

SPERM WHALE (PHYSETER MACROCEPHALUS) ACOUSTIC IDENTIFICATION

Mike van der Schaar, Eric Delory and Michel André.

*Laboratori d'Aplicacions Bioacústiques
Universitat Politècnica de Catalunya (UPC)
mike.vanderschaar@upc.edu, http://www.lab.upc.es*

*Centre Tecnològic de Vilanova i la Geltrú
Avda. Rambla Exposició, s/n
08800 Vilanova i la Geltrú
Barcelona, Espanya*

Recordings of a group of diving sperm whales are often made with a small towed array from a boat. This type of array usually does not allow accurate bearing estimation of sources of the received signals, which makes it difficult to separate the whales in the recordings or to identify which animal produced which signal. Additionally, the signals themselves are influenced by sea noise and are strongly directional, both complicating the use of learning classifiers. We present classification results comparing the use of radial basis functions and

support vector machines for identification, both using Gaussian kernels. Using features extracted from the signals with a local discriminant basis, these classifiers were able to distinguish between seven whales for the duration of a click train with 80% accuracy. Support vector machines showed best generalisation towards an entire dive for one whale, using only a small segment at the start of the dive for learning, with an accuracy of 79%.

DATA AND IMAGE ACQUISITION SYSTEM TO MEASURE EMERGENCE ACTIVITY RHYTHMS ON NEPHROPS NORVEGICUS POPULATION ASSESSMENT

David Sarriá¹, Joaquín Del Río¹, Antoni Mànuel¹, Jacopo Aguzzi², Francesc Sardà²

*1. Centre Tecnològic de Vilanova i la Geltrú (SARTI),
Rambla de l'Exposició s/n, 08800 Vilanova i la Geltrú, Spain*

*2. Institut de Ciències del Mar. CSIC
Passeig Marítim de la Barceloneta 37, 08003 Barcelona, Spain*

Keywords: infrared, USB, image acquisition, LabVIEW, Matlab

Introduction

The Norway Lobster, *Nephrops Norvegicus* (L.), is a decapod crustacean inhabiting of complex burrow systems in the muddy continental shelves and slopes of the Atlantic and Mediterranean Europe. These species are fished intensively in the Mediterranean and they are showing signs of overexploitation.

The project objective is a system design for CSIC marine biologists group that measure the emergency rate of the Norway lobster and permits characterize this specie studying different modulation variables like sex, size, food presence, isolation or coexistence in group.

Since the animals are only captured when they are outside the burrows, the estimations of the biomass populations of this important fishing resource are unknown, to be able to determine and to quantify what number from the population emerges and which are the causes constitutes the biological purpose.

Twelve aquariums with artificial burrow properly equipped and prepared were developed to mount the system and extract the behavior of isolated Norway Lobsters (one by aquarium).

System desing

The solution to detect presence in aquatic surroundings without using wiring inside the acuariums and not to induce stress to the Norway lobster has been using infrared emitters and receivers [1] outside the aquarium (the infrared wavelengths are not detected by

Nephrops [2-3]). They are placed forming detection vertical barriers and positioning them in strategic zones allows to detect the step and location of the Norway lobster in the aquarium.

An innovative and customized acquisition system has been developed that is able to acquire up to 64 photodiodes incorporated in each of the twelve aquarium tanks. The infrared signals of each aquarium are acquired by a low cost microcontroller with an integrated AD converter [4] and sent to the host computer using USB protocol [5].

Another developed subsystem controls the day light photoperiod and illuminates the aquarium from above with IR and blue light (480nm) [3].

A low cost USB infrared camera complements the system and permits to view each aquarium in darkness. Applying vision algorithms [6] is possible to confront the results obtained with infrared sensors.

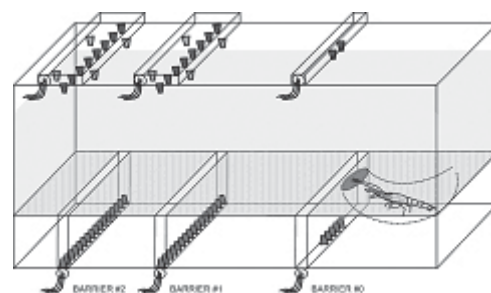


Fig. 1. Assembly of infrared barriers in one aquarium tank

