

Road condition assessment by OBIA and feature selection techniques using very high-resolution WorldView-2 imagery

ABSTRACT

Accurate information on the conditions of road asphalt is necessary for economic development and transportation management. In this study, object-based image analysis (OBIA) rule-sets are proposed based on feature selection technique to extract road asphalt conditions (good and poor) using WorldView-2 (WV-2) satellite data. Different feature selection techniques, including support vector machine (SVM), random forest (RF) and chi-square (CHI) are evaluated to indicate the most effective algorithm to identify the best set of OBIA attributes (spatial, spectral, textural and colour). The chi-square algorithm outperformed SVM and RF techniques. The classification result based on CHI algorithm achieved an overall accuracy of 83.19% for the training image (first site). Furthermore, the proposed model was used to examine its performance in different areas; and it achieved accuracy levels of 83.44, 87.80 and 80.26% for the different selected areas. Therefore, the selected method can be potentially useful for detecting road conditions based on WV-2 images.

Keyword: Object-based image analysis (OBIA); WorldView-2; Feature selection; Chi-square; Road condition