

Camouflaged Image Classification

UVA DS 4002 Case Study by Evelyn Tse
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Context/Motivation: In the age of digital technology, the ability to accurately detect objects in images has become increasingly important across various sectors. From autonomous vehicles to surveillance systems to the healthcare industry, object detection is becoming increasingly popular and useful in improving efficiency and standardization. However, traditional object detection methods tend to struggle with images containing hidden objects. These objects are camouflaged, blending into its surroundings and causing difficulties for machine learning algorithms.

But to what extent is there a discrepancy in accuracy? Camouflaged objects pose potential threats when unidentified, such as in wildlife monitoring or search and rescues cases. While we hope object detection models can identify any type of object, we need to account for these “edge” case scenarios. Hence, we need to determine whether we need improved model robustness to enhance object detection in real-world situations.

Deliverables: You are a data scientist tasked with conducting a comprehensive exploration of camouflaged image classification. You will immerse yourself in object detection analysis, exploring various machine learning models and analyzing their performance on camouflaged and non-camouflaged images. Your deliverable will contain a detailed report outlining your results, insights, and future research. The task requires initial analysis and cleaning of data, model performance on the data set, comparison of results across camouflaged and non-camouflaged images, and delivery of findings. Through this, you will be able to explore image classification and object detection on another level, providing helpful insights to the world of data science.