

Self-supervised learning for fish classification

This project aims at detecting and classifying fish instances using an equipment (Deep Vision Subsea Unit) that captures underwater images in a controlled environment. The image acquisition system is composed of two cameras and a controlled illumination setup providing a homogeneous background colour. The detection of fish instances in the acquired images and the classification by their species allows the calculation of statistics of the trawl.

Deep learning techniques have proven to be a good way to solve this problem, but a great number of labelled training data samples must be provided to train a robust classifier. Manual classification must be performed by ichthyologists to ensure correctness, making the obtention of sufficient training data time-consuming and, thus, difficult due to lack of expert time.

In this project, a self-supervised approach will be investigated and developed to be able to train a robust classifier on a low number of prior annotated training data and exploit the large number of unlabelled data. The available images have been acquired from two different trawls, all of them containing four types of fish species (Herring, Mackerel, Blue whiting and Mesopelagic), as shown in *Figure 1*.

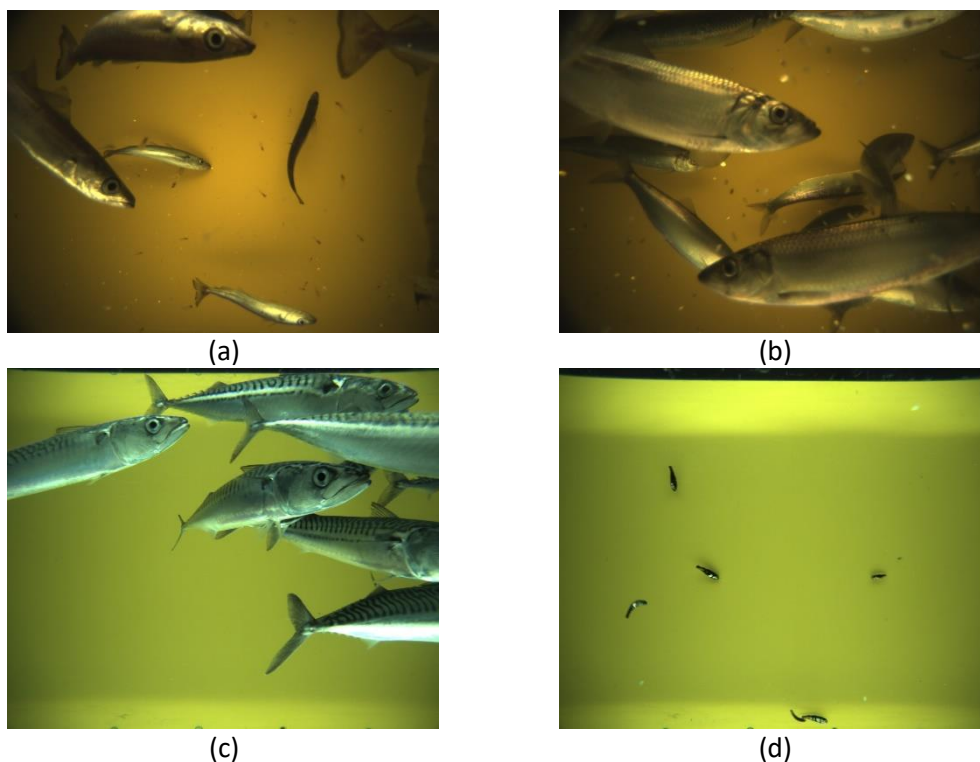


Figure 1. Samples of the two available datasets containing blue whiting (a), herring (b), mackerel (c) and mesopelagic (d).