

Multi-Temporal Mapping of Built-up Areas Using Daytime and Nighttime Satellite Images Based on Google Earth Engine Platform

Authors : S. Hutasavi, D. Chen

Abstract : The built-up area is a significant proxy to measure regional economic growth and reflects the Gross Provincial Product (GPP). However, an up-to-date and reliable database of built-up areas is not always available, especially in developing countries. The cloud-based geospatial analysis platform such as Google Earth Engine (GEE) provides an opportunity with accessibility and computational power for those countries to generate the built-up data. Therefore, this study aims to extract the built-up areas in Eastern Economic Corridor (EEC), Thailand using day and nighttime satellite imagery based on GEE facilities. The normalized indices were generated from Landsat 8 surface reflectance dataset, including Normalized Difference Built-up Index (NDBI), Built-up Index (BUI), and Modified Built-up Index (MBUI). These indices were applied to identify built-up areas in EEC. The result shows that MBUI performs better than BUI and NDBI, with the highest accuracy of 0.85 and Kappa of 0.82. Moreover, the overall accuracy of classification was improved from 79% to 90%, and error of total built-up area was decreased from 29% to 0.7%, after night-time light data from the Visible and Infrared Imaging Suite (VIIRS) Day Night Band (DNB). The results suggest that MBUI with night-time light imagery is appropriate for built-up area extraction and be utilize for further study of socioeconomic impacts of regional development policy over the EEC region.

Keywords : built-up area extraction, google earth engine, adaptive thresholding method, rapid mapping

Conference Title : ICGGIS 2021 : International Conference on Geoinformatics and GIS

Conference Location : Ottawa, Canada

Conference Dates : July 12-13, 2021