PROJECT PROPOSAL

COMP 3120 Advanced Web Development

MediConnect

GWDP Monday 5PM Code Fighters

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Mediconnect

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1. Project Outline

1.1. Main Purpose

The purpose of this app is to create a user-friendly web application that enables patients to easily book medical appointments and allows healthcare providers to review patients' medical records in advance. Through this app, patients can select suitable time slots for appointments and provide critical health information before visiting the hospital. Healthcare providers can then review the booked patients' medical records, ensuring a more efficient and prepared consultation.

1.2. Target User Group

A. Patients

Typically, patients experience the inconvenience of filling out medical records each time they visit a hospital. When seeing a new physician, they often need to explain their previous treatments and medications, which can be cumbersome. Important information, such as allergy details or vaccination history, might be overlooked or inaccurately conveyed, leading to the risk of incorrect prescriptions. By using our app, patients can manage their medical records efficiently, avoiding the need to re-enter information for every visit. This greatly enhances the convenience of the consultation process and ensures that critical medical information is accurately communicated, leading to safer and more effective care.

B. Physicians

For physicians, it is crucial to have a clear understanding of a patient's medical history prior to a consultation. However, when patients omit or miscommunicate vital information, it can hinder the physician's ability to prepare effectively. Family physicians may refer patients to specialists. Through our app, specialists can access family physicians' messages and preliminary judgments of the condition, which helps to share information among physicians and quickly help patients find the cause and then treat them. Inaccuracies in allergy or vaccination records can lead to serious consequences, such as incorrect prescriptions. Our app allows physicians to review the medical records of their scheduled patients in advance, enabling them to prepare thoroughly for the consultation. This improves the efficiency of the consultation and allows for more personalised and accurate treatment, reducing the need for repetitive questioning and ensuring continuity of care.

1.3. Personas

Persona 1

John Smith (30 years old, Male, IT Company Employee)

John Smith leads a busy professional life and wants to manage his health effectively. However, he finds it inconvenient to repeatedly fill out medical records every time he visits a hospital. He also has a chronic allergy, which requires him to inform the physician about his condition every time he receives care. John desires to use our app to register his medical records once and manage them continuously, allowing him to receive care without the hassle of repeatedly entering his information.

Persona 2

Sarah Johnson (45 years old, Female, Homemaker)

Sarah Johnson is responsible for managing the health of her family and regularly visits the hospital for vaccinations and health check-ups. However, she finds it cumbersome to remember and convey past medical treatments and vaccination records to physicians during each visit. Additionally, she has experienced issues where important treatment records from different hospitals were not available, leading to complications. Sarah hopes to use our app to consolidate and manage her family's medical records in one place, with easy access whenever needed.

Persona 3

Michael Williams (50 years old, Male, General Practitioner)

Michael Williams is a general practitioner who sees multiple patients daily and understands the importance of having accurate medical records for each patient. However, he often faces challenges when patients fail to provide complete or accurate information, making it difficult to prepare for consultations. Inaccurate details about allergies or past conditions can lead to incorrect prescriptions, posing significant risks to patients. Michael wants to use our app to review patients' medical records in advance, allowing him to prepare more efficiently and provide the best possible care.

1.4. Data Sources

Our project will adhere to FHIR (Fast Healthcare Interoperability Resources) Standards, which provide a standardised framework for exchanging healthcare information electronically[1]. However, due to the complexity and vast amount of data within FHIR, we will selectively implement only the necessary components (e.g., Appointment workflow, clinical background data).

Advantages of Using FHIR

Interoperability: FHIR allows the app to integrate seamlessly with other healthcare systems, facilitating easier data exchange between different stakeholders[1].

Standardisation: By adhering to FHIR, the app ensures that all healthcare data is structured in a way that is consistent with global healthcare standards[1].

Scalability: FHIR's modular approach allows us to start with essential features and gradually expand the app's capabilities as needed[1].

The primary data sources will include patient-entered information such as vaccination records, allergy details, existing conditions, and prior medical history. This data will be critical in providing healthcare providers with the necessary context to offer informed and effective care.

1.5. initial design & Workflow

The app will feature an intuitive "Outlook-style" interface, where users can select available time slots from Monday to Friday. These time slots will be fixed, and users can easily choose an open slot that fits their schedule.

Workflow

Step1. User Registration

Unregistered users will enter basic personal information to sign up.

Step2. Medical Record Entry

After logging in, users will be provided with a form to input their medical records (CRUD functionality will be implemented).

Step3. Appointment Booking

Users will choose from a list of 3-5 sample hospitals and select their preferred time slot from the available options to book an appointment (CRUD functionality will be implemented).

Step4. Physician Review

Physicians registered with the selected hospital will be able to review the patient's medical records after the appointment is confirmed, enabling them to prepare effectively for the consultation.

Step5. Physician's message

The physician can leave a message for the next physician so that the next physician who visits the case can see the previous physician's message and make a diagnosis for the patient.

2. A target Minimum Viable Product outline

2.1. MVP Functionality

A. Patients

1. Different pages will be rendered based on whether the user is logged in or not.

2. Patients can register by entering basic personal information, with passwords securely encrypted using bcrypt.

3. Secure login functionality will be provided using JWT tokens.

4. Patients will be able to register and manage their medical records, with full CRUD (Create, Read, Update, Delete) functionality supported.

5. Patients can view available time slots at selected hospitals and book appointments at their preferred times. This will also be managed through CRUD functionality.

6. Once an appointment is confirmed, patients will receive notifications about the status update.

B. Hospitals and Physicians

1. Physicians will be able to review the appointment requests for their associated hospital and update the status to confirm bookings.

2. After an appointment is confirmed, Physicians will be able to review the patient's medical records in advance, allowing for more efficient preparation for the consultation.

3. The physician can see the previous physician’s message while checking the case or history record so that the new physician can have a preliminary judgment of the patient's condition.

2.2. Excluded Features

A. Detailed Patient Information Options

In the MVP, patient medical records such as allergy information or medical history will be collected using free-text input. Implementing radio buttons or dropdown menus for predefined options has been excluded due to the increased complexity involved in this feature.

B. Family History and Health Insurance Information

Family medical history and health insurance details have been excluded from the MVP. These features were omitted to manage the complexity and scope of development at this stage but may be considered for future enhancements.

C. Physician-Type Users

For the MVP, hospital and physician data will be based on pre-configured mock-up data. The ability for hospitals and physicians to self-register is a potential future expansion but has been excluded in this initial stage to maintain simplicity.

D. Appointment Reminder Notifications

In the MVP, patients will not receive reminders for upcoming appointments. While this feature can improve the patient experience by reminding them of their appointment, it requires connecting to a calendar and sending notifications, which makes it harder to develop. Also, handling different time zones adds to the complexity. For these reasons, this feature will be added in a future version of the app.

2.3. Expansion Potential

A. Support for New User Types

Future expansions could include functionality allowing hospitals and physicians to directly register within the system. This would enable more healthcare professionals to utilise the app, thereby enhancing interaction between patients and healthcare providers and improving the overall user experience.

B. Collaboration with External Entities

Future development could enable the system to collaborate with various healthcare stakeholders, such as medical institutions, insurance companies, pharmaceutical firms, and government agencies. By broadening the scope of healthcare data utilisation and integrating with diverse services, the app could ultimately fulfill its vision of becoming a comprehensive open healthcare platform.

C. Multi-language Support

In future versions, the app can support multiple languages to reach more users. This will improve the experience for non-English speakers and make the app easier to use in global healthcare services.

3. Project Plan (Weekly Milestones)

3.1. Week 9

1. Implement the wireframe for the app using Figma and review the overall workflow.
2. Develop the user registration and login functionalities. This includes implementing secure login using JWT tokens and encrypting passwords using bcrypt.

3.2. Week 11

1. Create the app mockup using Figma and review any necessary workflow and design adjustments.
2. Generate mock-up data for hospitals and healthcare professionals.
3. Develop the dataset required for entering patients' medical records and implement the functionality to input this data.
4. Ensure that the entered data is correctly stored in MongoDB and rendered within the web application.
5. Do initial testing to make sure the routes are correct and then test the registration and login system to make sure the data is stored correctly in MongoDB.

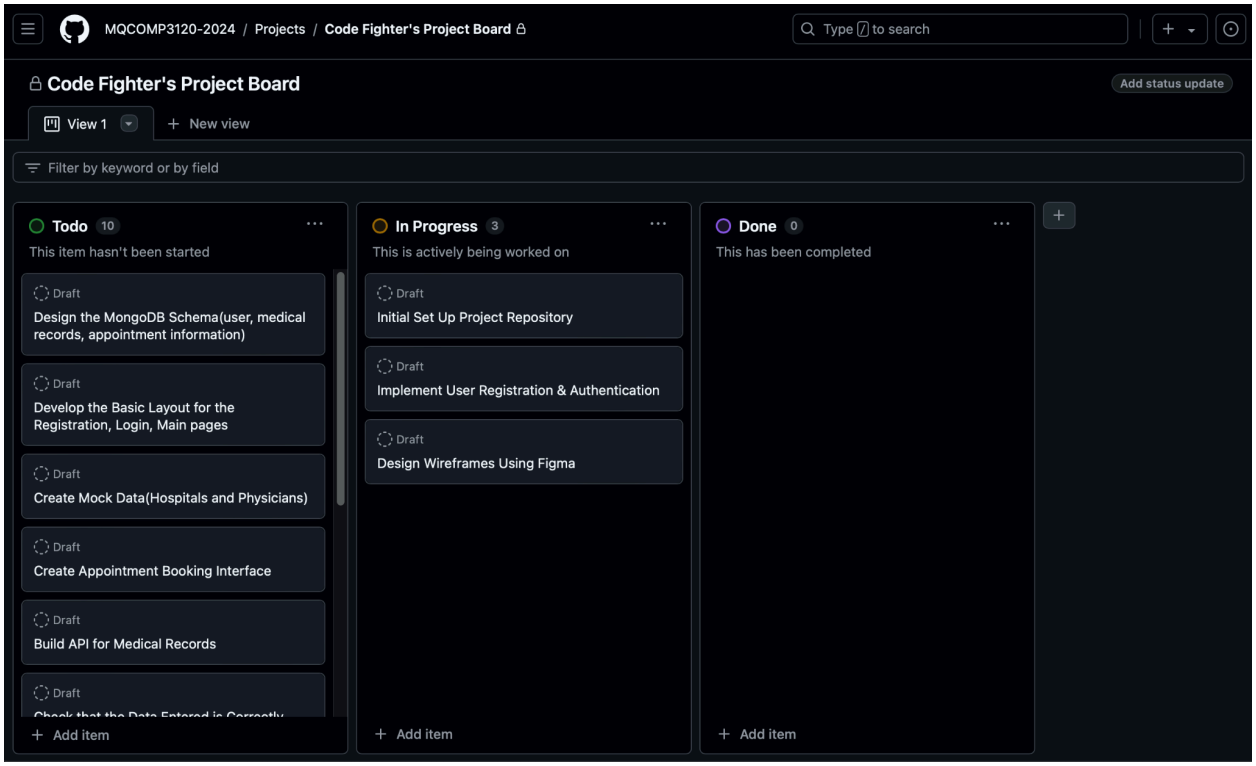
3.3. Week 12

1. Implement CSS for the registration, login, main page, and medical record entry page to improve the user interface.
2. Develop the patient appointment booking interface and functionality, allowing users to select available time slots from the chosen hospital.
3. Implement the interface for physicians to review patient information and complete the setup for role-based access control.
4. The second phase of testing ensures that the physician can view the patient information page and the appointment system and functions are perfected.

3.4. Week 13

1. Finalise the CSS for all pages to ensure a consistent user experience.
2. Review and ensure that patients can effectively perform CRUD (Create, Read, Update, Delete) operations on their medical records and appointment bookings.
3. Verify that notifications are correctly sent to patients when physicians confirm their appointments.
4. Integrate the entire system, conduct comprehensive testing, and address any remaining gaps.
5. Deploy the application.

4. The team's Github Project Board



Link to the board: https://github.com/orgs/MQCOMP3120-2024/projects/8/views/1

5. References

[1] Health Level Seven International, "FHIR Release 5 (v5.0.0): HL7 FHIR Foundation," 2021. [Online]. Available:https://www.hl7.org/fhir. [Accessed: Sep. 03, 2024].