NOTICE OF THESIS PROPOSAL PRESENTATION

Geodesy and Geomatics Engineering

Doctor of Philosophy

Mohammad Rezaee

Friday, February 5, 2016 @ 2:00 pm
Head Hall – Room E-13

Supervisor:	Yun Zhang, Geodesy and Geomatics Engineering
Supervisory Committee:	Monica Wachowicz, Geodesy and Geomatics Engineering
	Julian Meng, Electrical and Computer Engineering
Chair:	To Be Announced

DEVELOPING A DEEP LEARNING ARCHITECTURE SUITABLE FOR AUTOMATED OBJECT DETECTION IN HIGH SPATIAL RESOLUTION IMAGERY

ABSTRACT

Object detection is one of the mandatory steps in transferring imagery data into land cover information. This information can then be used in various applications such as urban planning, disaster management and environmental monitoring. Existing methods required some of the parameters and the features to be manually tuned and generated (low degree of automation); therefore, they cannot be effectively applied to large scale areas. Moreover, due to the small number of training and testing data used, because of limited ability of the method in processing large amount of data, they are not generalized to fit different types of input data and do not cover various land covers. Deep networks in machine learning have shown capabilities in automatic object detection. Specifically, deep Convolutional Neural Network (CNN), which is capable of processing 2D data, applied for object detection in aerial images uses a large amount of data for training and testing the network (large-scale processing) for generality. However, despite all the improvements in CNN for object detection, some problems remain, and the method still needs to be improved or enhanced. Since there is little research in the remote-sensing field, these improvements are critical.

This PhD research aims to improve the efficiency and accuracy of a deep CNN for object detection in order to benefit from its automatic procedure for object detection of satellite images. Therefore, the research will focus on developing a new CNN architecture to make the method compatible with High Spatial Resolution Images (HSRI) in the remote-sensing field. The envisaged improvements and enhancements are related to research issues such as the selection of the layer types, the data fitting procedure, and the hyper-parameters; as well as more powerful pooling layer for sampling and size reduction; and using the state-of-the-art structure prediction methods. In this way, the method would be capable of processing large-scale data in order to be applicable on a broad range of images. In addition, finding a better data fitting and optimization function is likely to lead to a more efficient prediction in Neural Network. Finally, enhancing the layer types and their functionalities are supposed to lead to a more accurate prediction. Thus, it is expected that the new CNN architecture increase the efficiency and improve accuracy of image detection.

Faculty Members and Graduate Students are invited to attend the presentation