

Group 29 – Microbiology Lab Information Management and Visualization System

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Problem Statement

- › Many scientists and researchers dedicate large amounts of time towards organizing, maintaining, and visualizing the data they collect.
- › The solution should be able to automate the process of organizing, maintaining, and visualizing data.

Functional Goals

- › Graphical User Interface
 - › Styling
 - › Create a visually appealing front end that also shows all relevant data
 - › User should be able to edit styles to their own liking
 - › Layout
 - › Layout should be easily understandable by the end user
 - › Graphing should be the primary focus of the layout
- › Data Import and Parsing
 - › The client should be able to import CSV or EXCEL files to be analyzed and graphed
 - › The solution should be able to parse data from the files and sort them into data structures for better visualization options

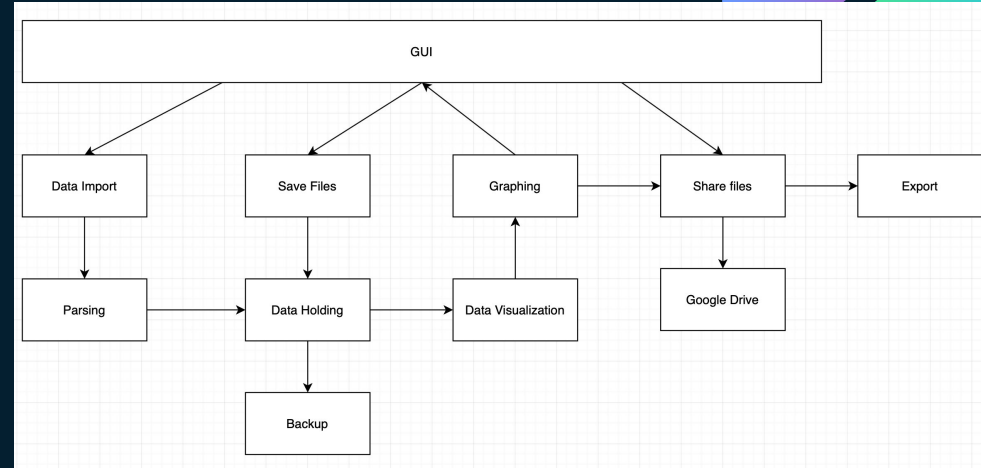
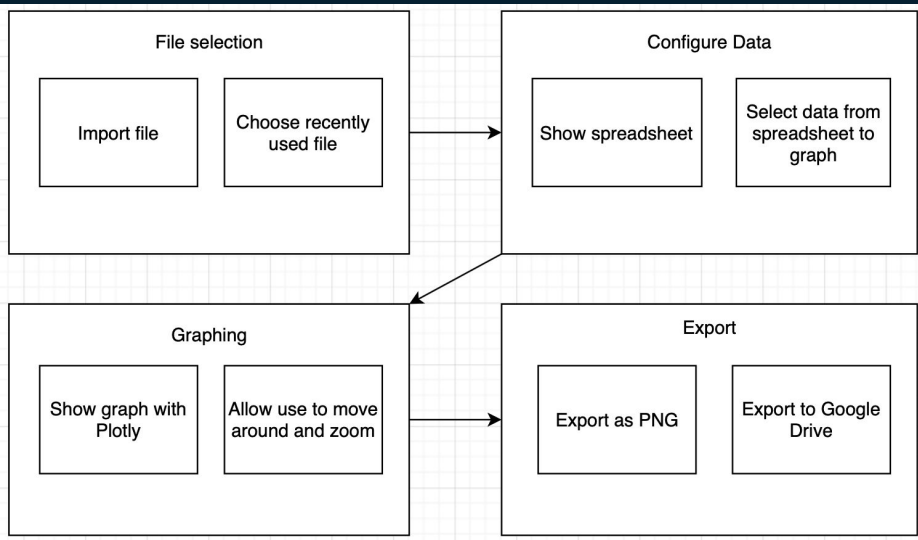
Functional Goals (Cont.)

- › Data Visualization/Graphing/Statistical Analysis
 - › Create a system that integrates with Plotly to create and show custom graphs to the end user
 - › System should perform some statistical analysis
 - › Generate large combinations of data into many graphs
- › Saving & Sharing Files
 - › The user should be able to save a current file within the application
 - › Create an export tool that can either share to Google Docs through an external API or save it as a picture to their local machine

Non-Functional Goals

- › Ensure the system could be maintained by one or two people
- › Ensure the research data will be secure
- › Python libraries be used to visualize the data
- › Parse the research data after it has been imported

System Block Diagram



GUI Prototype

Choose Graph Type

Scatter Plot

Box Plot

Line Graph

Heat Map

Histogram

Create Graph

Back to Home

Data Configuration (this will vary depending on type of graph)

X-axis: (drop down menu)

Y-axis: (drop down menu)

attribute3: (drop down menu)

attribute4: (drop down menu)

Show data as Excel file

Edit Config

Save

Back to Home

Export to Google Drive

Export to PNG

Statistical Analysis

Plotly Graph



Project Progress

- › Have a proof of concept application
 - › Takes in detailed data
 - › Displays selected data as specific graphs
 - › Currently scatter plots, histograms, box plots
 - › Planning to expand to more graphs desired by the client
 - › Working on statistical analysis
 - › P-Value, T-Test, other desired analysis
 - › Can export graphs to Google Drive
 - › Beginning process of generating large number of graphs
 - › Take different “variables” and their cross product, generate graphs for each of the different data sets
- › Have the CI/CD process built and executing

Technical Challenges

- › Generating a massive combination of graphs with varying axis variables/measurements/groupings in a quick and consistent fashion
 - › The large amount of data we have to work with creates more room for error
 - › Lots of different data types makes it more complex
 - › We need the graphs to be created quickly

What's Next

- › Combine individual efforts into one program
- › Flesh out and speed up the multiple data set graph generation
- › Allow the user to customize and save default graph templates and apply them to graph generation

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