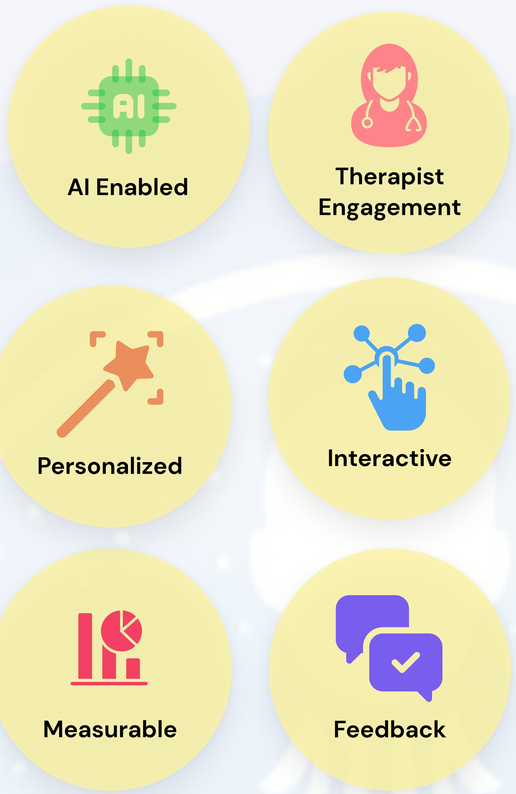
Physio AI Companion

Your AI Guide to Physical Rehab

UC San Diego
Jacobs School of Engineering
MAS DSE 2024 Capstone Project

ABSTRACT

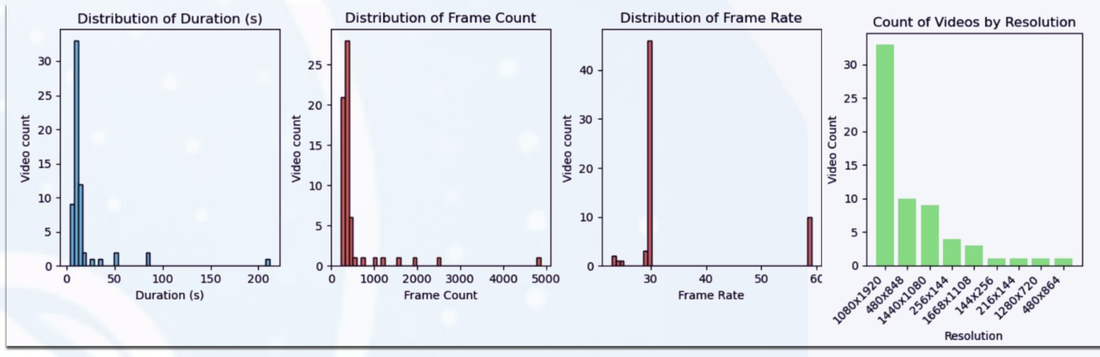
Physical Therapists (PT) and Kinesiologists recommend a series of exercises but often face challenges in continuously monitoring individuals performing exercises to ensure correct postures and prevent injury aggravation. This research attempts to address this issue by building a product designed to automate the detection of the incorrect biomechanics during exercises and provide users with timely feedback. The research effort began with a set of curated exercise videos, a set of biomechanical standards as well as developing a core model to analyze a single exercise - overhead squat. The work uses computer vision models and computational algorithms for a customized solution. The results from the core model are used to provide feedback to both practitioners and users through visual overlays on the exercise video and graphical presentation of biomechanical measures captured during the exercise.



OUR MOTTO

- Increase the effectiveness of health assessments
- Increase the effectiveness of unsupervised exercise
- Increase the practitioner's visibility on exercise programs' effects on their client base

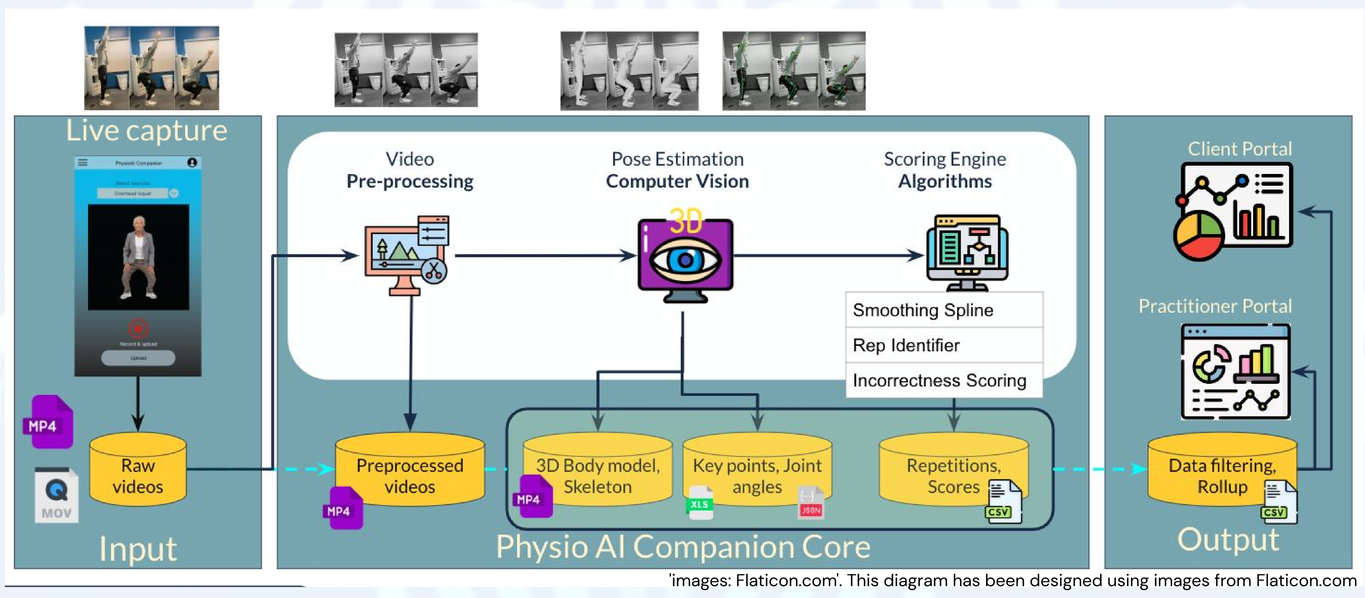
Video Data Summary



DATA PIPELINE

How we do it:

- Efficient and scalable data handling by preprocessing of videos
- 3D pose estimation and feature extraction with state of the art computer vision model
- Automated repetition identification
- Incorrectness scoring backed by biomechanical standards



'images: Flaticon.com'. This diagram has been designed using images from Flaticon.com

Features:

- Easy to use exercises video capture User Interface
- Timely, measurable biomechanical feedback through Client Portal
- Comprehensive analysis through Practitioner Portal

OUR DASHBOARD

Client Portal

Repetition	Incorrectness/Correctness Score	Body Part	Peak Value
1	0	Right Knee	95.09
5	0	Right Knee	90.2
10	0	Right Knee	90.83

Practitioner Portal

MEET THE TEAM

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LET'S THANK!

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