

Web Application for Aqualab Sensor Monitoring and Analysis

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Client: Dr. Turingan - Ocean Engineering and Marine Sciences

Progress of current Milestone

Task	Completion	Greg	Haley	Ruth	To do
<u>Investigate Technical Tools</u>	90%	10%	80%	10%	Select tools for uploading to cloud.
<u>"hello world" demos</u>	90%	10%	85%	5%	Demo for uploading to cloud.
<u>Resolve Technical Challenges</u>	100%	30%	40%	30%	None
<u>Compare and select Collaboration Tools</u>	100%	30%	40%	30%	None
<u>Requirement Document</u>	100%	5%	90%	5%	None
<u>Design Document</u>	100%	80%	15%	5%	None
<u>Test Plan</u>	100%	5%	15%	80%	None

Discussion of each accomplished task (and obstacles) for the current Milestone:

- Investigate Technical Tools
 - Communicating with sensors: All sensors were chosen and the software tools and hardware needed to communicate with them were researched and chosen. This includes Vernier air quality and pressure sensors and an Arduino and arduino interface shield to work with them as well as a Eureka Water Probes water quality sensor, RS232-USB connection, and pyserial library.
 - Displaying the data/User interface/data analysis tools/recording data/accessing recorded data: A web application framework with a Python backend and a HTML/CSS/JavaScript frontend was researched to ensure all functionality was

possible and tools were decided to implement this. This includes a MongoDB database, Flask Python web framework, and React frontend.

- "hello world" demos
 - Communicating with sensors: Example code was developed to demonstrate connecting to water quality sensor with RS232 connection and pycserial library as well as code to connect and read data from Arduino.
 - Displaying the data/User interface/recording data/accessing recorded data: Example code was developed using a MongoDB database, Flask Python web framework, and React frontend was developed as a proof of concept and to simulate create, read, update, and delete functionality between all the components.
 - Data analysis tools: Example code was developed displaying plotted data was developed using Plotly plots and Pandas correlation analysis on a sample data set.
- Resolve Technical Challenges
 - All technical challenges were addressed by researching and choosing the tools necessary to develop this product and bridging the knowledge gap needed to understand how to use these tools.
- Compare and select Collaboration Tools:
 - Team has decided that for software development we will use Github for code collaboration as well as our personal preference for IDEs. For all documents and presentations we will use Google Docs and Google Slides. For team communication we will use a mixture of Discord and Snapchat. Lastly, for overall task management and for our task calendar we will use Jira.
- Requirement Document:
 - Team discussed core features of the system and specified individual requirements for each feature. A draft of the requirements document was written and a meeting with the client was held to ensure their satisfaction and other additions. The document was then finished and shared with the project advisor for feedback and suggestions.
- Design Document:
 - Team discussed core features of the system and how best to organize this functionality into a system architecture to ensure modularity and scalability. Once a draft of the class diagram was drawn and UI mockups were made and shown to the client for feedback, the design document was written and official UI mockups were created and was shared with the project advisor for feedback and suggestions.
- Test Plan
 - Once a rough draft of the requirements was created, the Team wrote the test document and specific test cases for each requirement. The document was then shared with the project advisor for feedback and suggestions.

Discussion of contribution of each team member to the current Milestone:

- Gregory Thompson:
 - Completed design document including UML class diagrams. Decided on Pandas and Plotly for data analysis and display. Created "hello world" demos for each of those libraries.
- Haley Hamilton:

- Completed the requirements document, defining the external interface, function, and non-functional requirements. Supported the creation of UI mockups and presented them to the client for feedback as well as created the formal UI mockups. Researched sensors and APIs/libraries needed to communicate with sensors and advised clients of the sensors and hardware to purchase. Created a “hello world” demo of the basic web application framework using MongoDB as the database, Flask as the Python backend, and React as the HTML/CSS/JavaScript frontend. Created a “hello world” demo of connection methods with the sensors.
- Ruth Garcia:
 - Completed the test plan document, creating software test cases for each requirement found in the requirement document. Researched our test environment to advise our client of what computer would best suit the purpose of the project at our next meeting. Supported the creation of our UI mockups and presented to clients to receive feedback of what they would like to see, and how. Currently researching a way to add security to the application by using google sheets for the database, and logging in with an email and password after the admin edits the google sheet.

Task matrix for Milestone 2 (teams with more than one person)

Task	Greg	Haley	Ruth
Implement, test, and demo <i>Communicating with Sensors</i>	15%	85%	0%
Implement, test, and demo <i>User Interface</i>	0%	20%	80%
Implement, test, and demo <i>Recording Data</i>	30%	40%	30%
Implement, test, and demo <i>Uploading to Cloud</i>	90%	10%	0%

Discussion of each planned task for the next Milestone

- Implement, test, and demo *Communicating with Sensors*
 - This task includes officially setting up the hardware, API/libraries, and code needed to connect with and read data from the water quality, air quality, and

pressure sensors. Once this is implemented, the set up will be tested to ensure quality and reliability and demod for the client to ensure satisfaction.

- Implement, test, and demo *User Interface*
 - This task includes setting up the frontend user interface with different navigable pages as shown in the design document and making sure it can communicate with the backend. Once this is implemented, the user interface will be tested to ensure quality and reliability and demod for the client to ensure satisfaction.
- Implement, test, and demo *Recording Data*
 - This task includes setting up the database and ensuring we can store and retrieve data from it, whether it be sensor data or user data. Once this is implemented, the database will be tested to ensure quality and reliability and demod for the client to ensure satisfaction.
- Implement, test, and dem *Uploading to Cloud*
 - This task includes setting up a data cloud storage and implementing functionality so the recorded data can be transferred from the database to the cloud storage. Once this is implemented, the functionality will be tested to ensure quality and reliability and demod for the client to ensure satisfaction.

Date(s) of meeting(s) with Client during the current milestone: Tuesday, September 17th
Client feedback on the current milestone:

- Presented and reviewed the requirements document and asked for feedback regarding if they wanted to add, change, or remove any requirements. The client communicated that they were satisfied with the system requirements and functionality as documented.
- Presented the UI mockups to the client and asked for feedback:
 - Communicate they were satisfied with the mockups presented to them.
 - Mentioned they would like a notes section for documentation purposes.
 - Decided on hamburger navigation rather than tab navigation.
- Client inquired about functionality regarding security and keeping a log of the users that are logging in/out and when.
- Came up with a potential method of keeping security information.
 - Google sheets would hold the users name, email, password, role in the lab, and date of birth.
 - Admin will be able to edit the sheet (names, emails, password, role) and add or remove the people he will allow to use the software.
 - With this information we can keep a log of who logged in and any changes that they made.

Date(s) of meeting(s) with Faculty Advisor during the current milestone: N/A,
communicated via email.

Faculty Advisor feedback on each task for the current Milestone:

Overall, the students have done excellent work, successfully bringing together all the necessary components for software requirements, design, and testing plan.

- Investigate Technical Tools: Satisfied
- "hello world" demos: Satisfied
- Resolve Technical Challenges: Satisfied

- Compare and select Collaboration Tools: Satisfied
- Requirement Document: Satisfied
- Design Document: Satisfied
- Test Plan: Satisfied

Faculty Advisor Signature: _____ **Dr Khaled Slhoub** _____ Date: _____ **9/30/2024** _____