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

Coauthor
Affiliation
Address
email

Coauthor
Affiliation
Address
email

Coauthor
Affiliation
Address
email

Coauthor
Affiliation
Address
email

Abstract

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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 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 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.

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