THAPAR INSTITUTE OF ENGINEERING AND TECHNOLOGY

CAPSTONE PROJECT

(ODD SEMESTER 2024-25)

YOGA POSE PERFECT

An AI based Posture Alignment Assistant

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DEPARTMENT OF ELECTRICAL & INSTRUMENTATION ENGINEERING

(B.E. ELECTRICAL AND COMPUTER - IV YEAR)

CORRECTION

PRONE TO INJURY

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PRESENTATION OUTLINE

- **OBJECTIVE**
- **DELIVERABLES**
- **NEED ANALYSIS**
- **EXISTING AND PROPOSED SOLUTION**
- **PROPOSED FRAMEWORK**
- **IMPLEMENTATION STATUS**
- **RESULTS**
- **FUTURE SCOPES**

OBJECTIVES

- Development of Mathematical model / Deep learning model for pose detection and correction.
- To develop a novel Dataset containing various yoga poses.
- To provide real time visual feedback .

DELIVERABLES

1.Dataset Development

Yoga for everyone - A dataset Comprising Annotated Images and Videos of Various yoga Poses.

2. Development of Mathematical model for pose correction

Implementing mathematical model for real-time pose analysis, providing instant feedback and corrections during practice.

NEED ANALYSIS

1.) Identification of target users: Users who would benefit from the application, such as yoga practitioners of all levels, athletes, or individuals seeking to improve their fitness and flexibility at home.

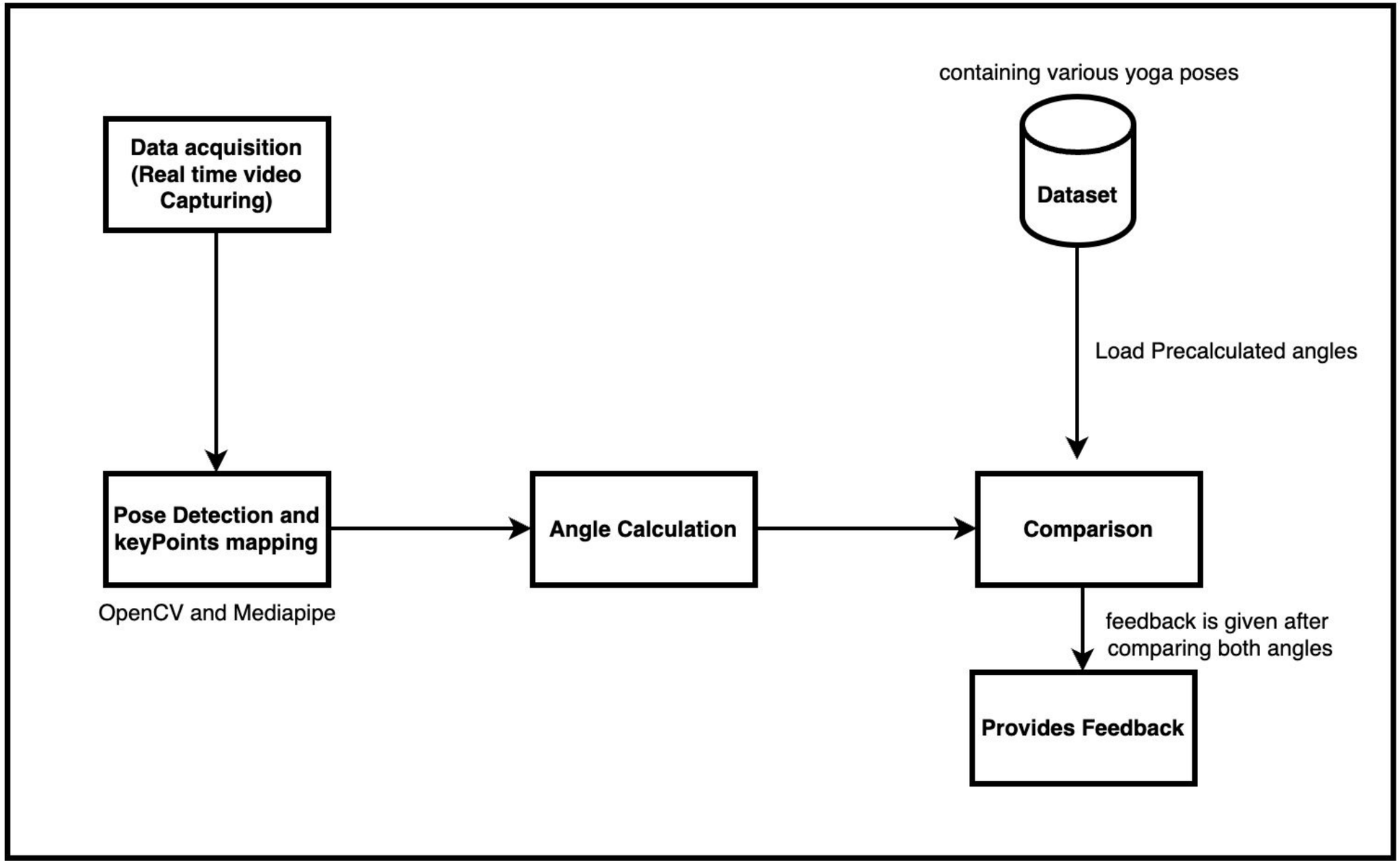
2.)Understanding user pain points: Identify the challenges and limitations faced by users in practicing yoga poses, such as difficulty in maintaining correct alignment or concerns about injury prevention.

3.)User experience considerations: Determine the desired features and functionalities of the application from the user's perspective, such as an intuitive interface, customizable settings, and informative feedback on posture and alignment.

EXISTING AND PROPOSED

EXISTING	PROPOSED
• Relies on in-person instructors or video tutorials with no real-time feedback. • Only identifies poses; does not offer guidance or corrections. • Limited adaptability to individual body types, skill levels, or alignment needs. • Generic instructions that may not address specific user needs.	• Provides real-time pose detection, alignment analysis, and corrective feedback. • Detects poses, analyzes alignment, and offers actionable corrections. • Accommodates diverse body types and demographics using a custom dataset. • Dynamic, real-time interaction fosters a more engaging and mindful yoga experience..

Proposed Framework



IMPLEMENTATION STATUS OF PROPOSED SOLUTION

1.Yoga pose perfect DATASET

Gathered a diverse dataset :

Created a detailed dataset with -

- **10 DIFFERENT YOGA POSES**
- **3 different Body Types**
- **3 Angles**

TARGETED POSES:

- Tree Pose
- Triangle Pose
- Cobra Pose
- Downdog Pose
- Butterfly Pose
- Camel Pose
- Diamond Pose’
- Goddess Pose
- Shoulder Stand Pose

CLICKED PHOTOS WITH

Samsung M30s (model no. SM-M307F/DS)

FOCAL LENGTH - **4.60mm**

IMAGE SIZE - **2992 X 2992 PIXELS**

Total Images - **3600 (360 * 10 poses)**

Yoga pose perfect DATASET



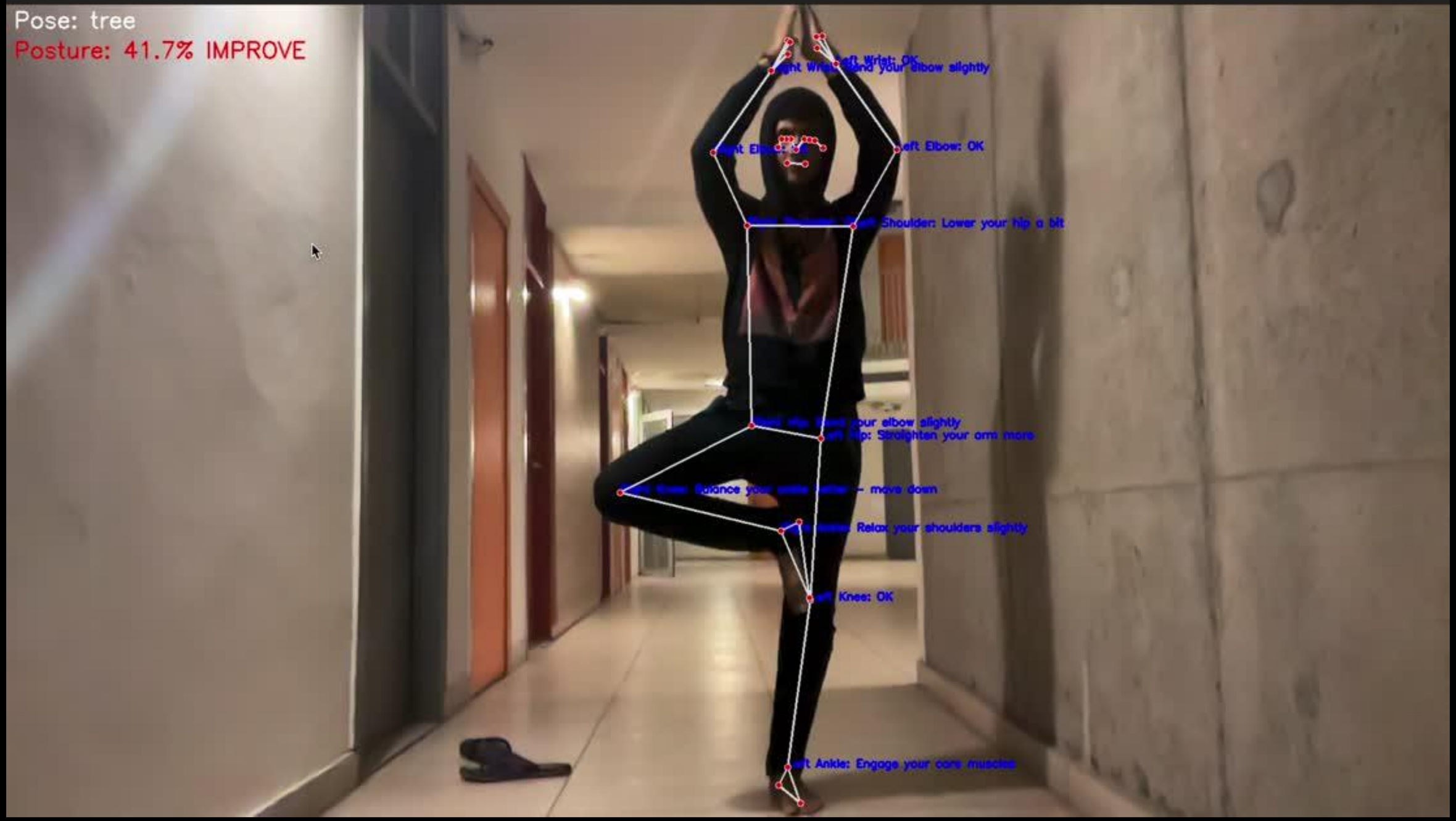




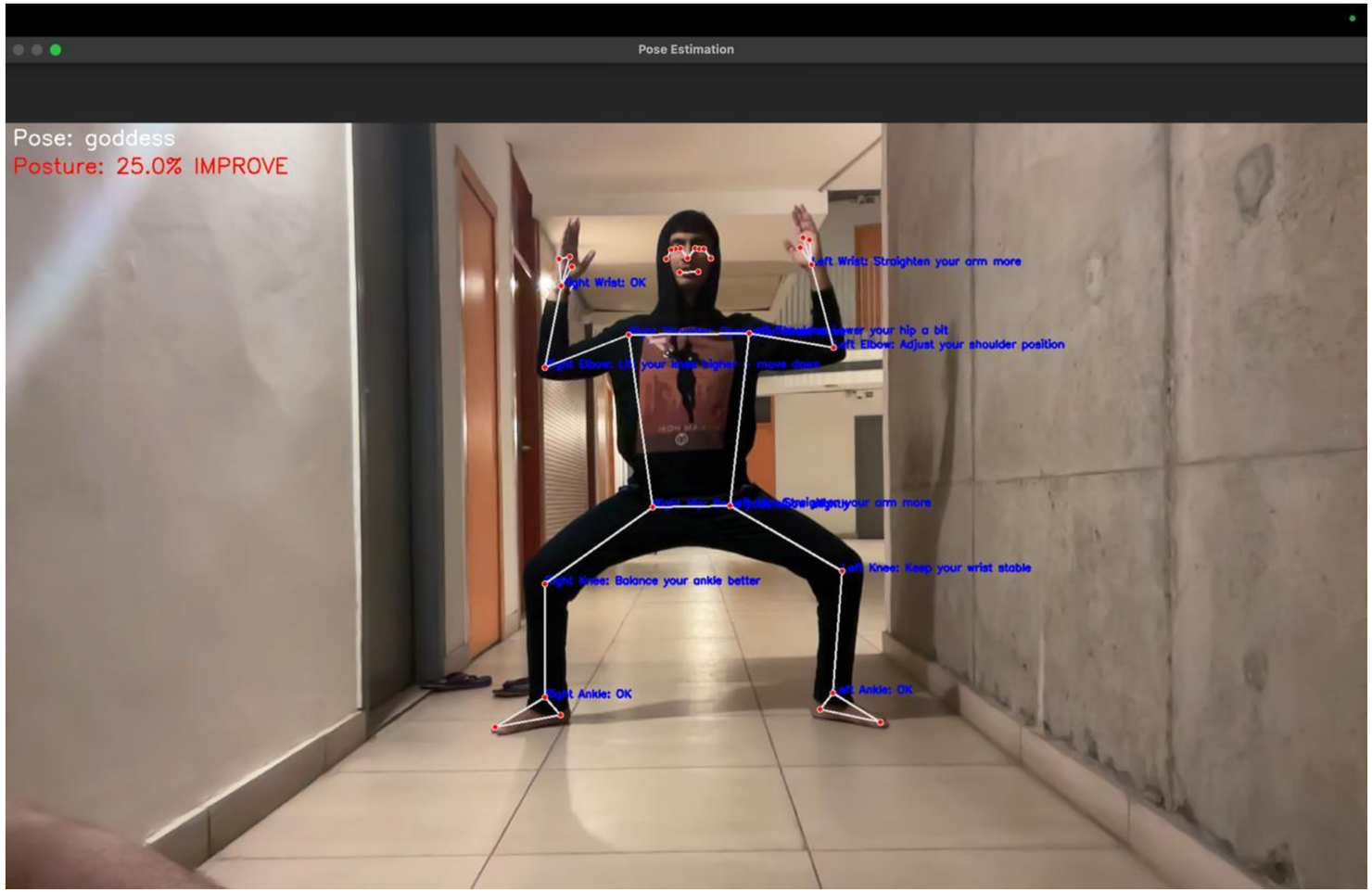



RESULTS

LIVE DEMO

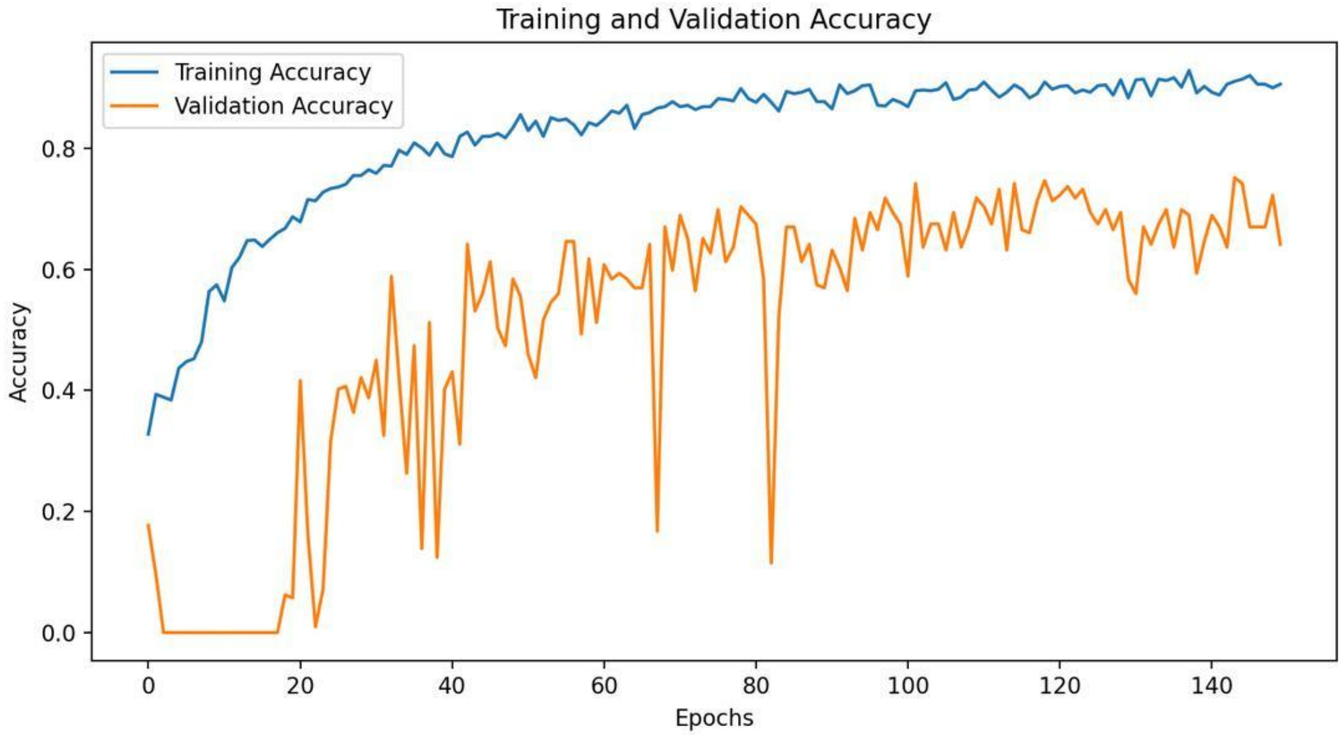

Pose: tree
Posture: 41.7% IMPROVE
Left Elbow: OK
Shoulder: Lower your hip a bit
Relax your shoulders slightly
Knee: OK
Ankle: Engage your core muscles

Yoga pose Detection with skeleton

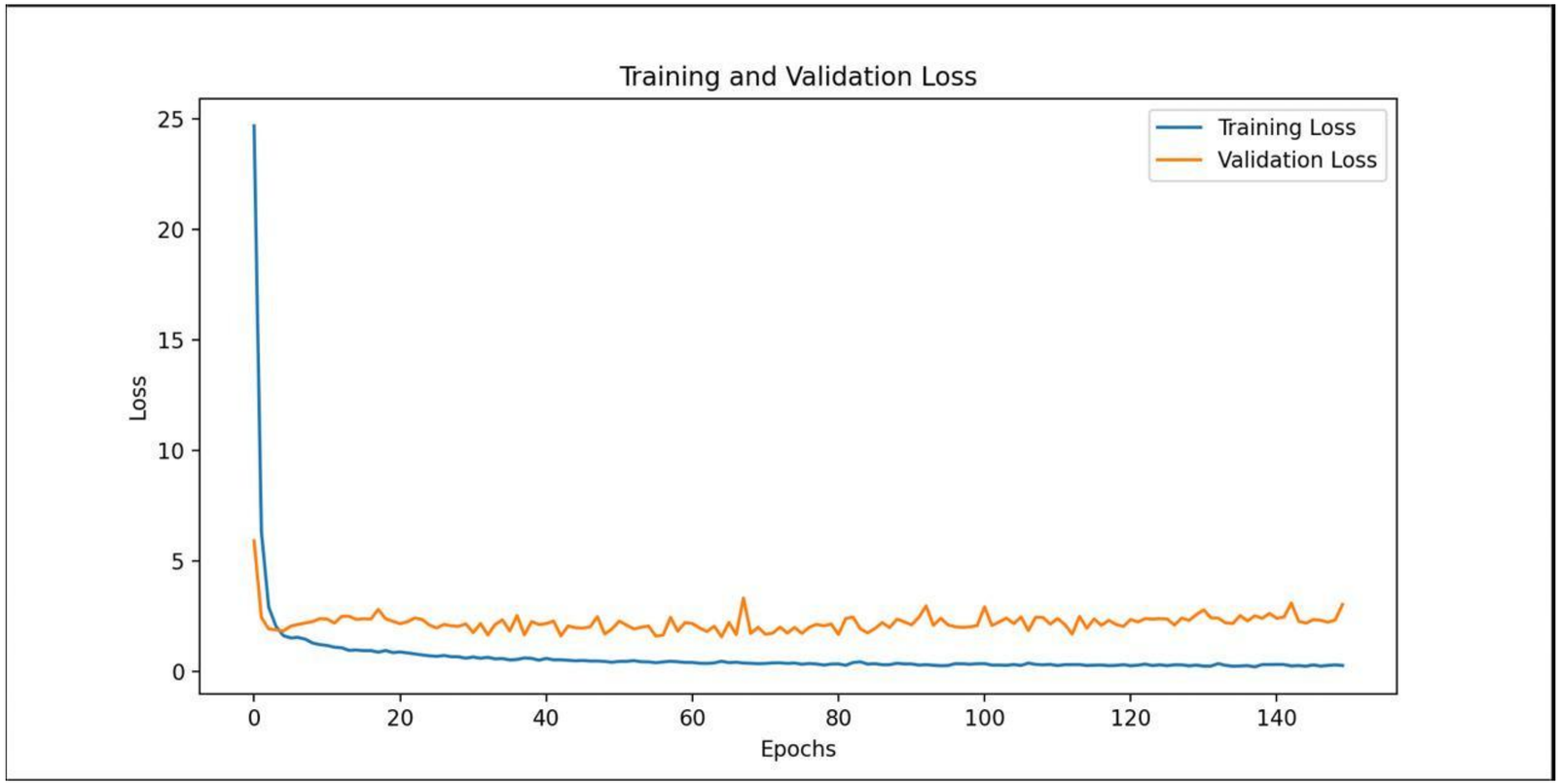


LIVE VIDEO WAS PASSED TO THE **MEDIAPIPE POSE ESTIMATION MODEL .**
THE MODEL RETURNS THE **DETECTED JOINTS LANDMARKS** IN THE IMAGE WITH FEEDBACK.

TRAINING AND VALIDATION RESULTS



TRAINING AND VALIDATION RESULTS



FUTURE SCOPE

- Integration of wearable devices for enhanced accuracy and feedback.
- Real-time multi-user tracking for group sessions.
- Expansion of datasets for inclusivity across diverse demographics and advanced yoga poses.
- Customizable **Voice** feedback tailored to user skill levels and goals.
- Applications in rehabilitation and physical therapy.
- Integration with fitness tracking apps and platforms.
- Multilingual support for global accessibility.
- Collaboration with wellness and healthcare providers.

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THANK YOU !!!