Object Recognition System (YOLOv8)

This is a real-time Object Recognition System built using YOLOv8, Python, OpenCV, and PyTorch. It can detect objects in images, videos, and live camera feeds, and includes features like:  
- Detect objects in images, videos, and live streams  
- Automated screenshot capture when specific objects appear  
- Automatic video recording during live detection  
- Simple and user-friendly interface (Gradio/Streamlit option)

# Project Setup

1. Clone the Repository:  
 git clone https://github.com/WhyShailesh/Object-Recognition-System.git  
 cd Object-Recognition-System

2. Create a Virtual Environment (Recommended):  
 Windows:  
 python -m venv venv  
 venv\Scripts\activate  
 Linux/Mac:  
 python3 -m venv venv  
 source venv/bin/activate

3. Install Dependencies:  
 pip install -r requirements.txt  
 (If torch fails, check https://pytorch.org/get-started/locally/)

4. Download YOLOv8 Model:  
 - By default, YOLO downloads automatically.  
 - Or manually from: https://github.com/ultralytics/ultralytics

5. Run the Project:  
 python app.py

# Features

- Image Detection: Upload an image and detect objects with bounding boxes  
- Video Detection: Run detection on pre-recorded video files  
- Live Camera Detection: Real-time detection from webcam  
- Screenshot & Recording: Capture frames or record video automatically

# Tech Stack

Python 3.8+, YOLOv8 (Ultralytics), PyTorch, OpenCV, Gradio/Streamlit

# Common Issues & Fixes

- CUDA/GPU not found → Install CUDA toolkit and correct PyTorch version  
- Slow detection → Runs faster with NVIDIA GPU  
- Large files → Clear /outputs folder regularly  
- Virtual environment errors → Activate venv before running

# Applications

Security, Surveillance, Traffic Monitoring, Industrial Automation, Retail, Smart Cities

# Future Scope

Multi-camera support, Cloud & IoT integration, Edge device optimization, Real-time alerts

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