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L09 1378

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Reflection and Analysis

1. Conceptual Understanding:

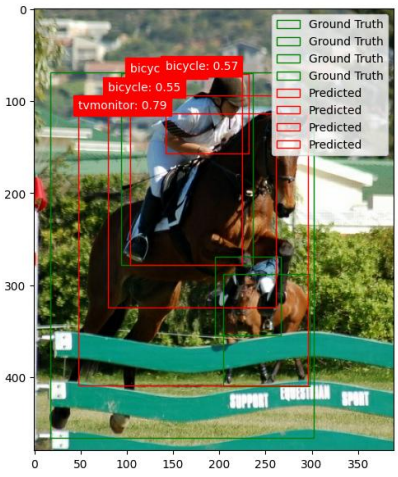
- What is the main difference between image classification and object detection? How is this difference evident in the output of this exercise?
  - “Image classification labels an entire image with a single class, while object detection identifies and localizes multiple objects within an image, often using bounding boxes.”
  - “Image Classification Output: A single label representing the image's content;

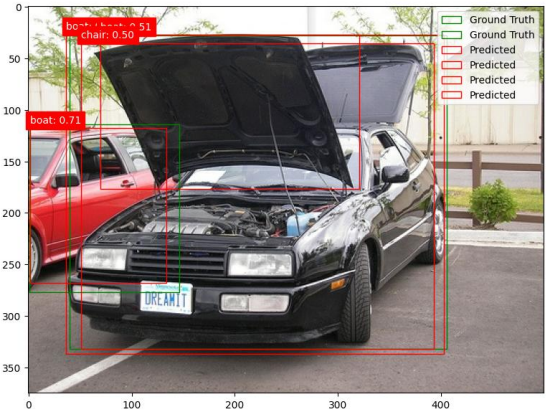
    “Object Detection Output: Bounding boxes around each detected object, along with their class labels”. AI Overview

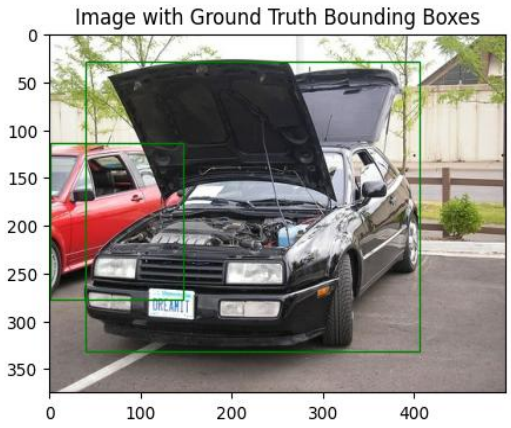
- Explain why we chose the SSD MobileNet V2 model for this task. What are its advantages and limitations, especially in the context of limited computational resources?
  - “For its efficiency and ability to perform object detection with limited computational resources, making it suitable for mobile and edge devices.”
  - “Advantages: lightweight and efficient; Real-time Performance; Depth wise Separable Convolutions; Competitive Accuracy; SSD Architecture allows for fast and efficient object detection”
  - “Limitations: Accuracy Trade-offs; Small Object Detection; Aspect Ratio Handling is less effective; Dataset Dependency; Limited for Complex Tasks” AI Overview

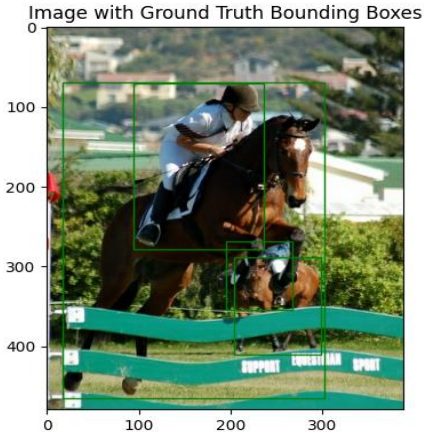
2. Code Interpretation:

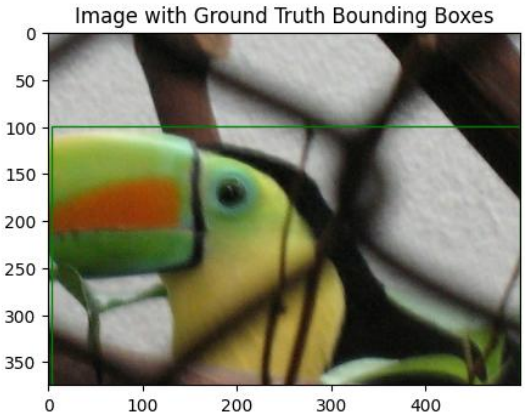
- Describe the role of the find _images with classes function. (“It serves to locate and categorize images based on predefined classes.”)
    - Why is it useful when working with a large dataset like COCO? (“It provides a diverse and comprehensive resource for training and evaluating computer vision models”.) AI Overview
- In the plot detection function, how does the threshold value (threshold=0.5) impact the number of objects displayed? “(a higher threshold leading to fewer objects being displayed and a lower threshold leading to more objects being displayed.”)
- Explain how the heatmap visualization helps you understand the model's confidence in its detections. (“It shows relationships between two variables, one plotted on each axis.”)











References:

AI Overview

Lab9VOC2007_Dataset_student_Notebook