



# Improving and Updating a Web Application GUI for Aquatic Gametes

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## Introduction

- Tasked with maintaining and improving the Visual software Graphical User Interface (GUI) for the Comparative Analysis of Oyster Seed Counting. .
- Began by reviewing the existing GitHub repository and codebase from previous student contributors.
- Communicated with the previous development team to understand recent changes and recommended next steps.
- Forked the original repository and worked in separate branches to maintain clean version control and documentation for future contributors.

## Objectives

- Improve the UI layout and overall visual design of the interface.
- Implement new foundational features that enhance usability and workflow.
- Maintain continuity with the existing codebase while setting up structure for future development.
- Ensure contributions are traceable and understandable for future students.
- Add Logins and Token Authorization for Improved Security
- Allow Local Exports on Machines of Major Operating Systems

## Features and Changes

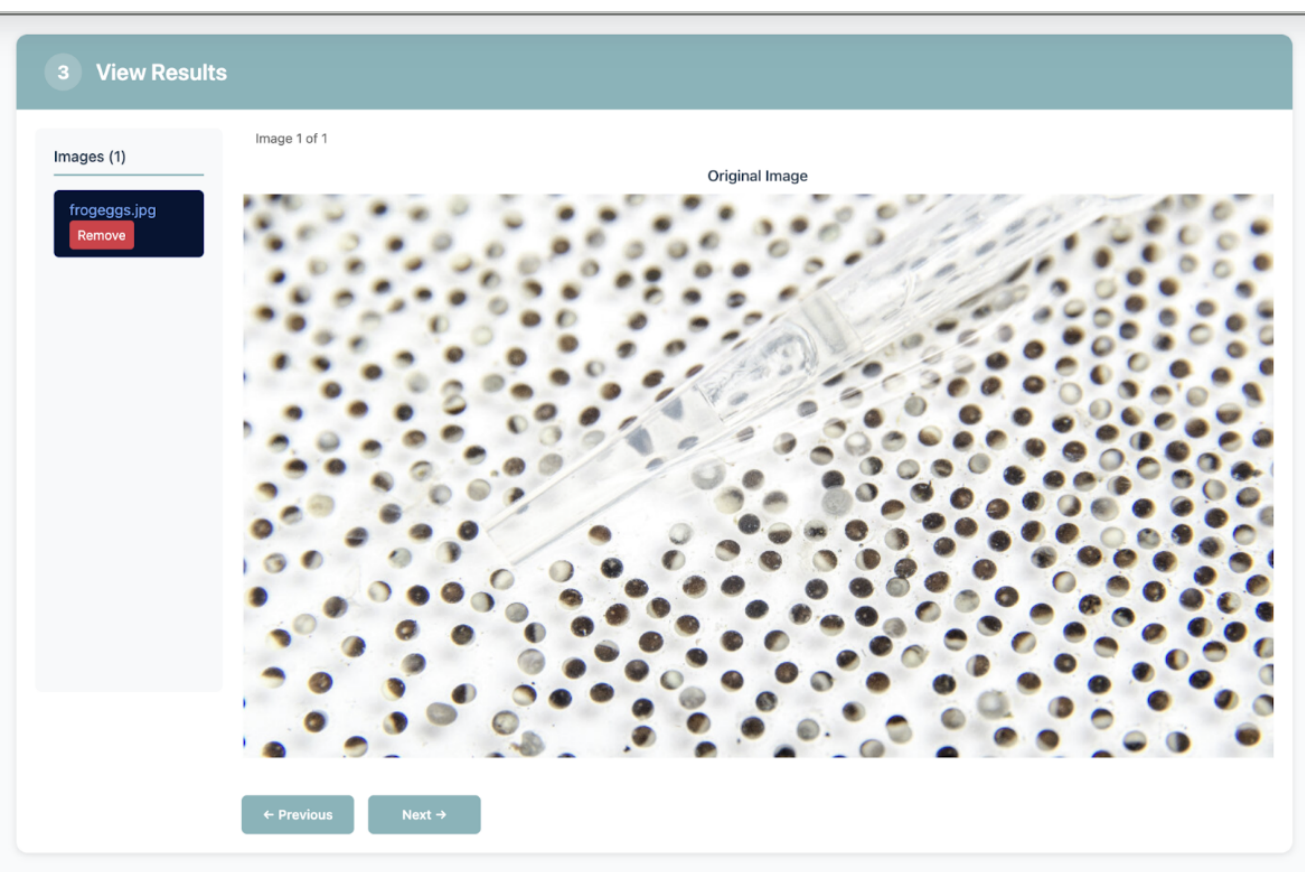


Figure 1. Refactored UI Input for Oyster Seed Counting

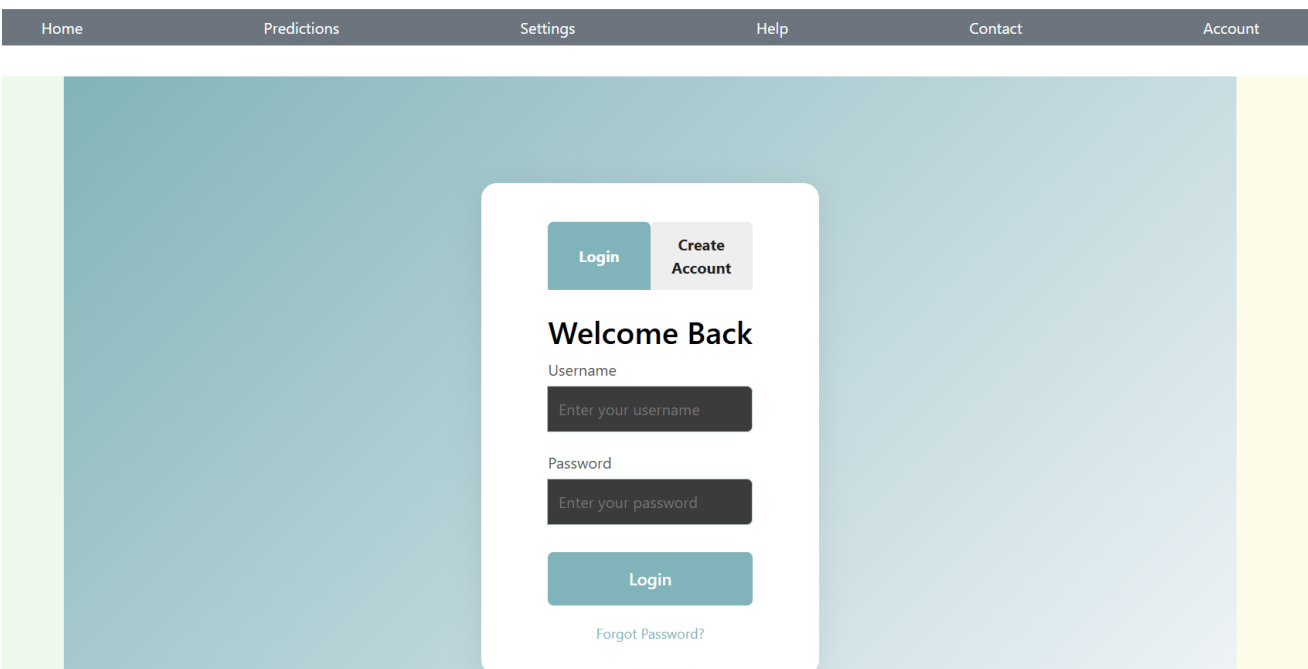


Figure 2. Basic Authentication

- Updated the UI with **major graphical style improvements** to modernize layout and appearance.
- Added **basic user authentication** using Django the (REST Backend Server Framework) using state of the art and secure JWT (JSON Web Tokens).
- Created a **login/account creation interface** with a tabbed design.
- Implemented an **Electron desktop export** for packaging the web app as a desktop application on Linux, Windows, MacOS.
- Updated the UI with **major graphical style improvements** to modernize layout and appearance.
- Added a **global Axios response interceptor** to automatically refresh JWT access tokens to circumvent receiving 401 Unauthorized Access errors.
- Ensured the login page only appears when necessary and is hidden after successful authentication.

## Major Codebase Components



Figure 3. Frameworks and Languages used to Rebuild Web Application



Figure 4. Major Operating Systems with Dedicated GUI Local Exports

## Redesign Goals

1. Streamline the overall user flow to reduce unnecessary steps and help researchers get to their tasks faster.
2. Improve visual clarity by restructuring layouts, grouping related controls, and reducing on-screen clutter.
3. Enhance accessibility with clearer labels, consistent styling, and more intuitive navigation pathways.
4. Introduce a modernized aesthetic that feels clean, balanced, and approachable for new and returning users.
5. Prioritize simplicity by removing confusing elements and making complex workflows more intuitive.

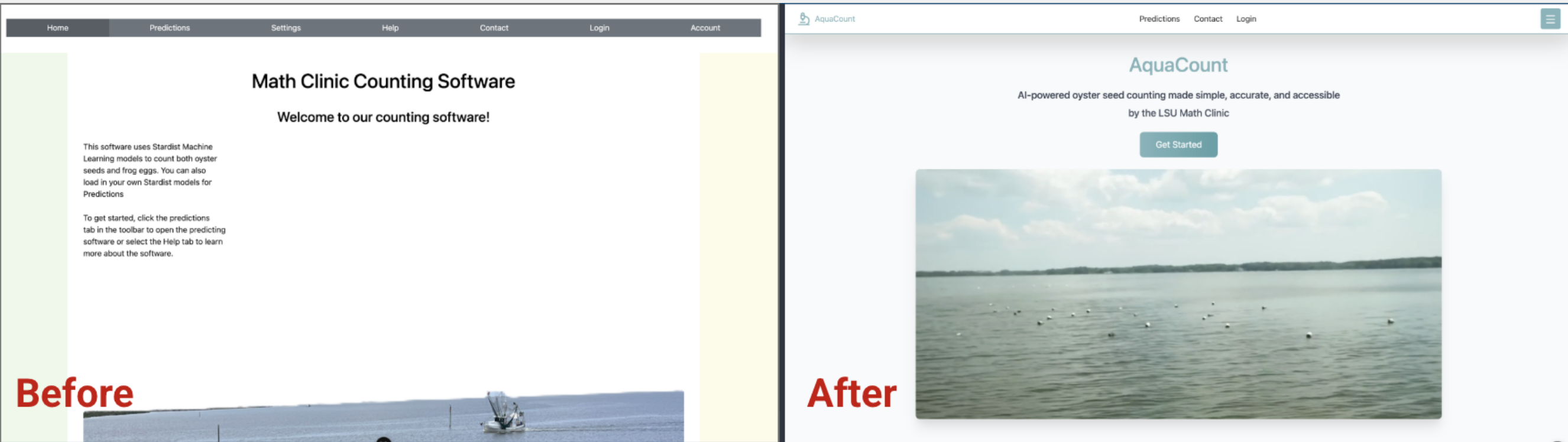


Figure 5. A Before and After Look at our Landing Page of the Site

## Documentation and Maintenance

- Updated and expanded the README to provide clearer setup instructions, library requirements, and troubleshooting notes for future developers.
- Refactored redundant or outdated sections of the code to improve readability, reduce confusion, and streamline future modifications.
- Standardized naming conventions, folder structures, and file organization to make the project easier to navigate.
- Improved documentation around settings files, JSON configurations, and Excel export paths to help future teams understand how data moves through the system.
- Removed unused code fragments and outdated UI elements to reduce clutter and minimize maintenance overhead.

## Future Work

For future work, we plan to add more flexibility to the Excel page maker, add calculation features, improve documentation, and add features related to egg development over time.

More quality-of-life and graphics changes are incoming, as well as completing the necessary changes and builds to make this program usable on the Raspberry Pi

Continuing to implement the authentication feature to which email address it will allow or take to a portal, depending on the extension of the address. An example would be to get with LSU ITS to implement myLSU logins into the program.

Further on authentication, implement the "Forgot Password" link at the bottom of the login screen so users can change their password if forgotten.

## Acknowledgements

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- We thank Maganizo Kapita and Gowri Priya Sunkara for their assistance in the machine learning project.
- We thank previous students on the project, Dow Draper and Alex Mensen-Johnson, for giving us an overview of the repository and understanding recent changes + recommended next steps.
- We acknowledge and thank the Department of Mathematics for foreseeing the utility of "Chaos" and the subsequent purchase.
- We would like to thank Elizabeth M. Robinson, Director of the Louisiana Sea Grant Research Lab and Michael C. Viosin Oyster Hatchery, and Dr. Sarah Bodenstein for giving us an opportunity to apply the Machine learning Algorithm on the oyster project.
- We also would like to thank the Aquatic Germplasm and Genetic Resources Center and Dr. Yue Liu et al. for providing us with guidance and data.

## References

1. <https://github.com/dhdschool/lsu-devision-web>
2. <https://www.laseagrant.org/out-reach/aquaculture/oyster-research-lab/lab-staff/>