GLOBAL MEET ON CLIMATE CHANGES AND SUSTAINABILITY

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Monitoring threats to wildlife using predictive analyses and visualizations from remote sensing data

Abstract: Land use and climate change are major drivers in regional extirpation and dispersal constraints of many wildlife populations. Wildlife corridors play a crucial role in maintaining connectivity between fragmented habitats offering ecological niche range adapatability and facilitating the movement of species, gene flow, and overall ecosystem resilience. However, monitoring potential corridor tracts can be challenging due to limited knowledge of species use of the land, financial constraints, limited trained personnel, and time. Remote sensing is a non-invasive and cost efficient method of capturing wildlife patterns with data collected autonomously through various capture devices. Two remote sensing methods include acoustic recording units (ARUs) and camera traps. We deployed paired remote sensing monitoring solutions in 24 sites across the midwestern United States to study wildlife patterns of mammals attracted to prey that are vocalizing species. A challenge of remote sensing data is the vast volume of data that must be catalogued and labeled. Recent work in computer vision and convolutional neural networks are simplifying the labeling task. Here, we propose a novel opensource workflow for wildlife monitoring to assess change with autonomously labeled data to produce visualizations and conduct predictive analyses. The visualization technique utilizes a generative additive model while predictive analyses are computed from ARU normalized ecoacoustic indices, data that benefit from the inherent temporal pseudo-replication by using a time-series ARIMA model. We conclude that this novel workflow could benefit land use planners and wildlife conservation officers to assess change more rapidly and seasonally to prevent wildlife extirpation and improve dispersal constraints at local and regional levels.

Biography: Kristen Bellisario received her PhD in quantitative ecology and acoustics in the environment. Her thesis work focused on identifying acoustic features to help increase knowledge of unstructured acoustic data and predictive tools to understand changes in habitat using acoustic recordings. Her postdoctoral work explored modeling of unstructured data of text and acoustics with emphasis on insects, infectious disease, climate change, and forestry. Her current research aims to develop custom acoustic insect classifiers and conservatio of large mammals by studying movement for wildlife corridors using remote monitoring methods.

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