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Comparison of automatic classification methods for beluga whales vocalizations

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The beluga whale is a loquacious marine mammal with a complex vocal repertory. It produces a wide variety of whistles and pulsed tones as well as high-frequency echolocation clicks. Automatic detection of the long-distance propagating communication calls are desirable for implementing passive acoustic monitoring (PAM) systems in their environment, for habitat utilisation studies and real-time early warning devices in anthropogenic impact mitigation systems. Signal processing methods were developed to classify beluga vocalizations from a PAM data set recorded in Cap-de-Bon-Désir in the Saguenay-St. Lawrence Marine Park in summer 2003 using a 6-hydrophones array with a 10-100 kHz sampling rate. The performance of an MFCC-based HMM system and a polynomial model applied to extracted time-frequency contours of vocalizations will be evaluated. The feasibility of real-time implementation will then be analysed for both methods.