Women's Digital Clinic

A better place for you, for me and for all the women in the world!!!

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Introduction

Women's Digital Clinic is a mobile application for all the women across the world which helps them maintain their personal wellbeing. The main purpose of this application is to track their well being by tracking their menstrual cycles, pregnancy semesters, symptoms and hormonal changes one experiences and much more. Through this application, one can not only track their cycles but also try to understand more underlying issues that women face in day to day life. The ultimate goal of this application is to provide a platform for all the women to maintain their health along with an opportunity to learn and understand more about themselves.

Key Features

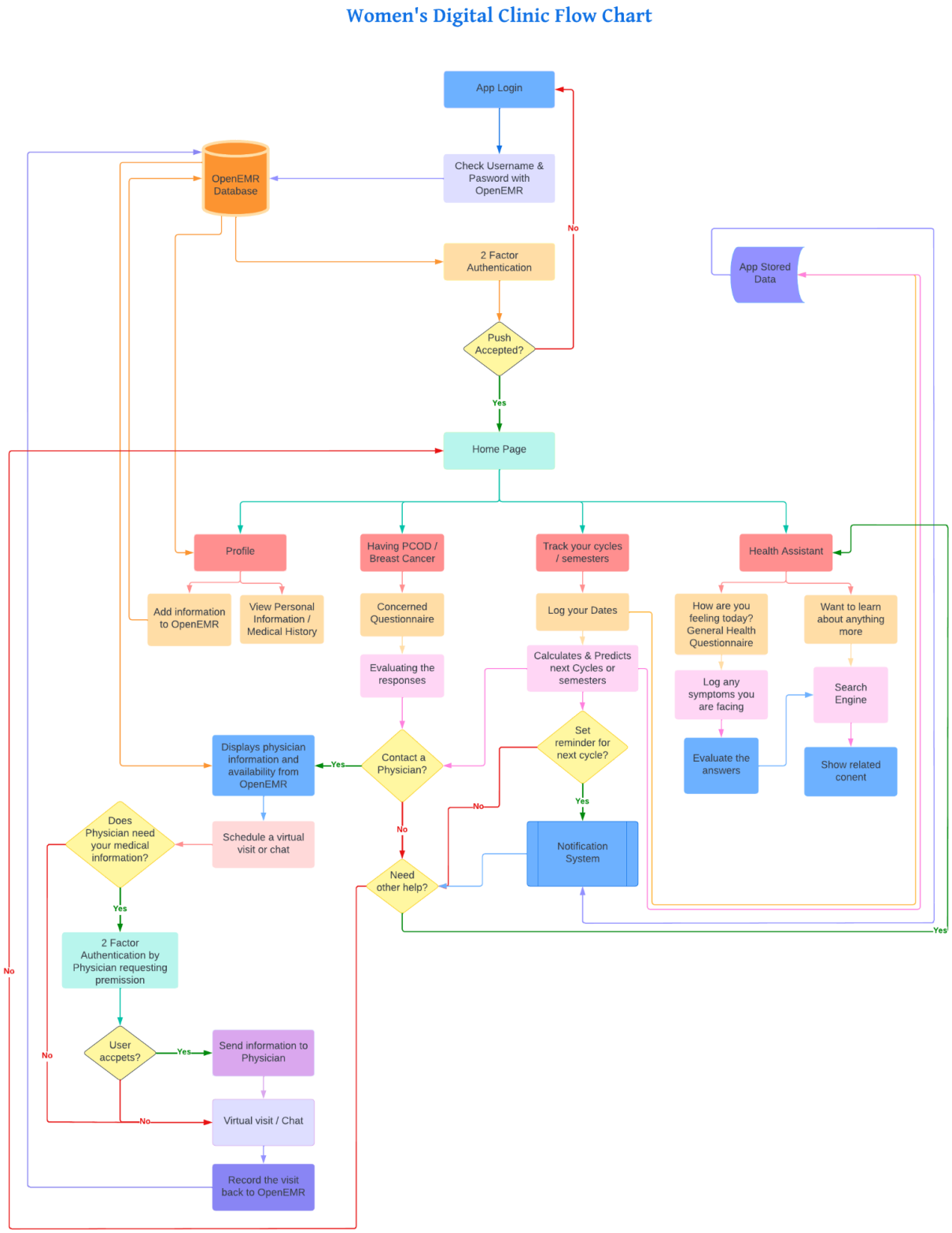
Women's Digital Clinic has few key features that are mainly focused upon. They are,

- ➔ A Login screen
- ➔ A Home screen with key icons
- ➔ Profile screen for each user
- ➔ Menstrual Cycle Tracking
- ➔ Pregnancy Semester Tracker
- ➔ PCOD Check Test
- ➔ Breast Cancer Check Test
- ➔ Contact a Gynecologist
- ➔ A Health Assistant
- ➔ Notification System
- ➔ Search Engine
- ➔ Security
- ➔ Integration with OpenEMR

Enhancements to OpenEMR

Enhancements	Explanation
Credentials Verification	We need a functionality that fetched the credentials in OpenEMR and verifies with those entered by the user during the login
In-&-Out Data Flow	We need a new API interface that establishes a connection between the App storage and OpenEMR database. This acts a medium of data flow from and in to OpenEMR
Two Factor Authentication	A double layer authentication to make the medical data in the OpenEMR flow and display to the user's front end. A new interface that is controlled by OpenEMR since the authentication to sent to the mobile number associated with OpenEMR
Tracking System	Having a calendar interface not only to view the scheduled appointments but also important dates or cycles marked by the user in the application can also be updated to OpenEMR as part of medical history

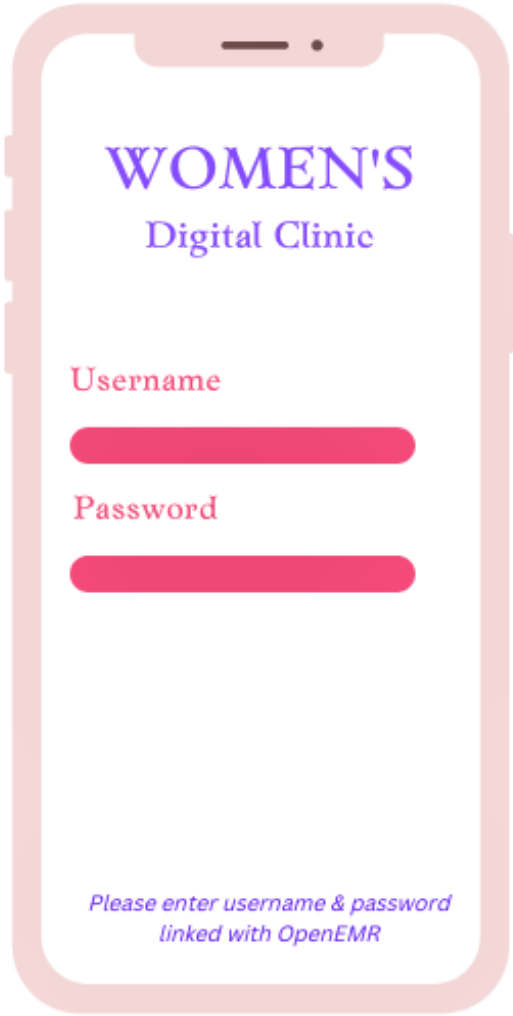
Working Flow Diagram



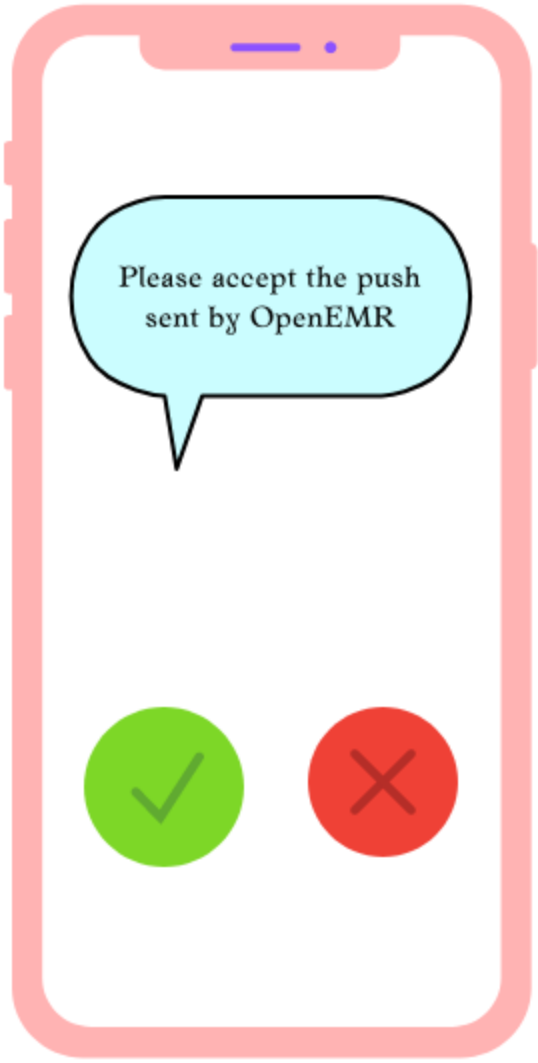
App Screens

Login Screen

This application has a login screen asking the user to enter their username and password. The app insists that the user enter the username and password which is associated with OpenEMR as the main purpose of this project is trying to enhance the OpenEMR system. Doing so, we can pull the user's medical information from OpenEMR and can also limit the users to female genders. The application can work even if the user does not wish to use OpenEMR credentials but they cannot access their medical information present in the medical records in OpenEMR. When a user does not link their application with their medical records the application does not support data reading from and as well as writing into the OpenEMR. Such features are limited to users with OpenEMR credentials only. And when a user enters invalid credentials, the app displays a disclaimer indicating the user to enter valid credentials.



Two Factor Authentication



We have learned in this course how important medical data is and how sensitive is the data concerning mental health and women's health like their menses, pregnancy data. It is extremely important for any application dealing with mental health and women's health data to have a well developed security framework. Even in Women's Digital Clinic, we implement a Two Factor Authentication for security reasons. Once the user logs in with OpenEMR credentials, the user gets a notification saying ***"Please accept the push sent by OpenEMR"***. This notification is sent to the user's mobile number that is associated with the OpenEMR data. At the bottom of the screen, the user is asked to either accept the push by clicking the **Accept Button** or reject the push by clicking the **Reject Button**. The application performs this double layer security whenever the user logs in or wants to share the data. A similar push will be sent to the user when a physician tries to view their medical information as part of the diagnosis. The user can accept or reject the push accordingly to allow the physician access. In this way, we not only provide security to women's personal health data but also provide security for all the OpenEMR medical data of that person that the application uses.

Home Screen

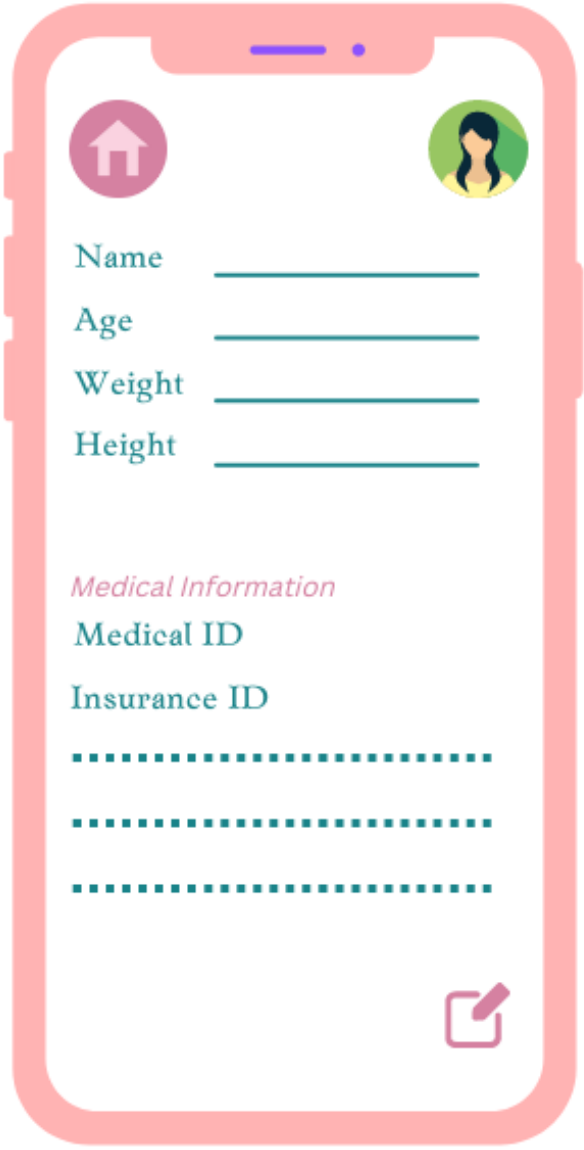
An interactive home screen is really essential for any mobile application which allows the user to understand its usage and helps them navigate along the application effortlessly. Women's digital clinic's application too has an interactive home screen displaying major features of the app as icons. On the homescreen , it has icons,

- ***Track your cycle*** - This leads to menstrual cycle and pregnancy semesters tracking screen
- ***Having PCOD?*** - Leads to the screen where user can have a check for PCOD/PCOS concerns
- ***Having Breast Cancer?*** - This icon leads to the screen where user can have check for breast cancer symptoms
- ***Your Health Assistant*** - On clicking this icon, the user is directed to a interactive screen assisting women's well being

The home screen also consists of a **Home** icon, which directs the user to the home screen on clicking it. There is also a **Profile** icon on the top right corner of the application which leads the user to their profile screen. The **Notification** bell icon on the bottom right of the screen leads the user to notification system or setting of the application.

Profile Screen

When the user clicks on the Profile icon that is present on the top right corner of the home screen, the user will be redirected to the Profile screen. The profile screen contains user specific information. This information is of three types,



- **Personal Information** - The user can view their personal information like name, username, phone number, email etc..,
- **Anthropometric Information** - Measures like Age, Height, Weight etc.., are important to track in applications like these. Hence, all these are displayed on this screen.
- **Medical Information** - Since the user logs in with OpenEMR credentials, their medical information like Medical ID, Insurance No., Medical History etc.., associated with their login is displayed here.

The user can click on the **Home** icon on the top left corner of the screen to revert back to the home screen. There is also a **Profile Picture** icon on the top right corner of this screen where users can update their profile picture. All the information in the profile screen can only be viewed by the respective users and the data is secured with double layer security. At the bottom right corner of the screen, we can see an **Edit** option which allows the user to add any information to their profile. This new added information can be stored back into the OpenEMR database if the user wishes to.

Tracking Screen

When the user clicks on the Track your Cycle icon on the home screen, the user is directed to the Tracking Screen where the user can track their menses cycle or track their pregnancy trimesters. At the top center, the screen displays *"Mark your dates and track your cycles"* while displaying a calendar option to the user. This calendar is an interactive calendar that can be integrated into the application with help of google or microsoft calendar API. On this calendar, the user can mark the dates for the current month indicating their period start date and the application automatically will calculate their predicted start dates for the upcoming cycle based on the historic data entered by the user. The same will be replicated with the pregnancy data with some minor changes. When a user enters the pregnancy tracking page, the user is asked to enter their first semester start date and then the application will calculate the start dates of the next two semesters three months from the start date of the current semester. At the bottom right of the screen, there is a **Notification** icon which comes into action when the user logs the current cycle dates on the calendar. It gives a prompt to the user asking if the user wants to *"Set reminders for your next cycle?"* along with an **Accept Button**. When the user accepts the prompt, the notification will set reminders for the next cycle start dates. When the dates approach the users get a notification on their screen.

Having PCOS/Breast Cancer?

On the home screen, when the user clicks on the **"Having PCOD?"** or **"Having Breast Cancer"** icons, the user is redirected to an interactive screen where the user can take a questionnaire related to these concerns. Let us consider the "Having PCOD?" screen, the screen displays a check test with a set of questions that are related to PCOD/PCOS like,

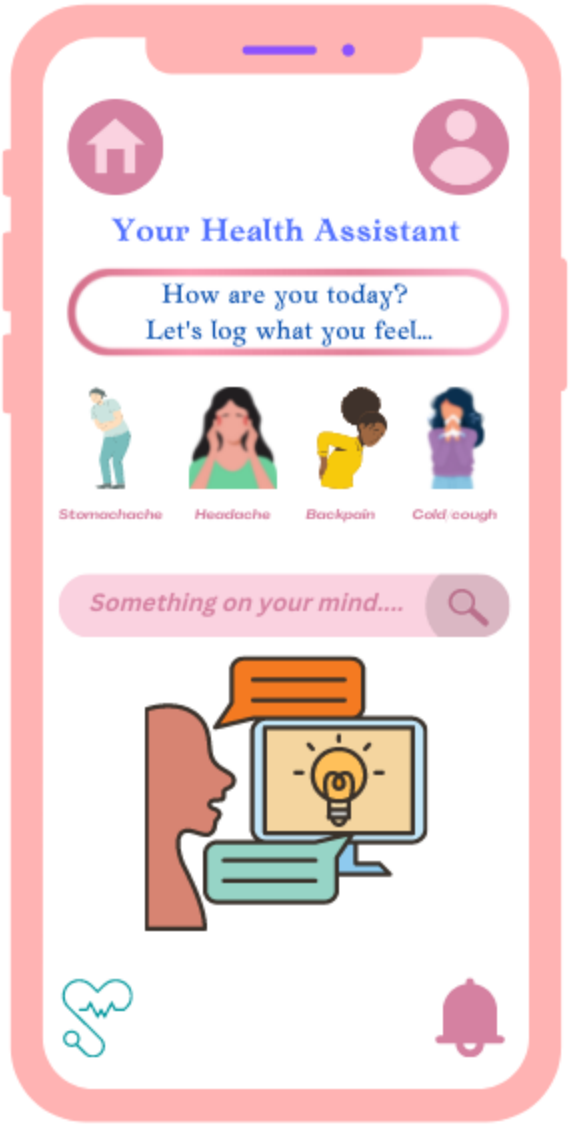
- Are you facing Hair Loss?
- How often is your menstrual cycle?
- Are you struggling to maintain your body weight?
- Have any women in your family been diagnosed with PCOS?

All these questions come with multiple options allowing the user to choose the option that best fits them. When the user answers these questions and submit them, the application will evaluate these answers and let the user know their potential risk index for that concern. If the user is tested with a high risk index then, the **Physician** icon at the bottom left of the screen prompts an alert to the user asking if the user wants to ***"Contact your Gynecologist?"***. When the user clicks on this icon, she will be redirected to a Contact Physician screen where they can view their desired physician's information and availability that is retrieved from OpenEMR and they can get in touch with them by scheduling an appointment/virtual call/chat. If the physician wants to access the patient's medical history records or menses data, the physician needs to request permission from the user. This is done by a two factor authentication where a push is sent to the user's registered mobile number that is associated with OpenEMR. This push displays the physician information who is trying to access their medical records. The physician can view their medical records only when the user accepts the push. This way a physician can give better and customized diagnosis to a patient without

any security breach. The Notification icon on the bottom right helps to set up any reminders or alerts. And the Home and Profile icon redirect the user to representative screens when the user clicks on them.

Health Assistant

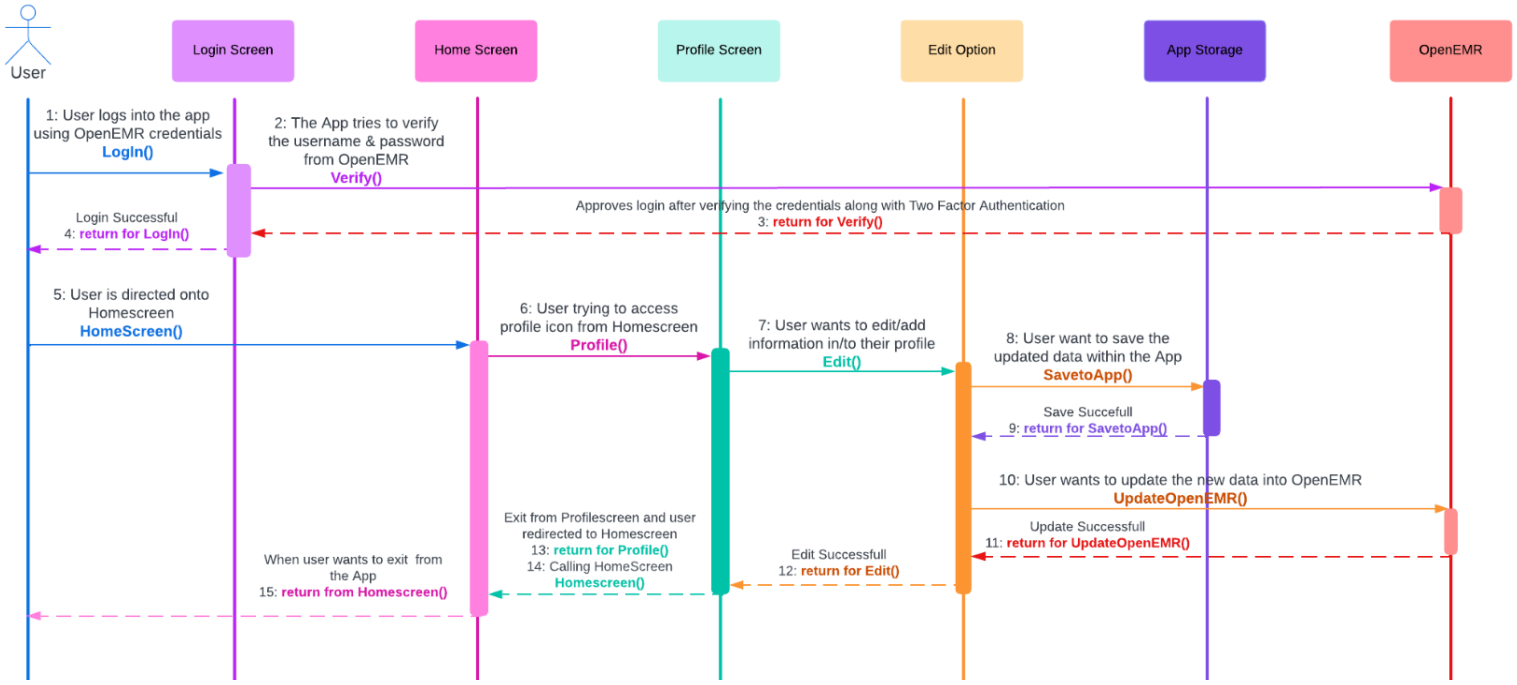
When the user clicks on the "Your Health Assistant" icon on the home screen, they are directed to an interactive screen where the women can understand other concerns bothering them and also learn the unknowns. At the top center, the user is asked "How are you feeling today?", The user can log what they are experiencing like their emotions - Happy, Sad, Angry, Mood swings etc.., or any symptoms like Stomach pain, Headache, Cramps etc. Doing so, the application can give the user some personalized insights related to specific concerns. The application will try to map these symptoms to the cycle phase of the women and indicate if those symptoms are due to the hormonal changes that happen during their cycles. If not it alerts the users with "Contact a Physician?" icon at the bottom left. There is also a search option for the user who intends to learn more about what they are experiencing or feeling. They can type in the search bar and the app tries to gather information related to it from the search engines like google, yahoo etc.., and displays them to the user.



Sequence Diagrams

Profile Edit

Here is a sequence diagram showing how the application interface interacts with the OpenEMR database.

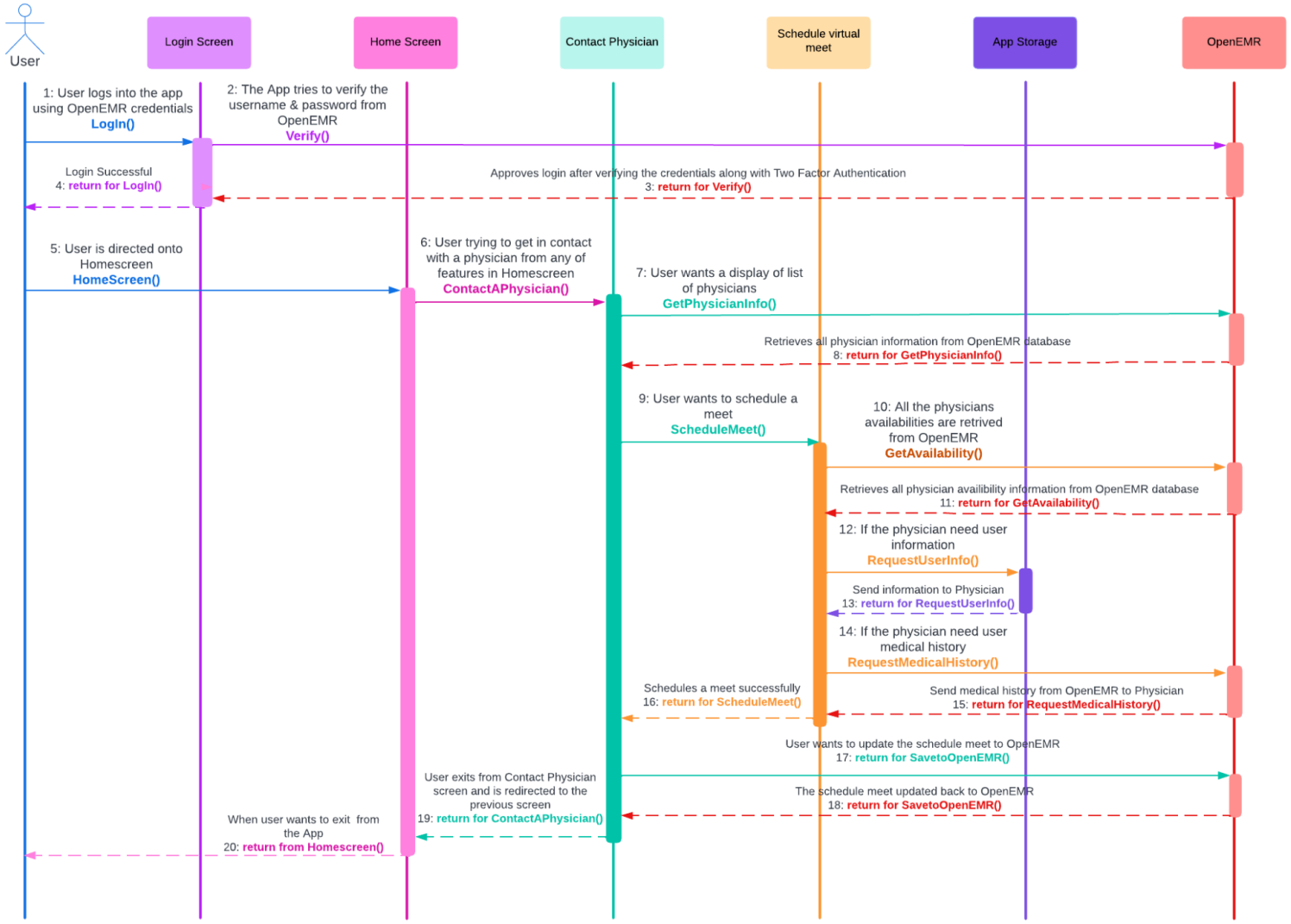


In the above sequence diagram depicts the following,

- User trying to log into the application using OpenEMR credentials
- User accessing the Profile screen through the Profile icon on Home screen
- Through the Edit option in the Profile screen, the user tries to edit their personal or medical information.
- These new changes can either be updated into the App storage through SavetoApp() or they can update or add any extra medical information to their medical records in OpenEMR through UpdateOpenEMR().
- Assuming that a Two Factor Authentication takes place during login and whenever the user tries to update/edit or access their OpenEMR data. A push will be sent to the registered mobile number that is associated with their OpenEMR Account

Contact A Physician

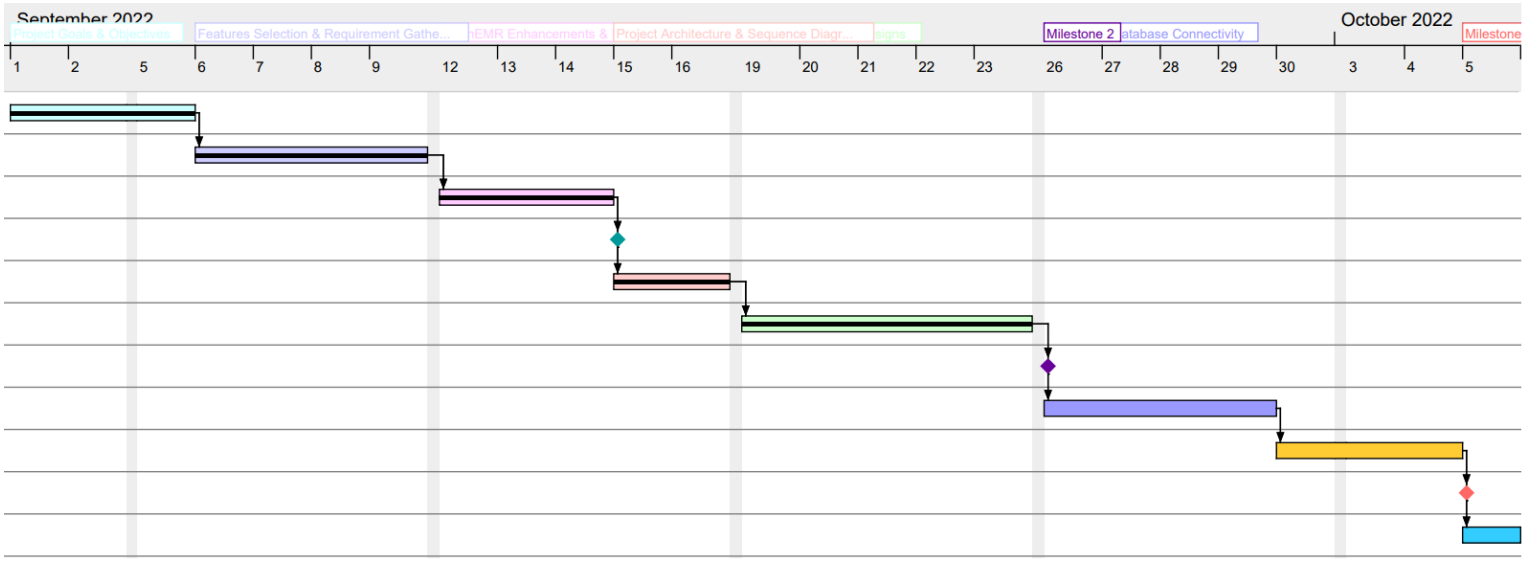
Here is a sequence diagram showing how the application interface interacts with the OpenEMR database to contact a physician.



In the above sequence diagram depicts, Users accessing the Contact Physician icon to look up for physicians on any related concern. Assuming that a Two Factor Authentication takes place during login and whenever the user tries to update/edit or access their OpenEMR data. A push will be sent to the registered mobile number that is associated with their OpenEMR Account. Whenever a physician needs to access a user's medical history or any other information from the App storage or OpenEMR database, The physician needs to request the access from the user. In this case too, we assume that the user needs to approve a two factor authentication and grant access to the physician.

Project Time Plan

Name	Begin date	End date
Project Goals & Objectives	9/1/22	9/5/22
Features Selection & ...	9/6/22	9/9/22
OpenEMR Enhancements ...	9/12/22	9/14/22
Milestone 1	9/15/22	9/15/22
Project Architecture ...	9/15/22	9/16/22
Application Screen Designs	9/19/22	9/23/22
Milestone 2	9/26/22	9/26/22
OpenEMR Database Connectivity	9/26/22	9/29/22
Any third party API's...	9/30/22	10/4/22
Milestone 3	10/5/22	10/5/22
Documentation & Furth...	10/5/22	10/5/22


September 2022
October 2022
Features Selection & Requirement Gathe...
Project Architecture & Sequence Diagr...
Milestone 2
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References

- The flow chart diagram of the application is created using Lucidchart web application which is an open source and free application for students.
    - https://www.lucidchart.com/
- Sequence diagram tutorial
    - https://creately.com/blog/diagrams/sequence-diagram-tutorial/
- All the mobile screens are designed using an open source web application called Canva. This is a free application with a set of icons and layouts for designing.
    - https://www.canva.com/
- The image used as title in Page 1 is taken from google images.
    - https://www.google.com/url?sa=i&url=https%3A%2F%2Faldianews.com%2Fen%2Fleadership%2Fadvocacy%2Faccess-cancer-treatments&psig=AOvVaw0n0ccI4No6DuaZWMG6_urM&ust=1664483665979000&source=images&cd=vfe&ved=0CAwQjRxqFwoTCODC6YSruPoCFQAAAAAdAAAAABAE
- PCOS questionnaire reference,
    - https://www.endocrineweb.com/guides/pcos/do-have-pcos-pcos-symptoms-quiz