchema with a nested plant data array stored within each plant, including a timestamp for each data entry. This setup facilitates storing historical plant data and enables graphical representation in the UI, however, these changes are not on the node.js server yet. RESTful endpoints have been created and tested to handle database modifications.

The home screen has been redesigned on the front end to show user plants more interactively. Selecting a plant card now redirects users to a detailed sensor data screen. This screen displays current sensor data and a 24-hour graph for a selected day.

Further work was done with the NPK sensor to try and establish communication with the device. Issues were identified surrounding the conversion from the rs 485 communication protocol to the UART communication protocol.

Past Week Accomplishments:

- The backend node.js server was made on Render, so team members can conveniently access the restful endpoints without using a localhost.
- The backend MongoDB database was modified to accept plant data as an array of plant data objects with a timestamp. Allowing for plant data storage for previous times and UI graph display of plant data. This work is, however not currently running on the Render node server because it still needs some adjustments to work with the graph display for each plant properly.
- Restful endpoints were also made and tested for the backend to manage most aspects of the database changes.

- The frontend UI adjusted the home screen that displays user plants now, when a plant card is pressed, it redirects to a plant sensor data screen. The plant sensor data screen is nearly complete and will have current sensor data and a 24-hour graph of plant data from a specified day.
- First attempts were made to communicate with the NPK sensor. No successful communication was made, but we believe the issue lies in the conversion from UART to rs 485.

Plans for Coming Week + Action Items:

- Holden Brown - Finish the plant data card screen with backend data. Push updated backend to Render. Tidy up UI elements such as the temperature reading in the weather component.
- Tejal Devshetwar - Help Holden with the work he plans to do and work on getting API data for UV Index and humidity.
- Blake Hardy - Hopefully get communications working between the NPK sensor and microcontroller. The converter and IDE have caused some issues so we may need to do some of this manually.
- Cameron Jones - Work on setting up code to communicate between the microcontroller and server. Start researching web sockets so the microcontroller and mobile app can talk
- Cayden Kelley - Continue work with Chase to establish communication between NPK sensor and microcontroller.
- Chase O’Connell - Set up Thonny IDE to allow imported libraries. Implement and debug test code incorporating these libraries to receive data back from the NPK sensor.

Pending Issues:

- Tejal Devshetwar
 - No issues
- Holden Brown
 - No issues
- Blake Hardy
 - No issues
- Cameron Jones
 - No issues
- Cayden Kelley
 - Difficulties with UART to MODBUS conversion.
- Chase O’Connell
 - Difficulties with UART to MODBUS conversion. Will continue to work on developing functionality.

Individual Contributions:

Team Member	Contribution	Weekly Hours	Total Hours

Tejal Devshetwar	Added a screen for create account and made edits so that each card opens up a new screen. This change will need to be edited again based on the backend logic which is set up.	2	27
Holden Brown	Made a new screen that displays plant data. Adjusted the database to store plant data over time. Made a node js server on Render to access the MongoDB backend from anywhere without a local host.	16	49.8
Blake Hardy	Troubleshooting UART/rs485 converter, which lacks much documentation. There is a problem with the libraries we would like to use and the Thonny IDE. Will continue trying to resolve.	4	28
Cameron Jones	Researched Request library created skeleton code for communication between pico and the server. Attempted to locally host database	5	27
Cayden Kelley	Worked with the NPK sensor and attempted to communicate with the device. Did some general research for communication between pico and server for better understanding of overall solution.	6	45.5
Chase O'Connell	Set up the RS485 to TTL converter board and attempted to communicate with the NPK sensor. Determined fixing our issues with the Thonny IDE library is the best next step towards communication.	5	28