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Virtual Yoga Assistant using Machine Learning and Artificial Intelligence

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Abstract: *In recent years, yoga has become an integral part of life for people worldwide. This growing interest has created a demand for scientific analysis of yoga postures. Pose detection techniques offer a promising approach to identify and assist people in performing yoga poses with greater accuracy. However, posture recognition remains a challenging task due to the limited availability of datasets and the difficulty of real-time posture detection.*

To address this, a large dataset has been developed with over 5,500 images representing ten different yoga poses. A tf-pose estimation algorithm is used to create a skeletal overlay on each image in real time, drawing the human body's skeleton to extract joint angles. These joint angles serve as features for training various machine learning models. The dataset is split, with 80% used for training and 20% for testing. This approach has been tested on multiple machine learning classification models, achieving an accuracy of 99.04% with a Random Forest Classifier.

Keywords: YOGI - YOga Gesture Identification dataset, Computer Vision, Machine Learning, Classification, Gesture Recognition

I. INTRODUCTION

A virtual yoga assistant software is a digital tool designed to provide guidance, support, and resources for individuals practicing yoga. This software can offer a wide range of features to enhance the yoga experience, whether you're a beginner or an experienced yogi. Here are some key features and functions that such software could include: Customized Yoga Plans: The software can create personalized yoga routines based on a user's goals, fitness level, and preferences. Users can specify whether they want to focus on flexibility, strength, relaxation, or a combination of these. Video Tutorials: Provide a library of yoga poses and flows with video demonstrations by experienced yoga instructors. Users can follow along with these videos to ensure they are performing poses correctly. Voice-guided Sessions: Offer audio instructions during yoga sessions, guiding users through each pose, breathing exercises, and meditation. This can be particularly helpful for users who prefer not to watch a screen while practicing. Progress Tracking: Keep a record of a user's yoga practice history, such as the number of sessions completed, progress in achieving specific goals, and overall performance improvement. Meditation and Breathing Exercises: Include guided meditation sessions and breathing exercises to promote relaxation, mindfulness, and stress reduction. Yoga Pose Analyzer: Use computer vision technology to analyze a user's alignment and form during yoga poses. Provide real-time feedback and suggestions for improvement. Community and Social Features: Allow users to connect with others who share their interest in yoga, join virtual yoga classes or challenges, and share their progress on social media. Nutritional Guidance: Provide information on yoga-friendly diets and nutrition plans to complement the physical practice. Equipment Recommendations: Suggest yoga mats, props, and clothing suitable for different styles of yoga and skill levels. Yoga Philosophy and Knowledge: Offer articles, videos, and resources to help users deepen their understanding of yoga's philosophy, history, and its holistic approach to well-being..

II. PURPOSE

To develop Virtual Yoga Assistant by using Machine Learning and Artificial Intelligence which monitor human body parts movement the Accuracy of different Yoga Poses which guides the User to Practice Yoga.

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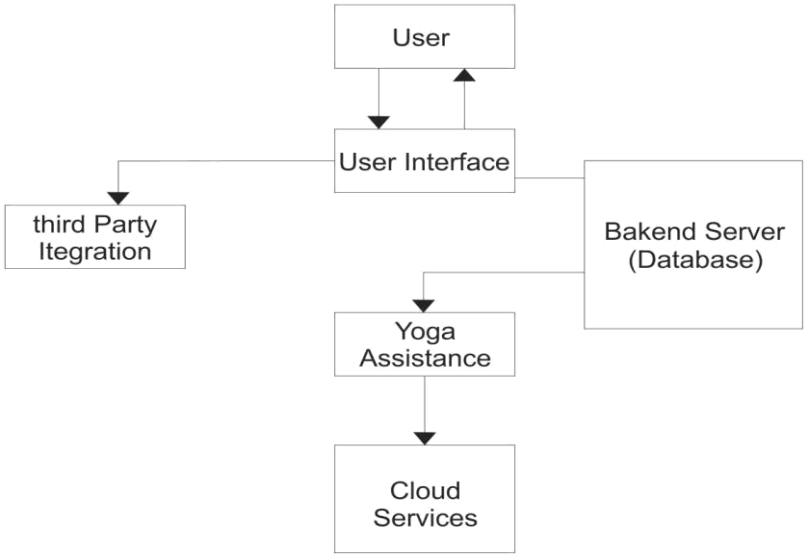
Yoga is an ancient Indian science and a way of living that includes the adoption of specific bodily postures, breath regulation, meditation, and relaxation techniques practiced for health promotion and mental relaxation.
Yoga has been adopted internationally for its health benefits. Among several techniques, physical postures have become very popular in the Western world. Yoga is not only about the orientation of the body parts but also emphasizes breathing and being mindful.

III. OBJECTIVE OF SYSTEM

- To do thorough literature survey on the Yoga Posture Recognition By Detecting Human Joint Points In Real Time.
- To design appropriate algorithms and system for the Pose Estimation and Productive human body posture.
- To implement the algorithm for the Virtual yoga Monitoring Assistant
- To test and validate the results.

IV. SYSTEM ARCHITECTURE



Skin diseases are a widespread health concern affecting millions of people worldwide. These conditions can range from mild irritations to severe, potentially life-threatening illnesses. Early detection and accurate diagnosis of skin diseases are crucial for effective treatment and prevention of complications

User Registration:
Here User has to register with required parameters such as name, mobile, password and hardware ID.

User Login:
After user registration done successfully user can login to the system

Video Input:
After successful login we input from video key extraction point feature.

Predict Pose
Feed Back Generation
Algorithm & Mathematical Model

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S={I, O, P, S, C, P, Ad, Q, G,H/w, S/w, Failure, Success}
Where
S=System
C= Check Mood U=UserAd=Admin
G=Pose Detection.

Procedures {P}= {Pr, Cc, Qid, Amt} Where,Pr= Check Features
Qid= Find Pose
O is Output of system
Output {O} = {Output1, Output2, Output3} Where,Output1=Image Scan successfully Verify Output2=Match with train data(Pose).
Output3=Detection of Pose

V. CONCLUSION

A system is suggested that classify ten yoga poses and the dataset upholds on six classification models of machine learning. The yoga pose is detected based on the angles extracted from the Skeleton joints of TF pose estimation algorithm. 94.28 accuracy altogether was attained of all machine learning models. The data preprocessing and model training was done on Google Colab and Ubuntu 18.04.4 LTS terminal. Future ideas also includes expansion of YOGI dataset on more yoga poses and implement deep learning modules for better performance

VI. ACKNOWLEDGMENT

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