

PosePerfect - Yoga Pose Detection using Machine Learning

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Abstract: The global popularity of yoga has witnessed significant growth in recent years, primarily due to its well-documented benefits for physical health, mental well-being, and spiritual development. As a result, an increasing number of individuals are adopting yoga as part of their daily routine. However, a considerable portion of these practitioners engage in yoga without the supervision or guidance of a qualified instructor. While yoga offers numerous advantages when practiced correctly, incorrect execution of poses (asanas) can lead to serious health complications, including muscular injuries, nerve damage, and, in extreme cases, conditions such as strokes. To mitigate such risks and promote safe yoga practice, this research explores an intelligent system capable of detecting and evaluating yoga poses using machine learning techniques. The proposed system leverages computer vision and pose estimation algorithms to analyze the practitioner's body posture and determine whether it conforms to standard, expert-defined yoga poses. By providing real-time feedback and corrections, the system serves as a virtual instructor, helping users to align their poses accurately and avoid potentially harmful deviations. This paper presents the architecture and implementation of the yoga pose detection model, including data collection, preprocessing, model training, and evaluation metrics. The model utilizes keypoint detection frameworks such as MediaPipe and OpenPose, integrated with classification algorithms to identify and assess various yoga postures. Experimental results demonstrate the model's effectiveness in recognizing poses with high accuracy, establishing its potential for real-world application in yoga training apps and wellness platforms. Ultimately, this study aims to bridge the gap between the widespread practice of yoga and the accessibility of expert supervision by introducing a scalable, AI-driven solution that promotes safe and effective yoga practice.

Keywords: Yoga Pose Detection, Machine Learning, Pose Estimation, Real-Time Feedback

