

We are looking for a bio-informatic Master student, for a 5-6 months internship, to develop a deep learning based method to detect birds on a cryptic background

The amount of data collected in scientific studies has been increasing substantially in recent years, and the field of ecology is not an exception. Dealing with large data volumes can be quite challenging and time consuming. One of the solutions to increase the speed of these data processing is to use deep learning based methods.

We are studying the nest building behaviour of the sociable weavers (*Philetairus socius*),



in order to understand the phenology of this behaviour. Sociable weavers are colonial cooperatively breeding birds endemic to southern Africa, and they build the largest nest among the bird taxon. To achieve this objective, we recorded several dozens of hours of videos of the top of the nest structure, where the birds come to build.

Fig1: Bird detected using Mask RCNN

The objective of this internship is to develop a deep learning based method to automate the detection of the birds on the nest structure, which is a cryptic background. The crypticity of the background represents the real challenge of this objective.

We are looking for a student who is quite comfortable coding with Python and who has some knowledge in deep learning methods. The tasks of the student will be:

- 1) To organize the dataset. Most of the training data for the neural network will be provided. Additional data will be extracted from videos if needed.
- 2) To create the deep learning neural network. We will probably use on Mask RCNN type. However, this can be adapted if a better option is found.
- 3) To compare the different architectures (Mask RCNN, FasterRCNN, ...) and hyperparameters (learning rate, Intersection over Union, ...) on the validation accuracy of the neural network.
- 4) To organize the method as a user-friendly pipeline to be used easily.
- 5) To provide basic statistics that describe the phenology of building through time.
- 6) (Optional if still time) Look into the potential for deep learning to perform individual identification from pictures.

The internship will be located at the "Centre d'Ecologie Fonctionnelle et Evolutive" (CNRS) in Montpellier, France. The student will be integrated into an international research team and be supervised by Nicolas Silva (PhD student) and Claire Doutrelant (PI).

If you are interested, please send a CV, a motivation letter and one reference person to contact to: Nicolas Silva (silva.nicolas.j@gmail.com) and Claire Doutrelant (claire.doutrelant@cefe.cnrs.fr)