Mobile Health EMA
Technical Specifications

Senior Design I (Cpt S 421)

Erin Mullen | Micah Jenkins | Kily Nhan | Kim Nguyen | Edwin Zheng

Mentors:
Porismita Borah
Nicole O'Donnell

Instructor:
Behrooz Shirazi

Updated Project Description

The Ecological Momentary Assessment (EMA) application will collect data from participants in real time. This application will run on cross- platforms, iOS, Android, and Window phone. It can store predefined questions. The Admin is able to send short messages to remind the participants to take the survey. If the survey has not filled out, the app also reminds the participant to take the survey with n number of times within a time interval. The participant can use the app to respond to multiple surveys in a day. Unlike other survey applications, such as SurveyMonkey or Qualtrics, this app will allow admins to send push notifications, messages, and pictures. Although a survey application may be embedded in the program, we will provide the admins with more features as well as giving the users the ability to fill out surveys offline. The app is capable of detecting any software update.

Complete List of Client and Stakeholder Requirements and Needs

The basic requirements for this project includes two interfaces- a mobile app environment for the user and a desktop environment for administrators. The user must be able to receive notifications and take surveys, while the app will send survey results to the admin when the user's device is connected to the internet. There will be at least two admin levels- one with the ability to delete data, the other without. Admins will be able to: view data on users (including survey results), download data as a CSV file, create surveys, send messages to users via push notification, schedule any messages and surveys, specify visibility of data to the user, and remove users from a study.

Broader Impacts & Considerations

This project is for health communication research involving studies on diet, exercise, smoking, etc. Results gathered from the studies done using this application can impact how doctors, researchers, health providers, etc. interact with patients. It can also change the habits of participants.

Mapping Requirements to Technical Specifications

- The project will have three different user roles:
    - Admin- access to all functionality on web-based application, ability to delete data
    - Clinician- Access to all functionality on web-based application, will not be able to delete data
    - Participant- Access to all functionality on mobile app based on the specification of the study created by clinician/admins

- Project consists of two applications:

    - Desktop web portal
        - Accessible by admins and clinicians
    - Mobile application
        - Accessible by participants
    - login to the associated account
    - respond to the surveys

- Web portal
    - Accessible by admins and clinicians via their own accounts
    - Accounts accessible via email and password
        - Will remain logged in until choosing to log out
    - Admins and clinicians will have the ability to:
        - Create, start, and end studies
        - Create, edit, and schedule surveys
        - Create, schedule, and send notifications/messages to users
        - Download survey data as CSV file
        - Set the ability for users to view their survey progress and results
        - Remove participants from a study
    - Supports concurrent studies
    - Admins and clinicians will be notified after a certain amount of time if surveys are not completed by participants
    - Runs Qualtrics (or similar survey application) that will support creation of surveys and provide data storage
    - Admins and clinicians will be able to download survey results as a CSV file
    - Displays basic statistics
        - Peak time for survey responses
        - Average response time
        - Depending on topic, can display different statistics (example: for surveys on alcohol consumption, can display average number of drinks per day)
        - Can be filterable by participant, date, time, etc.

- Mobile app
    - Compatible on iOS, Android, and Windows phones, available in all app stores
    - User accounts are password protected, but they will remain logged in, unless they choose to log out
    - User accounts are also associated with a unique ID
    - Survey data will consist of:
        - Starting and finished timestamp
        - Time taken to complete
        - Results
        - User ID
    - If the user is offline, survey data will be stored on the device until user is back online

        - If the device does not have enough memory to store the data, the user will be notified before taking any surveys
    - Survey data will be sent to the web portal associated with the admin/clinician in charge of the corresponding study
        - Sent data will be encrypted
        - After sending, the data will be deleted from the user's device
    - If allowed by the admin/clinician, the user will be able to view their survey results and progress
    - The app will notify the user and admin/clinician if the user hasn't responded to a survey in a certain amount of time (set by admin/clinician)

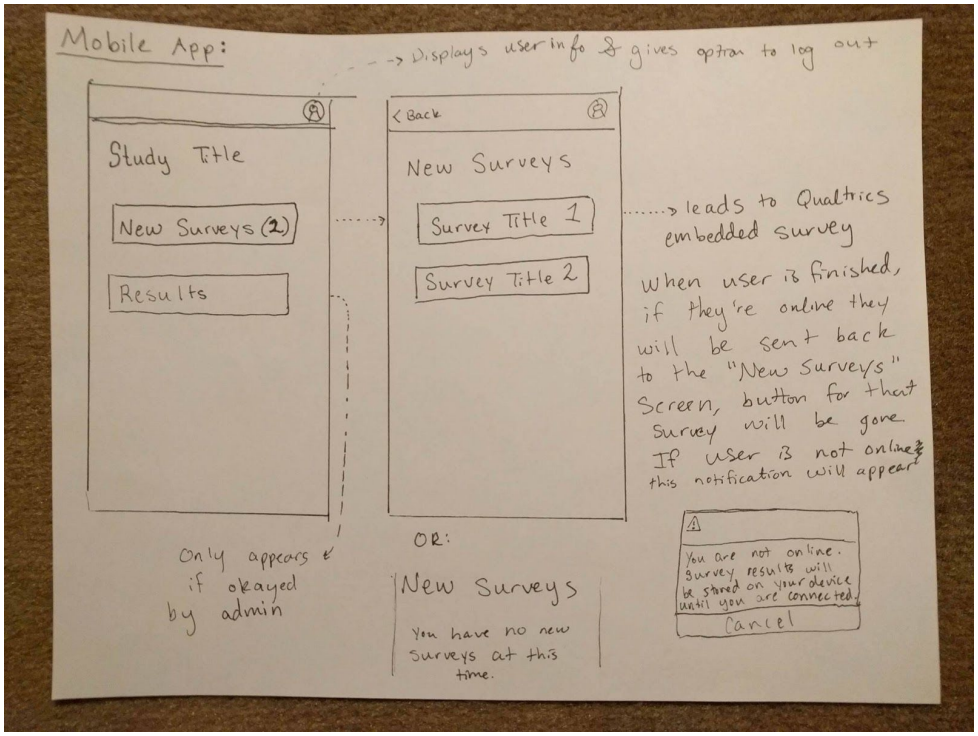
- The app will be coded using Xamarin Studio to ensure cross-platform ability
- Majority of the project will be done in C# and stored in GitHub
- Optional machine learning
    - Based on survey data for each participant:
        - Suggests best times to send notifications and surveys to participant
        - Determines which type/format of notification the user responds best to

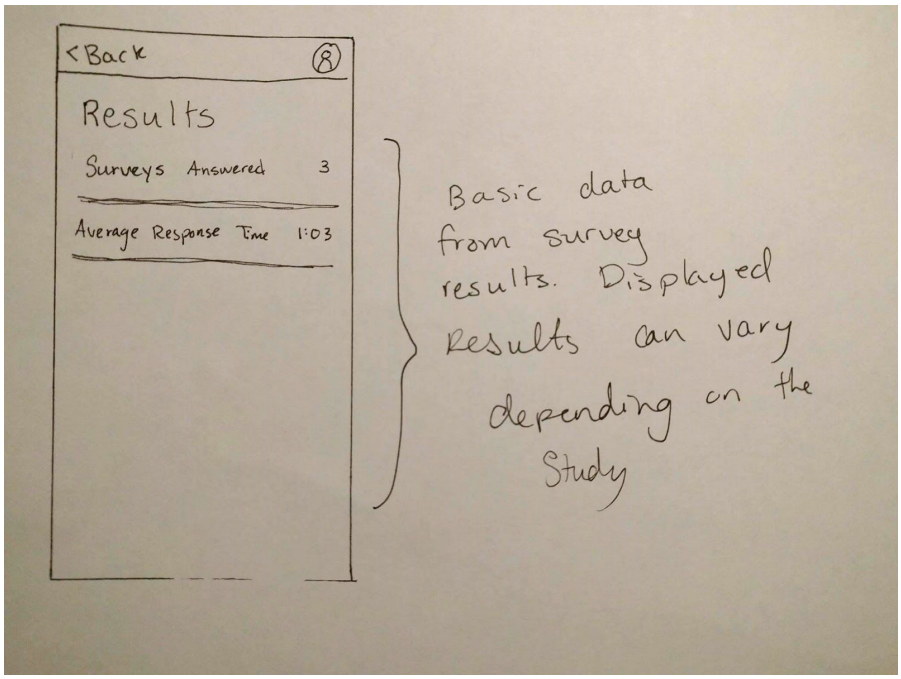
Summary of Target Technical Specifications

The app will run on Android, iOS, and Windows platforms. A desktop web-based application will also be available so that admins and clinicians can create and edit studies. User's responses will be stored and managed from their personal account. If the app is installed in user's phone, they will receive push notifications for a certain time interval. Collected data can be export to csv file so researchers can perform their study more easily.

First Draft Mock-ups

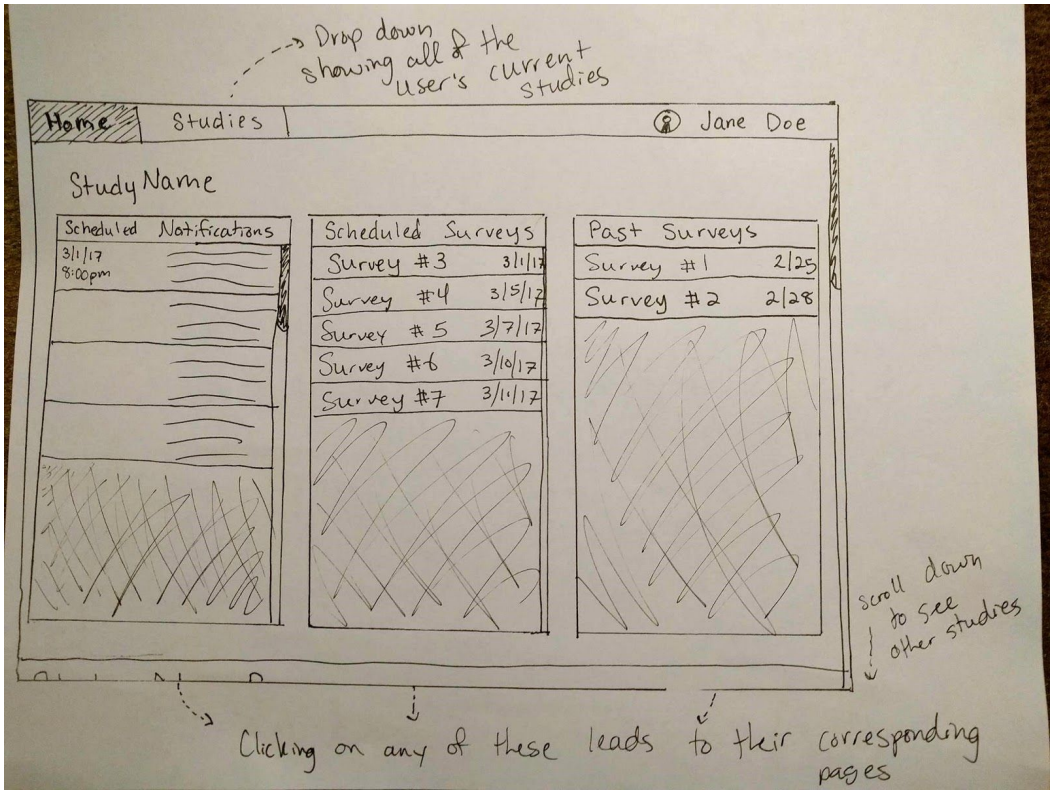
Mobile App:



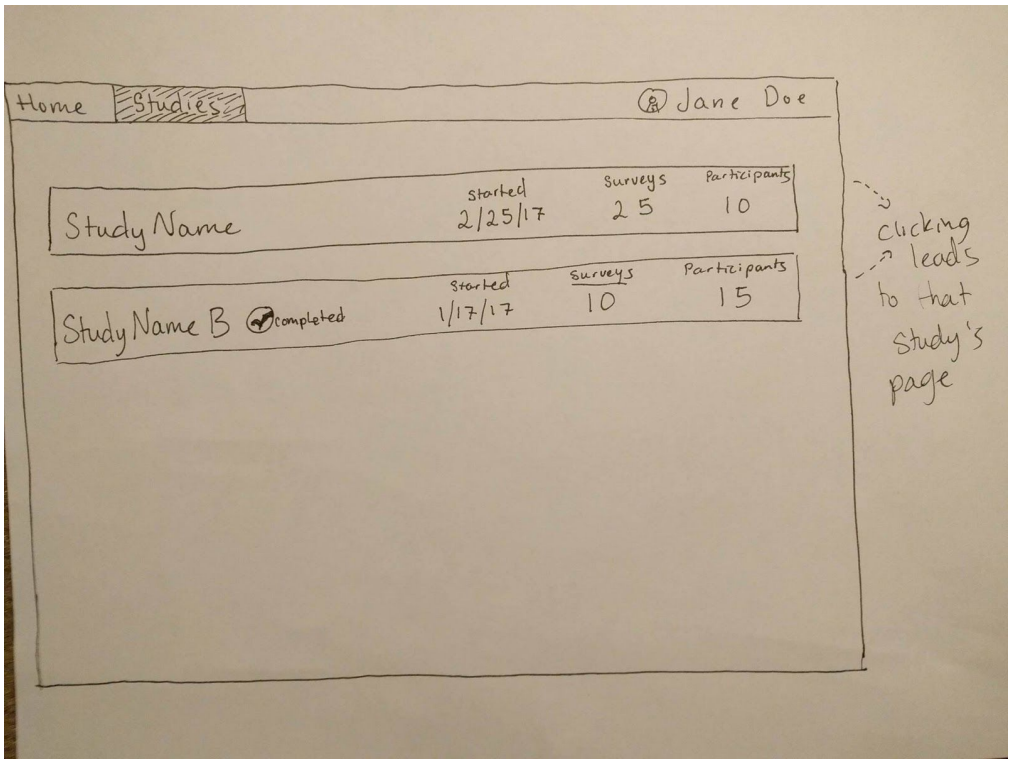


Desktop:

Dashboard (home page):



Studies page:



Study page (for a selected study):