Deep Learning - Project Finalization

GitHub Link (Ideation and Meeting Notes): big-dawgs/research (github.com)

Team Name:

Ferrero

Project Name:

Now You See Me

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Project Definition:

Objects hidden in plain sight is a common phenomenon called camouflaging.

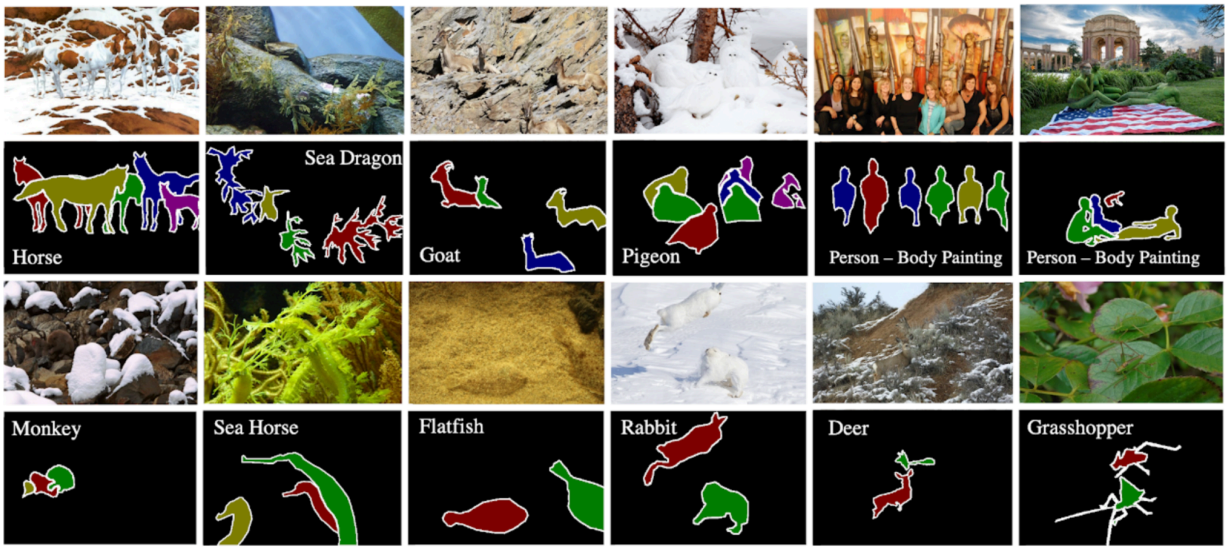
The project aims to take instances of (camouflaged) objects in different environments and use style transfer to explore how the object may appear in an environment different from the one the instance was originally in.

The object may be people, inanimate objects, animals, etc.

Dataset Description:

CAMO - https://paperswithcode.com/dataset/camo

Camouflaged Object (CAMO) dataset specifically designed for the task of camouflaged object segmentation. The dataset focuses on two categories, i.e., naturally camouflaged objects and artificially camouflaged objects, which usually correspond to animals and humans in the real world, respectively. Camouflaged object images consists of 1250 images (1000 images for the training set and 250 images for the testing set). Non-camouflaged object images are collected from the MS-COCO dataset (1000 images for the training set and 250 images for the testing set). CAMO has objectness mask ground-truth.



COD10K - https://www.kaggle.com/datasets/getcam/cod10k

The COD10K dataset is a large-scale dataset for Camouflaged Object Detection (COD), introduced by *Fan et al.* It addresses the challenge of detecting objects that blend into their surroundings, a phenomenon known as camouflage, which deceives the observer's visual system. COD10K includes 10,000 images divided into camouflaged (5,066), background (3,000), and non-camouflaged (1,934) categories, organized into 10 super-classes and 78 sub-classes. It is designed to facilitate research in fields such as computer vision, medicine, agriculture, and art by providing a robust benchmark for COD, filling the gap left by the scarcity of large datasets in this domain.

Expected Outcomes:

- This project is for fun! We want to see the application of style transfer in camouflaged object segmentation.
- Our goal is to demonstrate how an object camouflaged in one environment can be effectively disguised in a completely different setting through the application of style transfer.
- By understanding how objects transform across different environments, we aim to improve segmentation techniques for camouflaged objects in cross-environment scenarios. This could lead to more robust and versatile object detection systems.

Relevant Papers:

1. arxiv.org/pdf/1603.08155 - Perceptual Losses for Real-Time Style Transfer and Super-Resolution
2. https://arxiv.org/pdf/2304.09148v3 - SAM Fails to Segment Anything? – SAM-Adapter: Adapting SAM in Underperformed Scenes: Camouflage, Shadow, Medical Image Segmentation, and More
3. https://ieeexplore.ieee.org/abstract/document/10103836 - FSNet: Focus Scanning Network for Camouflaged Object Detection
4. openaccess.thecvf.com/content_CVPR_2020/papers/Fan_Camouflaged_Object_Detection_CVPR_2020_paper.pdf - Camouflaged Object Detection
5. https://arxiv.org/pdf/2203.03041v4 - Highly Accurate Dichotomous Image Segmentation
6. https://arxiv.org/pdf/2407.01414v1 - Styleshot: A Snapshot on any style