

Searching for the best audio classifier for animal-borne audiloggers

During the last decade, biologging has emerged as a central tool for behavioural ecology, allowing to collect sometimes massive datasets that are however bringing up new methodological challenges for ecologists. The period has simultaneously seen massive advances and successes in deep learning approaches, and many consider that they could become the go-to method for biologging, even being directly integrated into the loggers (edge computing). Deep learning can be tedious to implement though, and is well-known to be power-hungry, whereas simpler classification methods such as gradient boosting on decision trees (e.g. Catboost) could also be highly successful. Comparisons of these classification approaches using real-world examples from ecological studies remain rare however.

Here we will fill this gap by comparing the performance of various classifiers of increasing complexity on audio data collected from animal-borne loggers. We will use several examples to assess the generality of our results, including for instance snorts from plains zebras or barks of sheep guard dogs. We will report on the standard assessments of accuracy of the classification (e.g. recall, precision), which will allow not only to judge the relative merits of the various classifiers, but also show the ability of state-of-the-art approaches to classify audio data from animal-borne loggers, an emerging tool. We will also discuss these results in the light of the numerical complexity of the methods, which is a critical driver of the consumption that would be imposed onto the logger should these methods be embedded for edge computing in low-power biologging devices.