

Abstract

Oil Slicks Detection in SLAR Images with Autoencoders [†]

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In this manuscript, the main aim is to detect candidate regions to be oil slicks in Side-Looking Airborne Radar (SLAR) images using Deep Learning techniques. The proposed approach is based on Autoencoders to allow us to automatically discriminate oil spills without *hand*-crafted features or other features extracted from traditional computer vision techniques. Each image is acquired from two SLAR sensors located on both sides of an aircraft. The method can work well although the regions have a high probability of having artefacts and noise caused by the aircraft maneuvers. Those artefacts and noise are caused by not only the looking angle of both antennas which generate a blind swath beneath the aircraft, but also by other error measurements obtained when the aircraft turns. The presented method is implemented as a denoising Autoencoder that uses the Convolutional Neural Network (CNN) as encoder and decoder functions, where the decoder function learns to detect only the oil slicks. This approach can be used for detection of oil spills in emergency missions. The behavior method has been tested using SLAR images acquired from a TERMA radar for mapping the sea surface and surveillance of Spanish coasts. The results show that our method works suitably in different weather conditions and with different natural phenomena such as shoals of fish or seaweed.

Conflicts of Interest: The authors declare no conflict of interest.



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