NOTICE OF
UNIVERSITY ORAL
GEODESY AND GEOMATICS ENGINEERING

Master of Science in Engineering

Wen Jiang

Thursday, August 16, 2018 @ 10:00 am

Head Hall – Room E-11

Board of Examiners: **Supervisors:**   **Emmanuel Stefanakis, Geodesy & Geomatics Eng.**

Examining Board: **Raid Al-Tahir, Geodesy & Geomatics Eng.**
Suprio Ray, Faculty of Computer Science
Chair: **To Be Announced**

WHAT3WORDS GEOCODING EXTENSIONS AND APPLICATIONS FOR A UNIVERSITY CAMPUS

ABSTRACT

  Geocoded locations have become necessary in many GIS analysis, cartography and decision-making workflows. A reliable geocoding system that can effectively return any location on earth with sufficient accuracy is desired. This study is motivated by a need for a geocoding system to support university campus applications. To this end, the existing geocoding systems were examined. Address-based geocoding systems use address-matching method to retrieve geographic locations from postal addresses. They present limitations in locality coverage, input address standardization, and address database maintenance. These limitations have recently sparked an interest in developing alternative geocoding systems that apply alphanumeric codes as a reference to locations, such as Geohash, Google's Open Location Code, and what3words to name a few.

  Among them, what3words drew attention. It uses a simple combination of three words as a code to represent the location within a 3-meter square on the earth surface. The codes of what3words are less error-prone in communication, efficient to encode and decode, easier to memorize, and multiple languages are supported. The advantages of w3w geocoding system makes it a suitable geocoding method for university campus applications. However, the fixed 3 by 3 meter resolution and lack of consideration of three-dimensional encoding may limit its applicability. To better support geographic applications with special requirements, the what3words geocoding system was extended. This research proposes a series of what3words geocoding extension models in two aspects: variable-resolution and third dimension support. To satisfy the needs of applications for both indoor and outdoor environments, the extensions provide a variety of finer and coarser resolutions of w3w cells. They also enable the three-dimensional encoding.

  A RESTful application programming interfaces (API) implementing one of the w3w extensions—QTEM model, was designed and tested in order to perform the two-way transformation between the extended code and the geographic coordinates. This API was used as the geocoding processing component in the development of three application prototypes for a university campus, which are indoor facility management, indoor navigation, and outdoor navigation.

Faculty Members and Graduate Students are invited to attend this presentation.