PhD Seminar 2

Wednesday March 27, 2019 at 3PM in Reynolds, Room 2224

Similarity Learning Networks for Animal Individual Re-Identification-Beyond the Capabilities of a Human Observer

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ABSTRACT:
The ability of a researcher to re-identify (re-ID) an animal individual upon re-encounter is fundamental for addressing a broad range of questions in the study of ecosystem function, community and population dynamics, and behavioural ecology. Tagging animals during mark and recapture studies is the most common method for reliable animal re-ID however camera traps are a desirable alternative, requiring less labour, much less intrusion, and prolonged and continuous monitoring into an environment. Despite these advantages, the analyses of camera traps and video for re-ID by humans are criticized for their biases related to human judgment and inconsistencies between analyses. Recent years have witnessed the emergence of deep learning systems which re-ID humans based on image and video data with near perfect accuracy. Despite this success, there are limited examples of this approach for animal re-ID.

For my PhD seminar, I explore the viability of novel deep similarity learning methods on five species: humans, chimpanzees, humpback whales, octopus and fruit flies. My implementation demonstrates the generality of this framework as the same process provides accurate results beyond the capabilities of a human observer. In combination with a species object detection model, this methodology will allow ecologists with camera/video trap data to re-identify individuals that exit and re-enter the camera frame. Our results suggest this is just the beginning of a major trend that could stand to revolutionize the analysis of camera trap data and, ultimately, our approach to animal ecology.