I read the entire article.

The study was completed to develop a fast and accurate method for estimating wildlife abundance. The previous, most widely used method for estimating the abundance of a particular species in a specified area is quite time consuming and labor intensive. This involved taking aerial photos of the landscape, manually counting the observed species, then inferring total population size based on statistical methods. The study aimed to utilize novel approaches in deep learning to essentially automate this process. This seems to be a large step in the right direction to automate the entire process of wildlife abundance estimation. This study in particular used aerial photos in Serengeti National Park in Tanzania and aimed to estimate the wildebeest population. They wanted to see if their deep learning method could at least maintain the accuracy seen in counts made by volunteers on Zooniverse, or citizen scientists. They used the wildebeest population because, for several reasons, this is perhaps the most important metric of the ecosystem’s health. In order to replace the need to have experts painstakingly annotate countless images, they deployed two approaches. The first relies on the wisdom of crowds. The authors consistently emphasized the importance and gratitude toward the citizen scientists that manually annotated images for use. The wisdom of crowds often leads to a very accurate, meaning similar to the expert opinion, estimate. The second utilized a modified YOLO neural network and computer vision that counted wildebeest based on input data from Zooniverse volunteers. Both approaches were accurate, but the neural network was significantly faster and scalable.

I thought it was super cool that they utilized the wisdom of crowds. I remember learning about this principle, so it’s cool to see it implemented. I know that a common issue in deep learning systems is the fact that they are only as good as their input data, so it was nice and thorough of them to think of that. It was also cool of them to emphasize the importance of the volunteer citizen scientists for the study. Another strength of the study was part of the data collection. They used three aggregation methods, mean, median, and filtered mean, in order to increase the accuracy of citizen scientist counts. The architecture of the neural network didn’t seem super complex, which seemed like a plus to me.

One aspect of the paper that seemed to be somewhat of a weakness was the fact that the algorithm was only trained on wildebeest counting. They didn’t try to use YOLO on other types of species, so I’m sure that would be a great place to focus future efforts on. Wildebeest counting might be much easier than other types of animals that are smaller and harder to spot. Another aspect of the paper that I felt might be a place of improvement was the fact that aerial images were taken by airplanes flying over the National Park. Perhaps they could transition to satellite images that are real time, in combination with the automated counting using an advanced version of their algorithm that could track species population in real time.

This was my own work.