

(AI/ML) Automated monitoring of Dutch wildlife utilising state-of-the-art computer vision models

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Client details

Deepak works as an Associate Professor at the Saxion University of Applied Sciences. He believes that modern day industrial and societal challenges demand a multi-disciplinary approach. As a cross-disciplinary person himself, his passion lies in acting as a potent bridge between highly impactful technologies and society. Given his desire and rich experience in (multi-physics) mathematical modelling, data science/machine learning, data engineering and open-science, he envisions himself to further learn and spread his knowledge via teaching and a variety of societally relevant projects. Eventually, his ambition is to establish his own research area bridging the areas of mathematical modelling and machine learning. Hence, realising effective real-life digital solutions aka digital twins.

Project background

The number of meadow birds (top row in the image below) in The Netherlands continue to decline, despite the years of effort to protect them. As a result, due to the very small meadow bird population, there is a lot of predator pressure on them. Example predators could be a fox, cat, stoat (see bottom row in the below image). This of course depends on the

- Number of predators and potential prey in the breeding season; and
- Site / area management and use of space by all kinds of species throughout the year



To reduce this increasing pressure of preying on the meadow birds, the focus is currently mainly on combating predators. However, we believe that more attention is required on landscape management. This can be done by integral year-round monitoring of area management in combination with continuous collection of observations. That is, collecting data corresponding to the behavior and movement of animals in the field, the quality of the biotope and area management.

Currently, there exists no integrated and reliable assessment/monitoring system for the sustainable management of meadow bird areas. The monitoring data that is available is spread across various databases. And, it is unclear to site managers on how these data sources can be utilised for management monitoring and the management questions are sometimes not clearly formulated.

Hence, resulting in several technical challenges we will address.

Wildlife Monitoring Student Project Proposal

In this project

Of the many data sources, in this project, you will work with camera trap image data where you will look into contemporary computer vision (CV) technologies, which could really help in extracting relevant wildlife information. Besides utilising novel CV modelling algorithms, you will also setup the underlying data processing / ML pipeline, i.e., collecting, preprocessing, model training, evaluation and deploying the models with an API. Ideally, the API should take raw camera trap images as input and output relevant animal statistics.

Tasks

- Review state-of-the-art animal detection models for camera trap images
- Examine and consider different data pre-processing methods for camera trap images
- Process and annotate raw camera trap image data required for model training
- Train your own model(s) and combine it with models such as MegaDetector
- Evaluate the model performance for different approaches
- Setup / update an existing data processing pipeline, which automates the process of converting raw image data to annotated image data and then extracting relevant statistics

Constraints

- You will build on some of our existing developments

Involved partners

Sensing Clues, DIKW, Wageningen University (WUR), Van Hall Larenstein University of Applied Sciences (HVHL), Saxion University of Applied Sciences

Project page

<https://www.hvhl.nl/onderzoek/projecten-content/boeren-burgers-en-buitenbeesten.html> (in Dutch)