



URBAN CHANGE DETECTION UTILIZING MULTI-PLATFORM AND MULTI-VIEWING-ANGLE HIGH RESOLUTION OPTICAL IMAGES

MARCH 28th, 2017

1 pm Room C-10 (Head Hall)

Presenter: Dr. Shadnam Jabari

Abstract

To date, numerous research papers on urban change detection have been published, in which commonly close-to-nadir satellite images are used to avoid the misregistration problem caused by relief displacements in the images. This severely limits the data sources for change detection, because the majority of high resolution satellite images are taken with an off-nadir angle and the most portion of aerial images have off-nadir views as well. To solve this issue, in this work, a change detection framework is designed using the Patch-Wise Co-Registration (PWCR) method to co-register the images and the Multivariate Alteration Detection (MAD) method to detect changes. the PWCR method is used to overcome the relief displacement problem in image registration and this method is further expanded to incorporate images taken from different sensors. Thus, images taken from multi-platforms and multi-view-angles can be used for change detection. In this method, a Digital Surface Model (DSM) and the exterior orientation (EO) parameters of the images are used to guide the detection of the corresponding points in the bi-temporal images. Then, from the corresponding points, corresponding patches are generated. Finally, the MAD method is employed to detect the changed patches based on the spectral properties of the corresponding patches. The approach was tested on different combinations of off-nadir satellite and airborne images. The accuracy achieved was from 89% to 92% in co-registration and over 90% in change detection. This approach demonstrates the potential to open up the remote sensing data sources for urban change detection.

Presenter

Shadnam Jabari is a Post-Doctoral Fellow in the Department of Geodesy and Geomatics Engineering, University of New Brunswick (UNB), Fredericton, Canada. She received her PhD degree from the same university. She received her MSc in Civil-Remote Sensing Engineering and BSc in the Civil-Surveying Engineering from the University of Tehran, Iran.

She currently is a technical project manager of a research project in UNB regarding sensor fusion. She has been working in the Geomatics Engineering field since 2005 having experiments in industry, research, and university teaching fields. Her research interests include computer vision, remote sensing, 3D imaging, image processing, object-based image analysis, digital mapping, and Photogrammetry.