Web Application for Aqualab Sensor Monitoring and Analysis
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Faculty advisor from CSE: Dr. Slhoub - kslhoub@fit.edu
Client: Dr.Turingan - Ocean Engineering and Marine Sciences

Progress of Current Milestone:

Task	Completion	Greg	Haley	Ruth	To do
Implement, test, and demo final UI	100%	0%	70%	30%	N/A
Implement, test, and demo user roles and permissions	100%	0%	80%	20%	N/A
Final system updates and error handling	100%	60%	40%	0%	N/A
Test/demo of the entire system	100%	10%	70%	20%	N/A
Conduct evaluation and analyze results	100%	0%	70%	30%	N/A
Create user/developer manual	100%	60%	20%	20%	N/A
Create demo video	100%	0%	100%	0%	N/A

Make App Accessible Remotely	0%	–	–	–	Next project iteration/will set up for client when needed.
Create a User Logging Feature	0%	–	–	–	Next project iteration.

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

- Implement, test, and demo **final UI**
    - We added all and any final UI tweaks we felt were necessary. This included simple changes to the styling and web page headers, as well as adding calculated relationships to the analysis page, adding clearer range values on the home page, formatting the data in the CSV files, and cleaning up the appearance of charts and the GUI. Also included any needed changes following user permissions implementation and any last minute client request.
- Implement, test, and demo **user roles and permissions**
    - For this task we completed implementing and testing the user roles and permissions. This included making updates to the login functionality to allow client connections to create and be associated with JWT tokens. The token contains data associated with the logged in user such as their name, user id, and role. Whenever the user is trying to access a functionality that requires a certain role permission, the token is included in the header of the request and is verified in the flask backend.
- **Final system updates and error handling**
    - This task included further integration between frontend, backend, and database. A stop run button was implemented to allow the client to stop the current run, this terminates the backend sensor threads, updates the system state in the database to "waiting" (ensuring the client has to reconfigure the sensors before another run is started), and increments the run number. Further updates we made following lab testing with the sensor to ensure the sensor could properly connect, read, and disconnect. We have successfully implemented the functionality that allows users to smoothly and efficiently change the range of the sensors and update the read frequency. Additionally, we considered and tested multiple "program recovery after shutdown" scenarios and made necessary changes to ensure our system was as robust as possible.
- **Test/demo of the entire system**
    - Throughout the implementation of the final changes and after everything completed, Haley went into the lab multiple times to work with the sensor and ensure the system was working as expected. This included testing for with the sensor was disconnected, if the sensor randomly rebooted, troubleshooting sensor connection issues, and ensuring the data was accurate and displaying in a timely manner.
- Conduct evaluation and analyze results

    - Our project is evaluated on client satisfaction. Because of this, it was decided that our evaluation included performing acceptance testing without clients to ensure their satisfaction and that we met their expectations for all of the system features we provided. Testing in this manner went extremely well and was very effective. Overall as a summary of our analysis, most of, if not all, features and user interface pages were very easy and intuitive for the client. We identified multiple items that were essential to add to the user manual, including how to configure sensors and what information from the sensor/company was needed to complete this task. We also identified some UI choices that made features unclear or not obvious to the user, and have noted these as needed changes for the next iteration of the project.
- Create user/developer manual
    - A user/developer manual was created to detail really every important thing we could think about the system. This includes important installation and configuration instructions for the user to allow them to install the product on a computer and reference throughout their use of the software. This also included developer information about the organization of the system files and to make it easier for another group to pick up the project if there happens to be another iteration as Dr.Turingan intends. This developer manual explains to purpose and functionality of all the different files and folders as well as important packages and tools utilized, such as JWT tokens.
- Create demo video
    - Once the product was completely finalized and tested, a final and ultimate demo video was created to showcase all the functionality of the system. It was taken as the system was connected to the lab sensor and demonstrates the login system, the home page with populating data charts, the change range and out of range alerts functionality, as well as the analysis tool, settings page, and user management system.
- Make App Accessible Remotely and Create a User Logging Feature
    - Unfortunately there wasn't enough time to complete some of the goals we wanted to accomplish. The ultimate goal was to ensure the app was running and hosted for the clients to use remotely. As we were focusing on completing and testing a fully functional system, we felt we could leave this out of the milestone and fully host the system after the showcase/whenever it was needed for real lab trials. Same thing with the user logging, with no time left we felt this would be a feature the next project iteration would implement for the client.

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

- Gregory Thompson:
    - Created and filled out the user/developer manual, ensured easy backend integration with frontend and database including full change range and change data read frequency functionality. Ensured the system was robust in case of recovery due to system shutdown.
- Haley Hamilton:
    - Added final tweak to the UI, including changes to the configure sensors page, home page and tank tabs modals and charts, as well as small additions to the rest

of the system. Implemented and tested user roles and permissions fully across the backend and frontend using JWT tokens and flask decorators for the flask app routes. Implemented final system updates including changes to connected to the real sensor, change range and change frequency updates, fully implemented the stop run button and frontend/backend/database implementation. Wrote the acceptance testing/project evaluation and conducted it with the aqualab team with Ruth, and wrote corresponding analysis. Added portions to the user/developer manual and created the demo video.

- Ruth Garcia:
    - Began the JWT token implementation for Haley to finish up as I didn't have the latest database and files to have a fully functioning environment to test anything. Assisted with logging feedback during the user acceptance testing session, filled out a few sections of the user manual, and collaborated with the poster.

Lessons Learned:

Importance of agile development process: Each of the team member's senior year was certainly hectic and we all had different schedules. It was easy to lose sight of when the next milestone was due and what tasks had been/needed to be completed to make progress on the milestone. Originally we had intended on using JIRA to keep track of this, but we quickly forgot to update the tasks on the tool and each of us were so busy that keeping the JIRA updated became a task in itself. For our future endeavors, it's important to remember how helpful weekly scrum meetings and daily stand ups can be.

Importance of planning: While it's definitely difficult to plan a complex system with a lot of features all at the start, it would have benefited the project to spend more time in this area. Certain aspects like the main program backend and the architecture of the React frontend could have benefited immensely from additional planning as some we lost sight of some intended features/functionality and in some cases those features were not implemented in the easiest/scalable/best way.

Date(s) of meeting(s) with Client during the current milestone: 4-7-25 and 4-18-25
Client feedback on the current milestone:

- **4-7-25:** The system at this time was at a point where trials/demos could occur. This meeting with the client/aqualab team included connecting to the sensor and troubleshooting connection issues with the system as well as monitoring long term system performance and behavior.
- **4-18-25:** This meeting with the client included conducting acceptance testing and client satisfaction evaluation. The system was hooked up to the sensor and multiple different runs were started as we instructed the users to navigate our system and rate the difficulty of the features and their satisfaction with the system.
- **Multiple other dates between 4-7-25 and 4-18-25:** The trials from 4-7-25 were repeated with different updates to the system. This includes testing the change range feature, the change read frequency feature, analysis tool, user permissions and roles, and the stop run button.

Date(s) of meeting(s) with Faculty Advisor during the current milestone: Communicated via email.
Faculty Advisor feedback on each task for the current Milestone:

- Implement, test, and demo final UI **Satisfied**
- Implement, test, and demo user roles and permissions **Satisfied**
- Final system updates and error handling **Satisfied**
- Test/demo of the entire system **Satisfied**
- Conduct evaluation and analyze results **Satisfied**
- Create user/developer manual **Satisfied**
- Create demo video **Satisfied**
- Make App Accessible Remotely **Satisfied**
- Create a User Logging Feature **Satisfied**

Faculty Advisor Signature: ____Dr Slhoub_____ Date: ___4/21/2025_____

Evaluation by Faculty Advisor
Faculty Advisor: detach and return this page to Dr. Chan (HC 209) or email the scores to pkc@cs.fit.edu

Score (0-10) for each member: circle a score (or circle two adjacent scores for .25 or write down a real number between 0 and 10)

Gregory Thompson	0	1	2	3	4	5	5.5	6	6.5	7	7.5	8	8.5	9	9.5	10
Haley Hamilton	0	1	2	3	4	5	5.5	6	6.5	7	7.5	8	8.5	9	9.5	10
Ruth Garcia	0	1	2	3	4	5	5.5	6	6.5	7	7.5	8	8.5	9	9.5	10

Faculty Advisor Signature: _____ Date: _____