

From Pixels to Postures: AI and Machine Learning Techniques in Animal Behavior Analysis

Dr. Bart Geurten, University of Otago, NZ

Unsupervised machine learning has long been used to categorize complex, time-dependent behaviors in various species using kinematic data from video observations. While the algorithmic foundations of this approach remain consistent, recent projects have highlighted new dimensions to its application.

In two distinct studies—on farmed deer welfare and developmental encephalopathic epilepsy in tadpoles—we scaled our analyses to over 1.6 billion data points, enabled by advancements in computational hardware. Surprisingly, however, the discovery of more nuanced behavioral categories was not merely a result of larger datasets. Instead, it arose from leveraging a more complex feature space, challenging the canonical belief that scale alone drives finer categorizations.

This talk will detail how these advancements reshape our understanding of behavioral clustering, emphasizing the role of feature complexity over data volume in refining behavioral prototypes, while showcasing the technical and biological insights derived from these groundbreaking applications.