

DETECTION AND CLASSIFICATION OF SELECTED MIDWATER AND BENTHIC ORGANISMS IN UNDERWATER VIDEO

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We present a system that enables automated annotation of underwater video transects for quantitative studies of ocean ecology. Remotely operated vehicles (ROVs) equipped with high resolution video equipment facilitate quantitative video transects (QVTs) of oceanic midwater and benthic habitats. QVTs provide data at the scale of the individual midwater macrofauna and epibenthic megafauna and their natural aggregation patterns that advance studies in animal diversity, distribution and abundance. Analysis of QVTs, however, is labor intensive and costly, reducing the amount of data analyzed from transects and thus limiting understanding of the factors regulating the abundance and distribution of marine populations. 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. The identified 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 Bayesian 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, and classification by the system of the midwater polychaete *Poebius meseres* and the deep-sea benthic echinoderm *Rathbunaster californicus* in video footage.

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