HUMAN POSE ESTIMATION

TEAM -15   KIET(+)

Team Details

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ABSTRACT

• Introduction

Human Pose Estimation (HPE) is a computer vision task that detects and analyzes human body postures to determine the position and orientation of humans in images or videos.

• problem statement :- Predicting numeric coordinates
of key points in human images.

• OBJECTIVE

The goal of this project is to develop an efficient system which uses deep learning and computer vision techniques to detecting key human points (such as elbows, knees, and shoulders) in static images.

• REAL-TIME APPLICATIONS

- Sports Analytics : Tracking athlete movements for performance Improvement.

- Healthcare: Posture correction and rehabilitation.

Input of the project

=> user uploads the image of the human

sample image

Algorithms and Technology

Algorithms :

1. Convolutional Neural Networks (CNNs): Used for extraction of spatial features of the image.

model selected:- HRNet

Tech stack

- Programming Languages: Python

- Libraries: OpenCV, NumPy, pandas, Matplotlib

- Frameworks: pytorch, MMPose, TorchVision

•process workflow

Step-1. Data Collection & Preprocessing:
- Gather annotated datasets like COCO,
- Normalize and augment images to improve model efficiency.

Step-2.Model Selection & Training:
- Choose an appropriate model (HRNet, etc.).
- Train using labeled datasets.

Step-3. Inference & Evaluation:
- Test on unseen images.
- Evaluate accuracy using metrics like PCK(Percentage of Correct Keypoints) and mAP(Mean Average Precision).

Step-4:- Deployment:
- Optimize model size for real-time applications.
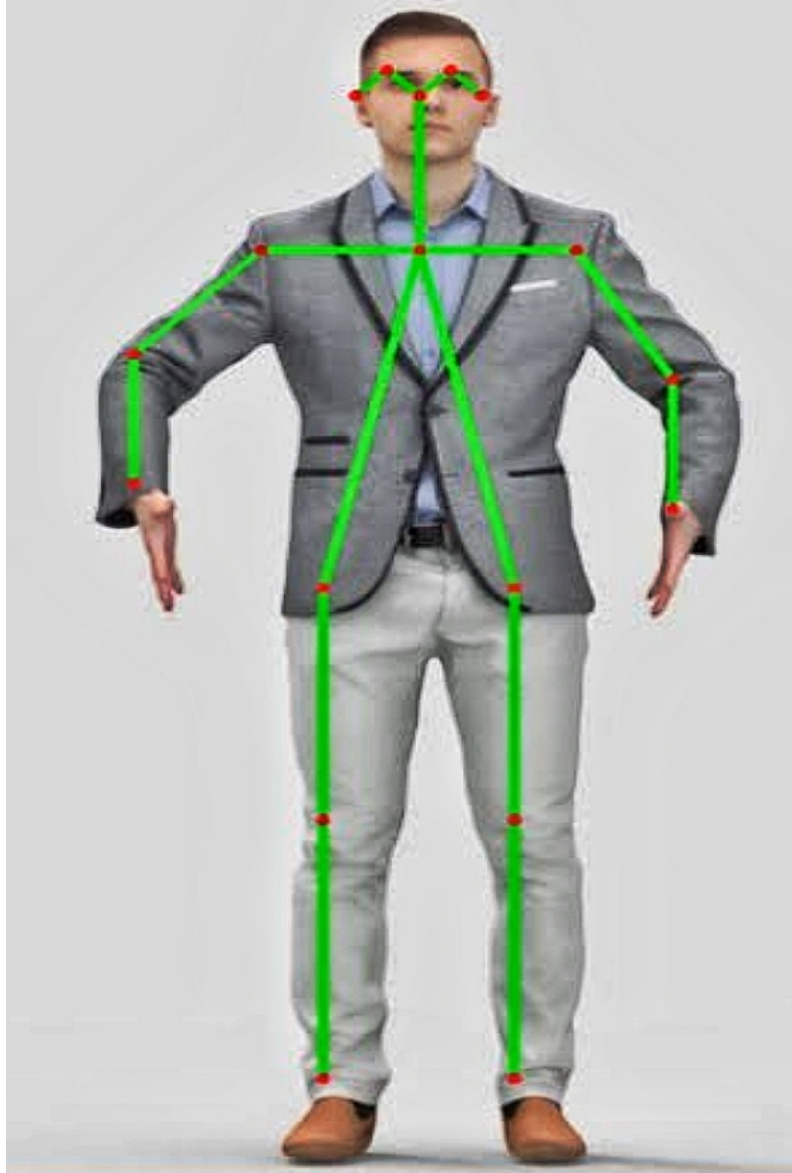- Deploy via API or edge devices.

output of the project

the model gives the output as image
  => Detect Keypoints:
  => Mark Keypoints on the Image:
Return the Processed Image as the same image, now with the skeletal structure drawn on it.

conclusion

this project successfully implements a human pose estimation model capable of detecting and marking keypoints on human bodies from images. The model demonstrates accurate and efficient performance using datasets like COCO, with evaluation metrics such as PCK and mAP validating its effectiveness.