

Yoga Posture Recognition

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Abstract: Nowadays Musculoskeletal disorder is increasing day by day in humans because of accidents, and because of the busy schedule of employees, they also face an identical problem and also the people between age of 35 to 60 facing the same problem. to beat this problem physical exercises can reduce this disorder and yoga could be the best choice for this, yoga is an important physical exercise for all the issues.in short, yoga is the best medium. but for doing yoga we'd like proper training and also a trainer who will monitor accuracy, body movement. so, to boost the popularity accuracy with reduced training times, we must be prepared Microsoft Kinect to recognize different mutual points of the human body in real-time and from this mutual duration we assume various angles to live the accuracy of specific yoga poses for a user. To test also, explain the recommended program, we decided video series of yoga. Our proposed system can successfully recognize different yoga poses in real-time.

INTRODUCTION: -

Human naturally is vulnerable and subject to wide-ranging health diseases of which musculoskeletal disorders is a crucial arena and needs urgent attention. Every year a wide range of people are affected by various sorts of musculoskeletal disorders due to accidents or aging problems. Yoga can promote positive physical change. Studies have shown that yoga is effective in managing symptoms associated with musculoskeletal disorders including osteoarthritis carpal tunnel syndrome, hyper kyphosis, and low back pain. Additionally, Yoga shows significant improvements in motor skills and physiological methods that have a vital sign, heart speed rate, and human body weight have been noted. Research also suggests that the cardiopulmonary benefits of yoga include improvement of cardiorespiratory wellness as well as improved forced expiratory volume and increased vital capacity. Traditionally, yoga is completed during a yoga centre within the presence of a yoga trainer which can lead the victim into remedial assistance? Our solution suggests a foreign yoga training approach without the trainer where the patient can substitute in front of a tool and perform yoga poses correctly without the necessity of a trainer or being present at the yoga training centre. Real-time human pose detection may be a growing and important area which specializes in realizing and understanding the human pose from depth images. With the introduction of Microsoft Kinect, it became easier to understand the human pose. Till now a wide range of labour is completed on human pose detection, physical rehabilitation using Kinect. But, Yoga an important aspect of physical rehabilitation remained untouched. In our work, we want to discover yoga postures

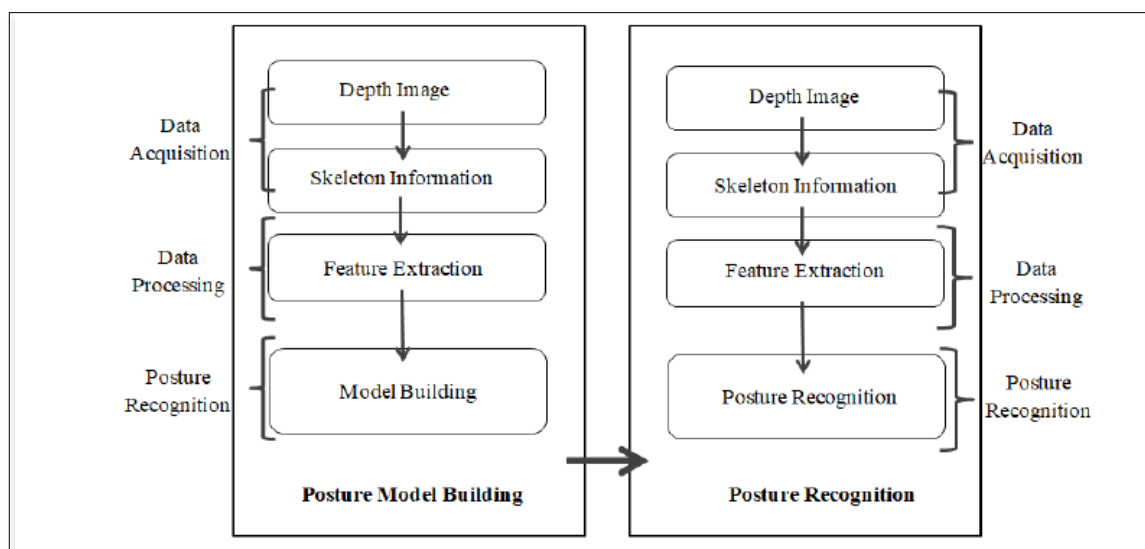


Fig.1 Steps of the Proposed System



with a human from Microsoft Kinect and cross-check the poses against true data. We have set a reference model of true data surely poses concerning which we've detected the poses. The main challenge was the detection of body co-ordinates joints. Using the co-ordinates of Kinect capture, the poses are detected. The purpose is to remotely monitor the yoga [4]poses for patients. The system will work as a personal guidance system. The purpose of remotely monitoring yoga poses is to extend fitness with minimal monetary investment. As at a particular time doctors [3]or physicians can't take care of all the patients, [2]they will benefit both the patients and doctors in terms of efficiency.

Objective:

1. To enable the scholar to possess healthiness.
2. To practise mental hygiene's.
3. To maintain emotional stability.
4. To integrate moral values.
5. To attain higher level of consciousness.

RELATED WORKS: -

In the literature, several works have been proposed for human posture recognition. Among them, most of the works use colour information captured from traditional cameras. For human gesture recognition the use of Kinect does investigate in articles with several data tunnelling organizations methods such as backpropagation neural network (BPNN), help vector device (SVM), choice tree (DT), and simple Bayes (NB) [1]. Coaching of elderly personnel through Kinect should be done of prior value because of this development like telemedicine and distant therapeutic services. While the discussion of this potential of Kinect being a fitness monitoring method must held presented on with its control throughout blocking parts of everybody or things that are not connected to the view. SVM method is applied to analyse body position from a 3D optical frame created of a collection of profile information data in which passes the distinguished [5]human positions in thumbnail image form. A multiclass SVM is used to classify human posture using a human skeleton, angles of six sticks in the exoskeleton, including objective change vectors to understand a person behaviour analysis in. In a centroid radii model as shape descriptor does apply to build a human position within several frames. Under [1], a method is intended toward contemporary body tracking and posture recognition in cluttered environments in the context of human-robot interaction. In [4], a combination of MPEG-7 contour-based shape descriptor and projection histogram did manage to understand this principle positions also the histogram created a guide to follow this principle positions more the by the segmentation process. Great efforts have been devoted to vision-based human posture recognition. However, creating a healthy individual position identification operation with excellent production but remains to be a challenging task. Conventional approaches in this area were generally based on regular sensor such as RGB camera, which is not only computationally costly but also easily affected by the brightness variations and background clutters [3]. Recently there has been a growing company within managing Microsoft 3D sensor Kinect for vision-based human posture recognition [2]. In addition to an RGB camera, Kinect contains a set of built-in IR sensor the system, which can capture distance information between object and that IR sensor and gives intensity icon at the case charge like 30fps with a resolution of 480*320. Moreover, the accuracy also the robustness of Microsoft Kinect to discover these mutual spots of the human body is perfect which aids to detect complex human postures [1].

EXISTING SYSTEM:

The problem definition for planning the system is to keep up the information on Yoga Posture Recognition. It's needed to do some exercise due to this pandemic situation. Due to this situation we have to maintain social distancing then we can't join any yoga class so in this system we don't required any trainer to do yoga. We can do exercise using this system. This system detects the posture and give the instruction on screen to do next step. It's very helpful to us.

PROPOSED SYSTEM

There are three steps required to implement the project.

1. Information Acquisition:

For capturing video information, Kinect is well equipped with its in engineered infrared optical device projector that's combined with amino chrome CMOS device. This device conjointly features a multiarray mike and an RGB camera that facilitates to capture image. aside from ability of Kinect to facilitate color [3]image and depth image, it conjointly features a skeletal pursuit tool that may acknowledge twenty joints of a person's body as shown in (Fig. 2.) Each joint purpose saves 3 information- index price, coordinates on x, y and z direction and standing of joint. The index price is exclusive for every joint. The co-ordinates provide the worth in x, y, z direction of the joint as shown in fig3. The standing info provides whether or not the joint is half-tracked or not.

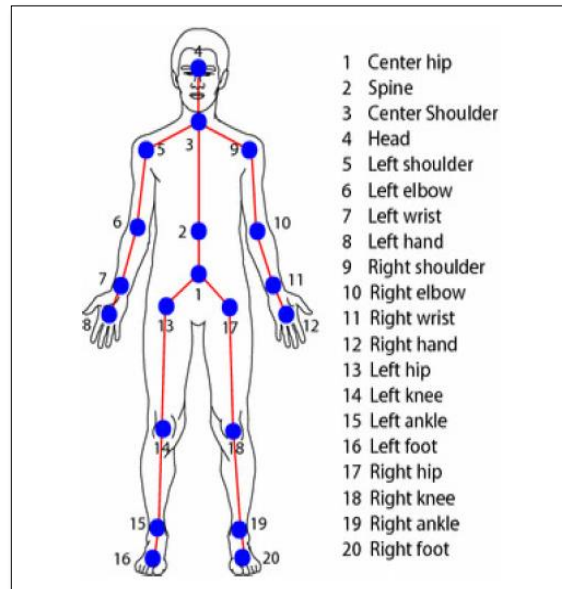


Fig 2. Human Skeleton Information from Kinect

2. **Information process:**

From the pursuit of joint points of human skeleton by Kinect we are able to extract the coordinates of the joint points. As yoga positions area unit predefined and that we shall acknowledge specific 3 poses we are able to leave the joint points marked as 8, 11, 2, 16, 20 for additional process. For the cause that we tend to try to discover, these joint points won't have any useful price for precise detection.[3] As an example, the joint purpose price of Left wrist joint and right wrist joint area unit enough for detection that is why the [2]joint purpose price of paw and mitt area unit unimportant and weren't taken into thought. The same instance may be given for Spine, left foot and right foot joint purpose. During this paper, we'll conclude the joint angles of the chosen points for deed accuracy. during this context, {we will area unit going to} use 15 points for additional process that are shown as marked in fig4. The points that area unit used for additional process area unit marked blue at intervals a black circle and also the points that don't seem to be used area unit marked in blue circles.

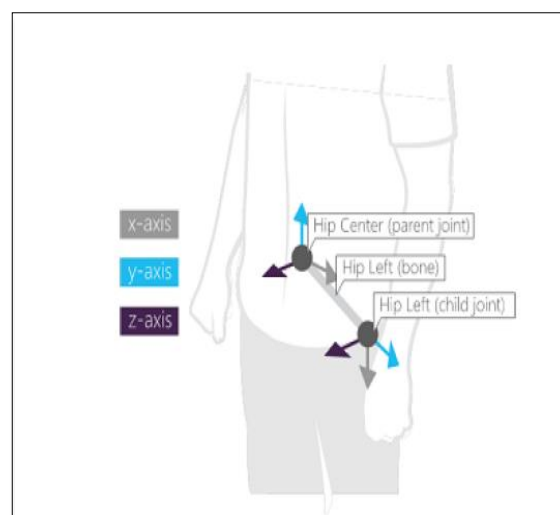


Fig.3 Three Co-ordinate of joint points in Kinect

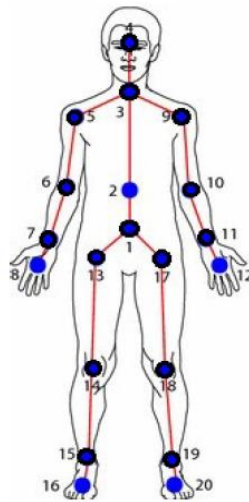


Fig4.Selected joint points for yoga Pose Detection.

3.Yoga Posture Recognition: -

For yoga posture recognition we tend to propose to use the subsequent technique wherever we'll use the chosen ten joint points for calculative. All the x, y and z coordinates of the joint points determines the structure of each single yoga position. we've got engineered the reference structure for each yoga position by gathering info of the joint points from human posture of five gymnastic exercise beneath management of certified scientist. Then we've got manipulated the information of those five models and came up with a typical reference model by taking the typical angular distances of the joint points that makes our system good to check with candidate frames.

To calculate the angle between 3 points in 3d axis we've got followed the construct of vectors. for instance, in Fig 4, 3 points three (Shoulder Center), five (Shoulder Left) associate degreeed vi (Elbow Left) can create an angle C. For hard the worth of angle 356 we are going to produce 2 vectors 53 and 56. Let angle 356 is denoted as angle nine and 53 is denoted as xz and so the angle between these 2 vectors are found from the circular function formula for locating angle between vectors. The formula for locating the circular function angle for this instance

$$\Theta = \cos^{-1} \frac{(\vec{XY} * \vec{XZ})}{(|\vec{XY}| * |\vec{XZ}|)} \quad (1)$$

Applying this formula, we've got calculated all the angles from angle A to angle J. Let the check angle be T, the reference angle be denoted as R and also the total range of angles square measure denoted as metallic [2]element then the common deviation of a cause nine are often calculated as follows

$$\delta = \frac{\sum(T - R)}{TA} \quad (2)$$

The recognition is claimed to be unsuccessful, if the common deviation or specific angle deviates suddenly from the standard.

REQUIREMENTS

HARDWARE REQUIREMENT

Processor: Intel Core I3

RAM: 4GB

Hard Disk: 500 GB

SOFTWARE REQUIREMENT

Operating System: Microsoft Windows 10

Software Package: Visual Studio 2010, C#.net

APPLICATIONS:

1. It also helpful for Eyesight improvement.
- 2.And also hearing and voice Development.



- 3.It develops our memory.
- 4.It develops our physical stamina.
- 5.It also develops our brainpower.

ADVANTAGES:

1. It makes our body more flexible even an individual can easily touch his/her toe and can bend down.
2. It makes us suitable and protect us from back pain and arthritis.
3. It is a simple thanks to reduce by using different postures and haven't any side effect.
4. Regular yoga controls the high vital sign problem.
5. Yoga practice keeps you cheerful and improved depression.

DISADVANTAGES:

1. Excessive and difficult posture can give physical injury, cramps in several body parts.
2. Yoga may be a very long yoga which isn't suitable for all age groups and all genders.
3. Choosing inappropriate yoga posture can affect badly in one or differently.

CONCLUSION:

Maintaining and promoting the varied Indian yoga traditions. To conduct workshops, seminars round the world. To bring specific amount of self-discipline within the operations of the yoga institutions. Certifications of yoga professionals and yoga schools. To prescribe different courses for imparting yoga education, training, therapy and research. The purpose of yoga is to make harmony within the physical, vital, mental. Yoga, as a heed practise, can help correct basic limitations of the mind by improving self-awareness, self-control and self-worth.

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