



# REPLAY: INTERACTIVE REHABILITATION SYSTEM WITH REAL-TIME AI FEEDBACK

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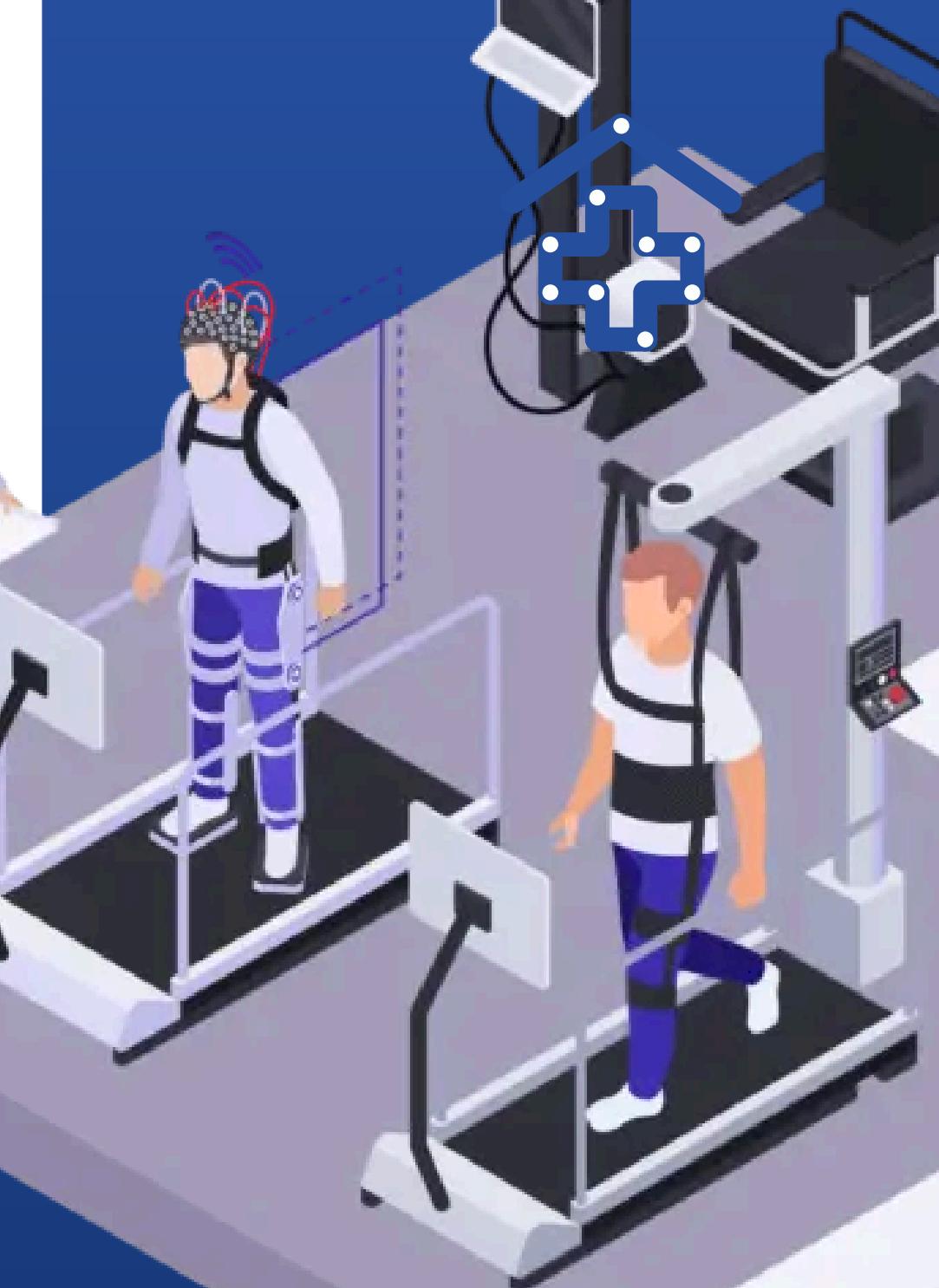
# Agenda

- Problem Statement
- Proposed System
- Dataset & Tools
- Methodology
- Implementation
- Future Enhancements



# Problem Statement

Rehabilitation exercises for patients recovering from injuries or surgeries are often repetitive, monotonous, and difficult to sustain, leading to poor adherence and incomplete recovery. Patients in remote or underserved areas also struggle with limited access to professional rehabilitation facilities. There is a pressing need for engaging, interactive, and accessible rehabilitation solutions that not only motivate patients but also enable therapists to remotely monitor progress.

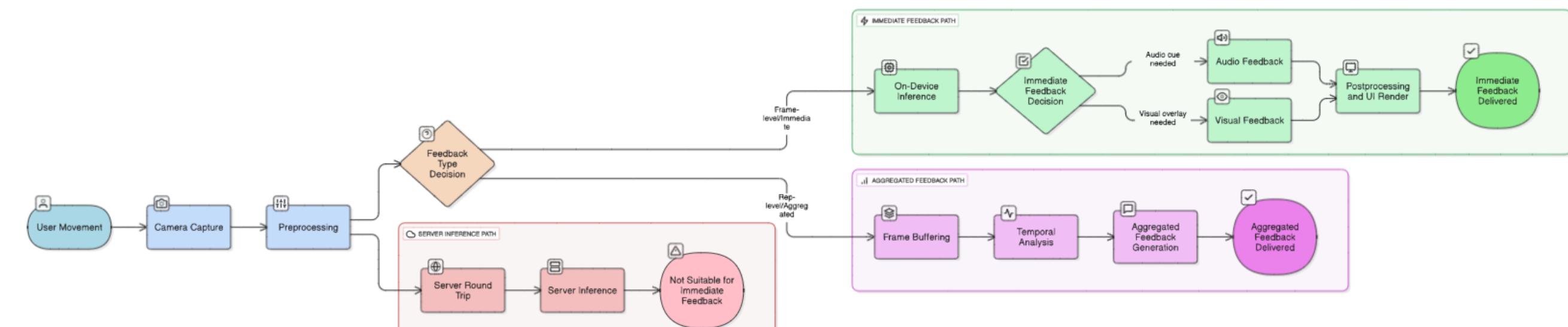




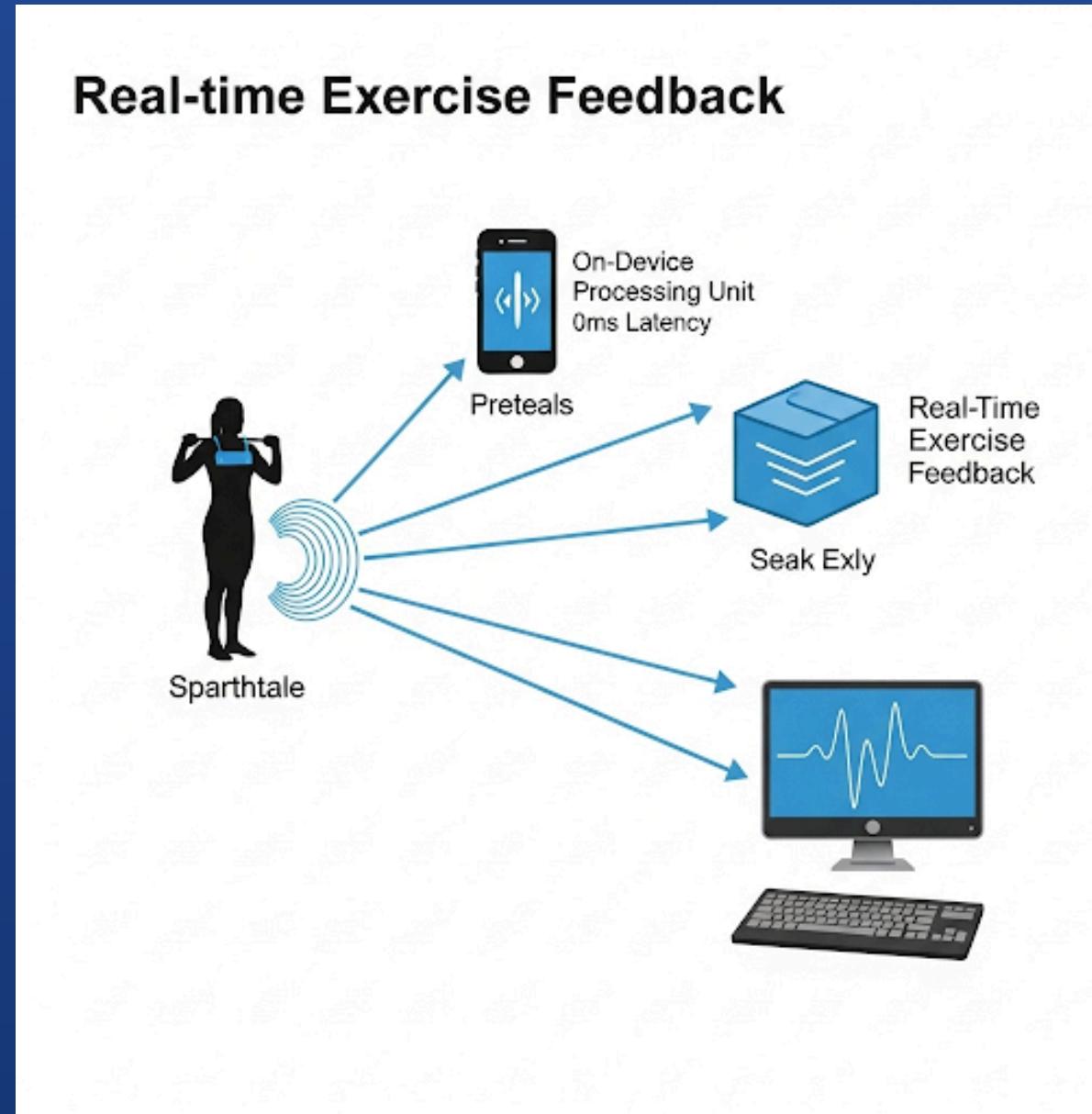
# Proposed System

The proposed system, Pose2Heal, is an AI-driven gamified rehabilitation platform that uses computer vision and pose estimation to guide patients through physiotherapy exercises. It transforms routine, repetitive exercises into engaging, game-like activities while enabling remote monitoring by doctors/therapists.

- Input Layer (Camera/Video Feed)
- Processing Layer (Pose Estimation + Exercise Recognition)
- Gamification Layer (Motivation & Engagement)
- Monitoring Layer (Doctor/Patient Dashboard)



# Tools and Framework

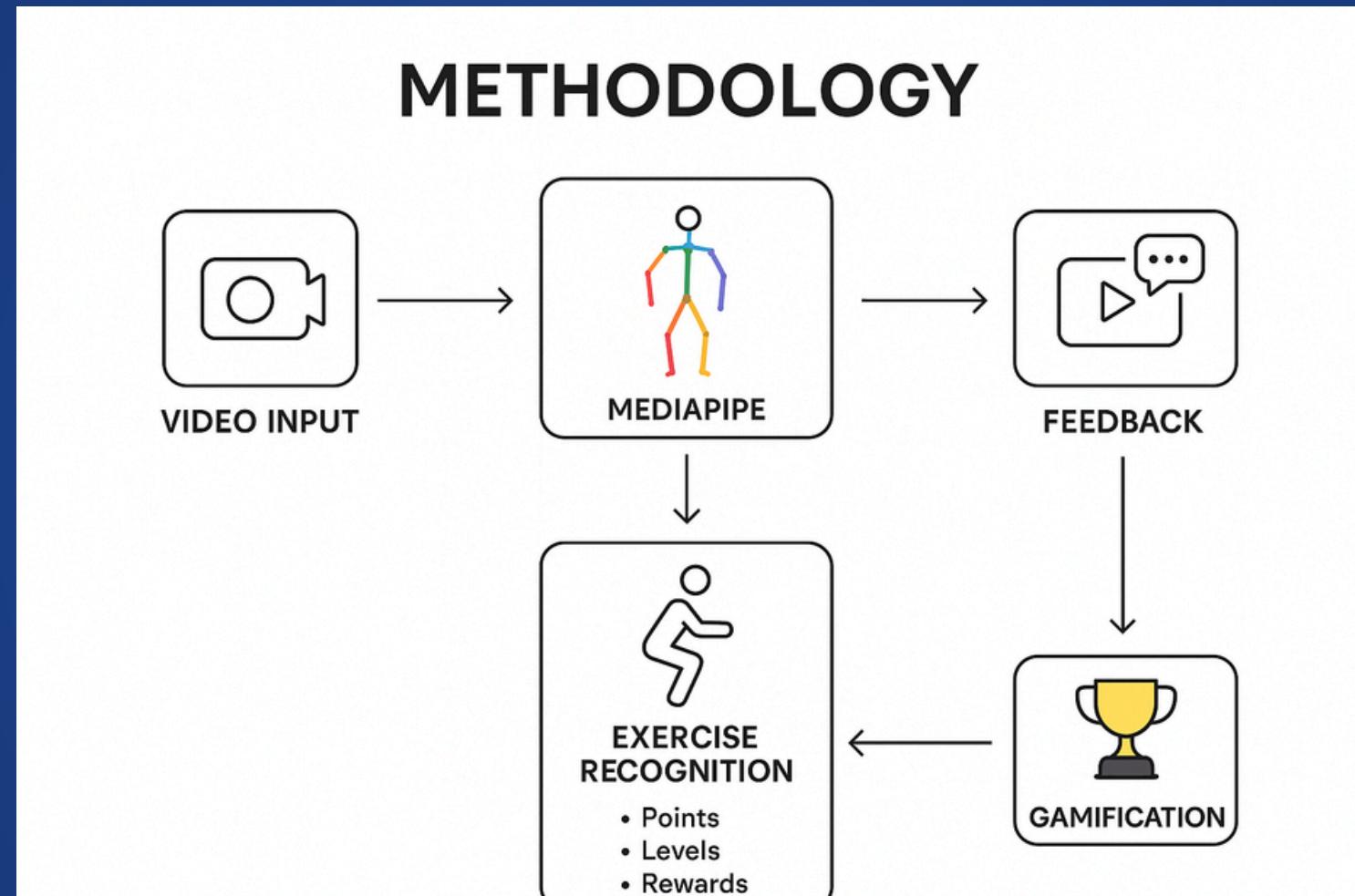


- Frontend:
  - Website for patient interface
  - WebRTC or similar for video streaming
- Pose Estimation:
  - MediaPipe Pose (Google) → lightweight, real-time skeletal tracking
  - Alternative: OpenPose or MoveNet (but heavier compared to MediaPipe)
- Gamification Layer:
  - Unity / Godot (if making interactive games)
  - Or integrate simple scoring logic in frontend
- Backend:
  - Python (Flask/FastAPI) for managing patient data & analytics
  - Database: PostgreSQL / Firebase for logs & progress storage



# Methodology

- User Setup: Patient logs into the system (desktop/mobile).
- Exercise Session: Camera captures live feed → Pose estimation extracts skeleton.
- Real-Time Feedback: System validates posture & repetitions, gives instant correction tips.
- Gamification: Points, stars, and progress bars update live.
- Data Storage: Session data stored in a backend database.
- Dashboard Access: Patients view progress → Doctors remotely monitor trends.





# Future Enhancements

While the proposed system currently focuses on gamified rehabilitation using MediaPipe for real-time pose detection, future enhancements could include AI-driven personalization, AR/VR integration, wearable data fusion, advanced analytics dashboards for doctors, and tele-rehabilitation support. These improvements would make the system more immersive, clinically robust, and scalable.

01

**AI-driven Personalization**

- Use machine learning to learn patient progress patterns and auto-adjust difficulty levels of exercises.

02

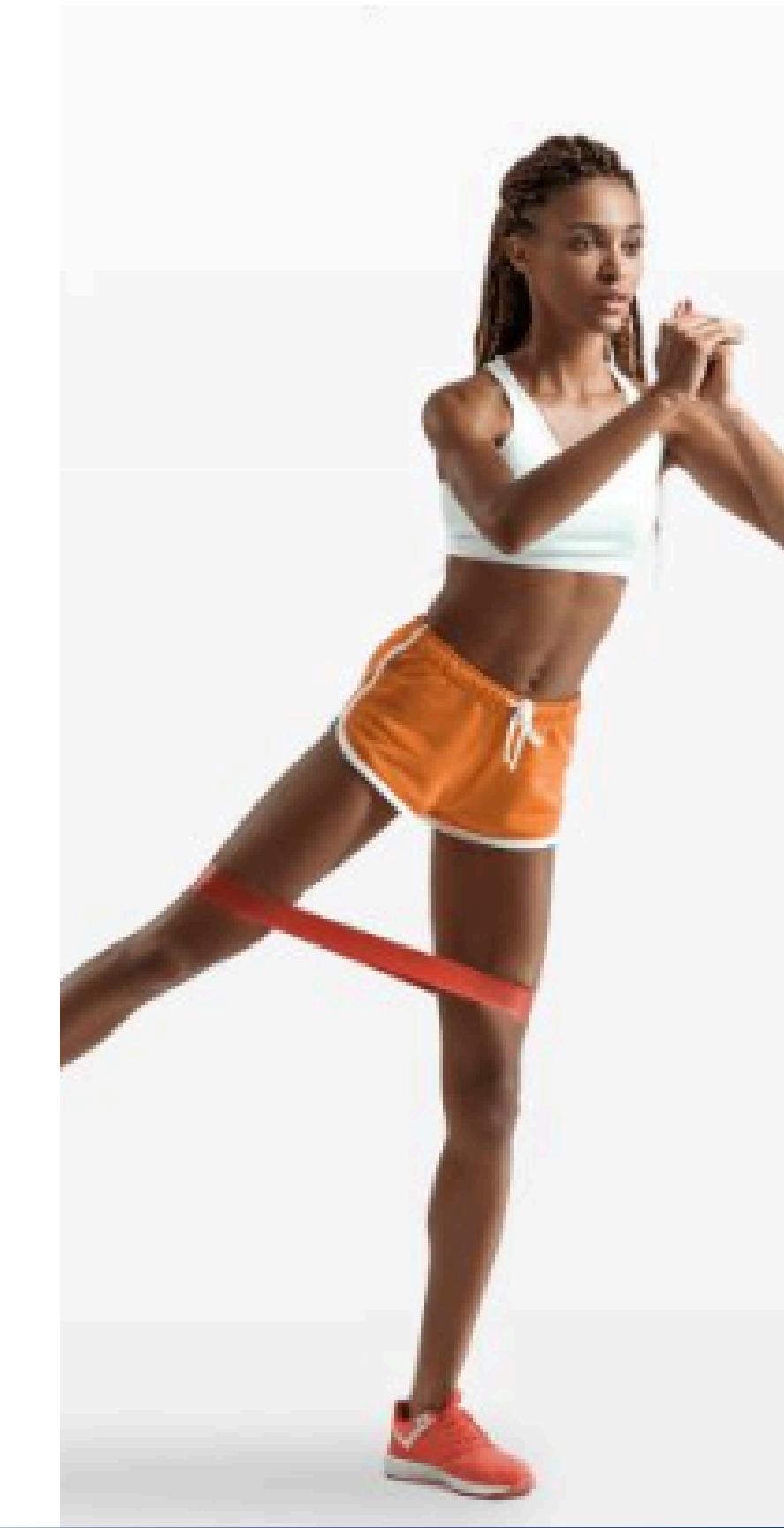
**AR/VR-based Immersion**

- Extend gamification into Augmented Reality.

03

**Progress Analytics Dashboard for Doctors**

- Long-term visual progress tracking (graphs, heatmaps of body motion)



Thank  
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