COMPARISON BETWEEN LEE AND KUAN ALGORITHM FOR OIL SPILL DETECTION FROM SAR IMAGES

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COMPARISON BETWEEN LEE AND KUAN ALGORITHM FOR OIL SPILL DETECTION FROM SAR IMAGES

By

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LIST OF ABBREVIATIONS

APC	Antenna Pattern Correction
GHz	Gigahertz
HH	Horizontal-horizontal
m/s	Meter per second
^{o}	Degree
PACE	Picture Analysis, Correction and Enhancement
RMS	Root Mean Square
SAR	Synthetic Aperture Radar

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ABSTRACT

An important and serious cause of marine pollution at sea surface is oil spill pollution. Oil spill usually occur at main ship traffic routes, near to platforms or in mouth of rivers or estuaries. The application of RADARSAT satellites are being used to routinely monitor ocean oil pollution. Their main advantages are independence of the sun light. That mean its can be used at day and night. However, they will present speckle and noise. To reduce these speckle and noise, adaptive filter was used. This study mainly concerned on comparison between Lee and Kuan Algorithm for oil spill detection from SAR images. Lee algorithm was used to determine the linearity of oil movements, while Kuan algorithm was used to enhance ships. This study shows that different algorithm was given different output. Window 7x7 was the best filter for Lee algorithm and 11x11 for Kuan algorithm. Image classification was used to get information about oil spill thickness and area of spillage. Sometime, not all dark slicks were oil slick. It can be a look-alike that cause by natural environment or low wind speed. Mean value of backscatter at oil slick area was 34.4 $\pm$ 0.5. Sea condition at this area is calm and wind speed were around 6 m/s while mean direction surface were around 50^{o} from North.

ABSTRAK

Tumpahan minyak merupakan satu pencemaran serius terutama di laut. Biasanya terjadi di laluan utama kapal, berhampiran pelantar minyak atau berdekatan muara sungai. Aplikasi Radarsat satelit sangat berguna untuk pemantauan pencemaran minyak yang berlaku di laut. Kebaikan utama ialah ianya tidak memerlukan cahaya matahari untuk berfungsi dan boleh digunakan pada waktu malam. Selain itu, ianya juga menghasilkan tompokan dan gangguan. Untuk mengurangkan gangguan ini, 'adaptive filter' digunakan. Tujuan utama kajian ini dijalankan ialah untuk membandingkan penggunaan Lee algoritma dengan Kuan algoritma dalam mengesan tumpahan minyak dengan menggunakan SAR imej. Lee algoritma didapati dapat mengesan tumpahan minyak secara linear manakala Kuan algoritma dapat mengesan kehadiran kapal. Penggunaan algoritma yang berbeza akan menghasilkan output yang berbeza. Tetingkap 7x7 susuai digunakan untuk Lee algorism manakala tetingkap 11x11 sesuai untuk Kuan algoritma. Pengkelasan imej dibuat untuk mendapatkan nilai ketebalan dan kawasan penyebaran tumpahan minyak. Kadangkala kawasan gelap merupakan kawasan 'look-alike'. Ianya mungkin disebabkan oleh aktiviti semulajadi atau kawasan tiupan angin yang lemah. Nilai mean bagi kawasan tumpahan minyak ialah 34.4 ± 0.5 dengan kadar tiupan angin ialah 6 m/s ke arah 50^{o} utara.