
Few Shot Learning for Object Detection: Comparison of Fine-tuning and Meta-learning Approaches

Jean-Bernard Uwineza

University of California, Riverside
Riverside, CA 92501
buwineza@ee.ucr.edu

Chetan Reddy Mudireddy

University of California, Riverside
Riverside, CA 92501
cmudi001@ucr.edu

Om Shankar Ohdar

University of California, Riverside
Riverside, CA 92501
oohda001@ucr.edu

Sayak Nag

University of California, Riverside
Riverside, CA 92501
snag005@ucr.edu

Vikarn Bhakri

University of California, Riverside
Riverside, CA 92501
vbhak001@ucr.edu

Abstract

The abstract paragraph should be indented 1/2 inch (3 picas) on both the left- and right-hand margins. Use 10 point type, with a vertical spacing (leading) of 11 points. The word **Abstract** must be centered, bold, and in point size 12. Two line spaces precede the abstract. The abstract must be limited to one paragraph.

1 Proposal

A small child visiting a zoo with parents for the first time recognizes a strange animal—a zebra, she is told. She keeps walking and a few minutes later, by the infirmary, she recognizes another animal, only smaller and wobbly this time. “A baby zebra”, she exclaims. From just this one example, she will be able to recognize just about every zebra she will ever see. Not only this, she will also be able to make remarkable connections to other animal that are similar to zebras. This is an ability machines have yet to acquire. Although machines have surpassed humans in visually recognizing objects, they still lack the ability to do so from a few examples. Recently, there have been promising advances towards the goal of making machines generalize from a few examples via a deep learning method called *few-shot learning*. There are many important applications that could benefit from the ability to learn from a few samples. Like any other problem, there are various approaches to this task. In this project, we propose to evaluate and analyze two of the most promising approaches.

Few-shot learning have received significant interest in the past few years, but mainly for the tasks of classification and rarely for object detection. In deep computer vision, the task of object detection is a more challenging one. Not only does the detector have to perform recognition of the different kinds of objects present, it also has to locate their exact locations. This is already a challenging task that relies heavily on the availability of massive amounts of labeled training data. When given base classes with sufficient examples and novel classes with few examples, few-shot learning attempts to find a model that will be able to correctly detect both base and novel objects at test time.