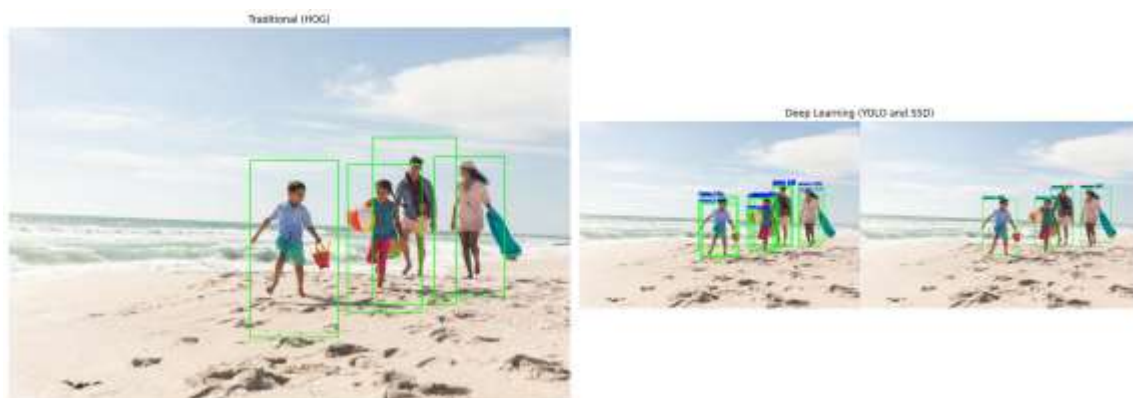


Exercise 4 focuses on comparing traditional and deep learning-based approaches for object detection, emphasizing their strengths and limitations. It starts with the HOG (Histogram of Oriented Gradients) method, a classic technique that relies on handcrafted gradient features to detect objects like pedestrians. This process involves loading an image, converting it to grayscale, and identifying pedestrians through gradient patterns. Next, the project implements YOLOv3 for real-time detection, downloading the necessary weights and configuration files to draw bounding boxes around detected objects while balancing speed and accuracy. Lastly, SSD MobileNet V2 is utilized for single-pass detection, prioritizing speed and effectively handling small or overlapping objects.



To provide a visual comparison, the code first displays SSD and YOLO results side-by-side, highlighting the strengths and potential differences in performance and detection accuracy between these two models.



Next, the results from HOG and the deep learning models (YOLO + SSD) are compared in a combined plot, showcasing the advancements of deep learning in terms of accuracy, robustness, and versatility across varied and complex scenes. This comparison effectively underscores the limitations of traditional methods and the enhanced capability of deep learning models to detect a broader range of objects more accurately in diverse environments.