**CSD TEAM-13**

YOLO Real Time Object Detection

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**Abstract**

YOLO, the best approach to object detection. Real-time detection plays a significant role in various domains like video surveillance, computer vision, autonomous driving and the operation of robots. YOLO algorithm has emerged as a well-liked and structured solution for real-time object detection due to its ability to detect items in one operation through the neural network. This research article seeks to lay out an extensive understanding of the defined Yolo algorithm, its architecture, and its impact on real-time object de tection. This detection will be identified as a regression problem by frame object detection to spatially separated bounding boxes. Tasks like recognition, detection, localization, or finding widespread applicability in the best real-world scenarios, make object detection a crucial subdivision of computer vision. This algorithm detects objects in real-time using convolutional neural networks (CNN). Overall this research paper serves as a comprehensive guide to understanding the detection of objects in real-time using the You Only Look Once (YOLO) algorithm. By examining architecture, variations, and implementation details the reader can gain an understanding of YOLO’s capability.

**Input**

* Real-time video or image data.
* Various objects in the scene that need to be detected.
* Pre-trained YOLO model weights.

### **Process**

**Preprocessing:**

* Convert image/video into a format suitable for YOLO (resize, normalize).
* Prepare live camera feed for real-time object detection.

**Feature Extraction (CNNs):**

* YOLO uses **Convolutional Neural Networks (CNNs)** to extract spatial features from each frame.
* Detects patterns, edges, and textures essential for object classification.

**Object Detection (Real-time Processing):**

* YOLO divides the image into a **grid** and processes it in a **single pass** through the neural network.
* Predicts bounding boxes, class probabilities, and confidence scores for objects.

**Bounding Box Regression & Localization:**

* YOLO assigns bounding boxes to detected objects and labels them with class names.
* Ensures accurate object localization in the scene.

### **Output:**

* Detected objects with labeled bounding boxes.
* Class names and confidence scores for each detected object.
* Processed image/video with marked objects.