Automatic object extraction from VHR satellite SAR images using Pulse Coupled Neural Networks

Fabio Del Frate*[a], Daniele Latini[a], Chiara Pratola[a]

[a]DISP-Tor Vergata University, Earth Observation Lab., Via del Politecnico 1, 00133 Rome, Italy

ABSTRACT

An unsupervised neural network approach for automatically extracting objects of interest from very high resolution (VHR) SAR images is proposed. The methodology relies on the use of Pulse-Coupled Neural Networks (PCNN), an interesting novel technique based on models of the visual cortex of small mammals. Different applications are considered. In a first case the extraction procedure is focused on the detection of buildings. In a second case the extraction of the perimeter of a dark spot representing an oil spill in a SAR image is considered. The performance given by the PCNN is evaluated and critically discussed for a set of new generation of X-band SAR images taken by COSMO-Skymed and TerraSAR-X systems.

Keywords: SAR, image segmentation, PCNN, oil spill detection, building extraction, COSMO-Skymed, TerraSAR-X