POSE ESTIMATION

A Computer vision based project in Jupyter Notebook

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Introduction

Pose estimation is a computer vision technique used to detect human body landmarks from images or videos. Using Python, OpenCV, and MediaPipe, we can efficiently track 33 key body points in real time. This enables applications in fitness, healthcare, gesture control, and interactive systems with minimal hardware requirements.

Objective

The objective of this project is to develop a real-time human pose estimation system using MediaPipe, Python, and OpenCV that accurately detects and tracks body landmarks. The system aims to support applications such as fitness monitoring, gesture-based control, and health posture analysis by providing an efficient and lightweight solution for human pose detection.

Tools And Technologies

Tools and Technologies Used:

1. Programming Language:
   - Python
2. Libraries & Frameworks:
   - MediaPipe – for real-time pose estimation
   - OpenCV – for image and video processing

1. Hardware:
   - Standard PC or Laptop with webcam
2. Software Environment:
   - Jupyter Notebook , Google Colab

WorkFlow

Capture Input
- Read video from webcam using OpenCV.

Initialize Pose Model
- Set up MediaPipe Pose with confidence thresholds.

Process Each Frame
- Convert BGR to RGB
- Detect body landmarks using MediaPipe

Draw Landmarks
- Overlay keypoints and skeleton on the frame

Display Output
- Show the result in real-time using OpenCV window

Release Resources
- Close video stream and OpenCV windows

Conclusion

This project successfully demonstrates real-time human pose estimation using Python, OpenCV, and MediaPipe. By accurately detecting 33 body landmarks, the system enables applications such as fitness tracking, gesture recognition, and health monitoring. The use of lightweight and efficient tools makes it suitable for real-world deployment on basic hardware, proving its potential for various AI-powered human interaction systems.

Future Scope

1 . Smarter Fitness & Healthcare: Real-time feedback for exercise, rehabilitation, and posture correction.
2 . Enhanced Human-Computer Interaction: More natural gesture control for gaming, and smart devices.
3 . Improved Surveillance & Security-Advanced anomaly detection and behavior analysis.

Thank You