Identification of ships image on SAR data using machine learning

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SAR(Synthetic Aperture Radar) has been popular in Earth remote sensing because this is available for all-weather and night time, unlike optical sensors. The identification of ships has been remarked from viewpoints of coast guard such as finding and monitoring marine accidents and poaching boats without Automatic Identification System (AIS). Current monitoring such situations still has been a visual inspection. This brings some difficulties such as too huge area, too time-consuming processes and so on to monitor them. So, screening candidates of ships have been required for helping the watchers. Machine learning is one of the best solutions because usual visual inspections have been substituted by the recent AI trend.
This research adopts the Convolutional Neural Network (CNN) because this is the most popular approach in image analysis. We have many uses with CNN in image recognition. This research verifies whether a ship image on SAR can be identified by CNN. This research used SAR images of PALSAR2/ALOS2 with a resolution of 10 m/pixel, polarization is HV (horizontal transmitting, vertical receiving) for the identification of ships. This machine learning needs a set of labeled data with positive/negative. The label is given to ship image on SAR using AIS. Results with PALSAR 2 data with a resolution of 10 m / pixel showed high accuracy of 95%. This research showed the availability of a method to discover ships from SAR images using CNN. In the future, this research will classification of ships not only identification. This research will examine how the change of SAR image due to marine weather affect machine learning. I would like to discuss with marine weather experts at JpGU.

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