SPACE NAV

In collaboration with TCS

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What is Space Navigator?

- A 2D therapeutic game for individuals with **cerebral palsy**
- Helps improve **gross motor control**, **spatial awareness,** and **core stability**
- Uses **tilt-based** mobile controls for rehabilitation exercises

What is the purpose of this game?

- **Traditional therapy** can be repetitive & **demotivating**
- Many rehabilitation tools **lack engagement & accessibility**
- Patients need fun, interactive ways to **stay consistent** with therapy
- Space Navigator **gamifies rehabilitation** using motion controls

How does it work?

- Users place their phone in a **3D-printed ring holder**
- **Tilting** the phone moves the spaceship
- Users follow **movement patterns** (circular, zigzag) to complete exercises
- The game **tracks progress** & provides feedback

What are the product features?

- Tilt-Based Controls
- Therapeutic Exercise Patterns
- Progress Tracking & Feedback
- Customizable Difficulty
- HyperIMU Data Streaming
- 3D-Printed Ring Holder

What are the user classes?

- **Primary Users:**
  - Cerebral palsy patients (children & young adults)
- **Secondary Users:**
  - Stroke survivors
  - Parkinson’s disease patients
  - Older adults
  - Therapists & caregivers
  - General users (for light motor exercises)

What are the system requirements?

Hardware:

- Mobile phone with an accelerometer & gyroscope
- 3D-printed ring holder for device stabilization
- Computer System

Software:

- Developed using Godot Engine
- Uses HyperIMU for motion tracking

Platforms:

- Web-based game (PC, Android, iOS)

What are some important system features?

Tilt-Based Motion Control

- Navigate a spaceship with real movement

Therapeutic Patterns:

- Circular & zigzag paths for motor skill improvement
- "Hold Steady" challenges for stability training

Gamified Elements:

- Collecting stars
- Real-time performance feedback

Monitors:

- Movement accuracy
- Exercise completion rate
- Session duration

Reports for Therapists

- Tracks patient progress & adjusts therapy as needed
- Customizable exercises based on performance

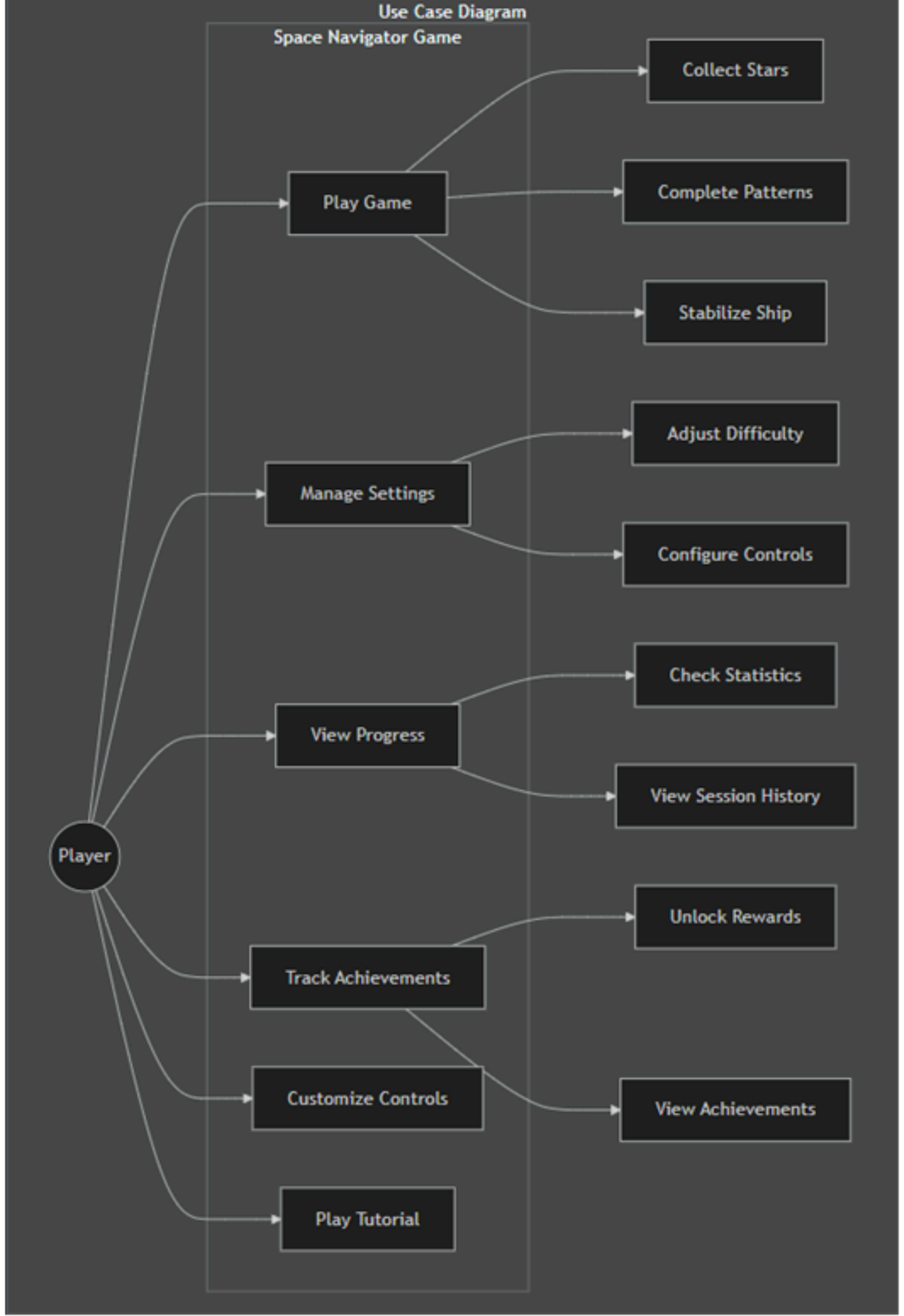
What Challenges are we facing?

- Cross-Platform Compatibility
- Motion Sensor Dependency
- Latency Issues
- Network Dependency
- Network Protocols

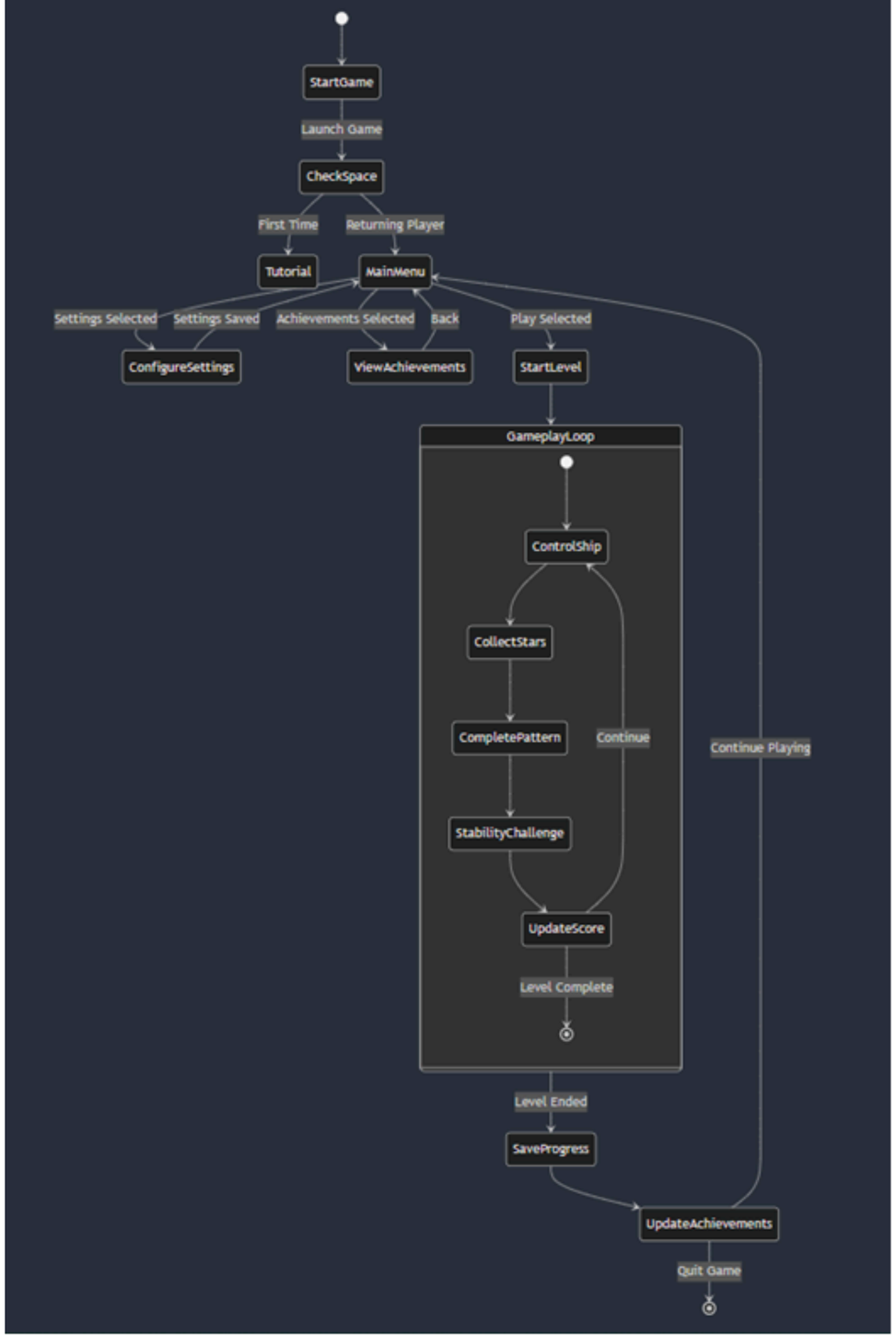
What are the Functional Requirements?

- **User Registration and Login:** Users(therapists and patients) can register via third-party-authentication (e.g., Google).
- **Game Setup and Calibration:** One-time setup of 3D printed ring holder used for Goo
- **Security:** Secure storage along with parental and privacy controls
- **Usability:** Simple and Minimalistic interface which is comprehensible to all end-users

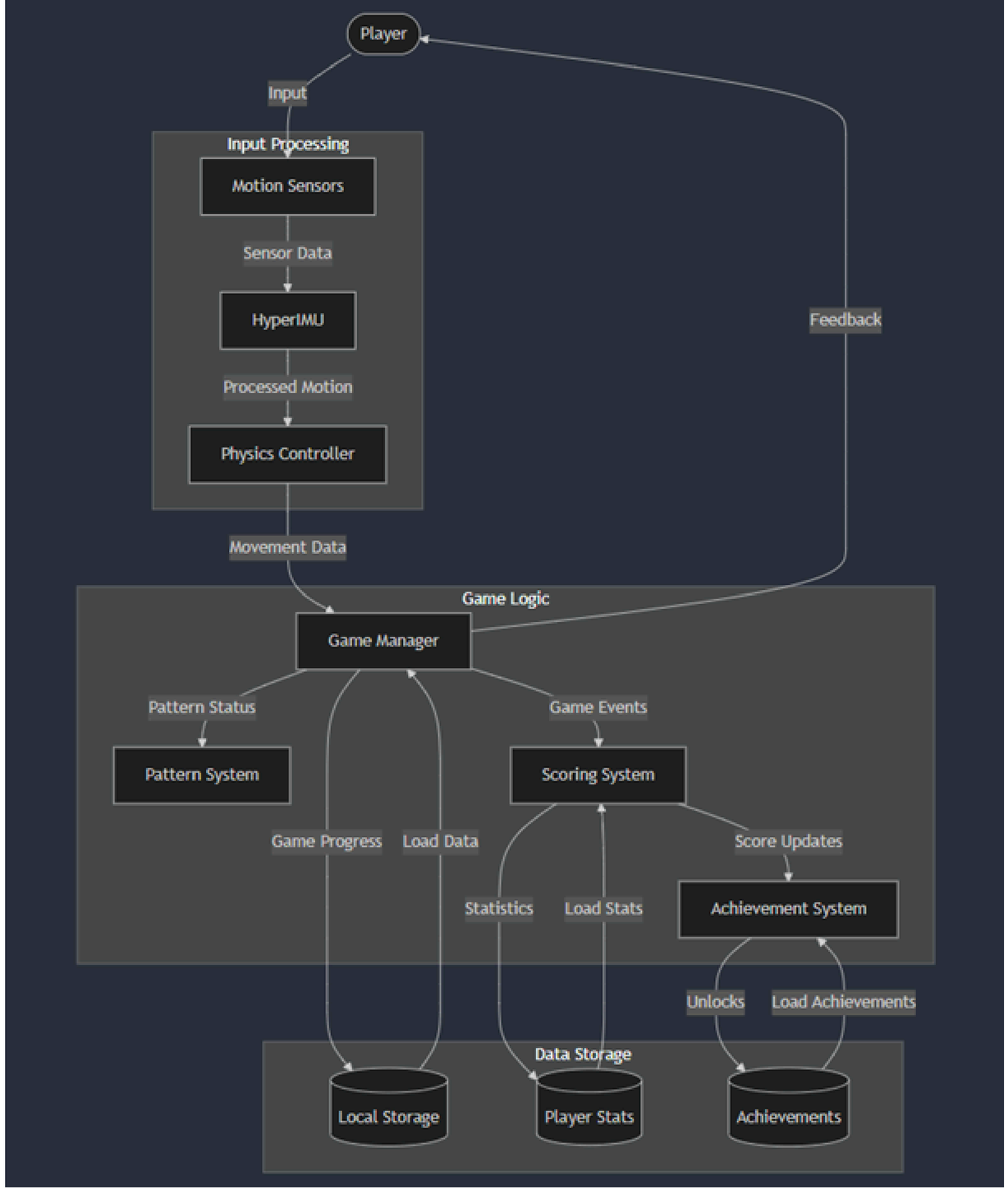
Use Case Diagram:



Activity Diagram:



Data Flow Diagram:



What are the Non-Functional Requirements?

- **Game Response:** 30 ms input lag and 60 FPS minimum for smooth gameplay
- **Game Accuracy:** Stability detection and calibration
- **Player Comfort:** 3D printed ring which provides better ergonomics and comfort
- **Gameplay Balance:** Various difficulty levels and progression

What is the Test Plan?

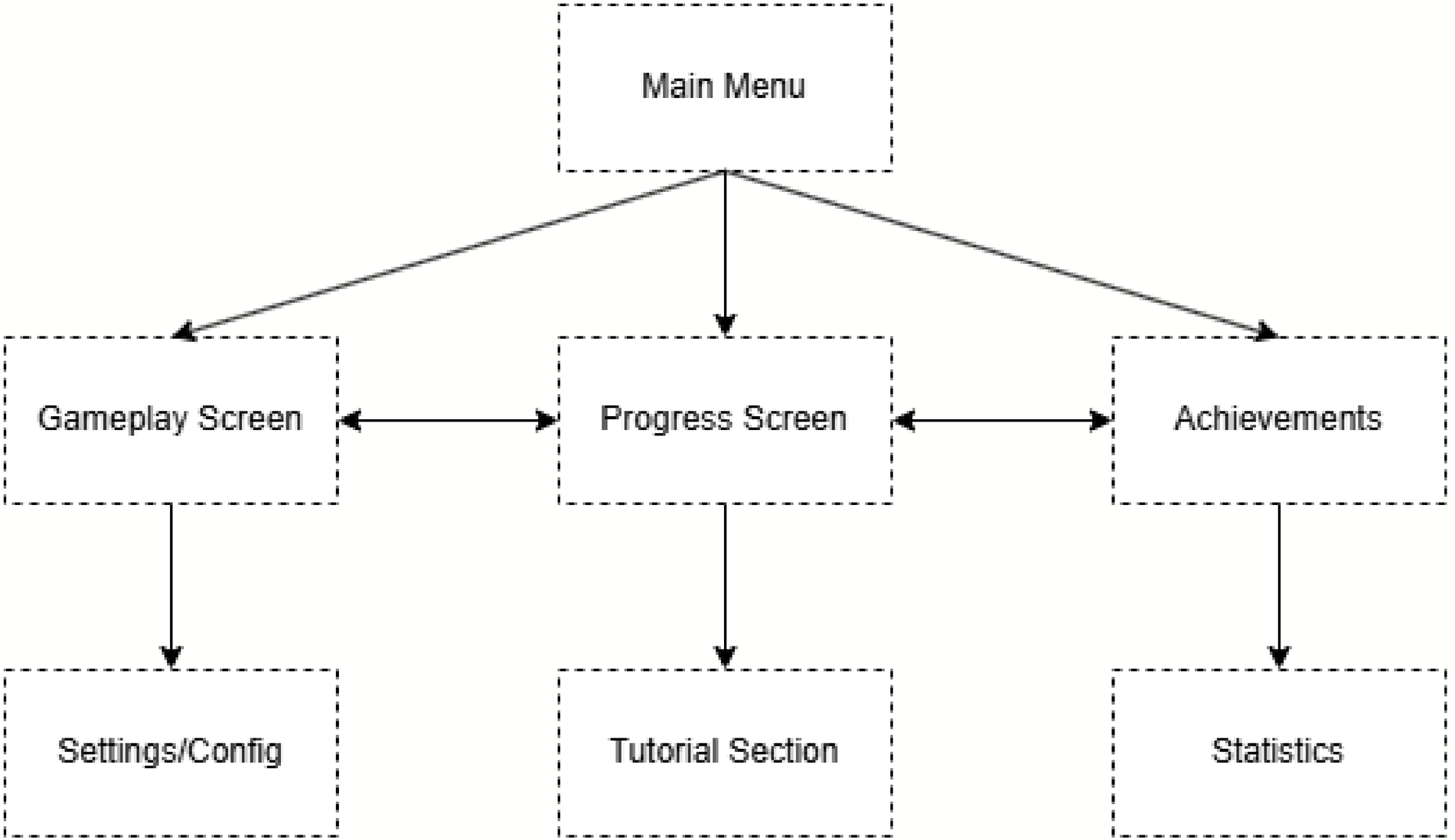
- **Unit Testing:** Motion sensor detection and UI responsiveness
- **Integration Testing:** Motion tracking with HyperIMU and Data Streaming
- **User Testing:** Conduct trials with rehabilitation patients and therapists

How does the user interface look?

- **Main Menu:** Start game, view progress, testing
- **Gameplay Screen:** Space themed interface with spaceship for tilt mechanism
- **Progress Screen:** Display movement accuracy and session reports

- **Achievements:** Level information and completion progress
- **Statistics:** Data for Therapists
- **Tutorial Section:** For first-time and returning users
- **Settings/Config:** For adjusting sensitivity levels and accessibility

Block Diagram:



In a Nutshell..

- Space Navigator turns rehabilitation into an **engaging experience**
- Encourages consistency in therapy through gamification
- **Accessible**, **customizable**, and data-driven for real **progress tracking**
- Brings innovation to physiotherapy & **rehabilitation**

Thank You