IAF EARTH OBSERVATION SYMPOSIUM (B1)
Interactive Presentations - IAF EARTH OBSERVATION SYMPOSIUM (IP)

Author: Mr. Nicolo Taggio
Planetek Italia, Italy

Ms. Daniela Drimaco
Planetek Italia, Italy
Mr. Maurizio Laterza
Planetek Italia, Italy
Dr. Giulio Ceriola
Planetek Italia, Italy
Mr. Mauro Sylos Labini
Planetek Italia, Italy
Mr. George Benekos
Planetek Hellas epe, Greece
Mr. Alberto Morea
Geophysical Applications Processing, Italy
Dr. Khalid Tijani
Geophysical Applications Processing, Italy

AUTOMATED COASTAL ZONE CLASSIFICATION USING AI: A SYSTEMATIC METHOD TO PERFORM COMPREHENSIVE LAND USE AND LAND COVER CLASSIFICATION IN COASTAL AREAS

Abstract

The challenge in land cover and land use classification (LULC) through remote sensing data lies in accurately categorizing and identifying different types of land surfaces and their respective uses from satellite or aerial imagery. This involves addressing issues such as spectral variability, mixed pixels, seasonal changes, and the complexity of urban and natural environments, making it a complex task requiring advanced image processing and machine learning techniques (ML). Coastal regions in Europe are rich in biodiversity, supporting tens of thousands of plant and animal species within unique ecosystems like inland or salt marshes and intertidal flats. These ecosystems play a crucial role in global ocean health. However, human activity poses a threat to these fragile environments, particularly due to the significant population density (40In 2020 Planetek Italia led an industrial consortium of European Earth Observation for the first Copernicus Land - VHR Coastal Zone (CZ) hotspot thematic mapping product on European Coastal Zones. Thematic hotspot mapping activities within the COPERNICUS Land Monitoring Service (CLMS) aim, complementary to generic wall-to-wall mapping, to provide specific and detailed land cover / land use (LC/LU) information to address environmental challenges and issues. The new products cover all European coastal territory to an inland depth of 10 km with a total area of approximately 730,000 km. The products have a minimum mapping unit of 0.5 ha and record around 71 LC/LU classes in 4 different levels. Leveraging Planetek's expertise and involvement in the coastal zone project, and drawing upon the company's proficiency in employing deep learning methodologies in remote sensing, this study implements a comprehensive approach to classify the coastal zone in Europe. In particular, to enhance the efficiency of the photo interpreter, various ML techniques, particularly deep learning approaches, have been incorporated and evaluated for classifying Coastal Zone maps across all levels (from 1 to 4). Utilizing

a specialized data access architecture, a substantial volume of remote sensing data has been organized to create diverse pre-trained models, facilitating predictions across different geographical regions.