Computer vision challenges in wildlife conservation (2/28)

By Dan Morris: Principal Researcher for Microsoft AI for Earth

What did the presenter do? Try to stress the data/technical part in the talk.

The presenter gave a talk on the overview of several problems in wildlife conservation where computer vision is poised to make a significant impact. He surveyed four topics:
1. Why this problem is challenging from a computer vision perspective
2. Why solving this problem can support conservation
3. The data sets that the AI for Earth program at Microsoft is working with and the models we're building to address this problem
4. How you can get involved

Dan also gave a demo of the *Microsoft AI for Earth - Species Classification* product. We got to submit our own pictures and have the product try to classify what species the picture had. Also, you can use this API to build your own tools, games, etc. We unfortunately didn't get too technical with the product and the technical decisions they made in their models, but I think it's just as important to consider potential biases that can impact those models.

What were the main findings/results/product?

The speaker talked about species classification from handheld photos. He gave us a demo of the product, *Microsoft AI for Earth - Species Classification*, and talked about some of the limitations, drawbacks, challenges, and future steps for the product. One such thing is that the product can be difficult in classifying species in photos because there is often image blur or animal camouflage. It's hard to capture such detail to correctly classify species. The range of images per class goes from 10 (smallest) to 200 (largest). It also works with plants!

Your personal comments. Was it interesting? Do you think it is relevant? How well did you understand? How does it relate to the course and to the other informatics-related topics?

The product was very interesting! I thought it was impressive that the product could classify species in such poor-quality images, and it was very interesting to hear Dan talk about the challenges the classifier product faces. There were things I had not even thought about until he discussed them. For example, images of interest that have species you may want to classify often come from camera trap image processing. These images from the camera trap usually happen at nighttime when the animals of interest come out. That saying, these images are *very* dark and blurry and the framing is terrible, so this is hard for the product to get through.

I thought it was also cool that when this product is tried on stuffed animals, the product can classify things generally right! The confidence level is very low for a lot of them (~50% or less) but it's still amazing that deformed stuffed animals can still be classified into their general species type. Dan demonstrated this with a stuffed penguin.

Some questions that came to me when hearing about this product were mostly related to other challenges the classifier may face. If you have an image of 2 animals, or an animal and a tree, what will the product choose to classify? How does it handle multiple species in an image? Also, biases in the dataset for the model can be introduced from photographers and the types of photos they would upload (angles, etc.) so how do we overcome those biases?

It's important to understand the biases and challenges that come with machine learning models that we are trying to create. I think that is the biggest relation of this seminar to the course and other informatics-related topics. We unfortunately didn't get too technical with the product and the technical decisions they made in their models, but I think it's just as important to consider potential biases that can impact those models.