World Academy of Science, Engineering and Technology
International Journal of Electrical and Information Engineering
Vol:16, No:09, 2022

Hyperspectral Band Selection for Oil Spill Detection Using Deep Neural Network

Authors : Asmau Mukhtar Ahmed, Olga Duran

Abstract : Hydrocarbon (HC) spills constitute a significant problem that causes great concern to the environment. With the latest technology (hyperspectral images) and state of the earth techniques (image processing tools), hydrocarbon spills can easily be detected at an early stage to mitigate the effects caused by such menace. In this study; a controlled laboratory experiment was used, and clay soil was mixed and homogenized with different hydrocarbon types (diesel, bio-diesel, and petrol). The different mixtures were scanned with HYSPEX hyperspectral camera under constant illumination to generate the hypersectral datasets used for this experiment. So far, the Short Wave Infrared Region (SWIR) has been exploited in detecting HC spills with excellent accuracy. However, the Near-Infrared Region (NIR) is somewhat unexplored with regards to HC contamination and how it affects the spectrum of soils. In this study, Deep Neural Network (DNN) was applied to the controlled datasets to detect and quantify the amount of HC spills in soils in the Near-Infrared Region. The initial results are extremely encouraging because it indicates that the DNN was able to identify features of HC in the Near-Infrared Region with a good level of accuracy.

Keywords : hydrocarbon, Deep Neural Network,short wave infrared region, near-infrared region, hyperspectral image
Conference Title : ICSRS 2022 : International Conference on Satellite Remote Sensing
Conference Location : London, United Kingdom
Conference Dates : September 22-23, 2022