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Classification of yoga pose using machine learning techniques

J. Palanimeera *, K. Ponmozhi

Department Of Computer Applications, Kalasalingam Academy of Research and Education, Krishnankoil, Tamil Nadu, India

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ABSTRACT

Nowadays, yoga is that the part of existence during a number of the people. The human pose estimation is that the deep rooted trouble in computer vision. That has exposed in many challenges inside the beyond. They have many fields to capture the posture like video surveillance, biometric, webcam, sort of the equipment, etc. The pose detection techniques have observed and it'll be used to identify the posture and thus the accuracy of the yoga posture in machine learning techniques. To classify the yoga asana for Sun salutations set of postures in four machine learning models and pose estimation algorithm for a person's body is used for skeleton drawing in the real-time. Sun salutations set of posture are often collected the important time and used for the estimation of a pose algorithm for the accuracy result of yoga poses. We have used for various parameters. The find the results of classify of four machine learning technique during a sun salutation set of posture. Find the accuracy of knowledge in machine learning technique. This paper to classify the sun salutation yoga poses and which machine learning technique get the currency results of the pose. We have collected the info in one male participant. Their age, weight, height is often regarded. To detect the yoga pose supported the angle draw out from the skeleton joint of the estimation of a pose algorithm.

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1. Introduction

The subject is in the nature of the vulnerable and wide range health diseases of which musculoskeletal disorders may be a crucial arena and needs urgent attention. Once a year an outsize range of individuals are affected from various sorts of musculoskeletal disorders due to accidents or aging problem [1]. Human pose estimation may be a challenging problem within the discipline of computer vision. It deals with localization of human joints in a picture or video to make a skeletal representation. To automatically detect a person's pose in a picture may be a difficult task because it depends on variety of aspects like scale and determination of the image, illumination variation, background clutter, clothing variations, surroundings, and interaction of humans with the environment [2].

Computer vision techniques are wont to build AI software that works as a trainer. This software tells about the advantages of that pose and the accuracy of the performance. Yoga is a part of the life in many of us in recent years. This is often thanks to the advantages of the health. They are doing this in right way especially in right posture. Fig. 1 it gives the overview of this paper. They use machine learning modules an outsized number of image dataset has been created which sun salutation asana. The pose estimation algorithm has utilized in vision. This algorithm draws a skeleton of a person's body (shown in Fig. 2) by marking all the joint of a body and connects all the joints which provides a stick diagram referred to as the skeleton of a body (Table 1).

2. Related work

The review works of the physical body joint representation. The foremost of works are wont to color related and captured of the traditional camera. The machine learning algorithm has been used the model of BPNN, SVM, DT, NB classified of the techniques and used the tool of Kinect [3]. They use connect device to capture the posture for coaching to the elderly people to use the trial medicine and therapeutic service [4]. They need been wont to SVM of the machine learning model is assessed of the physical body posture is employed to 3D model is that the silhouette input data [5]. The large of the researchers have wont to the Kinect device [6]. They need wont to the sensor of the image within the Kinect device. It might to not capture the posture with the accuracy of high [7]. They even have wont to the Kinect v2. It provides to the high accuracy, but it require to the time is more [8].

* Corresponding author.
E-mail address: palanimeera@klu.ac.in (J. Palanimeera).

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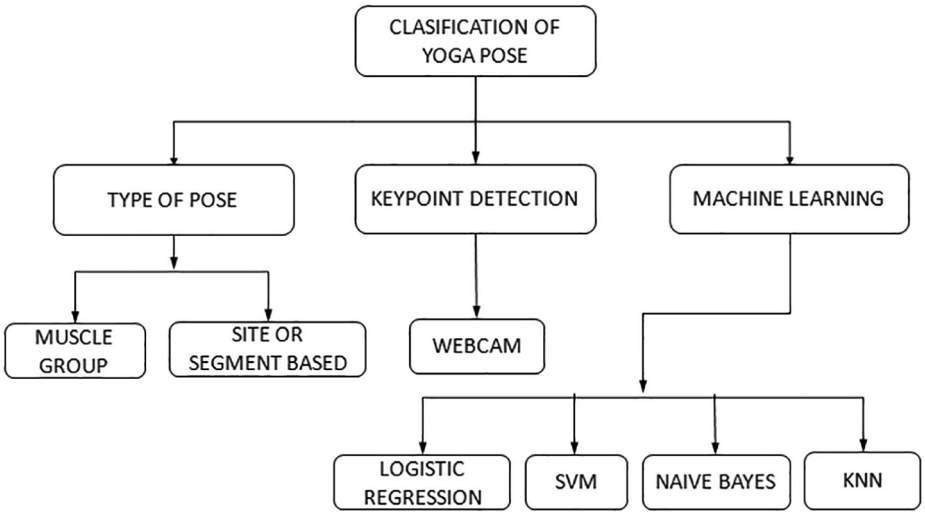

Fig. 1. Classification of yoga pose.

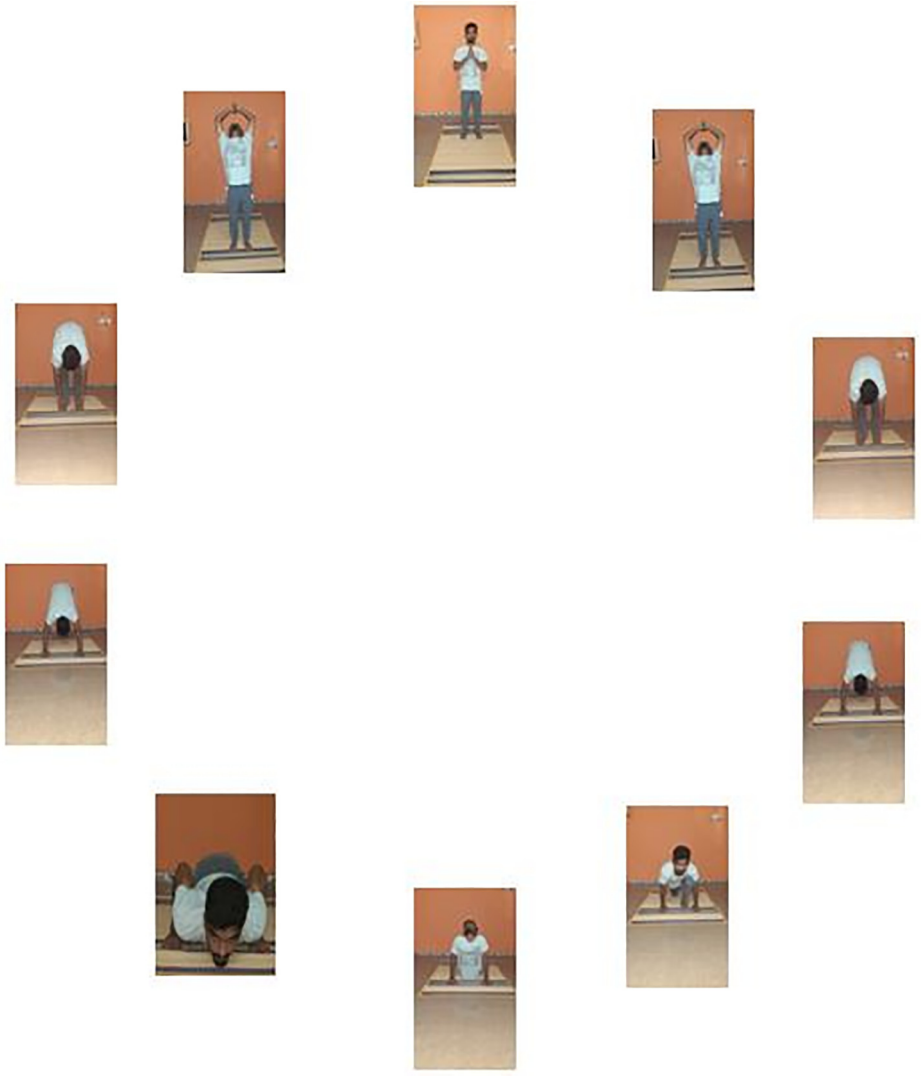

Fig. 2. Image of sun salutation asana data set.

Table 1
Data accuracy result.

S.N	Classifier of machine learning model	Accuracy
1	KNN	0.9902
2	SVM	0.9817
3	Naïve bayes	0.7347
4	Logistic regression	0.8461

3. Human pose estimation

Human posture recognition has made huge advancements within the past years. It's evolved from 2D to 3D pose estimation and from single person to multi person pose estimation [9]. Uses pose estimation to create a machine learning application that helps detect shoplifters whereas [10] uses one RGB camera to capture 3D poses of multiple people in real-time. Human pose estimation algorithms are often widely organized in two ways. Algorithms prototyping estimation of human poses as a geometrical calculation are classified as generative methods while algorithms modeling human pose estimation as a picture processing problem are classified as discriminative methods [11].

4. Dataset collection

The dataset is to the sun salutation yoga poses to collect to the normal webcam.

It consists of 12 poses it include the sun salutation asana, has performed the trainer. The image is taken from the traditional room. The space is employed to the daylight area. The capture the camera was normal webcam and to the person to perform to the yoga within the center of the camera. The space of the camera and the person in 4 m. Just one person's data are often collected. The person during the sun salutation of yoga pose collected to real time data. The pose is selection of variables for detection of posture algorithm it work efficiently.

5. Experiments and results

The gathering of Knowledge set after the steps are followed:

1. Training and testing the image
2. The skeleton has been created
3. The feature extraction
4. Classification of machine learning

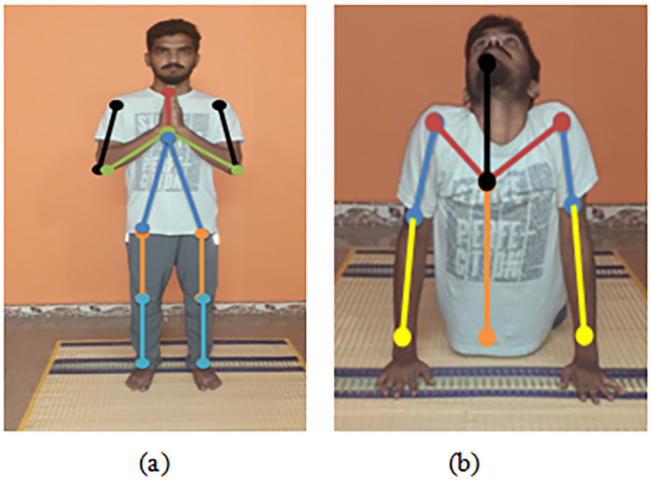

Fig. 3. The pose estimation can be created in skeleton.

5. Finally get the result

5.1. Skeleton created

First, The image was captured and therefore the parameter value can depart 1.5. Then the new image resized to 500*500 and use to the estimation of pose algorithm to urge the result for accuracy. The estimation of pose algorithm is often wont to the create the skeleton of the person to perform the yoga pose. They need to be marked in each physical body joint. Fig. 3 shows a stick diagram. This algorithm, it works accurate within the real time.

5.2. Feature extraction

Next, the pose estimation algorithm is often used. They need physical body, it 17 joints. 12 different angle us won't to detect and proper the yoga poses.

The joint angle calculated using formula

$$a^2 = b^2 + c^2 - 2bc(\cos A) \quad (1)$$

Wherea = between of point 1 and 2b = between of point 2 and 3c = between of point 1 and 3A = angle of point 2

Then find the distance of points

$$a = \sqrt{(x1 - x2)2 + (y2 - y1)2}$$

Where(x1, y1) co ordinate of point 1(x2, y2) co ordinate of point 2.

5.3. Classification of machine learning technique

Used for four machine learning models, namely KNN, SVM, naïve Bayes, logistic regression. The info it is often stored. The info need to type into training and test data set. They used for various parameters. After the evaluation the result, it can find.

6. Conclusion

This paper, to classify the sun salutation yoga poses and 4 machine learning model are classified. The yoga page is defected it supported the angle extracted from the pose estimation algorithm. The accurate result's gotten of machine learning models KNN. The get result of 96% of the machine learning Model. Future implementation of variety of individuals (group of person) doing many pages finding the results of SVM models.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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