

## Detecting, Tracking and Classifying Animals in Underwater Video

Duane R. Edgington, Danelle E. Cline, Ishbel Kerkez, Jérôme Mariette  
Monterey Bay Aquarium Research Institute  
7700 Sandholdt Road  
Moss Landing, CA 95039, USA

Abstract – We are developing software to analyze high resolution video imagery from cameras deployed on ocean observatories, enabling quantitative video analysis to be obtained at the scale of the individual organisms. Video survey advances studies in animal diversity, distribution and abundance. Analyzing video, however, is labor intensive and costly, limiting marine ecological research and application to aquatic management.

The challenge of analyzing video from fixed cameras in observatories operating around the clock is particularly daunting due to the enormous quantity of data. To address this problem we developed an automated system for detecting and classifying organisms, in which frames are processed with a neuromorphic-selective attention algorithm. Candidate locations are subject to a number of parameters and tracking, to mark detected events as "interesting" or not. The "interesting" events undergo further processing with a statistical classifier utilizing a Gaussian mixture model to determine the abundance and distribution of a selected organism category.

Presented data detail the comparison between professional annotations and automated detection of organisms in coastal and deep ocean observatory video footage. We present automated classification of organisms in benthic video footage.

Edgington, D.R., Cline, D.E., Kerkez, I., Mariette, J., Detecting, Tracking and Classifying Animals in Underwater Video. *International workshop on Video Processing and Recognition (VideoRec'07)*, Montréal, Canada, May 2007.