**CS302L: SE Term Project**

| Team number | 13 |
| --- | --- |
| Project Title | Alexis |
| Document | SE Project Concept Document |
| Existing Work | [BioDigital](https://www.biodigital.com/) |
| Differences | We will visualize how a consumable can affect organs and give medical professionals to add or update how a consumable affects the given human body. |
| Technologies | MERN Stack, simulation libraries like three.js |
| Customers | Medical Researchers and Scientists, Pharmaceutical Companies, Healthcare Professionals, Medical Students and Educators |

**Description**

The web Application has three main components:

1. A simulator that would simulate a particular body type’s reaction to a given particular consumable.
2. A Database to store information about the users, food, medicine, the effects the medicine has.
3. Allow particular users such as medical professionals,students to update or add new data about how a consumable affects the human body.

The simulator will visualize how a consumable will affect particular body parts based on the data about how that particular consumable affects the given body.

To use the web application, a user would first need to create an account and provide their medical history and such information. The user would then be able to select a food or medicine from the database and simulate its reaction in their body. The simulator would provide the user with information about the potential effects of the food or medicine, including any allergic reactions.

The web application would be a valuable tool for people who want to take consumables safely. It would be especially helpful for people with allergies or other health issues. The application could help people make informed decisions about what to eat and drink, and what medicines to take.

**Profile of Users**

Medical Researchers and Scientists, Pharmaceutical Companies, Healthcare Professionals, Medical Students and Educators, Patients can use this software to simulate as per their requirement and can get a diagnostic.

**Normal users:** They can simulate how their type of bodies react in general to the given consumable and see the results.

**Medical specialized users:** They have the ability same as Normal users but they can also update or add new data about how a consumable affects a particular type of body.

**Technology Stack**

**Backend:** *Node.js*

- **Why:** *Node.js* is a popular runtime environment for building scalable and efficient server-side applications. It's well-suited for real-time applications and can handle concurrent requests efficiently.

- **Alternative:** Python with frameworks like *Django* or *Flask* could also be suitable for web application development.

**Frontend:** *HTML*, *CSS*, *JavaScript* (UI frameworks and libraries: *React*)

- **Why:** *HTML*, *CSS*, and *JavaScript* are the fundamental technologies for building web user interfaces. *React* is a widely-used library for creating interactive and responsive UIs, making it an excellent choice for a modern web application.

- **Alternatives:** Other JavaScript libraries and frameworks like *Angular* or *Vue.js* can also be considered, depending on the team's familiarity and project requirements.

**Web Framework for Backend:** *Express.js*

- **Why:** *Express.js* is a minimal and flexible *Node.js* web application framework, ideal for building *RESTful APIs* and handling *HTTP requests*. It simplifies routing and middleware implementation.

- **Alternative:** *Koa.js* is another *Node.js* web framework that provides a more modern and lightweight alternative to *Express.js*.

**Database System:** *MongoDB*

- **Why:** *MongoDB* is a NoSQL database that's well-suited for storing JSON-like documents. It's flexible, scalable, and can handle unstructured data, making it a good choice for a project with diverse data requirements.

- **Alternative:** For structured data and strong consistency, alternatives like *PostgreSQL* or *MySQL* can be considered.

**Simulation Libraries or APIs:** Specialized pharmacological modeling libraries or APIs

- **Why:** Using specialized pharmacological modeling libraries or APIs is essential for accurately simulating human body reactions to medicines. These libraries are designed for this specific purpose and provide the necessary modeling capabilities.

- **Alternative:** There are various pharmacological modeling libraries and APIs available, so the choice depends on the specific requirements of your project.

**Comprehensive Database of Medicines:** Integration with external drug databases

- **Why:** Integrating with external drug databases is crucial for accessing up-to-date information about medicines, including their chemical properties, dosages, side effects, and interactions. It ensures that your application has access to accurate and comprehensive data.

- **Alternative:** Besides *NIH DIP API*, other drug databases like *RxNorm* or *openFDA API* can also be considered based on the scope of your project.

**Visualization of Simulation Results:** *three.js*

- **Why:** *three.js* is a powerful JavaScript library for creating 2D or 3D visualizations. They can help users understand and interpret the simulation results effectively.

- **Alternatives:** Other data visualization libraries like *D3.js* or *Aframe* can also be suitable depending on your specific visualization requirements.