YTC – YOGA TRAINER AND CORRECTOR

AI based yoga posture correction platform

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Abstract:

Yoga and exercise are can become our daily habit which is very beneficial for all the age types throughout the world. Many of the people cannot afford a personal coach or a guide to teach them. Yoga is such a thing that a person has to do it correctly if they don't that can lead to directly on our health. Yoga maintains the health system, on our flexibility and helps in many more good aspects in our lives. It is a fact that yoga and exercise can lead to a happy and healthy life. Our algorithm is going to suggest proper and correct poses to the user through which they can get the best results staying at home only. The most important of yoga poses is known around the world and proves the health benefits preached by ancient sages. As yoga becomes more important, yoga faces the following important challenges: Computer vision technology provides a promising solution for assessing human posture. However, these techniques are rarely used in the areas of health and exercise, and there are no specific references or projects. Named after yoga.

1. INTRODUCTION

Yoga is a group of physical, mental, and spiritual practices or disciplines which originated in ancient India and aim to control (yoke) and still the mind, recognizing a detached witness-consciousness untouched by the mind (Chitta) and mundane suffering (Duḥkha). It is most important to practice yoga poses accurately as any abnormal posture is not productive and tends to cause harm. This suggests having an instructor around while performing yoga. It is not always possible to have an instructor or to join yoga classes with nowadays lifestyle. An AI-based system helps to identify yoga poses and gives feedback or suggestions to users. It helps boost the physical health of a person and cleanses the body, mind, and soul of a person. Yoga can cure many diseases without any need for medicines. Human pose estimation is the computer vision problem in which the human pose of any person is detected when the camera receives an image of a human in front of it. The detection of human poses is done using key point's detection. These key points are the major points of the human body which include the nose, eyes, mouth, etc. There are two different ways to detect these key points. Some major work is done in the yoga poses detection using the human pose estimation field. To do this pose, the joints which are also known as key points of the human body, such as the wrists, elbows, knees, and ankles, are defined in the image or video. When the image is input to the pose estimation model, the coordinates of these recognized body parts are identified as output. Human pose estimation is a computer vision technique used to predict the position/pose or joint position of a part of the human body. To do this pose, the joints which are also known as key points of the human body, such as the wrists, elbows, knees, and ankles, are defined in the image or video. When the image is input to the pose estimation model, the

coordinates of these recognized body parts are identified as output with a confidence value that indicates the certainty of the human body.

2. Literature Survey

Human estimation is a hard-to-solve problem in the field of computer vision. It deals with locating human joints in an image or video to form a skeletal representation. AI Human Pose Estimation: Yoga Pose Detection and Correction by Rutuja Gajbhiye, Snehal Jarag, Pooja Gaikwad, Shweta Koparde, describes the methodology used to provide yoga pose estimation in Android applications, how the app is modelled, and how each component works. The approach used starts with passing the incoming image through a CNN classifier trained to look for people. When the human body poses are recognized, the pose estimation network searches for trained joints and limbs. The computer can then display the image to the user using markers that identify parts of the body.

Yoga Pose Detection and Correction using Posenet and KNN by Varsha Bhosale, Pranjal Nandeshwar, Abhishek Bale and Janmesh Sankhe focuses on exploring the different approaches for yoga pose classification, using PoseNet and KNN classifier. Using such deep learning algorithms, an individual can get the correct/ideal way/method to perform that specific yoga asana that he/she is trying to do. Using computer vision techniques and Open Pose (an open-source library), human pose estimation is used to estimate an individual's Yoga posture. The suggested system recognises the difference between the actual and target positions and corrects the user with high accuracy by offering real-time visual output and necessary instructions to correct the identified pose.

In Yoga Pose Estimation and Feedback Generation Using Deep Learning by Vivek Anand Thoutam, Anugrah Srivastava, Tapas Badal and Vipul Kumar Mishra, deep learning-based techniques are developed to detect incorrect yoga posture. With this method, the users can select the desired pose for practice and can upload recorded videos of their yoga practice pose. The user pose is sent to train models that output the abnormal angles detected between the actual pose and the user pose. With these outputs, the system advises the user to improve the pose by specifying where the yoga pose is going wrong. The proposed method was compared to several state-of-the-art methods, and it achieved outstanding accuracy of 0.9958 while requiring less computational complexity.

3. Data and Sources of data

There are ten different steps / positions that make a Surya Namaskar. Before doing a Surya Namaskar we should chant all the thirteen chants in the given order starting from "Om Mitraaya namahaa : Every step in Surya Namaskar is a different yoga position. During every step we have to do the 'purak' and rechak breathing steps alternately. Eg. Step 2- purak, Step 3- rechak- Step 4 – purak and so on. To get the maximum benefit of Surya Namaskar hold yourself stable in every position for at least 10 to 15 seconds.

4. Research Methodology

The Proposed Model will get trained using the output video which consist images of different poses. The web cam captures a video of a person performing various Surya Namaskar poses. There are 12 Surya Namaskar postures present in the database. The proposed system identifies the key points. These key points are compared to the poses present in the database to see if there is any correction required. If the two poses are highly similarity status, then the pose of a user is considered perfect. If the user's yoga pose does not match the coordinates of the pose present in the database, the system will generate instructions for the user to correct their pose. The user can follow the instructions which appears on the screen and correct the mistake. After practicing yoga, the user can continue the session or end the practice session.

5. Advantages

The strengthening and lengthening effects of yoga can improve mobility and function, helping the body to recover from physical injury. And the benefits for mental health can lead to improved sleep patterns and enhanced wellbeing, greatly improving your quality of life. Yoga can support the healing process and help the person experience symptoms with more centeredness and less distress.

6. Application

Yoga trainer and corrector can be used to improve someone's mental, physical health, their flexibility, quality of life, relief stress and many more by showing correct yoga poses.

7. Theoretical Framework
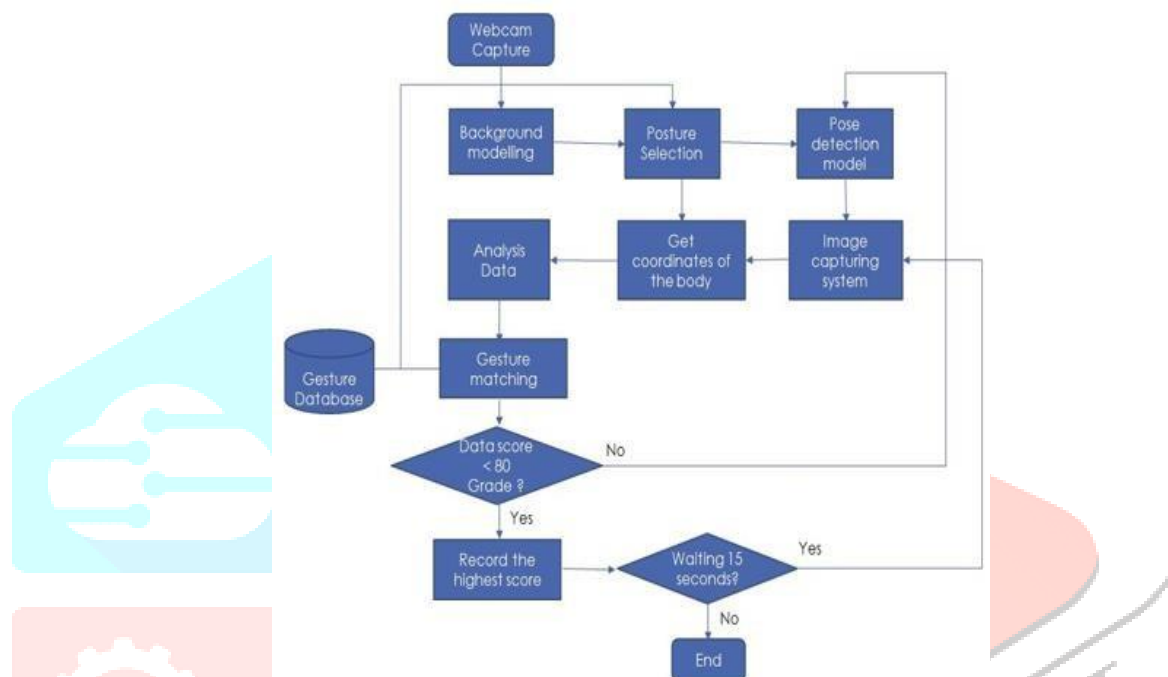
Pose – Overall, Pose Net will move returned a pose object containing a list of key elements and an instance diploma self-warranty score for a detected person. Pose self-warranty score - Determines the overall self-warranty withinside the estimation of a pose, ranging amongst 0.0 to 1.0. It can be used to cowl poses which are not deemed strong enough. Key point - A part of a person's pose wherein the crucial aspect body issue is predicted, which consist of the nose, right ear, left knee, right foot, etc. Key point Confidence Score - Determines the self-warranty of an predicted key point feature is accurate, ranging amongst 11 0.0 and 1.0. It can be used to cowl key elements are not deemed strong enough. Key point Position - 2D x and y coordinates withinside the proper input picture wherein a key aspect has been detected.

8. Conclusion

Over the last few years, a lot of research is done to estimate human position. Human posture estimate differs from other computer vision. It is a challenge for human posture estimation to locate and assemble human body parts based on an existing human body posture. The use of Yoga Trainer and Corrector can help people avoid injuries and increase their health. The results were quite impressive. The movement of the yoga Asanas can be analysed using video analysis to check their correctness and give advice. Model designs such as Pose net, Ml5, and KNN Classifier are appropriate for video-based analysis.

9. Future Scope

The proposed model presently classifies the most effective 6 yoga asanas. There are some yoga asanas, and therefore growing a pose estimation version that may be a hit for all of the asanas is difficult to trouble. The dataset may be improved by including extra yoga poses carried out through people now no longer most effective in indoor placing but additionally outdoor. The overall performance of the fashions relies upon the exceptional of OpenPose pose estimation which might not carry out nicely in instances of overlap among

human beings or overlap among frame parts. A transportable tool for self-schooling and real-time predictions may be carried out for this system. This painting demonstrates the pastime's reputation for realistic applications. A method similar to this could be applied for pose reputation in responsibilities inclusive of sports, surveillance, healthcare, etc. Multi-character pose estimation is entirely new trouble in itself and has plenty of scope for research. There are plenty of eventualities in which unmarried character pose estimation might now no longer suffice, for instance, pose estimation in crowded eventualities might have more than one folk as a way to contain monitoring and figuring out the pose of every individual. A lot of things inclusive of background, lighting, overlapping figures, etc. that have been mentioned in advance on this survey might in addition make multicharacter pose estimation difficult.

10. References

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