# **YOLOv7 Pose Estimation Pipeline Documentation**

This documentation provides a detailed overview of a Python-based pipeline for pose estimation on images and videos. The pipeline utilizes the YOLOv7 architecture adapted for pose estimation tasks. It includes enhancements to handle different media formats and is flexible to work with images or videos of varying dimensions. This guide describes setup, usage, and technical details of the modified scripts to facilitate pose estimation on different inputs.

Link to notebook: <https://github.com/Aadharsh1/ML-Deep-Learning/blob/main/Pose_Estimation_Experiments/Yolov7_Experiments/pose_estimation.ipynb>

Note: The scripts to be replaced are included in the notebook.

## **Repository and Setup**

**Clone the Repository**: Clone the YOLOv7 pose estimation repository to access the necessary scripts and models:  
  
!git clone https://github.com/RizwanMunawar/yolov7-pose-estimation.git

cd yolov7-pose-estimation

**Install Dependencies**: Ensure all Python dependencies are installed by upgrading pip and installing requirements from the provided requirements.txt file:  
  
!pip install --upgrade pip

!pip install -r requirements.txt

**Model Weights**: Download the YOLOv7 model weights for pose estimation:  
  
!wget https://github.com/WongKinYiu/yolov7/releases/download/v0.1/yolov7-w6-pose.pt

## **Usage**

### **Image Pose Estimation**

For estimating poses from images, replace the pose-estimate.py script with the provided image script. This script processes an input image and outputs an image with detected poses. Key aspects include:

* **Model and Image Loading**: The script loads the YOLOv7 model and the specified image, applying necessary transformations to match the model input requirements.
* **Pose Detection**: Performs inference to detect poses and plots keypoints and skeletons on the image.
* **Output**: Saves two images—one with the full visualization (boxes and keypoints) and one with keypoints only.

To run pose estimation on an image:

!python pose-estimate.py --source "path\_to\_image.jpg" --device 0

### **Video Pose Estimation**

For video inputs, use the video script. This script handles videos of any dimension by adjusting frame sizes during processing. It outputs a video with pose estimations and an optional real-time display:

* **Video Processing**: Opens the video file, processes each frame to detect poses, and writes the results to an output video.
* **Performance Metrics**: Calculates frames per second (FPS) and provides a time comparison to evaluate performance.
* **Visualization**: Optionally displays the processed video frames in real-time.

To run pose estimation on a video:

!python pose-estimate.py --source "video\_name.mp4" --device 0

## **Configuration**

The scripts are configurable via command-line arguments to specify source files, output settings, and hardware options (CPU/GPU). Adjust the scripts based on the target media type (image or video) by replacing the pose-estimate.py script with the appropriate version provided.

## **Modifications from Original Repository**

The provided scripts have been modified from the original YOLOv7 pose estimation repository to:

* **Support Different Media Types**: Added flexibility to switch between image and video inputs.
* **Handle Various Dimensions**: Incorporated dynamic resizing of inputs to accommodate images and videos of different sizes and aspect ratios.
* **Enhanced Output Visualization**: Improved visualization options to include keypoints-only output and detailed skeleton overlays.

These enhancements make the pipeline more versatile and user-friendly for different pose estimation tasks.