Centre d'Etudes Biologiques Chizé
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Laboratoire Informatique,
Image et Interaction Laboratoire L3i
Faculté des Sciences et Technologies
Bâtiment Pascal
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Offre de stage – Development of Artificial Intelligence and Computer Machine Learning methods to analyse underwater video images collected by diving predators

Job Title

In view of the current sanitary conditions, the internship will take place between the Chizé Biological Studies Center (CEBC / CNRS, Chizé), the Laboratoire Informatique, Image et Interaction (L3i) and the candidate's home, teleworking in a location defined in agreement with the intern and the school. The dates are to be defined according to the availability of the trainee and the lapse of time generated by the administrative formalities. The internship is compensated (fixed internship compensation around 600 € / month).

Context

In the last 20 years, animal-borne bio-logging devices, have revolutionized the study of animal behavior in their natural environments, and allowed to start bridging these data gaps. With the information acquired from bio-logging devices, researchers have been able to reconstruct 3D movements of animals in the wild (e.g using combinations of different loggers as GPS, accelerometers, magnetometers or time-depth recorders), understand their foraging behaviour, success and effort and how movements relate to the surrounding environment. To date, researchers of the CEBC have accumulated many hours of video-recording data on Adélie penguins (*Pygoscelis adeliae*), that need to be processed. In 2017 to 2019, 22 Adélie penguins were instrumented with both accelerometers and camera in Dumont d'Urville French Antarctic station (Fig. 1). The cameras recorded continuously for 5-6 hours each while depth sensors, tri-axial accelerometers and GPS recorded every 1Hz, 25H and every 3 min, respectively.

Figure 1: prey encounter and captures by Adélie penguins with a camera logger mounted on their upper back. The top of the head and beak of the penguin is visible in the bottom part of the frame. Several types of prey are encountered; from left to right, krill in swarms, fish, unidentified and solitary krill. Contrast and ambient light differ in each shot and so does the tint of the background.

Mission

The objective will be to develop video and image processing methodologies based on machine learning to regularly extract relevant information from raw images. We will investigate how AI could be implemented on videos recorded by video-loggers mounted on Adélie penguins and develop some new protocol to assess the relevance and reliability of the extracted information.

For video images obtained from micro-cameras deployed on Adélie penguins, we aim to:

1) Use video data to detect start and end of dives, prey catching events performed by individual penguins while foraging underwater.
2) Develop algorithms to automatically detect prey captured and identify the species, size and density.
3) Match detected prey catching events with accelerometer recordings and identify specific patterns to be used to detect prey capture in individuals for which we only have accelerometer data.

Profile requirements

3rd year computer science student (Master Degree)
- Basic knowledge of AI/ML, deep learning, (e.g. matlab or python tensorflow, pytorch, keras …)
- Languages: English (read, written, spoken)
- Interest in environmental fields.
- Rigorous and autonomous

Contact

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