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**DECLARATION**

We hereby declare that the project entitled **“YOGA 360”** is the work done during the periodfrom **Nov 2020 to Jan 2021** and is submitted in partial fulfillment of the requirements for the award of degree of Bachelor of Technology in Computer Science and Engineering from MLR INSTITUTE OF TECHNOLOGY, Hyderabad. The results embodied in this project have not been submitted to any other university or Institution for the award of any degree or diploma.

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**Department of Computer Science & Engineering**

ABSTRACT

We have always heard the word ‘health’ and ‘fitness’. We use it ourselves when we say phrases like ‘health is wealth’ and ‘fitness is the key’. What does the word health really mean? It implies the idea of ‘being well’. We call a person healthy and fit when he/she function well physically as well as mentally. Good health and fitness are not something which one can achieve entirely on our own. It depends on their physical environment and the quality of food intake. We live in villages, towns, and cities. In such places, even our physical environment affects our health. Therefore, our social

responsibility of pollution-free environment directly affects our health. Our day-to-day habits also determine our fitness level. The quality of food, air, water all helps in building our fitness level.

INTRODUCTION

Covid-19 has forced us to exercise indoors. But home fitness has been shaping our lives for decades.

Home fitness has been in our lives for decades – and it’s taken on a new role since the Covid-19 pandemic closed gyms around the world. Whether it’s a yoga class on Zoom or panic-buying a Peloton, many of us are trying to find ways to exercise effectively within four walls. But where did the industry of Thigh master and Wii Fit come from – and where’s it heading after the pandemic?

Exercising has been around for a long time; yoga in India, tai chi in China and Olympic training in Greece go back thousands of years, but ‘fitness’ as we know it today is a relatively new construct, not even 200 years old. Working out isn’t just about staying in shape; the lines between fitness and the self-help movement have become blurred. “We need exercise not just as a beauty regimen now, and not just as a heart and health situation, now we need to do it for our mental health. This is now a burden in all of our realms,”

1.2 PURPOSE OF PROJECT

“**Over** -**eating** during these difficult days is something that’s troubling almost everyone. Being at home all day makes a person turn towards the refrigerator and the kitchen a bit too often. With no physical activity and too many opportunities to snack and binge eat while sitting on your couch can have adverse effects on our body, weight and overall health,” which is making people lack their health and immunity. recently all of us have been facing issue with the COVID-19. It has been testing our immunity and wellness around a year. So, to reduce this health constraint we the team B1 are coming up with an idea. where you stay at home and make your health

**2. Literature** **Survey**

2.1 Existing System

Wii Fit was originally designed as a health and fitness interactive training experience for the general public. There are, however, many examples of Wii Fit being utilized in clinical settings. This article aims to identify the contribution of Wii Fit in the field of health promotion and rehabilitation by: identifying the health-related domains for which the Wii Fit series has been tested, clarifying the effect of Wii Fit in those identified health-related domains and quantifying this effect. ii Fit was originally designed as a health and fitness interactive training experience for the general public. There are, however, many examples of Wii Fit being utilized in clinical settings. This article aims to identify the contribution of Wii Fit in the field of health promotion and rehabilitation by: identifying the health-related domains for which the Wii Fit series has been tested, clarifying the effect of Wii Fit in those identified health-related domains and quantifying this effect. Wii Fit has the potential to be used as a rehabilitation tool in different clinical situations. However, the current literature includes relatively few randomized controlled trials in each population. Wii Fit could be very beneficial for people with MS. Yoga, strength, balance, and aerobic training, which are all included in Wii Fit, have

been found to reduce fatigue, increase fitness levels, and improve quality of life in people. Wii Fit may minimize MS-related barriers to engaging in PA. For example, Wii Fit may enable people with MS to engage in exercise in their homes without expending unnecessary energy that is associated with exercising at a health club. Wii Fit may foster socialization by allowing participants to play and compete with friends and family members. Last, but perhaps most important, Wii Fit games may be fun to play, which may provide distraction or relief from the daily problems and stress that people with MS can experience and help foster intrinsic motivation to promote routine

Wii fit system Wii fit controller

• Disadvantages of Wii fit:

- Wii Fit may also address a potential drawback of typical home exercise programs.

- loss of opportunities for socialization.

- safety concerns about the unsupervised Wii Fit exercise program

-Most importantly it’s very expensive. Around 250$ for the system and additional cost for Wii fit is 70$.

-basically, deals with all the core workouts or activities

3.1 Proposed System

Here comes our idea which makes all these problems get into one solution. “Yoga 360” this particular web application makes your workout and yoga sessions much more interactive and enthusiastic. It is a camera-based application which helps in monitoring your body position which makes your session more accurate. It also helps in comparing your previous work versus your present work which makes it much more productive. whereas a human interaction may not be accurate but yoga 360 helps in mentoring and monitoring your every single move which makes us self-progressed. Our project also helps in making the session fun with your friends or partners. There are so many bonus rounds where you can compete with them and have fun.

**3.2 Advantages of proposed system**

• User friendly which makes you interact better.

• The user can interact with their friends virtually which makes you socialize.

• yoga 360 makes it budget friendly.

• affordable by everyone.

• A good Mentor for your physical health activities (yoga, gym).

**System Requirement**

-Requires internet connectivity.

-A Good camera which will help it in better understanding.

-More than ~ 2.5 MP (mega pixel)

**System Design**

**Proposed System Architecture**

Pose estimation from video plays a critical role enabling the overlay of digital content and information on top of the physical world in augmented reality, sign language recognition, full-body gesture control, and even quantifying physical exercises, where it can form the basis for yoga, dance, and fitness applications. Pose estimation for fitness applications is particularly challenging due to the wide variety of possible poses (e.g., hundreds of yoga asanas), numerous degrees of freedom, occlusions (e.g., the body or other objects occlude limbs as seen from the camera), and a variety of appearances or outfits. Our approach provides human pose tracking by employing machine learning (ML) to infer 33, 2D landmarks of a body from a single frame. In contrast to current pose models accurately localizes more key points, making it uniquely suited for fitness applications. In addition, current state-of-the-art approaches rely primarily on powerful desktop environments for inference, whereas our method achieves real-time performance on mobile phones with CPU inference

**IMPLEMENTATION**

We need to train the machine with required dataset. So, these data sets consists of different aasans and exercises in it with a particular data name and id . while performing those poses the system interacts with these data sets and gives the output to the user. Intially the the machine needs to be trained to find the particular activities performed by the user.so these trainings will be in multiple number which makes the machine choose the most precise ones. So , the impelemtation of this process id done through a camera which requires min 2.5 pixels by which the machine can capture better readings of the user and compare it to the dataset. Then it tracks and records the previous data and compares it with the stored data of the user and displays the output when user asks for it .

pose detection:- yoga example

The simple approach is to incorporate a person detector first, followed by estimating the parts and then calculating the pose for each person. This method is known as the **top-down** approach. Another approach is to detect all parts in the image (i.e., parts of every person), followed by associating/grouping parts belonging to distinct persons. This method is known as the **bottom-up** approach.

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The detector is inspired by our own lightweight Blaze Face model, used in MediaPipe Face Detection, as a proxy for a person detector. It explicitly predicts two additional virtual keypoints that firmly describe the human body centre, rotation and scale as a circle. Inspired by Leonardo’s Vitruvian man, we predict the midpoint of a person’s hips, the radius of a circle circumscribing the whole person, and the incline angle of the line connecting the shoulder and hip midpoints. The landmark model in MediaPipe Pose comes in two versions: a full-body model that predicts the location of 33 pose landmarks (see figure below), and an upper-body version that only predicts the first 25. The latter may be more accurate than the former in scenarios where the lower-body parts are mostly out of view.

Internal working of pose Detection.

The current standard for human body pose is the COCO topology, which consists of 17 landmarks across the torso, arms, legs, and face. However, the COCO keypoints only localize to the ankle and wrist points, lacking scale and orientation information for hands and feet, which is vital for practical applications like fitness and dance. The inclusion of more keypoints is crucial for the subsequent application of domain-specific pose estimation models, like those for hands, face, or feet.

Pose estimation refers to computer vision techniques that detect human figures in images and videos, so that one could determine, for example, where someone’s elbow shows up in an image. It is important to be aware of the fact that pose estimation merely estimates where key body joints are and does not recognize who is in an image or video. Pose estimation has many uses, from interactive installations that react to the body to augmented reality, animation, fitness uses, and more. We hope the accessibility of this model inspires more developers and makers to experiment and apply pose detection to their own unique projects. While many alternate pose detection systems have been open-sourced**,** all require specialized hardware and/or cameras, as well as quite a bit of system setup**. With PoseNet running on TensorFlow.js anyone with a decent webcam-equipped desktop or phone can experience this technology right from within a web browser.**Here using this TensorFlow model we can train the system the poses with their names to detect and compare the pose of a person doing yoga Sans Infront of camera.

**Result:**

As we can see the above two images. We can know the difference between the trained images for the machine.

In the first image we can get to see it has higher precision compared to user 2. This shows the precision obtained by the machine in showing the output.

**Conclusion:**

The need to stay home has created incredible opportunity for virtual fitness with yoga 360. By this point, we've all read for the headlines of dozens of articles along the lines of "How Coronavirus is Changing Forever in the case of fitness it's certainly true that we're likely to see some lasting changes, but a better headline might be "How Coronavirus is Enhancing Fitness Forever. In this pandemic more people are trying video and physical workouts than ever before. Some love them some can't wait to get back to the studio: It's the optimal option for now, and in the long term, Yoga 360 may give more people an opportunity to work out when and where they are able to even more frequently which helps in better fitness and wellness. As health is our first priority in life, we need to take care of it. Evolving with the technology, it is making us better and worst too. depends on us how we are adapting to the situation.

As our more difficult data set shows, there is still room for improvement. The parameters of the body model could be adapted to the specific subject being tracked. Discriminative partial pose detectors could be learned specifically for integration with this framework to focus on the remaining error modes.

**Future enhancement’s**:

Computer vision is being used in the detection and estimation of athletic movements such as yoga poses, deadlifts, and other strength-training poses. It is a challenging but important task.

In the above scenario, programmers prefer to use single-pose detection rather than multi-pose detection. The reason being, it is a less complicated detection method and delivers more accurate results.

Through exercise and fitness, computer vision technology has also improved healthcare in a couple of ways. For starters, it has aided in detecting body movements and made it easier for AI-powered physical trainers to detect wrong poses that are dangerous for fitness enthusiasts. They will estimate the position of an individual as they workout to minimize the chances of suffering injuries.

The same concept applies during medical treatment procedures such as physical therapy. Computer vision will detect joint motions of the patient in real-time and offer proper guidance through an AI coach, on the proper way to perform the exercises to avoid further injury.

In simpler terms, computer vision technology has made home workouts more efficient. It has also reduced the amount of money payable in gym memberships and helped to communicate whether or not the exercise was done correctly

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