Internship large scale image processing: Smart insect camera

Date: 29 September 2020

Background

The smart camera is an advanced, modern system for photographing, recognising and monitoring insects in a fully automated way. Insects are attracted to the screen and photographed. Based on the photos, visible shapes are automatically recognised as insects (and probably designated to main taxonomic groups) using machine learning algorithms and biomass is calculated. The camera can operate autonomously using a battery pack and solar panel. It can measure day and night for several months and send photos to a central server for image processing.

The incentive for the development of the monitoring system is the sharp decline of insects in the world. This new product can help 1. collect detailed data on flying insects in specific locations 2. determine long term trends. 3. Determine the effects of measures (e.g. grassland mowing methods) on insects. 80 cameras have been placed in four provinces in The Netherlands in 2020. Based on the experience from 2019 and 2020, a new version is designed ready for production at the end of 2020.

The ambition is to develop a nationwide network of automatic insect cameras using advanced image recognition technology based on deep learning. This network makes it possible to make statements about the development of biomass and the diversity of insects in the city, agricultural areas and nature. The network also offers an improved method for ecological research.

The automatic insect cameras have been developed by Naturalis Biodiversity Center, EIS Insects Knowledge Center, Radboud University and COSMONiO Imaging BV.

For more information on the system, see diopsis.eu

Internship goals

The internship will include working on or assisting with the following subjects:

- Enhancement of the image recognition module:
    - Improving deep learning method for detecting insects
    - Improving deep learning method for identifying insects
    - Improving deep learning method for tracking insects in sequential images
    - Improving deep learning method for biomass estimation
- Optimisation of the data pipeline: processing large volumes (ca. 20 million images) of data with deep learning based methods
- Extraction of relevant ecological measures from the image processing results

Requirements

- Study: computer science, data science or a related field
- Experience with deep learning frameworks
- Languages: fluent in English
- Interest in biology
- Ability to work independently
- Analytical, accurate and curious
- Good interpersonal skills

With this internship you will gain knowledge and experience of bringing an innovative product, based on and for science, to market. Preferred start is November 2020 with full-time attendance for preferable 6 months. Due to COVID-19 restrictions, working from home is strongly preferred. A Slack community is available for online communication and Skype is used for team meetings.

Procedure

Please submit your application to laurens.hogeweg@naturalis.nl and upload your CV & cover letter in English. For more detailed information about the internship feel free to contact us.