

# An Iterative Fuzzy Segmentation Algorithm for Recognizing an Odor Source in Near Shore Ocean Environments

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***Abstract*** – A mission of chemical plume tracing (CPT) in near-shore and ocean environments is to navigate an autonomous underwater vehicle (AUV) to find a chemical plume, to trace the plume to its source, and to declare the source location. It is necessary to recognize the declared odor source by using a visual system. Color images, which were taken in near-shore ocean environments when the source was declared, are very vague due to dim illumination conditions and fluid advection effects. This paper presents an iterative fuzzy segmentation (IFS) algorithm for extracting color components of the chemical plume and the odor source for visual confirmation of the correct declared odor source. The proposed approach might be of general interest in image processing and computer vision.

***Index Terms*** — Autonomous underwater vehicles, chemical plume tracing, fuzzy image segmentation, odor source recognition.