Common Fisheries Policy Surveillance Software - Mariscope.ai

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Abstract

This research endeavors to revolutionize fisheries surveillance under the Common Fisheries Policy (CFP) of the European Union. We propose an automated approach that leverages advanced neural network algorithms, particularly focusing on the precise detection of fish on fishing vessels using the You Only Look Once (YOLO) algorithm. YOLO, a real-time object detection system, and Convolutional Neural Networks (CNNs) form the backbone of our methodology. Our study addresses the limitations of existing surveillance methods, which are predominantly reliant on manual observation, by harnessing the capabilities of Artificial Intelligence (AI).

In exploring the current state of fisheries surveillance, we critically assess existing methodologies, underlining the urgent need for more innovative solutions. Our literature review highlights the integration of neural networks, such as CNNs and YOLO, in similar studies, and discusses common approaches, challenges faced, and lessons learned in the broader field of fisheries surveillance using AI.

We detail the specifics of model training, dataset selection, and augmentation techniques employed to enhance the algorithm's robustness against environmental variability and real-time processing demands. Additionally, we address challenges related to model generalization to ensure our approach is adaptable to various marine environments.

Our paper aims to be a pivotal contribution to the discourse on effective marine resource management, setting the stage for future advancements in automated fisheries surveillance. We emphasize the transformative potential of integrating advanced neural network algorithms into monitoring processes.

Furthermore, the project also includes developing a CNN model for binary image classification. This model aims to simplify the tasks of surveillance personnel. For instance, if the automatic fish measurement through the YOLO model does not meet accuracy expectations, we provide an alternative: a distance measurement functionality. This functionality allows staff to mark two points on an image using the CNN model. This means they can focus only on relevant sections of the record where fish are present, streamlining the surveillance process.

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