

Capstone Project Phase A 24-2-D-21

CareHub

Development of an Application for Daily
Management and Support for Parkinson's Patients

Presented by:

Omer Sommerstein
Aviram Fishman

Supervisor:

PhD Julia Sheidin

Agenda

1 Project Overview

Introduction, Parkinson's Disease Management, Problem Statement and Analyze problem.

2 Project Details

Flagship Project, Manual Management, and Related Work.

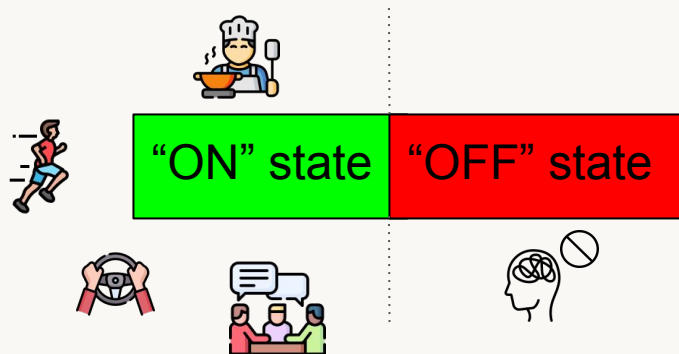
3 Technical Aspects

Project Goal, CareHub's Unique Features, User-Centered Design, System Architecture Use Case Diagram, Prototype Screens and Expected Achievements,.

Introduction

Parkinson's Disease Overview

- Parkinson's disease (PD) is a **progressive neurodegenerative disorder**, and is the second most common neurodegenerative disorder.
- It is affecting cognition and motor skills, leading to symptoms like **tremors**, **muscle stiffness**, and **slowed movement**.
- Patients experience periods known as "ON" states, where they can function normally, and "OFF" states, where their symptoms worsen and they can't perform daily activities.
- Currently, there is **no** cure, and **daily** management is crucial.



Parkinson's Disease Management

Researchers emphasize the critical role of managing daily routines for Parkinson's Disease (PD) patients. Studies show that:

- **Consistent tracking** of medication, nutrition, and physical activity can significantly extend "ON" periods.
- **Structured daily routines** help identify patterns that improve symptom control.
- **Active monitoring of symptoms** allows for early interventions and adjustments.
- **Proper management** improves not only motor symptoms but also non-motor symptoms such as mood, sleep, and cognitive function.

By efficiently managing their daily activities, PD patients can experience better outcomes and a more balanced lifestyle.

Problem Statement

Challenges Faced by Patients

Manual Tracking

Patients rely heavily on manually tracking their medication, diet, and physical activity to manage their "ON" state, while others do not.

Traditional methods

Traditional methods, like Excel or Google Sheets, lead to errors due to cognitive challenges such as memory loss in some cases.

1

Analyze problem

Fact

A Parkinson's patient experiences cognitive issues that **impact memory**.



Effective Parkinson's **disease management** relies on accurate documentation of patient experiences and symptoms.



Caregiver derives **insights** from the Parkinson's patient documentation to create a personalized treatment plan.



Flagship Project

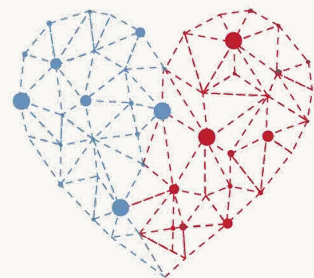


Importance of the Development

This flagship project at Brauda College focuses on developing innovative engineering solutions for individuals with disabilities.

At its core, the project aims to **improve the quality** of life for those facing physical challenges.

Michael Jackont, a person living with Parkinson's disease, is an integral partner throughout the entire process, providing valuable insights and feedback to ensure the solutions meet real-world needs.





Manual Management

Example by Michael Jackont

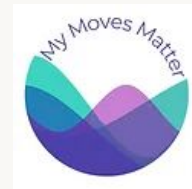
The table shows how most of PD patients manage their daily schedule.

יום	שני	רביעי
תאריך	25-דצמ	26-דצמ
שעה	7	7
מספר דופיקר	2.83	2.67
זמן ממוצע בין כדורים	06:00	07:05
07:30	מעדן סויה טבעי עם גרסלה	07:10
		07:30
		07:45
08:20	קפה	08:15
08:45	דופיקר	09:55
09:00	נשינה לטבריה למפגש העמותה	10:00
09:25	ירקות חתוכים	10:20
10:00	מפגש העמותה	10:45
10:15	חצי פיתה עם אבוקדו	11:00
10:45	חצי פיתה עם אבוקדו	11:40
11:30	דופיקר ונשינה הביתה	11:45
12:15	ירקות חתוכים	12:10
13:30	ספגטי ברוטב עגבניות וטופו	12:35
		13:10
		14:00
		14:10
14:20	דופיקר	14:20
14:50	מעדן סויה ונל	15:10
15:00	חצי תפוח, הלמנט'ש'יה	16:20
16:15	חצי פיתה עם חמום מלפז ופסטרמה	6
16:35	דופיקר	16:40
17:00	קצת קשיו	17:10
17:35	שורותם	
17:55	נשינה לאימון	17:20
18:10	דופיקר	18:15
18:20	ירקות חתוכים	18:25
18:40	רבע פיתה עם אבוקדו	18:45
19:00	אימון לקבוצת 5פ	19:00
20:25	סיום אימון 4.5פ	20:15
20:35	דופיקר	20:20
20:40	ירקות חתוכים, רבע פיתה עם אבוקדו, חצי פיתה עם חמום פסטרמה ונלפז	20:50
21:05	נשינה חזרה הביתה 5פ	21:40
22:05	קצת צמקים וקשיו	21:55
22:30	מקלחת	22:20
22:45	רבע דופיקר סימט לעוס	22:45
23:00	לילה טוב	23:15
04:00	רבע דופיקר סימט לעוס, 6 עוגיות מאפיות	02:30
07:00	קומה	03:15
		06:50

Related Work

Existing Solutions in the Market

We reviewed existing applications such as strivePD, MyTherapy, and MyMovesMatter.



They offers:

- ✓ Logging symptoms.
- ✓ Medication reminder.

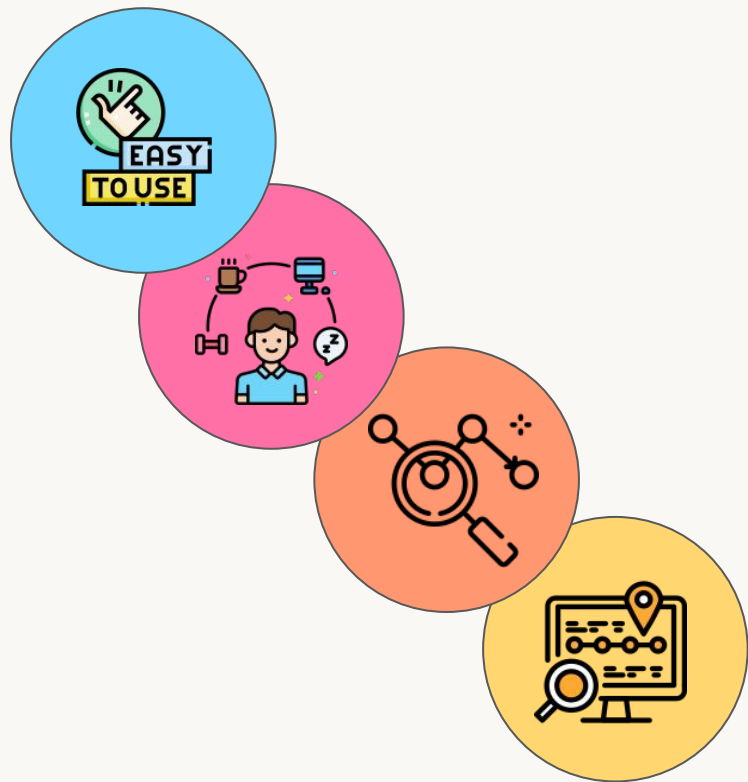
They **Don't** offers:

- ✗ Clinical Integration.
- ✗ User-Friendly Design.
- ✗ Incomplete Features

Project Goal

CareHub: A Technological Solution

- ✓ Easy-to-use platform.
- ✓ Log daily activities.
- ✓ Tracking symptoms.
- ✓ Generating insights (graph)



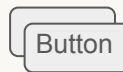
CareHub's Unique Features

Key Features of CareHub

CareHub was designed with Parkinson's patients in mind, offering:



Graphical data visualization
for easy understanding of
patterns.



Simple data entry
through large buttons
and built in data.



Integration with caregivers.



Real-time symptom
tracking.



Logging of nutrition,
physical activity, and
medication.

User-Centered Design

Designing for Accessibility

Interview:



3 X Parkinson patient



Masseur



Dietication



Table tennis trainer

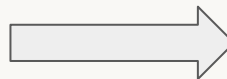


Therapist

User-centered design approach:

UCD

Name	
Role	
description	
Goals	
Needs	
Scenario	



Accurate Requirements.

Functionality.

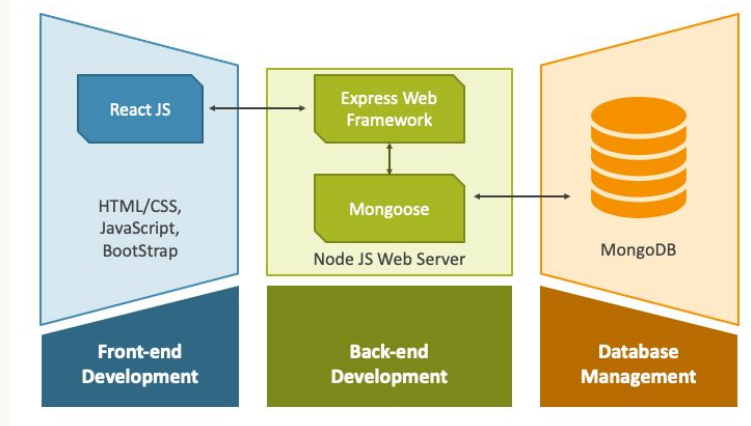
Easy to use.

System Architecture

Technical Overview

The application will be built using the MERN stack (MongoDB, ExpressJS, React, and Node.js).

The system is a web-based solution that is accessible from multiple devices, allowing patients and caregivers to log and view data in real-time.



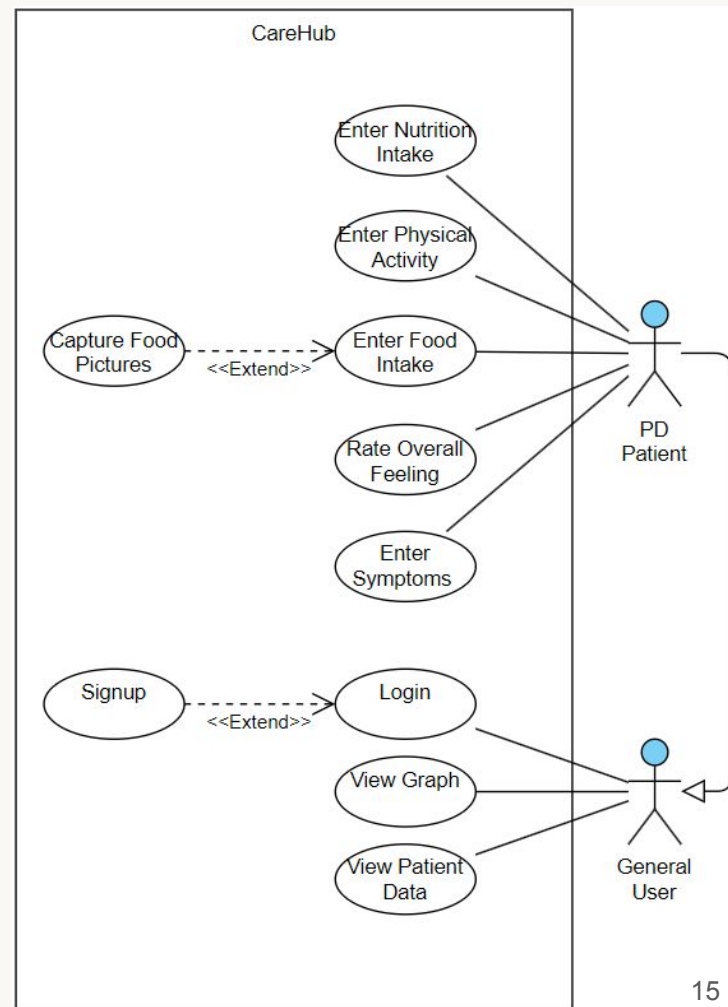
Use Case Diagram

How CareHub Works

This diagram shows how Parkinson's patients interact with the app.

They can input data like physical activity, nutrition, and symptoms.

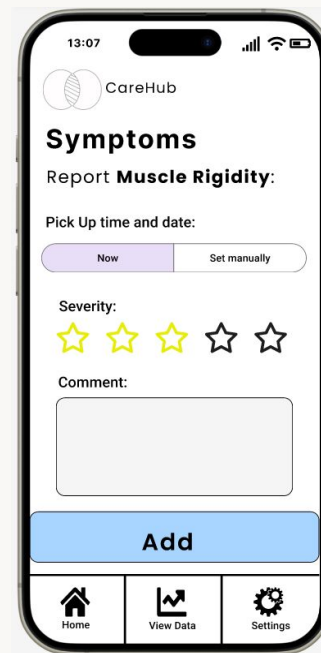
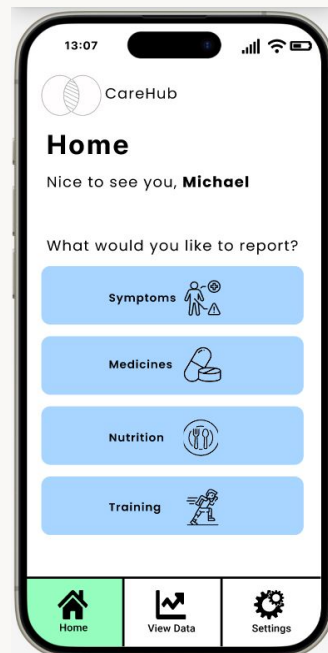
Caregivers can view the data and make informed decisions about care routines, improving the quality of life for the patient.



Prototype Screens

Prototype Screenshots of the App

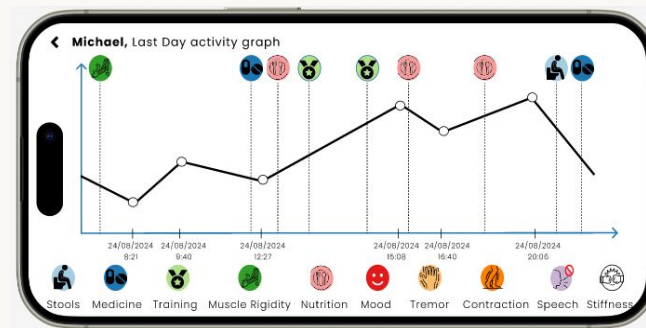
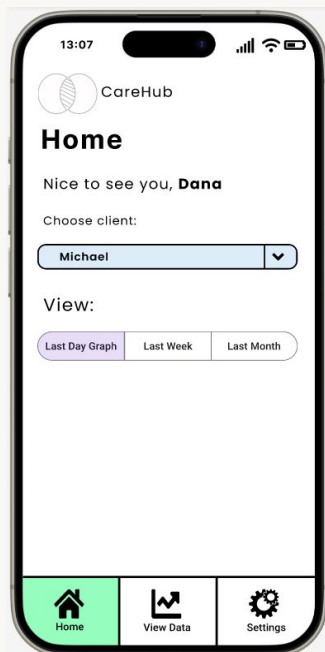
Parkinson's patient screens:



Prototype Screens

Prototype Screenshots of the App

Caregiver screens:



Expected Achievements

Project Outcomes

We expect CareHub to become a valuable tool in managing Parkinson's disease by:



Reducing the **cognitive load** on patients when entering data.



Improving **communication** between patients and caregivers.



Providing valuable **insights** through graphical data for better care decisions.

Q&A

Feel free to ask any question!

Thank You 🤔

