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# Development of an AI-Assisted Postoperative Rehabilitation System: Posture Analysis, Motion Scoring, and Real-Time Mobile Feedback Application

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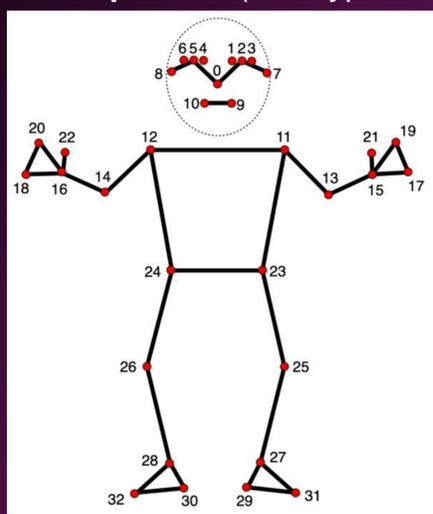
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## Background

- The aging population increases demand for postoperative rehabilitation.
- Traditional rehab requires frequent hospital visits and lacks real-time guidance.
- Goal: an AI-based system for real-time posture monitoring, corrective feedback, and scoring, integrated into a mobile app.

## Datasets

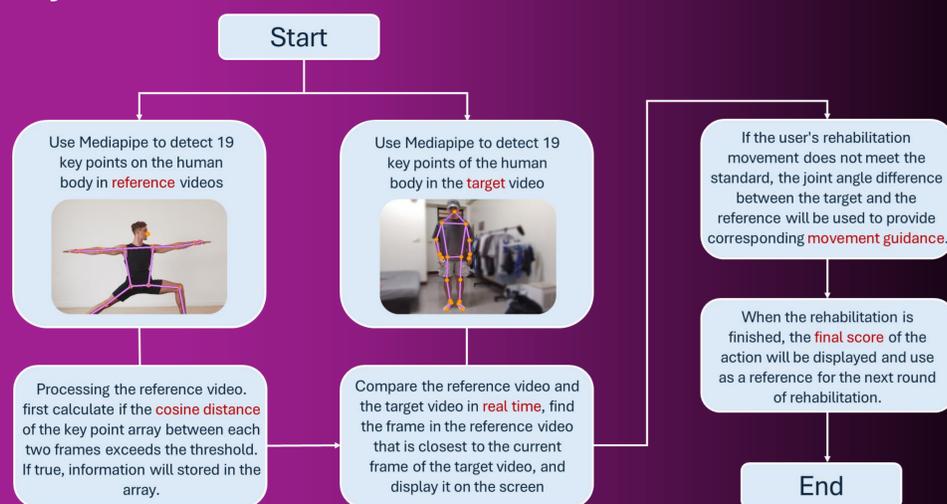
- Reference rehab videos processed with **MediaPipe Pose** (33 keypoints).



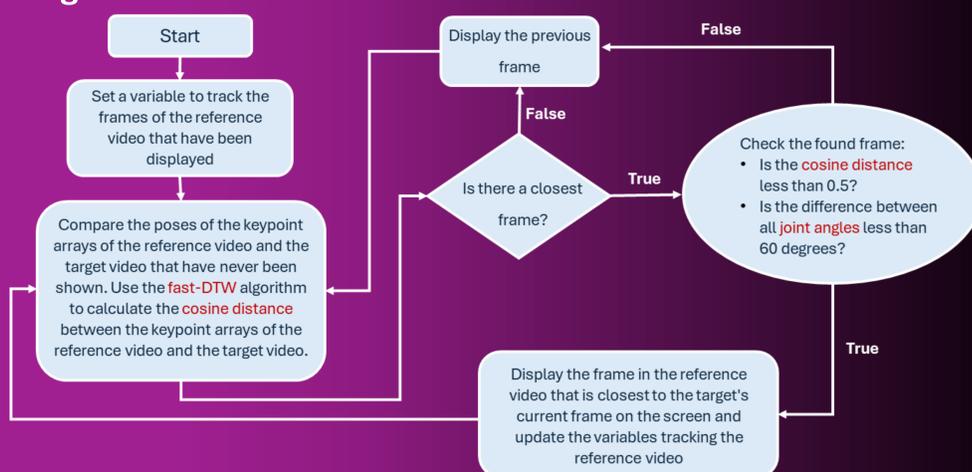
- Preprocessing selects representative frames using cosine distance.
- Input: skeletal coordinates & joint angle sequences; Output: real-time patient data for comparison.

## Methods

- **MediaPipe**: real-time skeleton detection.
- **FastDTW**: sequence alignment between user and reference motions.
- **Feedback**: corrective arrows for deviations; scoring based on similarity.
- **System Integration**: cross-platform app via Kivy and packaged as Android APK.
- **Multi-language Support**: interface and feedback available in multiple languages (e.g., English, Chinese), improving accessibility for diverse users.
- **System Workflow**:



- **Algorithm workflow**:



## Results (Expected/Preliminary)

- Accurate skeleton detection and motion alignment in real time.
- Features: immediate corrective feedback, quantitative scoring, progress tracking.
- Mobile app enables accessible, at-home rehabilitation.
- Multilingual usability: patients and therapists from different regions can use the same system.
- Potential to reduce therapist workload and improve patient recovery safety.

## Actual machine effect:

