group 7

Technical Presentation : Yoga Master Project

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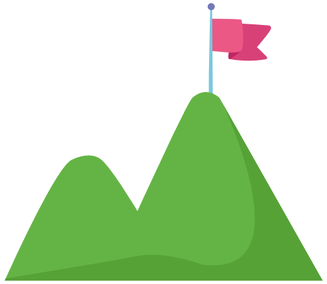
Project Objectives



01

Yoga Pose Recommendation Engine:

A user interface for selecting yoga goals (e.g., flexibility, relaxation) and physical conditions.
A backend recommendation system that suggests yoga poses based on the user profile.

02

Pose Estimation Module:

Integration of a pose estimation model to analyze uploaded photos and extract key body points.
Extract key joints and set thresholds to compare the user's pose with standard poses

03

Pose Comparison Algorithm:

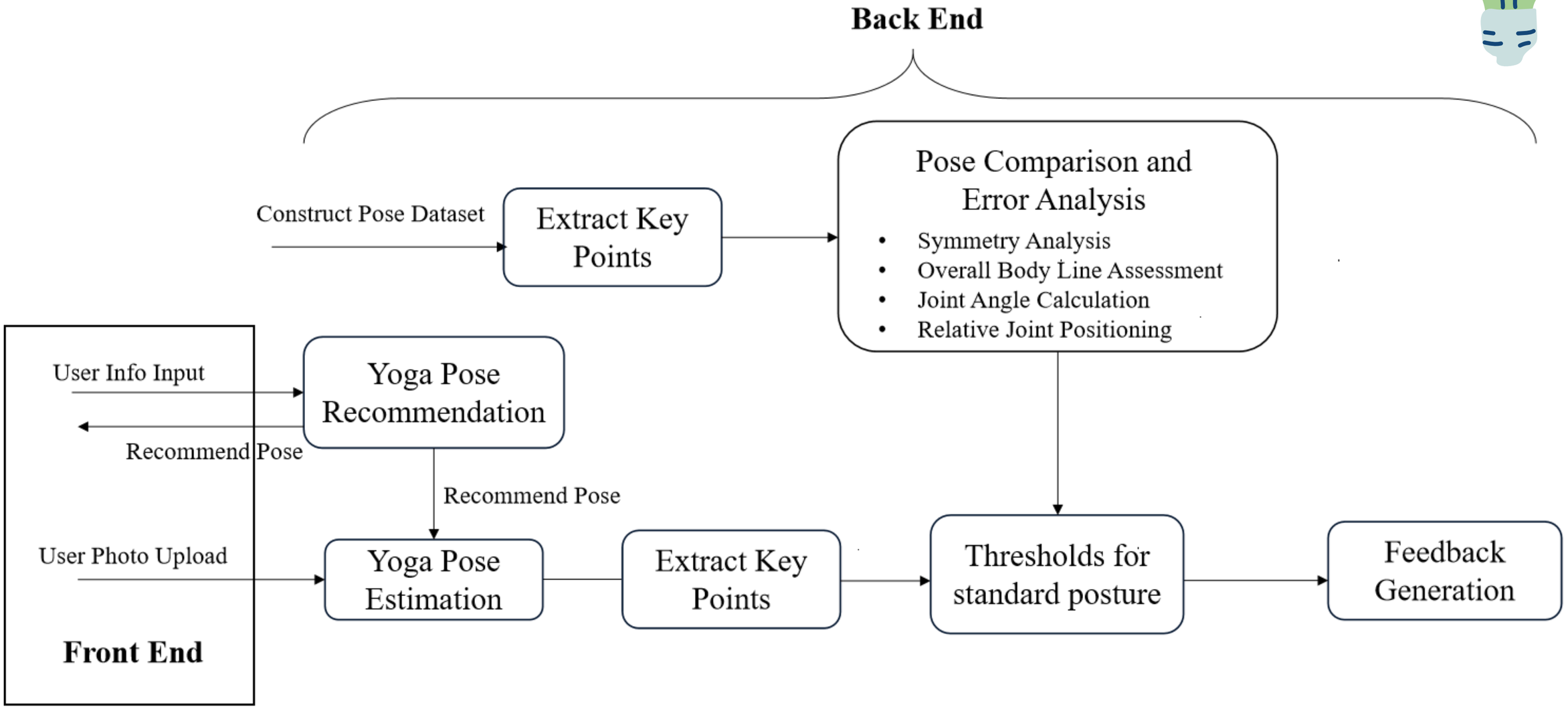
A comparative algorithm that analyses the user's poses against standard yoga pose thresholds and detects deviations from each threshold.

04

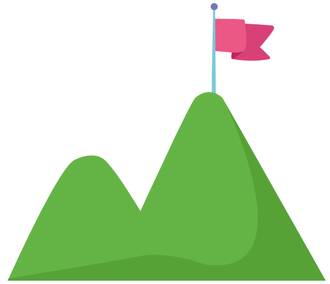
User Feedback System:

Generate detailed, easy-to-understand feedback on what to improve, with a focus on specific body parts.
Provide guidance on how to modify or correct the pose.

Architecture Flow



Frontend and Backend Overview

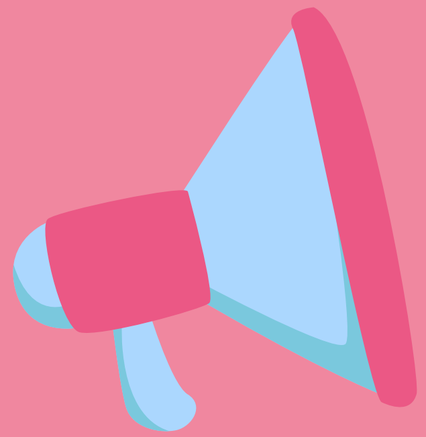


Frontend

Built using Vue.js for user input collection, image upload, and feedback display
Component Design:Includes message input, camera module, chat window, and various functional components to enhance user interaction

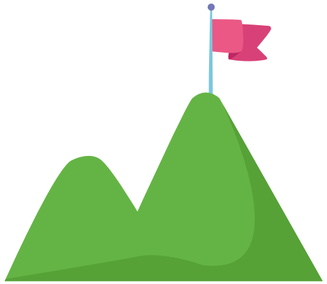
Backend

API Design:Provide RESTful API interfaces to handle user pose image data and return analysis results
Data Processing Flow:Includes image preprocessing, keypoint extraction, angle calculation, etc., to ensure the accuracy of pose analysis



Personalized Recommendation System

Tools and Technologies Used

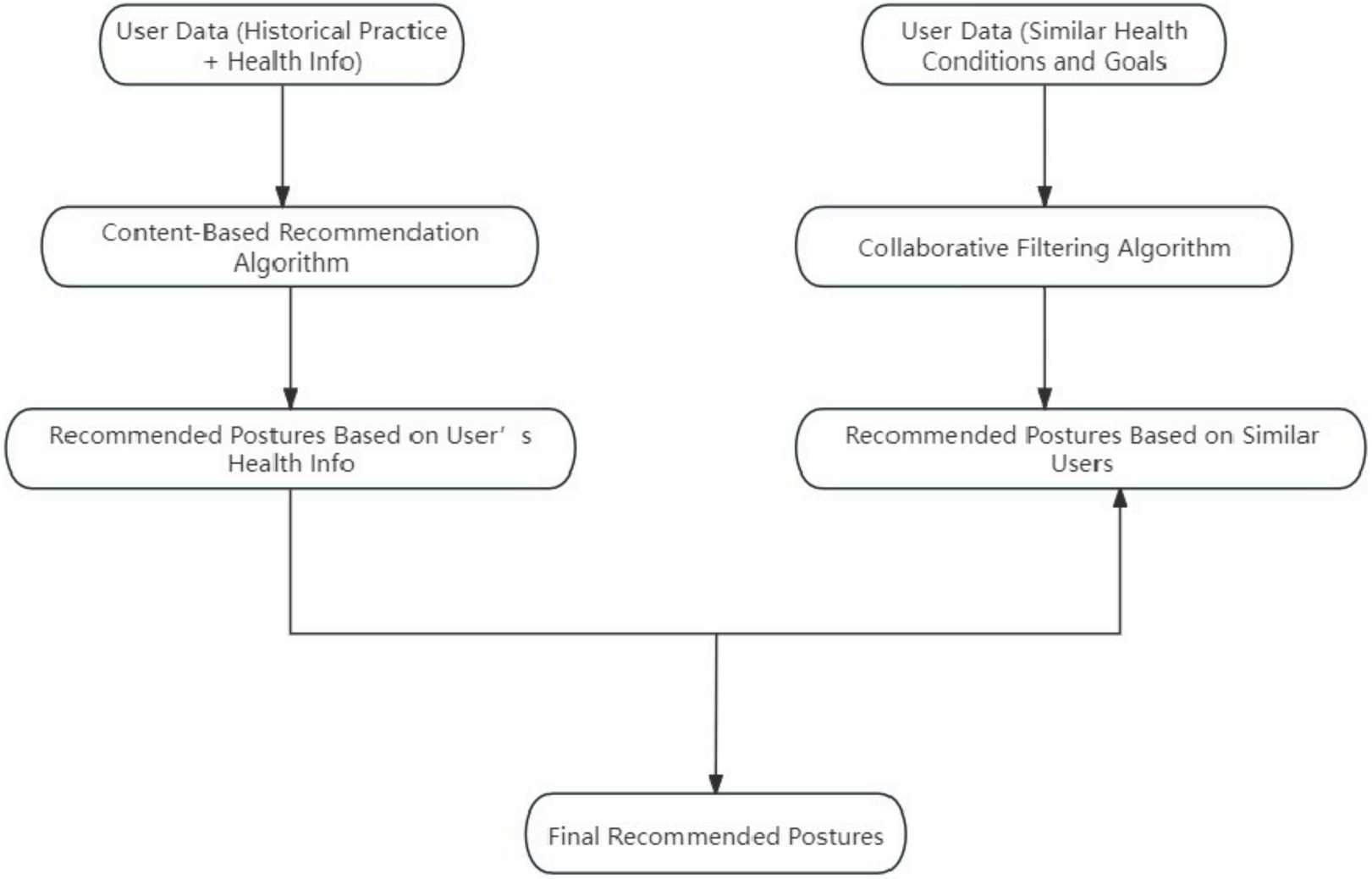


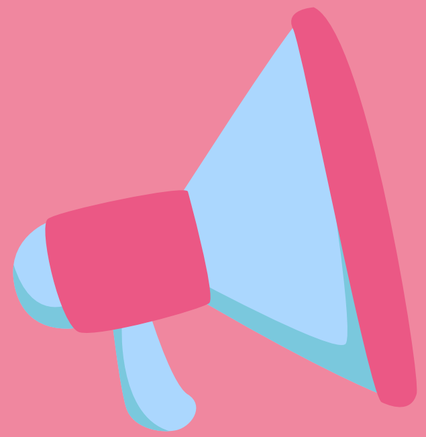
Content Recommendation：Generate personalized pose recommendations based on user practice history, health status, and goals.

Collaborative Filtering Recommendation: Use practice data from similar users for recommendations to enhance accuracy.

Smart Generation using OpenAI API：After filtering through content and collaborative recommendations, use OpenAI API to generate smarter, more personalized dialogues and suggestions.

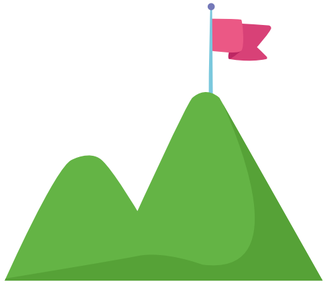
Voice Input Integration：Added voice-to-text input(webkit Speech Recognition) so users can give commands hands-free while practicing yoga.

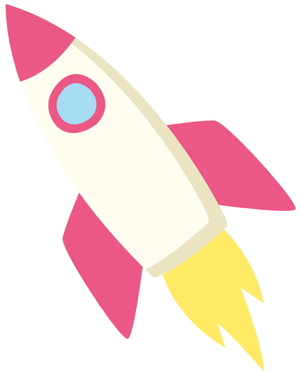

User Data (Historical Practice + Health Info)
User Data (Similar Health Conditions and Goals
Content-Based Recommendation Algorithm
Collaborative Filtering Algorithm
Recommended Postures Based on User's Health Info
Recommended Postures Based on Similar Users
Final Recommended Postures



Yoga Pose Estimation and Comparison

Tools and Technologies Used





Keypoint Detection (Pose Estimation): Yolo v11

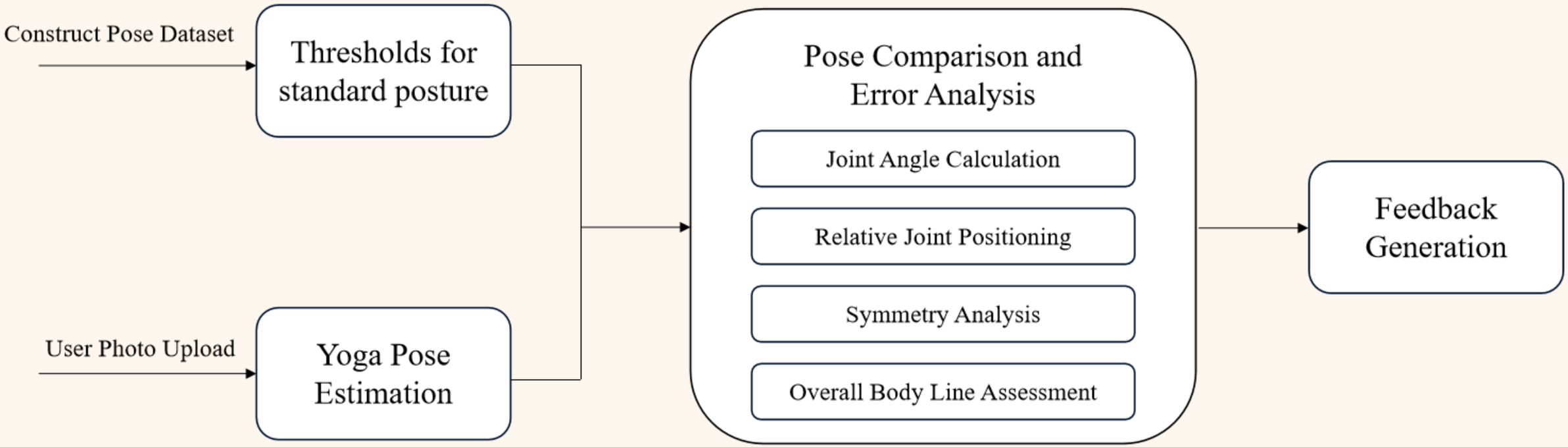
Computer Vision: Image Preprocessing

Angle and Symmetry Calculations

Machine Learning and Statistical Analysis

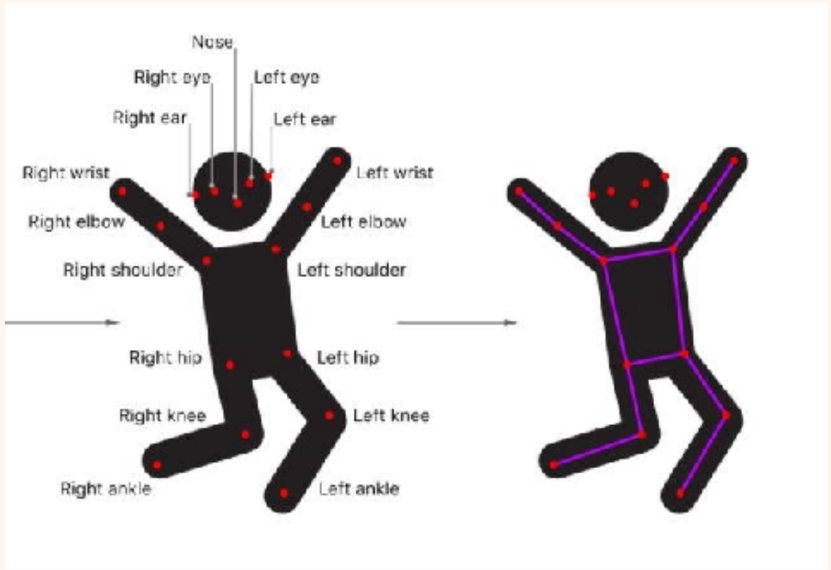
Real-Time Feedback Generation: GLM-4-0520 language model

Yoga Pose Estimation



Extract Key Points

Yolo v11



Accurate detection with 17 key-points

Real-time capability

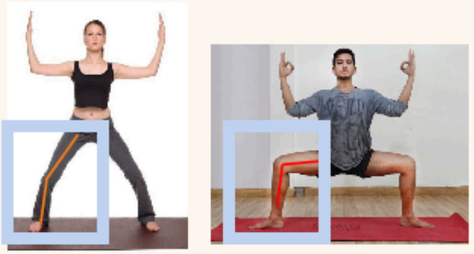
Low computational requirements

Fine-tuned with yoga dataset

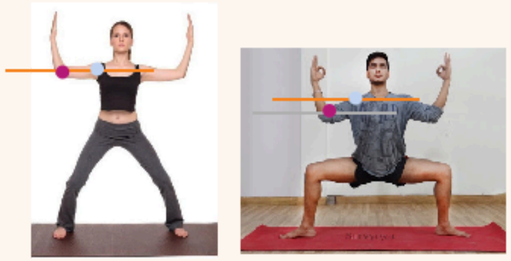
Pose Comparison

Define Characteristics of Standard Yoga Poses

Joint Angle Calculation



Relative Joint Positioning



Symmetry Analysis

Overall Body Line

Set Thresholds for Standard Posture

1. Calculate joint angles, relative positions, and slopes of key points for each pose in the dataset.

2. Perform statistical analysis on standard pose features.

3. Set thresholds based on mean and standard deviation.

4. Define tolerance ranges to account for individual differences.

Error Analysis & Real-time User Feedback

1. The system identifies the user's key points.

2. It calculates relevant features for these key points.

3. The calculated values are compared against preset thresholds to detect any significant deviations in joints or positions.

4. Based on the deviation analysis, the system calls the GLM-4-0520 language model to generate specific feedback.

5. Adjustment suggestions are provided to help the user improve their pose.

Conclusion

Our system combines personalized recommendations, pose comparison, and feedback generation to enhance user alignment and support individual wellness goals.