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Investigation of the influence of the detection algorithm on the classification of transient underwater sounds.

ABSTRACT - Masterthesis

In this thesis the impact of detection of short-time underwater signals on the performance of automatic classification was investigated. In the beginning of this thesis, the detection algorithm was described and the effects of the relative transient position within the signal processing on the detection result were considered. The outcome of this investigation is that the robustness of the detected start and stop time of the transient towards the relative transient position within the signal processing is strongly depending on the transient class and the used antenna array. Short, loud signals with high SNR (signal- to-noise ratio) are very robust and their detection results show only small variations. In the next step of this thesis, the values of the calculated features were inspected regarding their robustness. Afterwards, a ranking and a selection of robust features was created. The concluding investigation of the classification results of a „support vector machine“ classification algorithm has shown that classification performance is strongly depending on the feature selection. The best result was achieved by using all presented features (~77% of transients were correctly classified). By using the robust features, the outcome was only slightly worse (~75%). The sensitive features resulted in a clearly worse classification (~55%). An additional observation is that the classification result can be improved by augmenting the training data by time shifted copies of the transient (+~5%).