ASSIGNMENT - 11

1. What do REGION PROPOSALS entail?

Ans: Region Proposals in object detection are preliminary guesses about where objects might be located in an image. These are bounding boxes that pinpoint areas where the model should focus its classification efforts to identify what objects are present.

2. What do you mean by NON-MAXIMUM SUPPRESSION? (NMS)

Ans: Non-Maximum Suppression (NMS) is a technique used to eliminate redundant bounding boxes suggested during object detection. When a model proposes multiple boxes for the same object, NMS helps pick the most accurate one. It considers the overlap between bounding boxes and removes boxes with lower confidence scores that significantly overlap with a higher-scoring box.

3. What exactly is mAP?

Ans: mAP (mean Average Precision) is a metric used to measure the overall performance of object detection models. It summarizes the average precision (AP) across all object classes within a dataset. AP itself considers both the completeness (recall) and correctness (precision) of the detections for a particular class.

4. What is a frames per second (FPS)?

Ans: Frames per Second (FPS) refers to the number of images or frames a system can process in one second. It's a measure of speed commonly used in applications like video processing and real-time object detection. Higher FPS indicates faster processing and smoother performance.

5. What is an IOU (INTERSECTION OVER UNION)?

Ans: Intersection over Union (IOU) is a metric used to compare how much two bounding boxes overlap. It's calculated by dividing the area of intersection between the two boxes by the area of their combined union. IOU helps assess how well a predicted bounding box aligns with the ground truth bounding box for an object.

6. Describe the PRECISION-RECALL CURVE (PR CURVE)

Ans: Precision-Recall Curve (PR Curve) is a visualization tool used to evaluate the trade-off between precision and recall in a binary classification model. Precision represents the proportion of true positives among predicted positives, while recall represents the proportion of true positives identified from all actual positives. The PR curve shows how these values change as a classification threshold is varied.

7. What is the term “selective search”?

Ans: Selective Search is an algorithm used in object detection to generate region proposals. It efficiently identifies potential object regions in an image by considering factors like color similarity, texture, and intensity variations. Selective search was a popular choice before deep learning-based methods like RPN (Region Proposal Network) emerged.

8. Describe the R-CNN model’s four components.

Ans: The R-CNN model has four main components:

Region Proposal Network (RPN): (present in Faster R-CNN) Generates region proposals using a deep learning approach.

CNN Feature Extractor: Extracts features from the entire image using a convolutional neural network (CNN).

ROI Pooling: Extracts fixed-size feature vectors from each proposed region.

Classifiers: Classify each region proposal and refine bounding boxes for the detected objects.

9. What exactly is the Localization Module?

Ans: The Localization Module in R-CNN refines the initially generated region proposals. It takes the features extracted from each region and predicts bounding box coordinates and offsets to improve the accuracy of object localization.

10. What are the R-CNN DISADVANTAGES?

Ans: R-CNN Disadvantages:

* Computationally Expensive: Especially in its original form, R-CNN requires running the CNN multiple times, making it slow for real-time applications.
* Large Number of Training Samples: R-CNN requires a significant amount of training data for good performance.