**Assignment No: 7**

**Problem Statement:-**

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

**Theory:-**

**YOLO (You Only Look Once)** is a state-of-the-art, real-time object detection system that divides images into a grid and predicts bounding boxes and class probabilities for each grid cell simultaneously. YOLO is known for its speed and accuracy.

* **Pretrained Models**: Pretrained YOLO models like **YOLOv3** or **YOLOv4** can be used to detect objects in images without needing 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 **OpenCV DNN module** to load the pretrained weights and configuration files.
2. **Object Detection**:
   * Pass images or video frames to the YOLO model, which returns the bounding boxes, class labels, and confidence scores for detected objects.
   * Non-maximum suppression (NMS) is applied to remove redundant boxes.
3. **Real-Time Detection**:
   * Implement real-time object detection from video streams (e.g., webcam or video file) using the YOLO model.
4. **Applications**:
   * Object detection can be applied in various fields, such as autonomous driving, surveillance, and retail.

**Conclusion:-**

We implemented object detection using a pretrained YOLO model, accurately identifying and localizing multiple objects in real-time.