NOTICE OF THESIS PROPOSAL PRESENTATION

Geodesy and Geomatics Engineering

Doctor of Philosophy

Ikechukwu (Iyke) Maduako

Thursday, May 25, 2017 @ 10:00 am
Head Hall – room E-11

Supervisor:	Monica Wachowicz, Geodesy and Geomatics Engineering
Supervisory Committee:	Emmanuel Stefanakis, Geodesy and Geomatics Engineering
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Chair:	Emmanuel Stefanakis, Geodesy and Geomatics Engineering

EVOLUTIONARY GRAPH ANALYTICS OF TRANSIT NETWORKS

ABSTRACT

Evolutionary graph analytics of dynamic real world networks has recently been attracting attention from research communities with the main purpose of understanding spatial and time-evolving characteristics of the structure, connectivity and interactions in these networks. It has been applied in real-world networks such as web semantics, social, biological and communication networks. To the best of our knowledge attempts have been found in literature on applying evolutionary graph analytics in transit networks despite the fact that transit networks can be modelled as evolutionary graphs to discover human mobility patterns that can help solve the modern traffic problems by improving our understanding of reliability, vulnerability, resilience, recommendation and forecasting in transit networks.

Evolutionary graph analytics in transit networks proffers an efficient solution for studying the dynamics of the network as well as the dynamics in the network over space and time. Analysis of how the network properties such as shortest paths, centralities, network density and diameter change over time and space as a result of the dynamics of human mobility pattern in the network can be carried out through evolutionary graph analytics. Are shortest paths, transfer points, pivotal streets and stops constant in the network over time or do they change from time to time during the day, within the weeks and months? These and other questions can be answered through evolutionary graph analytics of the network.

Hence, the aim of this research is in twofold: (a) to develop a **Space-Time-Varying Graph (STVG)** that represents an evolutionary graph of the mobility characteristics and physical features of the transit network in order to analyse the evolution of the network properties over time and space. (b) to design an **Evolutionary Transit Network Analytics (eTNA)** workflow for analyzing massive transit data as evolving graphs in space and time. The research outcomes are expected to help transportation managers optimize their services and positively affect the utilization of public transit systems. This research will also have potential applications to transit emergency planning, time-dependent transfer point planning, transit trend analysis, transit location-based services as well as in time-dependent transit recommendation systems.

Faculty Members and Graduate Students are invited to attend the presentation