**Reflection and Analysis of Object Detection using TensorFlow and the Pascal VOC**

**2007 Dataset**  
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**Reflection and Analysis**

**Conceptual Understanding**

1. **Difference between Image Classification and Object Detection**  
   Image classification assigns a label to an entire image, identifying only the presence of specific objects. In contrast, object detection identifies multiple objects within an image and localizes them with bounding boxes, as seen in this exercise’s output with bounding boxes and class labels for detected objects (Girshick, 2015).
2. **Choice of SSD MobileNet V2 Model**  
   The SSD MobileNet V2 model is lightweight and ideal for environments with limited computational resources. Its **advantages** include speed and efficiency, allowing real-time object detection with reduced computation. However, **limitations** include accuracy issues, especially for small objects or complex backgrounds (Howard et al., 2017).

**Code Interpretation**

1. **Role of find\_images\_with\_classes Function**  
   This function filters images that contain specific classes, which is useful when working with a large dataset. By focusing on relevant images, it optimizes processing time and computation (Deng et al., 2009).
2. **Threshold Impact in plot\_detections Function**  
   The threshold value of 0.5 affects the confidence level for displaying objects. A higher threshold limits the output to high-confidence detections, which reduces false positives but could potentially miss some true positives (Redmon et al., 2016).

**Observing Results and Limitations**

1. **Object Detection Accuracy by Object Type**  
   The model may detect large or distinct objects, such as “person” or “car,” more accurately, as these are common in training data. Smaller or background-blended objects are more challenging due to model limitations (Lin et al., 2014).

**References**

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