Surveillance Object Detection using DJI Tello Drone & YOLOv5

DJI Tello is a **lightweight, programmable drone** that can be used for real-time **surveillance and object detection** using **computer vision and deep learning models like YOLOv5**. This setup allows the drone to autonomously detect people, vehicles, or other objects in a surveillance area.

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1. System Overview

Components Required

1. **DJI Tello Drone** – Compact and programmable drone with a camera.
2. **Python & OpenCV** – Used for video streaming from the drone.
3. **YOLOv5 (PyTorch)** – Object detection model.
4. **Edge Device (Laptop/Raspberry Pi/Jetson Nano)** – For real-time processing.

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2. How It Works

1. **DJI Tello streams live video** to the Python script.
2. **OpenCV captures the frames** and processes them.
3. **YOLOv5 detects objects** (people, cars, etc.) in each frame.
4. **Object bounding boxes and labels** are displayed on the video feed.
5. **Alerts/Actions (optional)** – The drone can track, record, or raise an alert based on detection.

pip install djitellopy opencv-python numpy torch torchvision

git clone https://github.com/ultralytics/yolov5.git

cd yolov5

pip install -r requirements.txt

Deployment on Edge Devices

For real-time performance:

- **Use Jetson Nano/Raspberry Pi** instead of a PC.
- **Convert YOLOv5 to TensorRT or ONNX** for faster inference.
- **Stream video to cloud for remote monitoring**.

- # Applications
- ✅ **Security & Surveillance** – Detect intruders in restricted areas.
  ✅ **Traffic Monitoring** – Identify cars, accidents, and congestion.
  ✅ **Disaster Response** – Locate people during rescue missions.
  ✅ **Wildlife Monitoring** – Observe animals in their habitat.

- # 8. Conclusion
- With **DJI Tello + YOLOv5**, you can create a smart surveillance system capable of **real-time object detection and autonomous tracking**. 🚀
- Would you like additional features like **object tracking, voice alerts, or cloud storage**? 😊