WEEK-15

Aim :-
    To implement a YOLO (You only look once) deep learning model for real-time object detection in images or) videos.

objective :-

→ To understand the concept of object detection using deep learning.

→ To learn how YOLO divides images into grids and detects multiple objects at once.

→ To implement a pretrained YOLOv5 or) YOLOv8 model using open source frameworks.

→ To visualize bounding boxes and class labels on detected objects.

Algorithm :-

1.) Load a pre trained YOLO model.

2.) Load an input image or) video frame.

3.) Resize and Normalize image for model input.

4.) Pass image through YOLO Network.

5) Get predictions → bounding boxes, confidence scores, and class labels.

6) Apply Non-maximum suppression (NMS) to remove duplicate boxes.

7.) Draw boxes and labels on the original image.
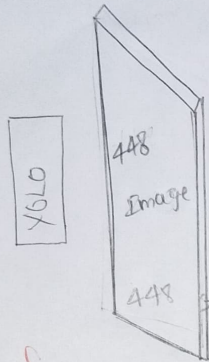
8.) Display detected objects.

Pseudo code :-

    Import YOLO Library

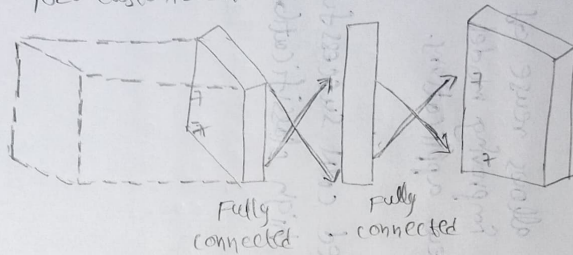   Load pre-trained YOLO model and weights

    Read input image or) video

    Resize and Normalize image

YOLO Architecture

YOLO

448
Image
448

YOLO Customized Architecture

Fully connected

Fully connected

Detecting 1 tag per class

Non-max suppression

63.4 mAP

45 mps

448 X 640(no detections), 68.1 ms

speed : 10.7ms preprocess, 68.1ms inference,

0.8ms postprocess per image at shape (b3, 448, 64s)

Results?

object	confidence	Bounding Box
person	0.93	Green box
car	0.89	Blue Box
Dog	0.85	Red Box

object detected : person (0.93)
object detected : car (0.89)
object detected : Dog (0.77)

Forward pass through YOLO model

For each detection :

    Extract confidence score and class id

    If confidence > threshold :

        compute bounding box coordinates

        Apply Non - maximum suppression

        Draw rectangle and label on image

Display output image with detections.

observation :-

→ YoLo detects multiple objects in a single pass efficiently.

→ Each object has a bounding box, label and confiden -ce score.

→ Accuracy increases when lighting and angles are clear.

→ Real-time detection works at high FPS.

Result :-

    The yOLO model successfully detected and labeled multi -ple objects.