Documentation: YOLOv8 Object Detection Web App using Streamlit

Overview

This project provides a user-friendly web interface for object detection using YOLOv8 (You Only Look Once) deep learning model. It supports detection through images, video files, and real-time webcam streams using the `Streamlit` framework.

Prerequisites

Make sure the following are installed:

- Python 3.8 or later
- Required Python packages:
  pip install streamlit opencv-python-headless numpy ultralytics
- YOLOv8 model file: `yolov8n.pt` (make sure it's in the project directory or provide the correct path)

File Structure

```
project_directory/
├── app-1.py          # Streamlit-based object detection app
├── yolov8n.pt        # Pre-trained YOLOv8n model
```

Features

- **Image Detection**: Upload and analyze a static image.
- **Video Detection**: Upload and process a video file frame-by-frame.
- **Webcam Detection**: Live object detection using webcam.
- **Adjustable Confidence Threshold**: Customize detection sensitivity.

How to Run

1. Start the Streamlit App

streamlit run app-1.py

2. Interface Usage

- Use the sidebar to:
    - Set the **confidence threshold**.
    - Choose a **mode**: Image, Video, or Webcam.

For Image Mode:

- Upload a `.jpg`, `.jpeg`, or `.png` file.
- The app displays the original image and detection results.

For Video Mode:

- Upload a `.mp4`, `.mov`, or `.avi` file.
- Video frames are shown with real-time object annotations.

For Webcam Mode:

- Click **Start Webcam** to begin live detection.
- Click **Stop Webcam** to end the session.

Notes

- This app uses the lightweight `yolov8n.pt` model which prioritizes speed.
- This is meant for **demo or educational use**; avoid using it in production without optimizations and testing.

Credits

- YOLOv8: https://github.com/ultralytics/ultralytics
- Streamlit: https://streamlit.io
