

GENETIC ALGORITHM FOR OIL SPILL AUTOMATIC DETECTION FROM MULTISAR SATELLITE DATA

Maged Marghany Institute of Geospatial Science and Technology (INSTeG)
Universiti Teknologi Malaysia
81310 UTM, Skudai, Johor Bahru, Malaysia, maged@utm.my,
magedupm@hotmail.com,

Abstract: Synthetic aperture radar (SAR) is a precious foundation of oil spill detection, surveying and monitoring that improves oil spill detection by various approaches. The different SAR tools to detect and observe oil spills are vessels, airplanes, and satellites. Vessels can detect oil spills at sea, covering restricted areas, say for example, (2500 m x 2500 m), when they are equipped with the navigation radars. On the other hand, airplanes and satellites are the main tools that are used to record sea-based oil pollution. The main objective of this work is to design automatic detection procedures for oil spill in synthetic aperture radar (SAR) satellite data. In doing so the genetic algorithm tool was designed to investigate the occurrence of using ENVISAT and RADARSAT-2 SAR satellite data. The study shows that genetic algorithm provides accurate pattern of oil slick in SAR data. This shown by 90% for oil spill, 3% look-alike and 7% for sea roughness using the receiver – operational characteristics (ROC) curve. It can therefore be concluded genetic algorithm can be used as automatic tool for oil spill detection in ENVISAT ASAR and RADARSAT-2 SAR data.

Keywords: MultiSAR satellite data, oil spill, Genetic algorithm, receiver –operational characteristics (ROC) curve, ENVISAT ASAR