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Yoga Posture Correction and Detection.

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A B S T R A C T

Exchange of words among the community is one of the essential mediums of survival. These people communicate using "Sign Language" among their communities which has its own meaning, grammar and lexicons, and it may not be comprehensible for every other individual. Our proposed methodology focuses on creating a vision-based application that interprets the sign language into understandable speech or text on an embedded device and this is done using deep learning techniques and machine learning algorithms. The dataset has been split into training data and test data in the ratio 9:1. This work involves CNN, IoT and Python Language.

Keywords: Convolutional Neural Network, Gesture hand language, Machine Learning, Alphabet.

1. INTRODUCTION

1.1 Significance

Yoga is a practise that has been around for ages and was created to help people with their physical, mental, emotional, and spiritual well-being. It has been a long-standing custom in India and is currently gaining popularity in Western culture. In a superconscious condition known as Samadhi, "yoga" refers to the unification of our particular consciousness with the Universal Divine Consciousness. The Rigveda, the oldest book ever written by humans, references the yogic meditation of the wise, and the Yajurveda urges us to practice yoga in order to improve our mental health, physical stamina, and wealth. The Upanishads are rich in yogic ideas. In addition, the Bhagavad-Gita frequently uses terminology connected to yoga, such as pranayama and samadhi.

Yoga practice can improve many different physical health concerns, including anxiety, insomnia, and depression. Yoga has many important advantages; hence a self-training method is needed. Our prototype will do away with the requirement to pay the teacher and lessen any unwanted effects brought on by bad posture. The user may practice yoga at anytime and anyplace thanks to this prototype. The suggested system determines its nature as well as if a person is doing improperly.

1.2 OBJECTIVES OF PROJECT

- To study and analysis of various CNN models for pose of yoga detection.
- To provide the virtual assistance based on current pose for user for correction.
- To recognize the postures more accurately.
- To make the users do the posture with high accuracy.
- To detect yoga type.
- To give the user more practice until they get the posture more perfectly

2. LITERATURE SURVEY

The dataset was prepared on various models for central issues got from two different posture assessment modules, Open Posture and Veil RCNN all together recognize the most reasonable posture assessment module for the ongoing framework, when Open Posture was at long last chosen as the suitable posture assessment module which was subsequently coordinated to the system.

The framework surveys a Yoga posture of a student by: 1) Distinguishing the posture or skeleton 2) Computing the distinction of the body points between the posture of a teacher and that of a client, 3) Showing the inaccurate part among student and educator, and 4) Characterizing the posture into four levels

with the typical point contrast. The adequacy of the framework was affirmed through applications to three people with various ages, sexual orientations, and body shapes utilizing three Yoga poses.

Introduced an intelligent framework that utilizes Kinect v2 for 6 Yoga presents acknowledgment with order voices to imagine the guidelines and pictures about the stances to be execution. Pointed that this framework be utilized for the advancement of helped Yoga movement that can work on the client's presentation. The outcomes revealed in this examination lead to a serious level of recognition.

Proposes a joint measurable model for human movement recreation and joint force assessment from monocular picture successions. consolidate 3D posture assessment through a factorization approach with an actual model of the human body to implement actual legitimacy on assessed 3D movements and to permit the assessment of undetectable internal moments.They tried the exhibition of the proposed technique concerning believability, exactness and emotional quality on a dataset of 45 strolling and 31 lifting movements as well as on this present reality illustration of the KTH data set.

Proposed framework showed that a consecutive engineering made out of convolutional networks was able to do certainly learning a spatial models for present by conveying progressively refined vulnerability saving convictions between stages. Issues with spatial conditions between factors emerge in different areas of PC vision like article discovery.

3. IMPLEMENTATION DETAILS OF MODULE

Techniques for convolutional neural networks were utilized to train and test the dataset that was obtained. A large portion of the data is utilized for training, while the remainder is used for testing. A Convolutional Neural Network's two primary parts are feature extraction and classification. Following the supply of the picture input, the input image's characteristics are obtained and translated into pixel values. ReLU and pooling are two steps that Convolutional Neural Networks go through before reaching the connected layer, the final level. The picture information was gathered from kaggle. Two sections make up the gathered dataset. 80 percent for instruction and 20 percent for testing, for example. Different techniques are used, including as feature extraction and preprocessing. In order to classify, CNN was employed. PHP and Bootstrap were used in the development of the front end and Python in the back end of the web application. The user-taken image is passed, and the features of the captured image are extracted. Extracted Features are compared to the training model, and based on the proximity of the matches, the predicted output is determined

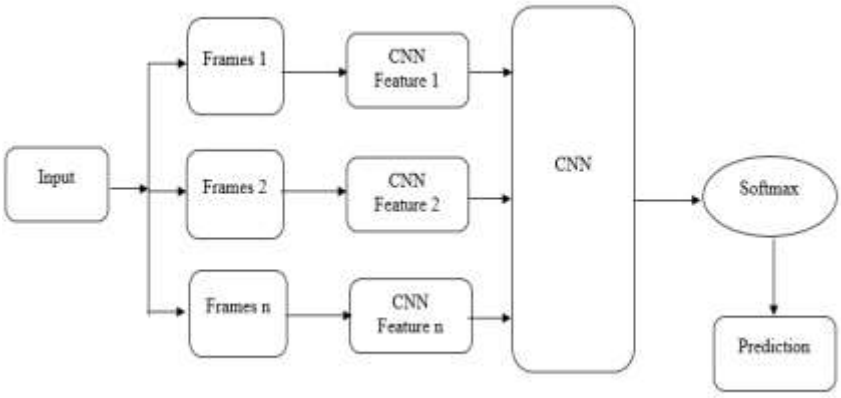


Fig 3.1-Flow chart of project

3.1 Dataset:-The dataset used is the Yoga Pose Exercise (YPE) dataset . This dataset focused on various yoga exercises ex: Mountain Pose (Tadasana), Tree Pose (Vrk- sasana) ,Triangle (Trikonasana) , Warrior I (Virabhadrasana I) , Downward-Facing Dog (Adho Mukha Svanasana) , Upward-Facing Dog (Urdhva Mukha Svanasana) , It may have been performed by different actors with different shapes and sex The videos are taken by Microsoft Kinect sensor, which contains a depth and RGB camera. Both RGB and gray-level of these videos are stored as well as their depth. In our system, only 8 yoga exercises are detected.

Pose Net: Pose Net is a pre-trained model used to pose estimation. Pose Net is choosen for its ease of installation and use for end-users and its lightweight. There are two architectures in Pose Net: Res net architecture and Mobile Net architecture. The implemented architecture in our system is the Mobile Net architecture. One of the important factors in choosing Pose Net with Mobile Net architecture is its high performance. The output from Pose Net is heat maps with its confidence score, which is the probability that a part of that key points type exists in that position. The second out- put is the offset vectors which is the location of the heat maps. Then, the model apply arg max() function on the confidence score to take the highest score to be the exact key-point, and the exact offset vector is the corresponding location of this highest confidence score. Pose Net can detects various 17 key points for the different parts of body.

Key points Normalization : The users who use our system may differ in shape, weight, and tall, as well as some of them may be close to the camera and others may be far away. All these pervious factors have a great effect on the key points scores and accuracy. For this reason, L2-Normalization type is applied on key points got from Pose Net, to make the sum of squares of the key points equals on

Pickle file: Using Pose Net, the key points got from the videos of each exercise are extracted and saved into pickle files. In this work, two modes are used. The first mode (Mode 1), each exercise has their pickle files will be used in comparison. The second mode (Mode 2), the key points got from these videos of each exercise are averaged. The same process is repeated for the seven exercises. The average pickle file is generated by putting these average key points in a single pickle file format for all these exercises.

4. DATASET USED FOR TRAINING AND TESTING

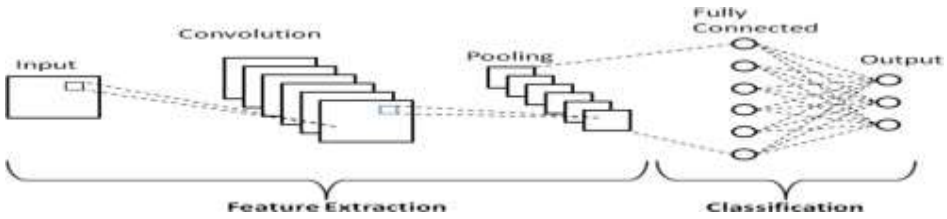


Fig 4.1- Sample dataset for test set

4.1. ADVANTAGE AND APPLICATION

- ***Advantage***
    - Quick and easy operating.
    - Less problems with high accuracy of prediction.
    - It is adaptable to any situation
- ***Application***

The proposed system can be used in following areas :

- GYM
- Home
- Yoga Classes

5. RESULT

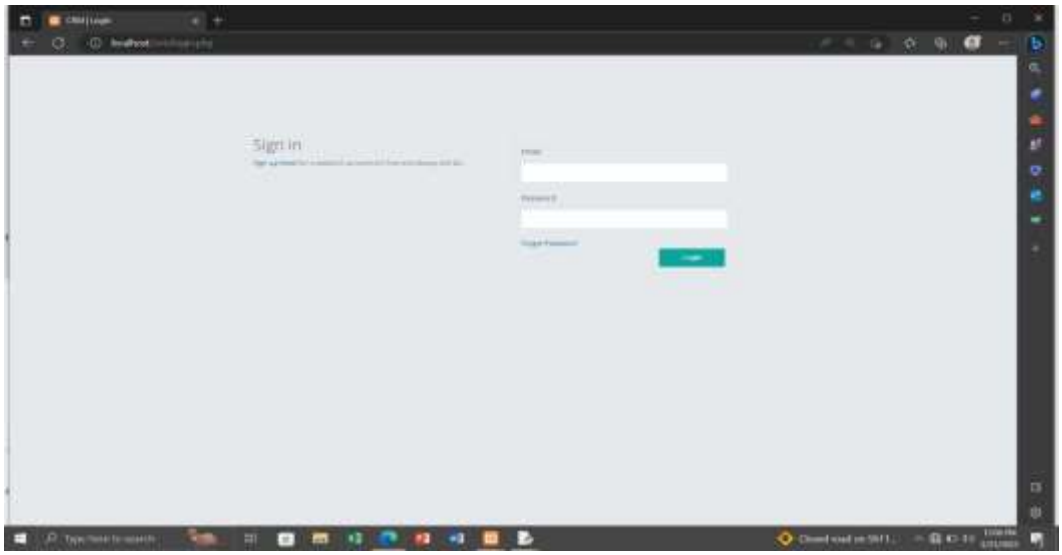


Fig 5.1 Home page.

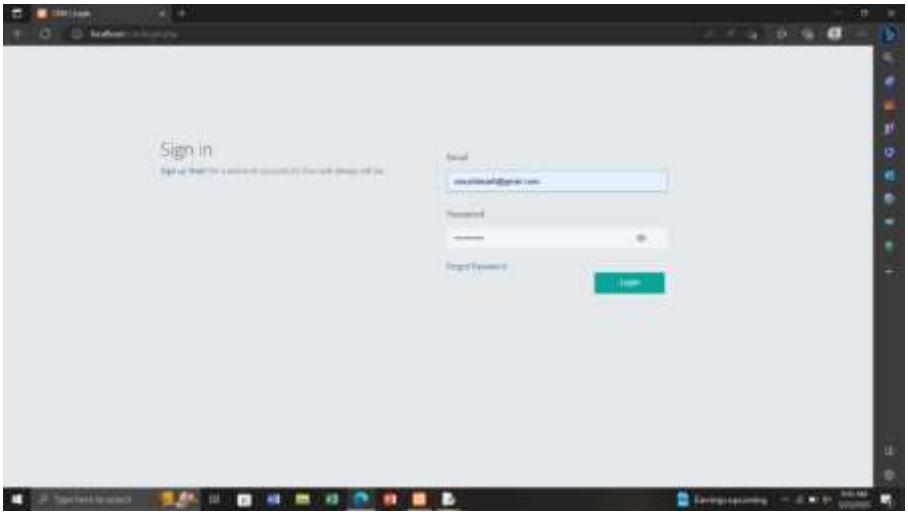


Fig 5.2 login page

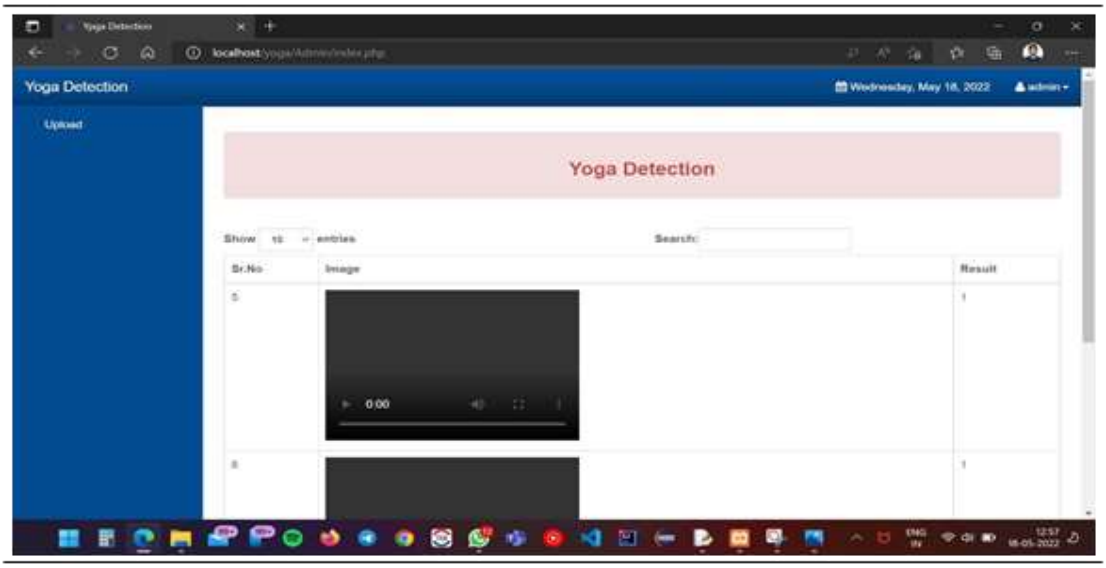
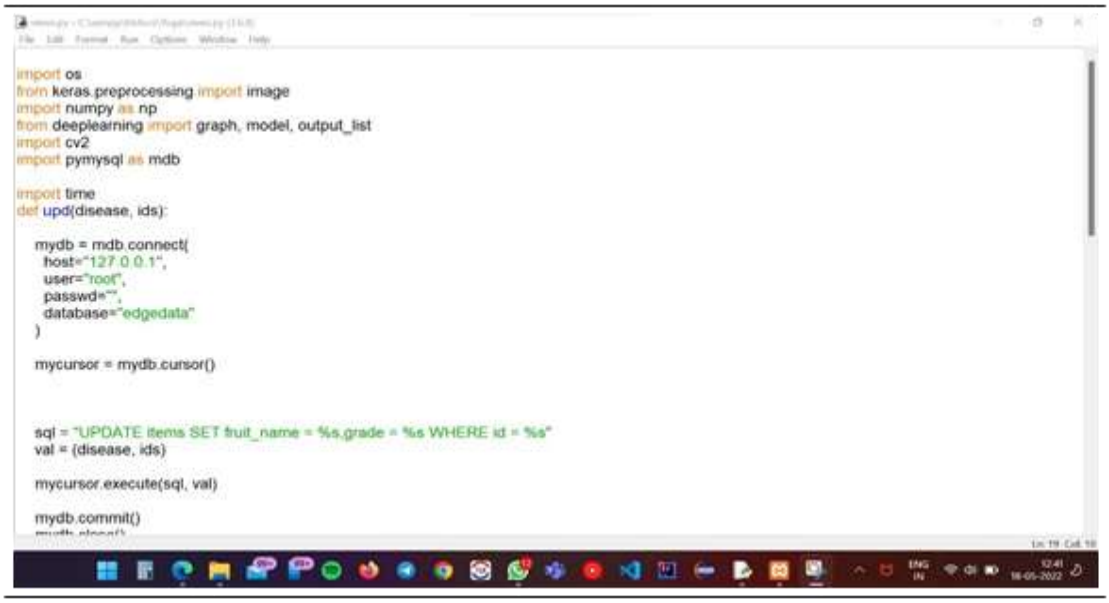


Fig 5.3: Prediction Page



```
import os
from keras.preprocessing import image
import numpy as np
from deeplearning import graph, model, output_list
import cv2
import pymysql as mdb

import time
def upd(disease, ids):

    mydb = mdb.connect(
      host="127.0.0.1",
      user="root",
      passwd="",
      database="edgedata"
    )

    mycursor = mydb.cursor()


    sql = "UPDATE items SET fruit_name = %s,grade = %s WHERE id = %s"
    val = (disease, ids)

    mycursor.execute(sql, val)

    mydb.commit()
```

Fig 5.4: Three Image Quality Metrics.

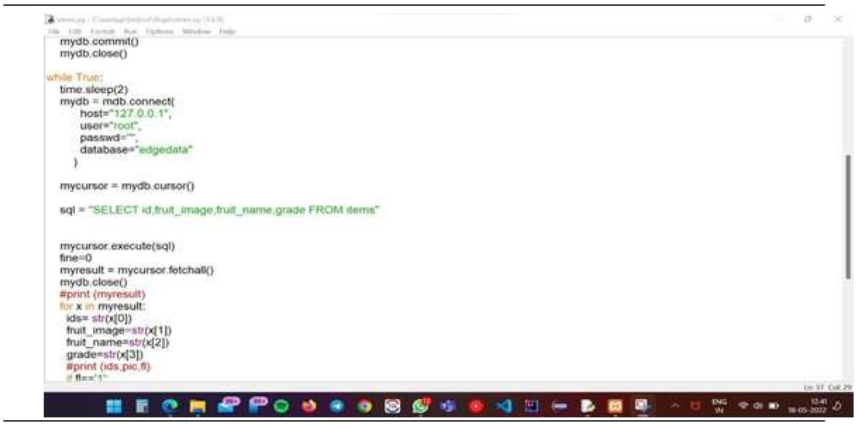


Fig 5.5: Connectivity.

6.CONCLUSION AND REFRENCES

6.1 Conclusion

A suggested human stance for yoga posture identification system. Convolutional neural network has been trained on a dataset of different poses. Human posture estimate differs from other computer vision challenges in that it must locate and assemble human body components based on a previously established human body structure. Yoga self-instruction programmes have the ability to both ensure that it is practiced correctly and increase the popularity of yoga. The extensive research being done in this area makes deep learning techniques appealing. Performance of CNN shows that pose estimation or activity recognition issues can also be solved with ML algorithms.

6.2 REFRENCES

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