Revealing Hidden Context in Camouflage Instance Segmentation

Thanh-Hai Phung and Hong-Han Shuai

National Yang Ming Chiao Tung University, Hsinchu 30010, Taiwan
{haipt.ee08,hhshuai}@nycu.edu.tw

Appendix A: Supplementary Methods

Objective Function Since the camouflage instance segmentation is category-agnostic, we utilize the confidence of the existence of objects at each location compared to the classification confidence in the generic instance segmentation. In addition, these masks are trained with focal loss ($\pounds_{mask}$) [1] and dice loss ($\pounds_{loc}$) [2] for the class masks' localization and cross-entropy loss ($\pounds_{cls}$) with the class scores. The total objective function can be shown as:

$$\pounds_{total} = \lambda_{cls} \times \pounds_{cls} + \lambda_{loc} \times \pounds_{loc} + \lambda_{mask} \times \pounds_{mask} \tag{1}$$

where the λ_{cls} to 1 by default, λ_{loc} and λ_{mask} are respectively set to 1 and 3 to balance the total objective function.

Appendix B: Supplementary Visualizations

Discussion. We present the visualization of various types of input images in Figure 1, Figure 2, and Figure 3. contain more examples in various scenarios like small, large, occlusion, and indistinguishable boundary camouflaged objects. The different figures show the robustness of our model in a wide range of challenged environments with superior accurate predictions.

References

1. Lin, T.Y., Goyal, P., Girshick, R., He, K., Dollár, P.: Focal loss for dense object detection. In: Proceedings of the IEEE International Conference on Computer Vision. pp. 2980–2988 (2017) 1
2. Milletari, F., Navab, N., Ahmadi, S.A.: V-net: Fully convolutional neural networks for volumetric medical image segmentation. In: 2016 Fourth International Conference on 3D Vision (3DV). pp. 565–571. Ieee (2016) 1

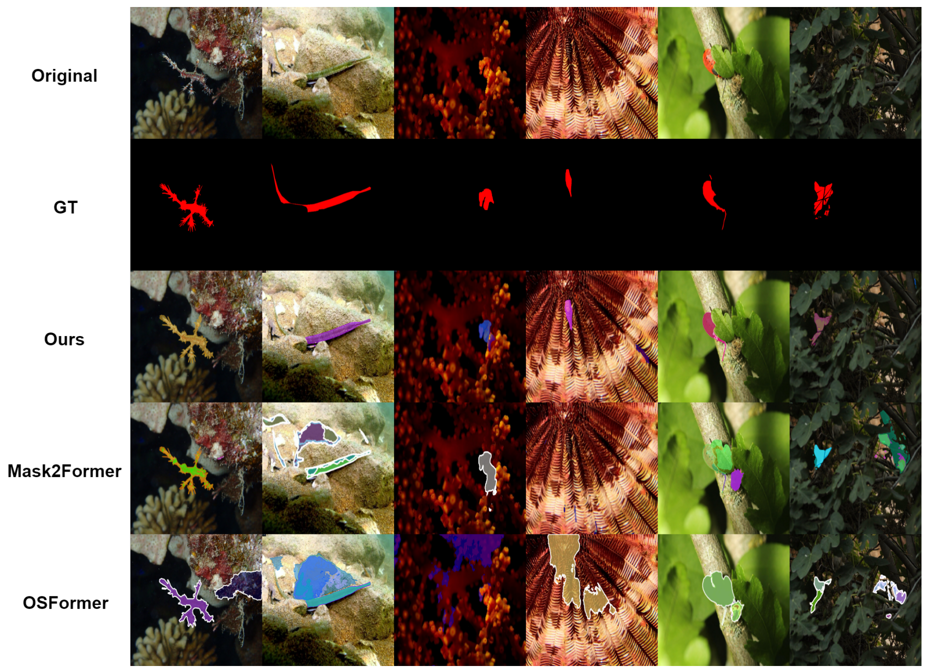

Fig. 1: Visual comparison of our prediction maps with state-of-the-art methods in detecting **small** camouflaged objects, zoom in for details.

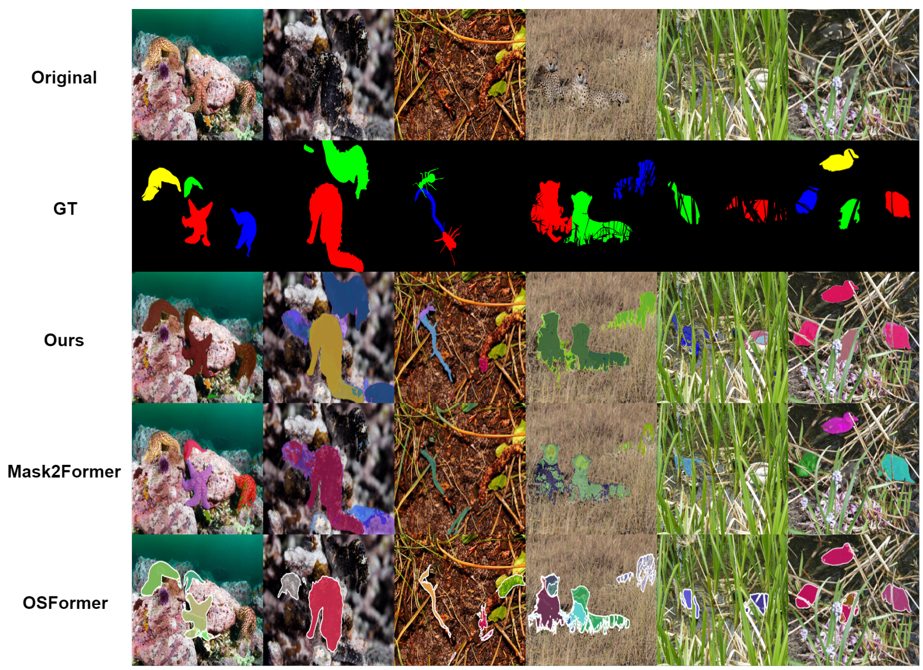

Fig. 2: Visual comparison of our prediction maps with state-of-the-art methods in detecting **large** camouflaged objects, zoom in for details.

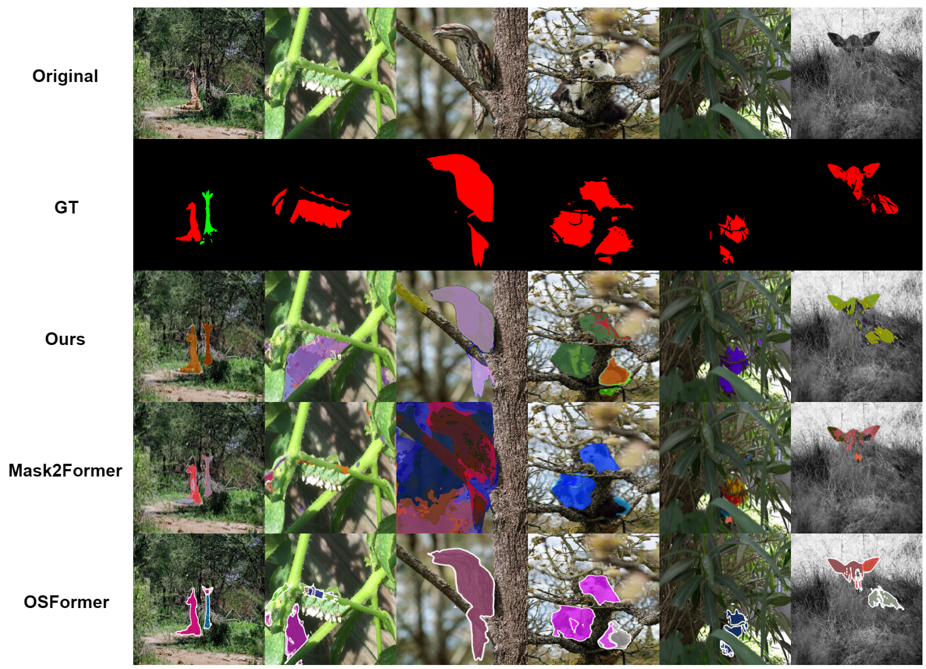

Fig. 3: Visual comparison of our prediction maps with state-of-the-art methods in detecting **occlusion** camouflaged objects, zoom in for details.