



REAL-TIME YOGA ASSISTANCE SYSTEM USING COMPUTER VISION TECHNIQUE

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ABSTRACT

The Real-Time Yoga Assistance System using Computer Vision Technique is an intelligent and interactive platform designed to support yoga practitioners by providing real-time posture detection and corrective feedback. Many individuals practice yoga without expert supervision, which often results in incorrect posture alignment and increased risk of injury. This system addresses these challenges by utilizing computer vision and machine learning algorithms to analyze human body movements through live video streams. Key body landmarks are detected and compared with predefined standard yoga postures to evaluate

accuracy. Technologies such as Python, OpenCV, MediaPipe, and Flask are employed for implementation. The system enhances safety, improves posture accuracy, and makes yoga practice accessible to users of all skill levels.

KEYWORDS

Computer Vision, Yoga Assistance, Pose Estimation, OpenCV, MediaPipe, Machine Learning

INTRODUCTION

combines physical postures, breathing techniques, and meditation to improve physical and mental well-being. Correct posture alignment is crucial for achieving maximum benefits and preventing

injuries. However, many practitioners lack continuous guidance, especially when practicing at home. Traditional yoga learning methods such as recorded videos and books fail to provide real-time posture correction. The proposed Real-Time Yoga Assistance System bridges this gap by using computer vision to track body movements and provide instant feedback. This system enhances learning efficiency, ensures safety, and allows users to practice yoga independently with confidence. Yoga is a holistic discipline that

LITERATURE SURVEY

Several studies have explored the application of computer vision and machine learning in fitness and yoga training systems. Johnson (2016) proposed a 2D pose estimation system using convolutional neural networks, which performed well for basic pose recognition but struggled with depth estimation. Jothika Sunney highlighted challenges such as lighting conditions and occlusion affecting posture detection accuracy. Zhang et al. introduced machine learning-based personalized yoga programs using clustering techniques. Zhou et al. developed

systems that provided real-time corrective suggestions using hybrid CV and ML models. Patel et al. used joint-angle-based classification for posture recognition. The proposed system overcomes limitations of previous works by offering real-time feedback, personalization, and improved accuracy using modern pose estimation frameworks.

RELATED WORK

Related systems focus on pose detection, fitness tracking, and exercise monitoring using computer vision. Most applications utilize frameworks such as Open Pose, Pose Net, or MediaPipe. However, many lack real-time correction capabilities or user-specific guidance. The proposed system integrates pose detection, feedback generation, and progress tracking into a unified platform, making it more interactive and user-friendly.

EXISTING SYSTEM

Existing yoga assistance systems rely on physical instructors, prerecorded videos, or basic pose recognition tools. These systems do not provide continuous real-time feedback and often fail to adapt to individual user needs.

PROPOSED SYSTEM

The proposed Real-Time Yoga Assistance System uses computer vision and machine learning to analyze posture accuracy in real time. It captures live videos, extracts body landmarks, compares them with reference poses, and provides corrective suggestions instantly. The system supports personalized feedback, safety monitoring, and progress tracking.

SYSTEM ARCHITECTURE

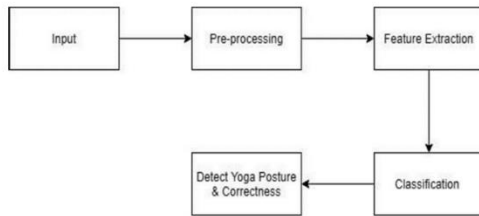


Fig1: System Design

The system architecture consists of camera input, pose detection module, posture analysis engine, feedback generation module, user interface, and database. Video input is processed to detect key points, which are analyzed and matched against standard yoga poses to generate feedback.

METHODOLOGY & DESCRIPTION

The methodology includes client-side interaction, server-side processing, REST API communication, and database

management. The client interface allows users to register, log in, and practice yoga sessions. The server processes pose data and return feedback in real time.

RESULTS AND DISCUSSION

The system was tested with various yoga poses and lighting conditions. Experimental results show that the system accurately detects poses and provides timely feedback. Users reported improved posture awareness and confidence while practicing yoga.

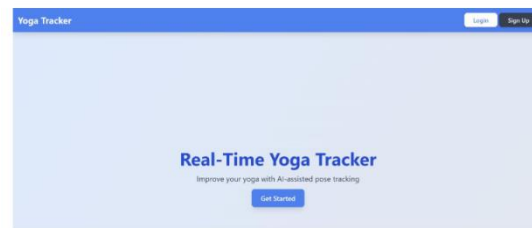


Fig2: Interface

Fig3: Signup page

Fig4: Login page

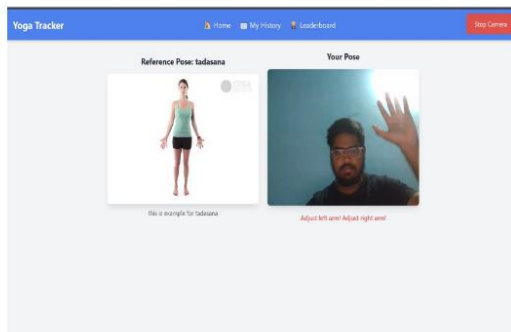


Fig5: Yoga pose

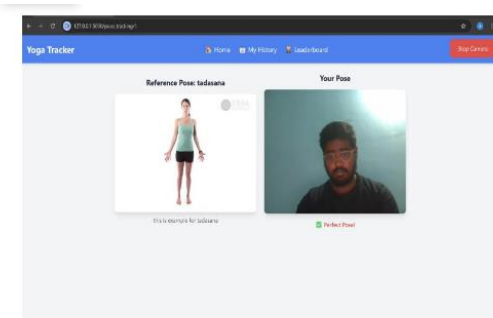


Fig6: Yoga pose result

CONCLUSION

The Real-Time Yoga Assistance System demonstrates the effectiveness of computer vision in fitness applications. By providing real-time posture correction, personalized guidance, and improved safety, the system enhances the overall yoga practice experience.

FUTURE SCOPE

Future enhancements include 3D pose estimation, AI-powered virtual instructors, wearable device integration, and advanced analytics for detailed performance evaluation.

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