ABSTRACT

Hussain, Ejaz. Ph.D., Purdue University, December, 2010. Urban Land Cover Mapping and Building Extraction from High Resolution Images. Major Professor: Jie Shan.

The availability of very high spatial and temporal resolution remote sensing data facilitates mapping highly complex and diverse urban environments. Such images capture very fine details of urban land covers, which are of great benefits to urban management and decision making institutions. However, mapping such detail information needs combined use of images and ancillary data, and very effective image analysis techniques. In this study an object-based image classification methodology has been developed for urban land cover classification using very high resolution aerial images, elevation data, city zoning maps, and address points data. Logically structured classification rules based on spectral, spatial and contextual features of the segmented objects have been developed, and tested over a small urban area. The same rule set is then transferred and tested on two similar images covering larger urban areas, as well as an image from different sensor. Land cover classification results through transferability of the rule set proved very effective and produced satisfactory classification results with an overall accuracy of 91% as against 96% that was achieved over the small training area. Buildings class has been further processed using semantic information from zoning maps, and building change analysis using reference building data. Buildings detection accuracy measures over 90 %, and the missing rate about 5%. The classification methodology based on integrated use of multiple data produced satisfactory land cover classification, and its transferability considerably reduced processing time and analyst's efforts.