Project Requirements Document V1

Team: Bacta Health, Project Vader

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Background

Physical therapy is often a battle between mental fortitude and physical ability. Doctors will give wildly different predictions and without a clear future you need muster the willpower to keep pushing to make what seems like negligible progress in the short window you have. Currently few or no solutions exist to motivate, engage, monitor, and assess patients in physical therapy without inpatient care or physician care. If PT stops being "medically necessary" insurance won't provide coverage and physical therapy can stop. We believe that a one stop solution to make physical therapy more effective and more affordable, especially for un-covered patients is missing. What's missing is a software to motivate the user with rewards or gamification, engage the user with prompts and reminders, monitor the user's progress and medications with smart easy-to-use tools, and assess progress using data from other users to provide best-case scenarios. The key improvement we aim to make in this domain is providing accurate predicted outcomes to users and given enough time, gamification of the experience.

Existing Solutions

Typically, physical therapy progress is tracked by consistent monitoring of pain and range of motion through check-ups with a doctor. Outside of check-ups, it is the responsibility of patients to take their medications and complete their exercises.

Currently, there are several applications that track if patients are keeping up with their exercises and medications and provide PTs with access to their progress. There are also a couple of companies, like Exer, that are utilizing computer vision to track range of motion in patients. However, there are no single-platform solutions for the issues that we are looking to solve in physical therapy.

Our vision is a central application where patients not only are able to track their progress but are incentivized to do so through some sort of rewards system or gamification of their exercises. In addition to this, we would like to use the data collected by users in order to give patients best-case scenario expectations if they follow through with their recovery plan.

Given the limited scope of the aforementioned existing solutions, it is apparent that a robust central application that utilizes a reward system and user data would be beneficial for those who are undergoing physical therapy.

Project Specification:

The goal of our project is to make a physical therapy tracker program to help those patients recover. The main users of our program are expected to be the physical therapy patients who need additional help to decide the next step therapy plan. The

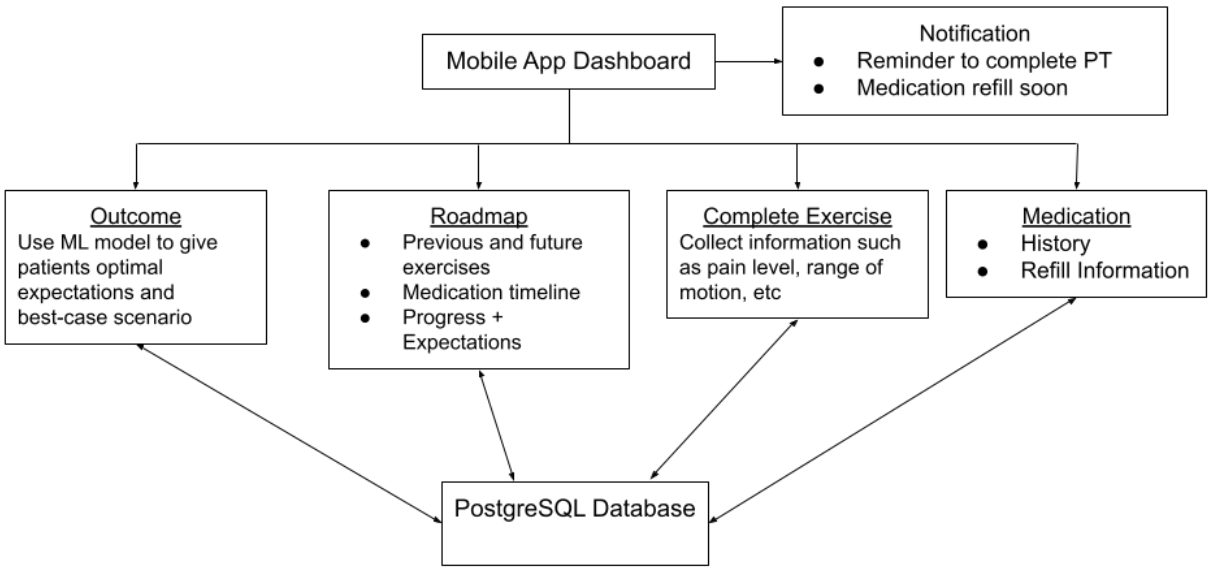
project will focus on designing a user-friendly format so that the user could easily check their current recovery progress by digitalizing and visualizing their current physical condition with minimal effort and professional knowledge. Also, the project will allow the user to communicate with other similar users to decide their following recovery plan without going to the hospital.

Our team goals are to

1. Design a data structure to store the data we get from users
2. Implement an algorithm/machine learning model to find the similar patients
3. Develop a website and a mobile app to help the patient interact with the database and track their recovery progress

Our project makes a couple of assumptions. As we need to have some initial data to do the classification, we can assume that some users have already uploaded their data to our database.

System Architecture Overview (WIP):



User Interaction + Design:

Users will first interface with the dashboard of the app. The dashboard will allow the user to do the following:

- View the Roadmap of their physical training, as well as look into the history of their exercises and any future exercises to be completed
- Complete an exercise, and upload any necessary verification if incentivized to. Other information about the exercise can be added at this stage, including level of pain, range of motion, additional notes, etc.
- Patients can view their medication history, and get refill information

Requirements (User Stories and Acceptance Criteria)

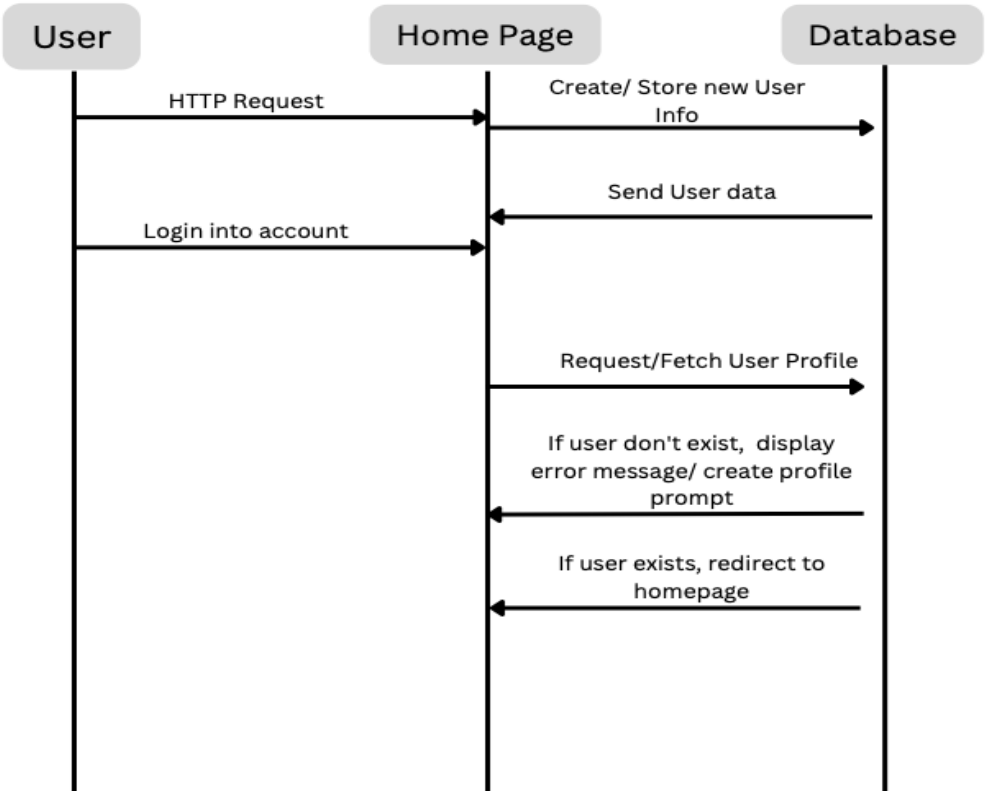
1. As a user, I want to be able to log into my account with an email address and password so I can track my progress.
2. As a user, I want to be able to track my progress in recovering by entering numerical data/metrics with pain level, flexibility with the tissue injured.
3. As a user, I want to be able to see visual representations of my progress through the use of graphs, charts, and pictures.
4. As a user, I want to be able to enter my kind of injury on the app and have it return an approximate recovery time based on other people with a similar injury.
5. As a user, I want to be able to receive PT exercises with a plan based on the injury I provide.
6. As a user, when given a set of exercises to do, I want to be able to see how the exercise is performed and the targeted muscles.
7. As a user, I want to be able to play fun games that prompt me to do the exercises given.

Non-functional Requirements

- The app should be secure so that users' profiles can only be accessed by them or any authorized personnel.
- The app should maintain data integrity and serious privacy measures so that sensitive information is not exposed.

- The app should have an organized data center and backend so that the app runs smoothly and efficiently.
- The app should be efficient and quick to load information from APIs and any visual representations(graphs, charts, pictures).
- The app should note to users the prediction uncertainty that it may have when setting a recovery timeline.
- The app should ask for the user's consent to use their data in helping other users get more accurate predictions.

System Models:



Appendices

Technologies Applied

- Frontend: Flutter/ Xcode / Dart
- Backend - ExpressJS with NodeJS
- Database - PostgreSQL via Prisma
- APIs - none yet
- User Authentication: - GoogleAuth
- Deployment platform - Fly.io