Infinity Yoga Tutor

Prasad Sanjay Bavke[1], Om Vidhyanand Gaikwad[2], Rohit Vilas Pawar[3], Shraddha Ravindra Jejurkar[4]

Department computer Engineering, S.N.D Polytechnic Yeola

Abstract

Yoga is an ancient science and discipline originated in India 5000 years ago. It is used to bring harmony to both body and mind with the help of asana, meditation and various other breathing techniques It bring peace to the mind. Due to increase of stress in the modern lifestyle, yoga has become popular throughout the world. There are various ways through which one can learn yoga. Yoga can be learnt by attending classes at a yoga center or through home tutoring. It can also be self-learnt with the help of books and videos. Most people prefer self-learning but it is hard for them to find incorrect parts of their yoga poses by themselves. Using the system, the user can select the pose that he/she wishes to practice. He/she can then upload a photo of themselves doing the pose. The pose of the user is compared with the pose of the expert and difference in angles of various body joints is calculated. Based on this difference of angles feedback is provided to the user so that he/she can improve the pose.

Keywords: Image processing, OPEN CV, CNN, GUI

INTRODUCTION

Human posture assessment is a difficult issue in the control of PC vision. It manages confinement of human joints in a picture or video to shape a skeletal portrayal. To consequently recognize an individual's posture in a picture is a troublesome errand as it relies upon various perspectives, for example, scale and goal of the picture, enlightenment variety, foundation mess, dress varieties, environmental factors, and connection of people with the environmental factors [1]. An utilization of posture assessment which has pulled in numerous analysts in this field is practice and wellness. One type of activity with multifaceted stances is yoga which is a deep rooted practice that begun in India however is presently celebrated overall due to its numerous profound, physical and mental benefits [2]. The issue with yoga anyway is that, much the same as some other exercise, it is of most extreme significance to rehearse it accurately as any erroneous stance during a yoga meeting can be ineffective and conceivably inconvenient. This prompts the need of having a teacher to manage the meeting and right the person's stance. Since not all clients approach or assets to a teacher, a computerized reasoning based application may be utilized to recognize yoga presents and give customized input to assist people with improving their structure.

EXISTING SYSTEM

Lately, human posture assessment has profited extraordinarily from profound learning and gigantic gains in execution have been accomplished [3]. Profound learning approaches give a more clear method of planning the structure as opposed to managing the conditions between structures physically. [4] utilized profound figuring out how to distinguish 5 exercise presents: pull up, swiss ball hamstring twist, push up, cycling and strolling.

OBJECTIVE OF SYSTEM

- Provide Easy to use shystem.
- Provide cost effective solution in market.
- Provide better pose details to user.

LITERATURE SURVEY

The capacity to estimate the head pose of another person is a common human ability that presents a unique challenge for computer vision systems. In this paper, we are discussing the difficulties in head pose estimation and we present an organized survey describing the evolution of the field. Our discussion mainly focuses on the advantages and disadvantages of each approach and spans 90 of the most innovative and characteristic of papers that have been published on this topic. We compare these systems by focusing on their ability to estimate coarse and fine head pose, highlighting approaches that are very well suited for unconstrained environments.

H150 pose estimation is important research topic in the field of computer vision as well as artificial intelligence. This paper focuses on the state-of-art progress of 2-D human pose estimation methods based on the deep learning. According to the neural network structure, these methods are classified as single CNN method, Multi-stage CNN method, Multi-branch CNN method, Recurrent Neural Network (RNN) method and Generative Adversarial Net- worksand time dependent rather than traffic dependent.

Human pose estimation has always been a challenging problem that holds great attention, it has the widespread and extensive variety of uses from the classification of images to activity acknowledgment, main challenge is detection, localization of the key points in the variation of body poses. To resolve this issue, substantial research work has been done in this area. After analyzing several results and detecting the restrictions, the author has reconstructed a simple model using neural network that estimates the poses and demonstrates the potential of CNN's. The author concludes with a few promising bearings and directions that have to be explored for future research.

We propose to use a feature selection method that finds the relevant features for the learning task at hand using feature interaction (based on word interdependencies). This will allow us to reduce considerably the number of selected features from which to learn, making our KNN algorithm applicable in contexts where both the volume of documents and also the size of the vocabulary are high, like with the World Wide Web. [WWW]..

PROPOSED SYSTEM

Firstly testing data is to be obtained/created, this data must be new and should not consist of any redundant data from the training phase. To obtain testing data yoga poses video is created by a different volunteer who is present at a different location. These videos are taken as test data and the equipment used for this is Web Camera. The frames of each video are then sent to the media pipe pose estimation model which finds the 33 key points onto each frame. Then similar preprocessing and feature engineering is done on the testing data which was done on training data to make testing data similar to training data. The reason for this is that machine learning models understand the training data. Finally, the output is obtained for the test data and then fed to the trained model to evaluate its performance based on its predictions.

SYSTEM ARCHITECTURE

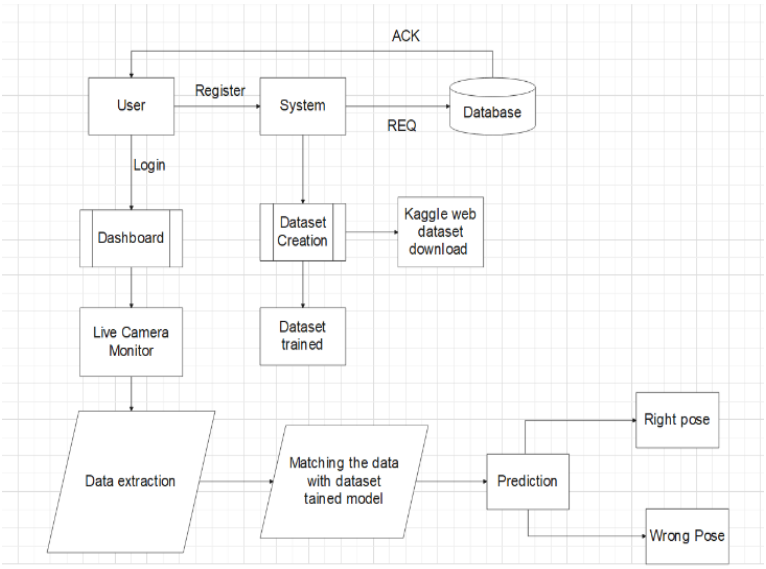

Fig -1: System Architecture Diagram

ALGORITHM/TECHNOLOGY

1. **Convolutional Neural Networks (CNN)**
   Convolutional Neural Networks (CNN) is one of the variants of neural networks used heavily in the field of Computer Vision. It derives its name from the type of hidden layers it consists of. The hidden layers of a CNN typically consist of convolutional layers, pooling layers, fully connected layers, and normalization layers. Here it simply means that instead of using the normal activation functions defined above, convolution and pooling functions are used as activation functions. To understand it in detail one needs to understand what convolution and pooling are. Both of these concepts are borrowed from the field of Computer Vision

2. **Region-based Convolutional Neural Networks(R-CNN)**
   R-CNN is a state-of-the-art visual object detection system that combines bottom-up region proposals with rich features computed by a convolutional neural network. At the time of its release, R-CNN improved the previous best detection performance on PASCAL VOC 2012 by 30% relative, going from 40.9% to 53.3% mean average precision. Unlike the previous best results, R-CNN achieves this performance without using contextual rescoring or an ensemble of feature types. To bypass the problem of selecting a huge number of regions, Ross_Girshick et al.proposed a method where we use selective search to extract just 2000 regions from the image and he called them region proposals. Therefore, now, instead of trying to classify a huge number of regions, you can just work with 2000 regions.
   R-CNN algorithms have truly been a game-changer for object detection tasks. There has suddenly been a spike in recent years in the amount of computer vision applications being created, and R-CNN is at the heart of most of them.

SYSTEM REQUIREMENTS

- **Software Used:**

1. Python 4.4 or above
2. Anaconda 2
3. Windows 8 or above

4. VS Studio Code

- **Hardware Used:**

1. Processor: Pentium IV or higher
2. Minimum RAM: 4GB Required
3. 20 GB available hard disk space and Only(64-bit) Version

APPLICATION

- Yoga Instructions
- Organization.
- Personals

CONCLUSION

In this project, we have proposed a system to recognize Eight major yoga pose by detecting of human joint points using Mediapipe. We have detected the yoga poses considering up to 100% accuracy. Our system may be wont to acknowledge alternative yoga poses from the reference model of each pose. Therefore our planned approach can facilitate to the practice of yoga when you need a trainer.

REFERENCES

[1] Akuhota and S. F. Nadler," Core Strengthening," American Academy of Physical Medicine and Rehabilitation, 2004.
[2] R. Szeliski "Computer Vision: Algorithms and Applications," Springer, 2010.
[3] Shruti Kothari, "Yoga Pose Classification Using Deep Learning" (2020). Master's Projects. 932.
[4] G. Bradski and A. Kaehler, "Learning OpenCV," O'Reilly, 2008.
[5] Z. Cao, T. Simon, S.-E. Wei and Y. Sheikh, "Realtime Multi-Person 2D Pose Estimation using Part Affinity Fields," The Robotics Institute, Carnegie Mellon University, 2017.
[6] W. Gong, X. Zhang, J. Gonzàlez, A. Sobral, T. Bouwmans, C. Tu, and H. Zahzah. "Human pose estimation from monocular images: a comprehensive survey", Sensors, Basel, Switzerland, vol. 16, 2016.
[7] G. Ning, P. Liu, X. Fan, and C. Zhan { "A top-down approach to articulated human pose estimation and tracking", ECCV Workshops, 2018. }.
[8] Utkarsh Bahukhandi, Dr. Shikha Gupta {\ em YOGA POSE DETECTION AND CLASSIFICATION USING MACHINE LEARNING TECHNIQUES 2021}.