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Abstract

Marine Oil Spill Detection with Deep Neural Networks †

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Oil spills, primarily due to accidents involving pipelines, tankers, and storage facilities, significantly impact marine life, particularly fish and shellfish. These leaks harm the fish and shellfish living in the seas. Within the scope of this study, open-source ocean images were used, with or without oil spills. In the dataset, there are 150 images in each class, and a total of 300 images. Before the training in deep neural networks for oil spill detection, data augmentation by rotating the dataset at certain angles to the right and left and various data preprocessing processes were applied. After the data augmentation process, the total amount of the dataset was increased from 300 to 400. In addition, as a dataset distribution, there are 320 images in the training data and 80 images in the validation data. Validation data were also used as test data. Deep learning-based deep neural networks MobileNetV2, Convolutional Vision Transformer (CvT), and ConvNeXT were used for classification processes in which oil spill detection with artificial intelligence is performed. When the application results were examined, it was observed that the classification results in deep neural networks had an accuracy rate of over 90%. Future work will aim to develop a real-time object detection interface that classifies and accurately locates oil spills.

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