IAF EARTH OBSERVATION SYMPOSIUM (B1)
Earth Observation Applications, Societal Challenges and Economic Benefits (5)

Author: Ms. Mina Al-saad
University of Dubai, United Arab Emirates

Ms. Nour Aburaed
University of Dubai, United Arab Emirates
Mr. Saeed Al Mansoori
Mohammed Bin Rashid Space Centre (MBRSC), United Arab Emirates
Prof. Hussain AL Ahmad
University of Dubai, United Arab Emirates
Prof. Stephen Marshall
University of Strathclyde, United Kingdom

SEMANTIC SEGMENTATION OF ROADS IN HIGH-RESOLUTION SATELLITE IMAGERY

Abstract

Remote sensing is a field that is constantly growing due to its importance in applications related to urban planning, risk assessment, resource exploration, and disaster management. Some of the most highly researched topics in the area of remote sensing include Land Cover Land Use (LCLU), object detection, scene classification, and semantic segmentation. Nowadays, researchers are looking into automating these tasks, as performing them manually is time and cost inefficient. Therefore, Deep Learning (DL) algorithms have been utilized for remote sensing and image processing tasks in the recent years. Many studies proved efficiency of DL algorithms, however, several challenges remain unsolved. In particular, semantic segmentation is one of the challenging tasks that is under heavy demand in the field of remote sensing. For this research study, semantic segmentation is applied to extract roads from high-resolution satellite images. Road mapping is an essential first step in several applications that include transportation, traffic management, and city planning. Extracting roads efficiently and accurately will in turn boost the overall outcome of the aforementioned applications. MASK RCNN and U-Net are two state-of-the-art Convolutional Neural Networks (CNN) that perform semantic segmentation. These two CNNs will be trained using publically available datasets from Kaggle website. Afterwards, their performance is enhanced by introducing extra feature layers and finding proper balance between down-sampling trade off and accurate object boundary localization, which is a current open problem in the area of semantic segmentation. The accuracy and loss of all experiments will be reported and sample results from the dataset will be demonstrated. The enhanced CNNs will also be tested using DubaiSat-2 images provided from Mohammed bin Rashid Space Centre (MBRSC).