Camouflaged Object Detection

Ismail Elomari Alaoui[1]*, Reda Chaguer[1]‘

Abstract
Object detection is a computer technology mainly connected to computer vision and image processing, that deals with detecting instances from various target objects. Because of the significant intrinsic similarities between the target object and the background, identifying objects that are embedded in their surroundings is far more difficult than typical object detection.
As a result, we would like to create a basic yet effective model that can outperform a variety of state-of-the-art object detection baselines across a variety of datasets. We will mostly use **COD10K**, which contains thousands of photos of camouflaged objects in a variety of natural settings, divided into 78 object categories.

Keywords
CNN/RNN — Deep Learning — Search Attention — Computer Vision — Object Detection

[1] *Department of Computer Science, AI Major, IIT, Chicago, USA*
*__Corresponding author__: ielomarialaoui@hawk.iit.edu
‘__Corresponding author__: rchaguer@hawk.iit.edu

Contents

1. Problem Statement

As a continuity of the Object Detection problem, a new problem that is now being studied is Camouflaged Object Detection. It consists on detecting camouflaged objects in an image such as animals for example, as we can see in figures 1 and 2.

Figure 1. Detection of a camouflaged crab

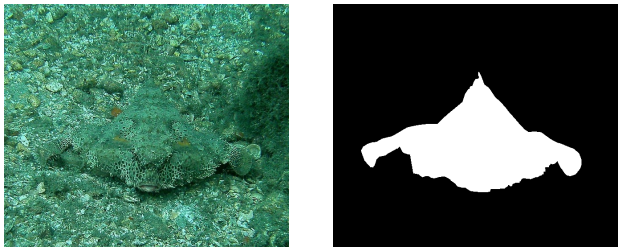

Figure 2. Detection of a camouflaged batfish

2. Brief survey of past solutions and proposed work

Several object detection algorithms exist already, but camouflaged objects conceal their texture into the surrounding environment which makes it a hard task in comparison to the normal Object Detection. The work in this project will aim to develop some improved ways to detect these hard-to-be-detected objects. It can be used in many different domains such as the medical domain or even for the autonomous self-driving cars for example in some particular cases.

3. Preliminary Plan

In the different papers published over this subject, working with convolutional neural networks and recurrent neural network is always mandatory. A preliminary plan to this project is to work with the public dataset COD10K , and build a network that can perform well on that database. Finally, finding the good metrics to calculate the performance of the model and give an overall idea of how well it performs. One thing

that can be done is to compare it with the different models that treat more or less the same subject.

All in all, this project is a Tensorflow/Keras implementation of the SINet network described in [1].

References

[1] Deng-Ping Fan, Ge-Peng Ji, Guolei Sun, Ming-Ming Cheng, Jianbing Shen, and Ling Shao. Camouflaged object detection. In *Proceedings of the IEEE/CVF conference on computer vision and pattern recognition*, pages 2777–2787, 2020.