A Tri-Layer Plugin to Improve Occluded Detection

Guanqi Zhan, Weidi Xie, Andrew Zisserman
Visual Geometry Group, University of Oxford

Introduction

Occlusion is very common in the 3D world
- One object is in front of another
- A portion of the scene disappears behind the non-transparent object that is closer to the viewer

Detecting/Segmenting occluded objects still remains a challenge for state-of-the-art object detectors

Data Preparation

Amodal Completion & Occlusion Reasoning

Generated Training Datasets: Occluder & Occludee Masks

Generated Evaluation Datasets: Occluded COCO v.s. Separated COCO

Experiment Results

Comparison with State-of-the-Art

For evaluation, we introduce two extra measures - Recall on Occluded COCO and Recall on Separated COCO to evaluate model’s capability of detecting partially occluded or separated objects. The plugin can always improve the number of recalled objects for both Occluded COCO and Separated COCO, which demonstrates the effectiveness of our plug-in. The improvement on occluded objects could be transferred to objects for both Occluded COCO and Separated COCO, which demonstrates the effectiveness of our proposed module as a general ‘plugin’, which can be inserted into pre-trained detectors, and give quick performance improvement.

Ablation Study

Only fine-tuning the head could already contribute the majority of the improvement, validating the effectiveness of our proposed module as a general ‘plugin’, which can be inserted into pre-trained detectors, and give quick performance improvement.