Aims and Objectives:

The aim of this project is to explore the development process of a full-stack application. This project will make use of an application program interface (API), both a SQL and NoSQL database, and a front-end created with the Vue framework (version 3.2). This project aims to make use of user interface (UI) and database administration (DBA) best practices by focusing on user experience (UX), a streamlined architecture and strong security measures to protect user data. These practices have been compiled from literature from both scientific research journals and industry leaders.

Literature Review

(This is going to be very brief and likely incomplete as I research more as the project continues and design choices adapt).

The database structure is a core component of this application. Storing data that is both saved to users and storing data being served to the application. Anderson and Nicholson, two senior database engineers at IBM, explain the differences and use-cases for a SQL or NoSQL database. SQL, or structured query language, is a programming language that is used for interacting with a relational database management system (RDBMS). SQL databases focus on reducing duplication in a database. This project will use PostgreSQL for its RDBMS. NoSQL is a non-RDBMS, data may be unstructured, or can adhere to a schema; this project will use MongoDB for its non-RDBMS.

In this project, a JavaScript-based framework, VueJS, will be used. Frameworks follow the model-view-controller (MVC) design pattern. In brief, MVC aims to separate user interfaces from the underlying data within an application. (Avraham Rayfield, 2001). This design pattern has existed since 1979, when it was first described by Trygve Reenskaug, developing on Smalltalk-79. (Reenskaug, 1979) An example of an MVC is a search function. The view is the actual search bar and button, the controller is the programmed logic that queries for the users search input, and the controller would be the database containing the data is returned to the view via the controller to the user.

There are three frameworks that are most commonly used in web application development, React, Angular and Vue. React, is technically a library which uses a virtual DOM, making it lightweight and efficient, but lacks built-in capability for routing, state management and some other features. Angular and Vue, are JavaScript frameworks. Angular interacts with Real DOM, which makes it slower than Vue or React as the entire tree must be re-rendered on state changes. Vue is a framework that lies somewhat between React and Angular. Vue uses a virtual DOM like React, but also is a full framework like Angular and has supported libraries for routing and state management.