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Transfer Learning for Animal Classification

Project Proposal

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TITLE

[Pending][22/11] Transfer Learning for Animal Classification

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ABSTRACT

Implementing an Animal Image classifier using Transfer Learning.

INTRODUCTION

Problem

The motivation for picking this topic is to explore the Transfer Learning technique in Machine Learning. Initially, we had decided to pick a kaggle competition for Transfer Learning on Stack Exchange Tags, which required us to train the network on tags of Stack Exchange questions of unrelated fields like Cooking and then predict unseen Physics question tags. We decided to make this challenge a notch more complex by doing the same for an animal image classifier rather than mere HTML tags.

Proposal

So, how is our project different from Cats vs Dogs classification models that are readily available on the internet? Well, we are classifying polar bears vs pandas (real ones, not the machine learning library); and all of us know that a naïve image classifier won't be able to differentiate between them as they have similar body features and similar color on some of their body parts. Not really, our implementation is different because of the fact that we wouldn't be training an entire model with a large data set, that would require several weeks on a very powerful computer to train. Instead, we would re-use a pre-trained model and merely replace the last layers for it to classify what we want it to classify. This is called Transfer Learning.

IMPLEMENTATION DETAILS

Model

Most important thing first, the model that we would be re-using is Google's Inception-v3. Inception-v3 is a Convolutional Neural Network trained for the ImageNet Large Visual Recognition Challenge using the data from 2012. This is a standard task in computer vision, where models try to classify entire images into 1000 classes, like "Zebra", "Dalmatian", and "Dishwasher". We would be using Transfer Learning to retrain the last layers of the Inception model to be able to classify two or more animal images.

Dataset

As the Inception model is trained on ImageNet dataset, we have to retrain the last layers on a different dataset, in order to truly ensure that it has **learned** something new. The Animals on the Web dataset is an example of one such dataset which consists of images from 10 animal categories collected from the web using Google Text Search on the category name.

Expected Results

Achieving high classification accuracy by using a very small number of images to re-train only the last layers.

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