Survey on Yogic Posture Recognition using Deep Learning

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Abstract*: The abstract emphasizes the growing importance of yoga pose detection, especially in integrating technology into yoga practice. It highlights the various benefits of yoga, such as physical health, mental well-being, and stress reduction. The paper discusses the significance of automated yoga pose detection in providing real-time feedback and enhancing self-correction. The research explores different approaches to yoga pose classification, focusing on PoseNet and KNN classifier. Using deep learning algorithms and computer vision techniques like Open Pose, human pose estimation is employed to identify yoga postures. A combination of CNN and LSTM is utilized for real-time yoga pose recognition from monitored videos. Existing techniques for yoga pose recognition often fail in real-world situations, prompting the need for more efficient methods. The paper presents a computationally efficient approach using deep learning for yoga pose recognition in complex environments. Artificial intelligence is proposed as a substitute for yoga instructors, assisting individuals with their poses. The paper introduces algorithms for creating skeletons of yoga poses and hand mudras, extracting joint angles as features for machine learning and deep learning models. Furthermore, deep learning techniques are developed to detect incorrect yoga postures, enabling users to upload recorded videos for analysis. The system advises users on improving their poses by identifying abnormal angles between the actual and desired poses.*

Keywords: Classification, Deep learning, Yoga pose Recognition, Computer Vision

I. INTRODUCTION

The introduction outlines the main objective of the research paper: to develop a comprehensive yoga pose identification system that accurately tracks poses in real-time. By leveraging CNN and LSTM algorithms and combining multiple modalities like RGB images, depth maps, and skeletal joint data, the study aims to bridge the gap between technology and yoga practice.

This integration of technology can offer practitioners real-time feedback, reduce the risk of injuries, and enhance the effectiveness of yoga sessions. Yoga, known for its physical, mental, and spiritual benefits, requires correct posture for efficacy, posing a challenge for practitioners without access to trainers. An AI-based application could fill this gap by detecting poses and providing personalized feedback. The paper proposes a novel approach using machine learning to analyze images or videos of yoga poses, facilitating accurate pose detection and personalized guidance.

It also introduces a computationally efficient method for pose recognition in complex environments. Acknowledging yoga's medicinal benefits, including stress reduction and improved concentration, the paper highlights the need for accurate pose detection and feedback to ensure practitioners reap these benefits effectively. While pose estimation and classification have advanced, current models often lack accuracy assessment. An AI-based application could offer personalized feedback for pose improvement. Correct posture is crucial for reaping yoga's benefits, necessitating the presence of an instructor.

Human pose detection considers factors like surroundings and clothing variations. Yoga has shown clinical benefits in improving immunity and managing chronic conditions like cardiovascular and respiratory diseases. Key points detection is used for human pose detection, identifying major body points such as the nose and eye.

II. METHODOLOGY

The methodology section outlines the input and output of the proposed system: real-time video input generating yoga posture predictions and advice for optimal angle and posture correction. Key points from the user's yoga pose are extracted, classified into trained yoga poses, and feedback is provided.
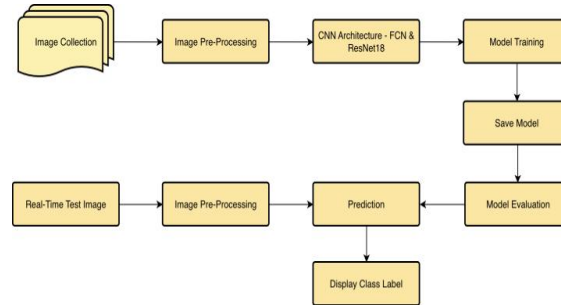

Fig.1 Block Diagram

The performance evaluation involves key metrics like accuracy, precision, recall and F1-score, along-side real-time testing to validate the system's potential for interactive training and feedback generation. Positive self-esteem is also highlighted as a potential benefit.

III. CONCLUSION

Recent research has focused on human posture estimation, crucial for applications like fitness to prevent injuries and improve effectiveness. State-of-the-art algorithms like KNN and Posenet are utilized for yoga posture estimation. Deep learning techniques show promise due to extensive research, leading to the development of an efficient real-time yoga monitoring system.

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