

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

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### Client details

Deepak works as a senior researcher/lecturer 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 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
- Examine the raw camera trap image data
- Train your own model(s) or use an existing one such as DeepFaune or create a hybrid one by combining models such as MegaDetector with your own trained/fine-tuned models
- Automate the data processing pipeline, that is, automating the process of converting raw image data to annotated image data and then extracting relevant statistics
- Evaluate the pipeline performance of different approaches

## 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)