Project Proposal: MyHealth

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1　Motivation and Impact

MyHealth is a web-based, clinic information system to allow patients to stay informed with their medical status and needs to better manage their health.

In 2020, COVID-19 shocked the world and placed people in a state of quarantine. This new style of living created new problems, and healthcare facilities were put to the test. People needed a quick and easy way to manage their health information. Whether it's getting lab results back, completing forms, or asking questions a google search wouldn't answer, the MyHealth application will offer a quick and easy solution. Just a simple feature like completing online forms can save users both time and hassle before going to a clinic. MyHealth will allow healthcare facilities and businesses to reopen and be on top of COVID-19.

2　Project Objective and Application Features

The objective of MyHealth is to create a patient portal information system. The pandemic sent people home from work but now that people are going back to work and school, they run the risk of spreading COVID-19. Some of the key features in the application will be displaying lab results, downloading and completing forms, scheduling appointments, and an online video conferencing between client and physician. Whether it is for COVID-19 or another virus, patients will be up to date with their health and can make decisions to help the community. With the introduction of the Delta Variant of COVID-19, we know COVID is here to stay a while longer. That means businesses, healthcare facilities, and schools will all require COVID-19 tests, and we will be the one to display the lab results. MyHealth will provide the user with different information about their health, as well as providing them with the necessary resources to stay on to top of it. And when they can't answer questions by themselves, there will be video conferencing available. This online video conferencing feature will be between the client and a licensed physician. With this feature, the client will be able to ask questions, talk, and send pictures to a person who can help. The final option would be to schedule an appointment with only a couple steps. Below is summary list of all the application features:

- User registration/login/logout system

- Email confirmation and notification

- Appointment scheduling/viewing

- Completing medical forms online

- Posting/Viewing current medication, lab results and medical history

- Uploading images

- Online video conferencing

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3 Technical Requirements

MyMedical is a web application that will be modeled after a traditional monolithic architecture. This means it will be composed of various software entities to stand as a single, functioning software application. These software entities include the following: a database management system, the business logic, and the user interface.

3.1 Database Management System

MyMedical will utilize a database management system (DBMS) to house all necessary data for supporting the application's features. Furthermore, the database schema will be in at least 3rd normalization form (3NF) to reduce data redundancy while still minimizing schema complexity. Object relational mapping (ORM) – a technique used to map objects in a programming language to the schemas in a database – will be used to access, manipulate, and extract data from the database (Note: SQL will be used, but is abstracted away from the programmer through the ORM for ease of development).

3.2 Program/Business Logic

MyMedical will utilize a programming language to handle HTTP requests/responses for exchanging information among the application users, application database, and any third-party API using serialized, validated JavaScript object notation (JSON). The code for this business logic will include any necessary framework and third-party packages to expedite the development of common web application features (i.e. user authentication). Moreover, the code will be readable, reusable, maintainable, and scalable in keeping with standard programming principals through the use of object oriented design patterns and thorough documentation .

3.3 User Interface

MyMedical will utilize a user interface (UI) to enable end users to interact with the application. The interface will be designed following Don Norman's and Gestalts design principles to allow users to easily discover application features whilst enjoying an engaging modern look. In addition, and most importantly, the interface will be a user centered design (UCD) that focuses on the users' needs to optimize user experience (UX).

These technical requirements will be met with the aid and use of various platforms and technology.

4 Platform and Technology

4.1 For The DBMS

- **PostgreSQL:** an open-source Database Management System.

- **PgAdmin:** a graphical user interface (GUI) used to manage PostgreSQL databases during development.

- **SQLAlchemy:** an ORM language used to query the database.

4.2 For The Business Logic

- **Python:** a high-level general-purpose programming language. The use of Python's Flask framework along with other extensions and third-party packages created for web development (flask-migrate, flask-jwt-extended, marshmallow, etc.) will be mainly utilized.

- **PyCharm:** an interactive development environment (IDE) designed specifically for programmers using the Python language.

- **Postman:** a platform that aids in the API development lifecycle.

- **Mailgun:** a third-party API that will be used for email confirmation/notification.

4.3 For The UI

- **HTML:** a markup language used to semantically structure webpages.

- **CSS:** the language used to style an HTML document. The CSS Bootstrap framework will be largely used for ease of styling.

- **JS:** a high level programming language that will be used to create interactive web components for end users and make API calls to retrieve data.

- **VSCode/Atom:** IDE's for creating server side scripts

4.4 For General Development and Deployment

- **Git/GitHub:** platforms used for versioning control and will be used for the reliable integration of work between team project members.

- **Heroku:** a cloud-based platform that will be used to deploy the MyMedical application.

Because PHP is easy to use during web development, it was originally considered as an alternative to Python. However, because PHP is directly embedded into HTML, it lacks 'separation of concern,' which, in addition to making code less maintainable, makes it difficult to coordinate integration among frontend and

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backend developers. Python on the other hand offers the 'separation of concern' that would allow paralleling development tasks among frontend and backend developers for an efficient workplan.

5 Workplan (tentative)

09/12 − 09/18: Brainstorming and Diagrams

Frontend

Based on proposed application features, brainstorm to create use case and sequence diagrams.

Backend

Based on proposed application features, brainstorm to create class diagrams and entity relationship diagrams.

09/19 − 09/25: Wireframes and Schemas

Frontend

Design UI mock-up/wireframe modeled after use case and sequence diagrams.

Backend

Properly convert entity relationship diagram into relation schemas ensuring the schemas are in in at least 3NF when necessary. Use schemas to implement database in PostgreSQL to be used in the MyHealth application.

09/26 − 10/09: Fact-Findng and Implementation

Frontend

- Conduct fact-finding research to grasp a better understanding of the needs of potential users. The fact-finding process will include gathering quantitative and qualitative data from potential users who will interact with the mock-up UI and who have participated in interviews and questionnaires regarding their needs and experience with online medical applications.

- Redesign UI mock-up/wireframe to reflect user needs gathered from the fact-finding process. Hence, the UI will be a more user centered design.

Backend

-Begin implementing application features:

Basic Application Features

1. User registration/login/logout system

2. Email confirmation upon registering

3. Test the API endpoints using Postman. When successful, create JS API calls to be used for the fronted later.

Primary Application Features

1. Appointment scheduling

2. Completing medical forms online

3. Posting/Viewing current medication, lab results and medical history

4. Test the API endpoints using Postman. When successful, create JS API calls to be used for the fronted later.

Secondary Application Features

1. Uploading images

2. Online video conferencing

10/10 − 10/23: Integration and Testing

Frontend And Backend

- Using the updated wireframe, implement UI integrating it with the back-end based on all the necessary API calls.

- Test and redesign/redevelop if necessary

10/24 − 10/30: Deployment