

FISH 538: Fisheries Acoustics

Assignment 3: Alternate Approaches to Target Classification

The cliché “there is more than one way to skin a cat,” applies to acoustic target classification in the way that hardware is developed, data is acquired, and in the way that data are analyzed. In class, we have seen the evolution of hardware from single frequency narrowband to multifrequency broadband and from analyst scrutinizing echograms to objective classification of target types using frequency responses. Are there other approaches?

A new paper by Allken et al. (2018) advocates the use of an Artificial Intelligence (AI) technique to classify acoustic targets. This is not a brand new concept (e.g. Haralabous and Georgakarakos 1996) but in the coming age of Big Data, do you think this is a logical next step in active acoustic data analysis?

Questions to consider:

1. Has this approach been used before? If so, what has changed? If not, then what is novel?
2. Are there any characteristics of acoustic data that constrain or limit the potential use of AI? If so, what and how? If not, then why not?
3. Are there any constraints of AI that limit the utility of this approach? If so, what are they? If not, then why not?
4. What do you think is an ideal approach to target classification? Make sure you explain why you think this approach has merit.

References

Allken, V., N.O. Handegard, S. Rosen, T. Schreyeck, T. Mahiout, and K. Malde. 2018. Fish species identification using a convolutional neural network trained on synthetic data. ICES Journal of Marine Science. <https://doi.org/10.1093/icesjms/fsy147>

Haralabous, J. and S. Georgakarakos 1996. Artificial neural networks as a tool for species identification of fish schools. ICES Journal of Marine Science. 53: 173-180.

Marking Rubric:

1. (5) review of previous use (more than Haralabous and Georgakarakos 1996)
2. (5) characteristics of data that support or constrain use
3. (5) characteristics of approach that support or constrain use
4. (5) ideal approach plus support for approach