Yoga Pose Detection From Videos & Images Using Machine Learning Approach

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ABSTARCT

Yoga pose detection is a challenging task in computer vision due to variations in body postures and environmental conditions.To address this challenge, this research proposes a comprehensive approach for yoga pose detection in video processing utilizing Single Shot Multibox Detector (SSD) and You Only Look Once (YOLO) algorithms, alongside 2D and 3D pose detection techniques.

INTRODUCTION

Yoga, an ancient practice originating from India, has gained immense popularity worldwide for its physical, mental, and spiritual benefits.Traditional yoga instruction relies on manual observation and correction By analyzing video recordings of yoga practices, video processing algorithms can identify and classify yoga poses, providing instant feedback on alignment, posture, and technique.

OBJECTIVE

- Pose Detection Accuracy
- Implement real-time pose detection and feedback.
- Alignment and Posture Analysis
- Multi-Person Detection
- Evaluate the system's performance and accuracy.
- Develop a user-friendly interface for real-time yoga pose detection.

METHODOLOGY
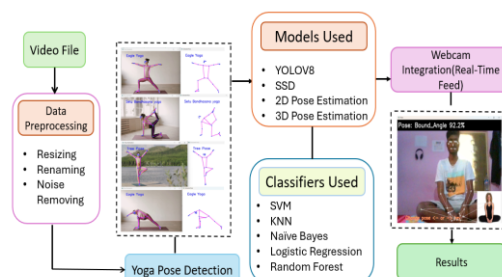
DATA DESCRIPTION

Dataset Used: Collected videos from various sources such as online yoga tutorials, fitness websites, YouTube, or by recording experimental videos.
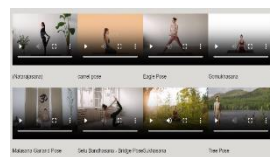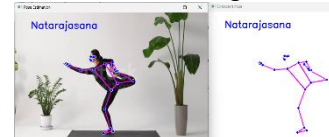

Video Dataset

Image Dataset

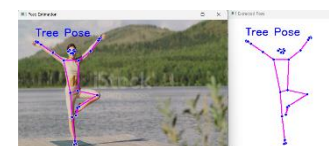| Input files	Format & Quality	Number of Items
Video Dataset	MP4 (4k)	20
Image Dtaset	JPG(4k)	20

RESULTS
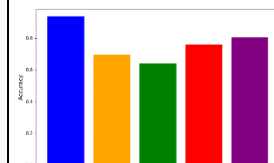

Sukhasana Yoga

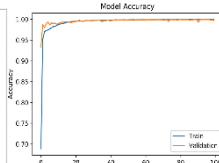Natarajasana Pose

Tree Pose

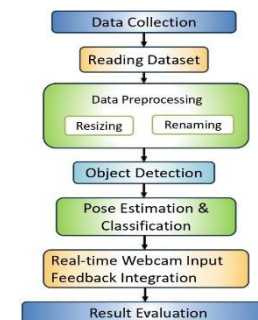L & R Hand Detection

Bound-Angle Detection

Accuracy Plot

AUC-ROC Curve

FLOWCHART

CONCLUSION

In this project, implemented YOLO and SSD object detection models for real-time yoga pose detection, achieving high accuracy and robustness in identifying poses from live video feeds.

Classifiers Used	Accuracy
K-Nearest Neighbour	0.63%
Support Vector Machine	0.69%
Logistic Regression	0.75%
Naive Bayes	0.80%
Random Forest	0.93%

REFERENCES

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[3]Hicham Boudlal, Mohammed Serrhini, and Ahmed Tahiri. A novel approach for simultaneous human activity recognition and pose estimation via skeleton-based leveraging wifi csi with yolov8 and mediapipe frameworks. Signal, Image and Video Processing, pages 1–17, 2024.