**Assignment No: 7**

**Problem Statement:**

Implement object detection using the YOLO (You Only Look Once) system and pretrained models.

**Theory:**

YOLO (You Only Look Once) is a cutting-edge, real-time object detection system that processes images by dividing them into grids and simultaneously predicting bounding boxes and class probabilities for each grid cell. It is well-known for its balance of speed and accuracy.

* Pretrained Models: Models like YOLOv3 and YOLOv4 can be used for object detection without the need to train a model from scratch.

**Methodology:**

1. Pretrained Model:
   * Download a pretrained YOLO model, such as YOLOv3 or YOLOv4.
   * Use the Darknet framework or the OpenCV DNN module to load the pretrained weights and configuration files.
2. Object Detection:
   * Feed images or video frames into the YOLO model, which will output bounding boxes, class labels, and confidence scores for detected objects.
   * Apply non-maximum suppression (NMS) to remove overlapping or redundant boxes.
3. Real-Time Detection:
   * Implement real-time object detection using the YOLO model with video streams from sources like webcams or video files.
4. Applications:
   * Object detection using YOLO can be applied in areas such as autonomous vehicles, surveillance, and retail environments.

**Conclusion:**

We successfully implemented object detection using a pretrained YOLO model, achieving accurate real-time detection and localization of multiple objects.

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