DATA EXTRACTION OF ANIMALS IN CAMERA TRAP IMAGES

Noah Samson George Mariyanathan

A dissertation submitted in partial fulfilment for the requirement for Bachelor of Engineering (Honours) degree in Software Engineering

Department of Computing

Informtics Institute of Technology, Sri Lanka

in Collaboration with

University of Westminster, Uk

2020

ABSTRACT

The world that we live does not contain only humans, it is teeming with life that coexist together creating diverse ecosystems. But the changing climates, deforestation and other alterations due to human activities have negatively influenced these ecosystems and has driven multiple species to become endangered and in worse cases, to extinction. Any changes in the environment or the species of the animals in an ecosystem could collapse the whole ecosystem. Therefore, conservation of the animals is important to protect the biodiversity of the Earth and maintain the delicate ecosystems.

The researchers need to investigate the response of animals to these negative influences so that proper conservation plans can be implemented. But the animals need to be monitored to be able to find the effects of either the negative influences or the conservation plans. And the most non-intrusive way of doing this is using Camera traps that takes images of animals, noting the location, date and time. Though this improves the process of monitoring the animals, a large number of images are taken and most of them are images that do not contain any animals. The time taken to go through all the images is immense and takes considerable man power to extract useful images, and with the increasing camera trap projects the number of images is only increasing.

This research focuses on using object detection to automate the process of extracting the details from the images. The existing solutions, use the help of citizen scientists to go through the images, and there are multiple researches on using classifiers to separate empty images and images with animals. But in this research, RetinaNet is used to detect animals in the images, counting and cropping the images to separate each individual images. And this research also explored ways to solve the class imbalance issue that is present in the dataset. The solution, was able to achieve 75% mAP and it shows that RetinaNet performs better than Faster R-CNN and the resnet 101 performs better than resnet 152 for this problem domain. The solution was tested and system has been evaluated by expert.

Keywords

Camera traps,   Citizen Scientists, Automated Animal Detection, Object Detection, RetinaNet, Counting animals in image.