

Assignment 3: Implementing YOLOv3 for Object Detection

Objective:

Your task is to build a Python script that uses a pre-trained YOLOv3 model to detect objects in a given image. You will need to load the model, process an image, interpret the model's output, and visualize the results.

Instructions:

Write a single Python script that performs the following steps:

1. Setup and Loading:

- Download the necessary YOLOv3 files: yolov3.weights, yolov3.cfg, and coco.names.
- Load the pre-trained YOLOv3 network using OpenCV.
- Load the class names from the coco.names file.

2. Image Processing:

- Load a sample image (e.g., a picture of a street with cars and people).
- Convert the image into a "blob" suitable for input to the YOLOv3 model.
- Feed the blob forward through the network to get the detection results.

3. Detection and Filtering:

- Parse the output from the model to extract the bounding boxes, confidence scores, and class IDs for each detected object.
- Apply Non-Max Suppression (NMS) to remove weak and overlapping bounding boxes, keeping only the most confident and accurate ones.

4. Visualization:

- Draw the final, filtered bounding boxes and their corresponding class labels onto the original image.
- Display the final image with the detections.

Upload:

- A Python script (.py) or IPYNB containing your complete, commented code.
- The final output image showing the detected objects with their bounding boxes and labels.