Greenwatch v2
Final Report

Revision 1

Prepared by

Sharome Burton
Delton Hughes
Victor Marchesi
Calvin Walmer

May 2, 2024

Table of Contents --   2

1. Introduction/Overview

Greenwatch was developed as a tool to monitor environmental conditions in the MSU greenhouse. This web-based system can be accessed remotely via any modern browser, making it ideal for widespread use within the biology department. The primary goal of Greenwatch is to enhance experimental capabilities in the greenhouse and foster collaboration between the Computer Science and Biology departments. This partnership aims to facilitate ongoing enhancements and additions to the Greenwatch system.

2. Requirements Phase

During the requirements phase, the team initially met with Dr. Pegg to understand the project and his needs. We continued to meet with him regularly throughout this phase to ensure we were fulfilling the requirements and that he was satisfied with the project's direction. The team felt that more frequent access to Dr. Pegg could have improved the quality of the product, especially given their agile approach. We met all of the functional requirements, while also almost completely all of our secondary requirements.

3. Planning Phase

Most of the planning phase was led by the group leader, Calvin Walmer, who managed risk assessment and organized the GANTT Chart. In hindsight, starting the GANTT chart earlier in the process, before coding began, could have helped us better prioritize project areas. Despite this, the planning was not entirely unsuccessful; we completed all the coding and successfully installed the Raspberry Pis in the greenhouse, achieving our main goal.

4. Implementation

During the implementation phase of the project, the team encountered several challenges, primarily related to updating the existing GreenWatch system. A significant issue was the older Raspberry Pis used in the project, which lacked WiFi adapters. This required the purchase of new adapters, which were not received until near the end of the implementation phase. Additionally, there was a recurring problem with the Raspberry Pis not rebooting properly, potentially remaining unresolved. Despite these obstacles, the team successfully upgraded the user interface (UI) and integrated it with the functional aspects of the backend, which were critical objectives for this phase.

5. Testing

.Due to the nature of our project, which was an improvement on a previously established code base, unit testing was not as important as it might have been if we were writing all of the code from scratch. Because of the high level of interaction between the user and our final product, integration testing of some form was performed at nearly every team meeting to ensure the product was functioning as intended.

5.1 Integration testing
The initial modules of the product were already completed by the previous development team of the GreenWatch v1. Integration testing was performed to ensure that the modules were interacting as intended.

5.2 System testing
Once the system had been hosted, integration tested, and the agents deployed. We began running system tests to ensure that the user would be able to interact with the system easily and that key functions could be performed.

6. Defects

The following are some known defects of our system:
- Adding room: when creating a room by clicking the add room button with a mouse it auto closes the modal and goes to the list of rooms modal. When pressed with the enter key it stays on the create room modal.
- iOS Styling: The custom styling for iOS devices was being overridden by other styles.
- Dark Mode: Implementing or maintaining dark mode styling posed difficulties.

7. Conclusions

These statements are reflections from each team member on the project. They include our thoughts on how the project progressed, the challenges we faced, the aspects we enjoyed, and more.

Sharome Burton

The project progressed smoothly from the initiation to eventual completion. Initially, a lot of effort was necessary to understand the work done by the previous team. The nature of this period of the project meant that while little implementation of code for the actual product was done or possible to be done, we were able to gain a better understanding of the requirements that we solicited from our client Dr. Pegg and the existing frameworks and code structure used to develop the project in the state we inherited it. This project was one of my first real exposures to back-end development and the integration of all these components into a full-stack application interacting with many different devices. Working within the team and having defined roles as well as an agile approach was enjoyable and helped smooth the process of development as we were able to utilize our individual strengths as challenges appeared, and learn from my teammates strengths as they tackled their issues that fell under their strengths and demonstrated solutions during our stand-up meetings. Getting initial implementations of new features and then regularly iterating on them was also enjoyable as it was evident that the project was moving at a great pace and the product was getting demonstrably better with each merge to our repository.

Delton Hughes

During this project, our team collaboration was highly effective. Initially, the process was slow and overwhelming, which is often the case with robust projects involving complex code from various contributors. However, as we gradually became more familiar with the system and learned to edit the code more efficiently, our confidence as a team grew, which gave us a morale boost. One of the significant challenges we faced was gaining momentum due to the project's complexity and the need to integrate others' code seamlessly. Despite these hurdles, I thoroughly enjoyed the creative aspects of the project, mainly tinkering with the design and enhancing the front end. Additionally, the regular team meetings were a highlight for me, as they were instrumental in solving problems and advancing the project.

Victor Marchesi

The Greenwatch project was executed with remarkable smoothness. Our team was well-coordinated and communication was effective throughout. Each member played to their strengths, allowing us to leverage these effectively for the project's success. Initially, the complexity of the existing codebase was daunting. However, after consulting with a former developer who provided an overview, and meeting with our client Dr. Pegg who outlined essential requirements we gained the necessary understanding to proceed confidently. Our development efforts involved familiarizing ourselves with the codebase, which enabled us to begin debugging, enhancing features, and overhauling the front-end design. We held productive weekly meetings every Tuesday at the Dillard Lab, where we discussed progress and assigned tasks for the upcoming week on Trello. The weekly meetings were structured, kept us aligned, informed, raised morale, and engaged. Despite its challenges, the project was very rewarding. I acquired substantial knowledge in JavaScript, CSS, HTML, and Python application libraries. More importantly, I learned invaluable lessons in contributing to and enhancing an existing project.

Calvin Walmer

      I thought the project at hand was a great learning experience for all of the members involved because of the many skills required to make it work effectively. Because of the different components, it was crucial that work was delegated in order to play to each of our team members strengths while still allowing us to learn from other members working on other sections. The beginning of the project started off very slowly due to the large code base and therefore involved getting familiar with the code which took significantly longer than expected. Once the learning curve started tapering off and we began to figure out what process and methodologies worked best for us, we began accomplishing milestones quickly. The tools we used to keep things organized (Google Drive for documentation, Trello for team organization and tasks, GitHub for version control, and Discord/iMessage for communication) helped tremendously in allowing the team to have easy access to the state of the documents as well as the overall state of the project so that work could be picked up on the fly without necessarily assigning it. I have really enjoyed working with this team for this project and felt it to have been the best team dynamic I have enjoyed thus far in both an academic and professional environment. While much emphasis was placed on developing and following a process and methodology in order to complete the project, I also feel that our team dynamic was part of the reason for our success.