

Machine Learning for Wildlife Image Classification

Chet D. Russell | University of Wyoming



Introduction

Motion-activated wildlife cameras (or “camera traps”) are frequently used to remotely and noninvasively observe animals. Manually classifying camera trap images is an encumbrance that has prompted scientists to use machine learning to automatically classify images.

Project Overview

Machine learning is the usage of computer algorithms that improve automatically through experience. In the case of this study, the machine learning model would be used for photo recognition to determine the most likely animal that is shown in a camera trap image.

Camera Traps

A camera trap is a remotely activated camera that is equipped with a motion sensor or an infrared sensor, or uses a light beam as a trigger. Camera trapping is a method for capturing wild animals on film when researchers are not present, and has been used in ecological research for decades.

Camera Trap Images



Limitations

- Machine learning models trained to recognize species from one location and in one camera trap setup might perform poorly when applied to images from camera traps in different conditions. For instance, different locations have different backgrounds (the part of the picture that is not the animal) and most models evaluate the entire image, including the background, leading to possible problems.
- the use of machine learning in camera trap analysis is often limited to computer scientists, yet the need for image processing exceeds the availability of computer scientists in wildlife research. For example, several researchers have provided excellent Python repositories for using computer vision to analyze camera trap images. These software packages enable programmers to use and train models to detect, classify, and evaluate the behavior of animals in camera trap images. However, these packages require extensive programming experience in Python, a skill which is often lacking from wildlife research teams.

Procedure

1. Collect camera trap images
2. Train machine learning models
3. Validate the models
4. Present validated results