

## Laurens Hogeweg



Job title: Deep Learning Engineer

Organisation: Naturalis Biodiversity Center and COSMONiO Imaging BV

Abstract:

**Title: Reducing the taxonomist's burden through AI**

The completeness and quality of the information in natural history museum collections are essential to support its use, such as in biodiversity research. The accuracy of the information currently largely depends on expert provided metadata, such as species identification. At the same time the world is running out of taxonomic specialists who can identify the biodiversity whose preservation has become a global concern (Drew, 2011).

Naturalis Biodiversity Center, Cosmonio Imaging BV, and Observation.org are investigating the role of artificial intelligence for automatic species identification in supporting collection management. One of our aims is to use human expertise where it is most needed, for complex tasks, and use computational methods for repetitive, less difficult identifications.

We demonstrate potential gains in the data entry process of a large collection (500,000+) of Java butterflies (Papilionoidea). At the moment, creation of collection records is manually performed by a team of volunteers who digitise the butterfly and enter its registration number. The species identification of all butterfly images is performed by a few experts at a later moment, creating a backlog of work, which limits the speed of publication of biodiversity information.

In this pilot project we evaluated the performance of automatic species recognition using deep learning based image recognition. We also investigated how to combine computer and human decisions to ensure both high data quality standards and reduction of expert time. In the presentation we will show preliminary results and discuss the potential and limitations of deep learning technology for collection management.

Bio:

Laurens Hogeweg is a deep learning engineer at Naturalis Biodiversity Center and COSMONiO Imaging BV. He has a background in machine learning of medical images, obtaining a PhD in that area at Radboud University Nijmegen, but since then has switched to broaden the application of machine learning to biological images. Currently he works as a deep learning engineer at Naturalis Biodiversity Center to develop a deep learning platform for biodiversity applications. The platform focuses on both natural history collections and species observations in the wild. The platform will be made accessible to researchers as well as the general public.