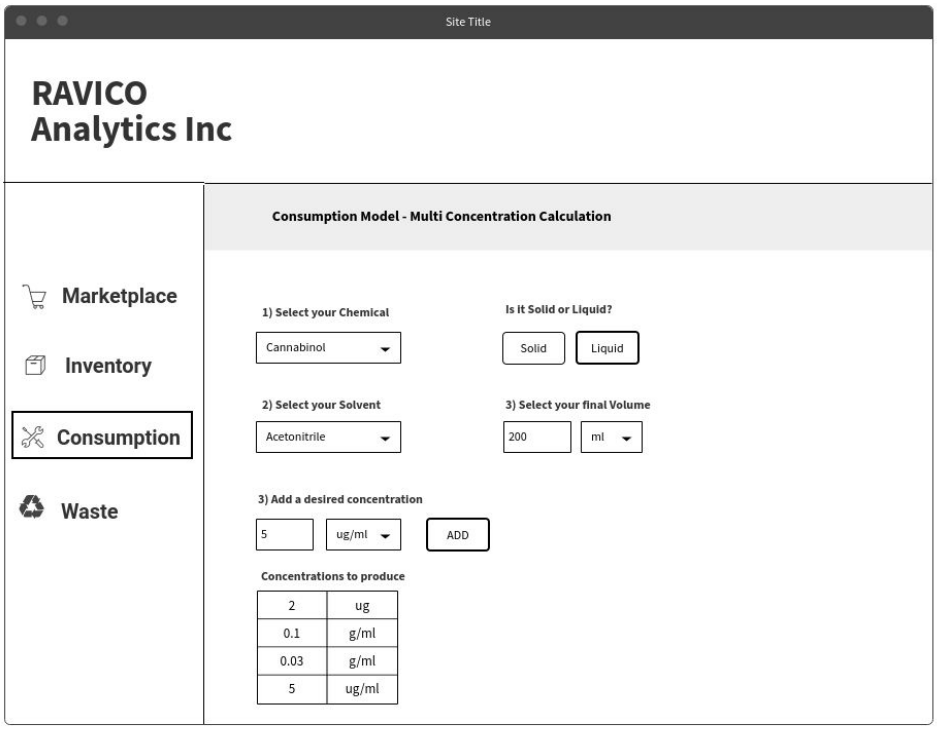
RAVICO Analytics Inc.

Product Details

Q1: What are you planning to build?

We are planning to build and iterate a web application software to automate the calculation of chemicals in different experiment scenarios.

In industry and academia, chemical consumption calculations are currently performed on excel spreadsheets which is proven to be inefficient and prone to unforgivable mistakes. We want to develop a quantitative web application that addresses this issue and will primarily be focusing on building the ‘Consumption Module’ which is a calculative tool that allows chemists to quantify the amount of chemicals needed in a given experiment to generate the desired outcome. The use of this application will optimize the amount of chemicals used in laboratories and reduce the amount of generated hazardous waste.



Q2: Who are your target users?

Our target users include lab technicians who prepare chemicals for future use, graduate students who research properties of specific chemicals or any chemistry students, scientists and researchers who work either in academia or industrial laboratories.

Each type of user may have different levels of need for the software. For example, free users will have the minimum access to available features. Lab technicians and researchers will be able to access all the calculation features while scholars and scientists may be able to modify how calculations are done.

Q3: Why would your users choose your product? What are they using today to solve their problem/need?

As of right now, most scientists and lab technicians need to perform calculations on excel spreadsheets or manually by hand. This is very inefficient and error prone. Our software is designed to automate the process of calculation and give them the precise amount of chemicals that they need.

Furthermore, the average cost per year for a small lab is well over 1 million dollars accounting for salary, cost of consumed chemicals and cost of waste disposal. It is projected that with automated chemical calculations, due to less errors and therefore chemicals used, we can save the lab 50% on cost for chemicals and waste disposal.

Q4: How will you build it?

The technology stack that is going to be used for this project is React, AWS Lambda, and Node.js. There is already a deployed website where React is used for frontend. (Redesign frontend e.g. make it responsive, add animation, focus on ease of use)

-- Expanding database

There should be a frontend where scientists can input information about their chemicals(e.g. Name of the compound, amount of chemicals used). For the backend we should handle the routes to use PubChem API and perform calculations with the user's input from the frontend.

To get the precise amount of chemicals for scientists to use our software is using PubChem's API for calculations.

For the testing, we are planning on using Jest to test, which is a JavaScript testing framework.

Q5: What are the user stories that make up the MVP?.

1. As a chemist I want to know the amount of a solid chemical needed in order to produce a solution with specified concentration.
2. As a chemist I want to know the amount of a liquid chemical needed in order to produce a solution with specified concentration.
3. As a chemist I want to know the amount of each chemical needed (more than one) in order to prepare a mixture of solution with specified concentration.
4. Suppose as a chemist I have a mixture of solution with a known concentration and I want a series of mixtures extracted from the solution with different desired concentrations. I want to generate the amount of each mixture solution needed in order to produce different concentrated solutions.
5. As a chemist I want to generate a workflow for each solution and include labelling and barcode information in order to make precise and accurate solutions.
6. As a chemist I want to update my inventory database with the correct amount of chemicals remaining so that the record is accurate and reflects transparent information about materials in stock.
7. As a chemist I want to record every step taken to address accidents in the lab.

- As a QC(quality control) manager I want to review work order reports and perform experimental trials if needed in order to ensure the quality and safety of experiments

Process Details

Frontend: Woojin, Tony

Role:

- Recreate the frontend of the web app where the main focus is on ease of use.
- Make the website responsive and add animations for a better user experience.
- The website should have a frontend for different sizes (e.g. web page looks fine on iPad, phone, or regular computer screen).
- Use React to create the frontend
- Use library such as Material UI to decorate the components
- Create a user profiling system

Backend: Alex, Khizr, Jiayang(Carlos)

Role:

- Handle the routes to use PubChem API, which gets the precise amount of chemicals
- Perform calculations with the user's input from the frontend.

Project manager/operation: Carlos - communication lead, team manager

Khizr - team manager (including access to Github, resources, API)

Role:

- Communicate with the rest of the team effectively
- Manage the team in order to resolve conflicts, track their progress
- Facilitate discussion in team meetings with partner
- Acquire access to the company's github, resources , API and other related materials

Q7: What operational events will you have as a team?

We will have regular/recurring team meetings to discuss our progress and any difficulties that we are experiencing. Due to the pandemic all meetings will happen online. In addition we will synchronize everyone with information needed to know in messenger/call on a weekly basis. We also plan to have paired coding sessions where one person is the “driver” and one person is the “navigator”; the role can be switched. This meeting can also incorporate code reviews to make sure code is well documented.

First meeting with partner :

Friday Oct 9th 2020, 2pm EST - 3pm EST

This was the first meeting between our project team, TA, and our partner. We introduced each other in the beginning where we talked about our backgrounds, strength of technology stacks, personal projects and skills, etc. Afsoon who is our project partner and chief scientific officer went through her company’s introduction, purpose, and stages of different projects through a powerpoint. We then discussed the scope of the project that will be assigned to us this term. We had a debate over whether to include mobile and web applications in our project; Afsoon made the point that due to limited resources and two teams will be working on the same project it’s challenging and difficult to ensure smooth governing. Our TA alexander insisted that the logistics were more complicated than what our partner thought and didn’t reach an agreement right away. They planned to have a separate meeting with Ravico this week and the outcome will be discussed and shared with us. In the end our team was directed to be familiarized with the code base and got informed on their tech stacks. The meeting ended shortly after.

Second meeting with partner:

Friday Oct 16th 1pmEST - 2pmEST

This was the second meeting between our team and the partner. We spent most of our time working on discussing our draft of deliverable 1 and taking her input to improve the document. We discussed how the frontend should be redone with a focus on ease of use and documentation. We also discussed getting access to the existing github and aws lambda and decided that one person (most likely operational leader) should receive the credentials and be responsible for merging our code to the existing repositories (production environment).

Q8: What artifacts will you use to self-organize?

We will have meeting minutes typed out after every meeting so that everyone gets informed on what was discussed. For each stage of the project, we'll have a TO-DO list; this list can be broken down into components such as backend, frontend, design, testing, etc. The project tasks will be assigned based on the role of each member and their strengths and weaknesses. There are times our team will work together on Discord where one person can share the screen and others can watch and give feedback. During weekly meetings we'll discuss the progress that we made and check off the list of tasks if anything is completed. There are some new tasks that need to be added to the TO-DO list because users will give feedback to our partner, so that we can improve existing applications. Tasks are scheduled based on their priority but also no tasks will be left behind untouched. There are certain tasks that need to be done first before the tasks that depend on it, there will also be new tasks that come in that have high priority.

After our second meeting with our partner, we decided that we would be using Trello as means of organizing tasks that need to be completed and managing tickets. Furthermore, we have decided tentatively to schedule weekly meetings on Tuesdays and Fridays from 12:00 -1:00pm to meet with our partner for us to show our progress and for the partner to provide insights on new tasks or things that need to be reworked from what we've already done.

Q9: What are the rules regarding how your team works?

Communications:
Our group will be meeting at 9PM on Mondays every week following right after our tutorials. The meetings will take place over voice chat on our Discord channel. Other than that, group members can communicate smaller matters over text which others will be expected to check at least once a day.
Meetings with our partner will occur twice a week on Tuesdays and Fridays at 12:00pm EST. The methods of these meetings will vary per meeting. Larger discussions will require a video conference over zoom whereas smaller updates can be communicated through email.

Meetings:
In our weekly meetings we will first take turns to share the progress each of us has made in the week prior. This will be a good time to bring up any issues members are running into and make the group aware of any target setbacks. Upon a setback, members will be expected to explain what they have attempted and what they are going to do to get back on track. During this time members can also seek advice from the group for additional help. After that, we will delegate tasks to each member and set

targets that we hope to achieve by the next meeting.

Conflict resolution: The first potential conflict is when teammates don't agree on one idea. When this happens we will evaluate the pro and con of this particular idea, one teammate will present the alternative and we'll also evaluate the pro and con of this idea. Based on the comparisons we'll reach an agreement. The second potential conflict is when one of the members becomes non-responsive. When this happens, the team lead will contact the team member directly and find out the cause of this. If the contact fails and still remains unresponsive we'll escalate this to the teaching team. The team lead can give a warning to the member for the first time. The third conflict can happen when there is a discrepancy of expectation between the partner and our team. Since different people come from different backgrounds it's hard to fulfill everyone's taste at once. When this happens it is very important to ask the user's needs, since we are still students who are still learning there are things that go beyond our capabilities. We'll do our best to satisfy the partner and the users.

Highlights

1. The decision on the scope of the project. In the initial meeting we discussed two options, one is to have both teams work on the same thing both web and mobile; the other is to have one team that works on the web and another team that works on the mobile. The argument given for the first option is to have exposure to all development environments as a student. The TA prefers this since she is an expert in mobile development. But this option presents challenges to the partner as they are resource limited and don't have enough time to manage two teams on this level. We decided to take on the web application and the other team will be doing mobile application because we have some experiences in web application.
2. The decision to use AWS lambda on the backend. The alternatives can be express.js, NoSQL. But based on our partner's situation and business needs, we agreed on AWS lambda. First we don't want the app to be costly because it is a startup business. Second AWS lambda is currently their backend infrastructure and tearing it down completely wastes all the hard work they put in. AWS lambda is very efficient to use and therefore our choice.
3. The decision that our partner and we agreed on was to give admin privileges of the AWS service and master repo (currently a proof of concept our partner developed previously) to only our team manager. The alternative was for everyone to have free access in merging changes into the master repository for

our partner. This may result in hard to track changes and code breaking scenarios.

4. Another consideration we need to make is cost consciousness when using AWS lambda functions. We don’t want the app to be costly because the startup has limited funding.