ACOUSTICS2008/2905
Automated classification of odontocetes in open ocean environments using a novel multiclass suport vector machine

Susan Jarvis[a], Nancy Dimarzio[b], Ronald Morrissey[b], Jessica Ward[c] and David Moretti[c]

[a]Worcester Polytechnic Institute, 100 Institute Rd, Worcester, MA 01609, USA

[b]Naval Undersea Warfare Center Division Newport, 1176 Howell Street, Bldg 1351, 2nd Floor, Newport, RI 02841, USA

[c]NAVSEA, Newport Undersea Warfare Center, Newport, RI RI 02841, USA

Mid-frequency active sonar has recently been implicated in several marine mammal stranding events in various geographic locations. This has caused increased interest in monitoring and mitigating the effects of anthropogenic noise on marine mammals. Some species can be more susceptible sonar than others. For example, beaked whales (particularly Mesoplodon densirostris) have been the predominant species involved in most of the strandings. Key to effective monitoring and mitigation is the ability to automatically detect and identify the animals present, especially the species of high interest like beaked whales. This paper presents a novel class-specific support vector machine (CS-SVM) methodology for automated, species-level classification of small odontocetes. A CS-SVM has been developed and trained to identify click vocalization from several species of odontocetes including Mesoplodon densirostris. The algorithm processes time series data in a fully automated fashion first detecting and then classifying click vocalizations. The current CS-SVM configuration correctly identifies clicks from M. densirostris over 95% of time. Further results from the application of this automated classifier to data recorded at the AUTEC and SCORE undersea range facilities will be presented.