

Development of a cetacean classifier to support the study of Passive Acoustic Monitoring data in the marine renewables sector in Wales

Summary

Tidal turbines are designed to extract energy from strong tidal currents. However, they have the potential to injure large marine animals.

It is thus paramount to monitor the movement and behaviour of these animals near operating turbines, which is traditionally done via passive acoustic monitoring (PAM).

PAM consists of recording and analysing the vocalisations from marine mammals, like echolocation clicks and calls. This project aims to develop **a tool that automatically classifies marine mammal click detection** into species.



Methodology

A **hierarchical recurrent neural network (HRNN)** is used towards the classification of echolocation clicks in three groups of species (Bottlenose or Common dolphin, Risso's dolphin, Harbour porpoise) or as noise.

Feature extraction was not required, and clicks could be classified based on their raw waveform with accuracy, **precision** and **recall > 80%**.

The HRNN classifier was used to process PAM data collected in a tidal site targeted for the development of renewable energy sources. Classified clicks inform the **presence of each species** per unit of time.

Benefits

- Open-source software tool
- Reduction of labour from months to hours
- No need for special expertise
- Facilitates and accelerates impact assessments
- Method can be applied to other regions and species

Further exploitation/next steps

Further development may include acoustic localisation of both the animals and the turbines, and thus the monitoring of any induced behavioural changes.



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