YOGA POSE DETECTION.

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ABSTRACT: An approach to precisely determine various Yoga pose Assessment using deep learning algorithms has been demonstrated in this work. In this system, we propose a yoga pose assessment system using pose detection to help the self-training of yoga. The system first identifies the yoga pose by detecting multiple parts of humans, such as joints only with the help of pc camera. In this system, we also propose an improved algorithm to calculate scores that can be applied to all poses. Our application is analyzed on different Yoga poses under different scenarios, and its robustness is also. An in-depth hybrid learning model is suggested for the use of the convolutional neural network (CNN) and long short-term memory (LSTM) for identification of yoga in real-time videos where the CNN layer is used to extract features from key points for each found frame from an open pose and made by LSTM to give a temporary forecast.

KEYWORDS – Yoga pose detection, Self-learning, CNN algorithm, LSTM, Deep learning.

I. INTRODUCTION:

Human pose measurement is a challenging problem in directing a computer vision that deals with the making of human organs in an image or video to create bone representation. To automatically detect a person's pose in an image is a difficult task as it depends on a number of aspects such as scale and resolution of the image, illumination variation, background clutter, clothing variants, surroundings, and involvement of humans with the surroundings. An application which determines the pose has fascinated many researchers in this domain is exercise and fitness. Another form of yoga that is more complex is the oldest form of yoga that has its origins in India, but is now known worldwide because of its many spiritual, physical and mental perks. Various pose extraction methods are then examined along with deep learning-based models - Convolutional Neural Networks (CNNs).

II. MOTIVATION:

Human pose detection is a tough problem in discipline of computer vision. Automatically detecting a person's posture in a photo is a difficult task as it depends on many factors such as the scale and adjustment of the image of the bright light the contrast of the surrounding clothing and the harmony of the people with the surroundings. There are a number of yoga asanas, and hence creating a pose estimation model that can be successful for all the asanas is a tough problem.

III. PROBLEM STATEMENT:

Recently to detect and identify Human action recognition is so difficult and with our fast-paced lives these days people often choose to exercise at home but feel the need for a teacher to check their exercise form. As these resources are not always readily available, human recognition can be used to create a self-paced exercise program that enables people to learn and practice and exercise properly. The Proposed system is used with Convolutional Neural Network for Recognizing Human Action Based on Yoga Pose Classification Using Image Processing and Deep Learning.

IV. LITERATURE SURVEY:

[1] "A Proposal of Yoga Pose Assessment Method Using Pose Detection for Self- Learning" By M. C. Thar, K. Z. N. Winn University of Information Technology Okayama University. This paper put forward a Yoga pose assessment method using pose detection to help the self-learning of Yoga. This paper proposed a Performance Evaluation System as Yoga Pose Training System to help the self-learning of Yoga. This paper proposed how to explore yoga poses using pose discovery to help self-study of yoga.

[2] "Real-time Yoga recognition using deep learning" By S. K. Yadav, A. Singh, A. Gupta and J. L. Raheja, Springer-Verlag London Ltd., 2019. An in-depth hybrid learning model is proposed using CNN and LSTM to monitor yoga in real-time videos where the CNN layer is used to extract features from the key of each frame found in open pose and followed by LSTM to provide temporary predictions. This paper shows a mobile assistant yoga app based on human key acquisition models for video chat.

[3] "Miss Yoga: A Yoga Assistant Mobile Application Based on KeyPoint Detection" By Sylvie Gerbaix. This paper shows a yoga assistant's mobile app based on personal key model simulation models where real yoga instructors guide and supervise their students to practice yoga with video chat. An in-depth hybrid learning model was proposed using CNN and LSTM to recognize yoga in real-time videos.

[4] "Learning Temporal Regularity in Video Sequences" By Jozsef Suto. The authors approach this issue by studying the production model of so-called normal motion patterns using multiple sources with limited control. Two-mode auto-built-in autoencoders with unencrypted performance especially we suggest two built-in autoencoders so that they can operate without minimal guidance.

[5] "Real-Time Anomaly Detection and Localization in Crowded Scenes" By Ammar Ladjailia. A fully unsupervised dynamic sparse coding approach for detecting unusual events in videos based on online sparse constructability of query signals from anatomically learned event dictionary. Authors propose a fully unsupervised dynamic sparse coding approach for detecting unusual events in videos based on online sparse constructability of query signals from an atomically learned event dictionary, which forms a sparse coding base.

V. SYSTEM ARCHITECTURE;

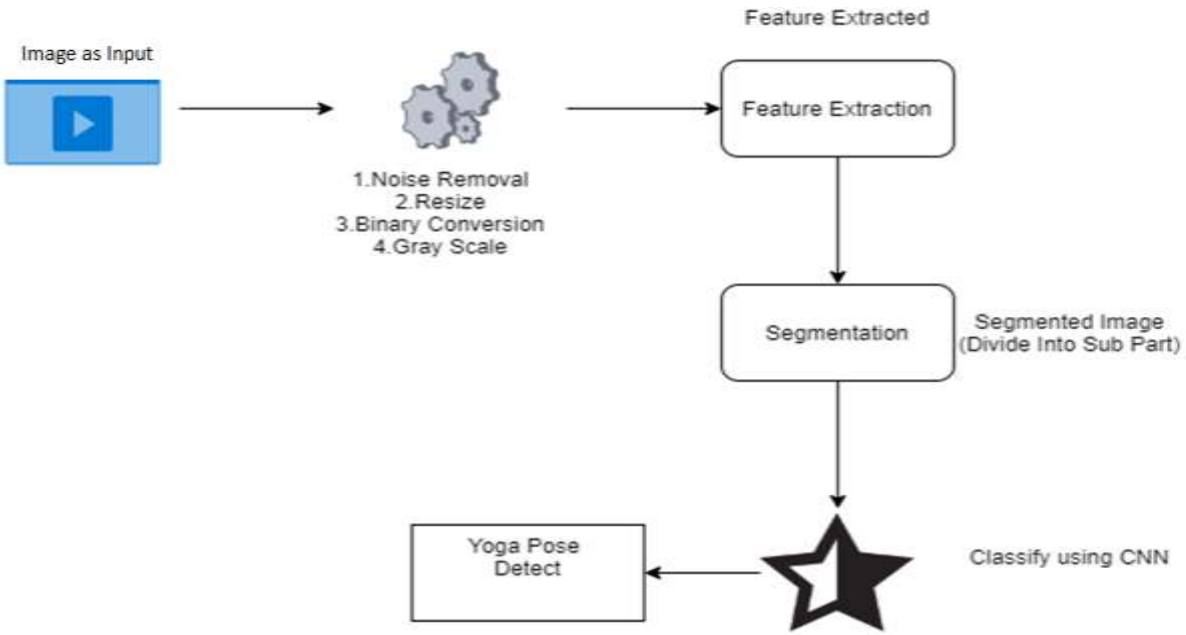

Fig. *1*: System Architecture

Modules:

i) Preprocessing- The purpose of pre-processing is the development of image data that prevents unwanted disfigurements or emphasizes other image features that are important for further development, or the transformation of geometric images (e.g. rotation, measurement, translation) is incorporated into pre-processing methods here as similarly using techniques.

ii) Feature Extraction- Feature extraction is part of a size reduction process where the original set of raw data is further subdivided and analyze by the SVM algorithm. So, when you want to process it will be easier. The most important characteristic of these large data sets is that they have a large number of variables.

iii) Classification- "The proposed system is used with Convolutional Neural Network for Recognizing Human Action Based on Yoga Pose Classification Using Image Processing and Deep Learning.

VI. ALGORITHM:

CNN

The convolutional neural network (CNN) is a phase of deep learning network. CNN represents a major improvement in image recognition. It works as

- Input - We have live image capturing of the user.
- Convolution - In this step, we will work on feature detectors, which act as neural network filters. Then work on feature maps.
- Pooling - In this layer, we reduce the image stack to a smaller size. Pooling is done after putting it through the launch layer.
- Flattening – We convert data into a 1-dimensional array to insert it into the next layer.
- Fully Connected - We have finished training the network and can begin to predict and evaluate the performance of the partition.

VII. ADVANTAGES:

- Anyone can learn and practice yoga from anywhere at any time from their comfort.
- As it's a free software so anyone can access it.
- Correctness of the pose can be done very quickly and also the precision is calculated.

VIII. DISADVANTAGES:

- Sometimes the system may get slow due to heavy consumption of memory.
- Users need to maintain little patience in order to get the pose detected correctly.

IX. CONCLUSION:

The time-distributed CNN layer to detect patterns between key points in one frame and the LSTM to study the patterns discovered in the latest frames. Using LSTM for the memory of previous frames and polling for de-noising, the results make the system even more robust by minimizing the error due to false keypoint detection. As the frames of a Yoga Images are sequential.

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