14:50   *Health, Hunger and GIS*

The application of Geographic Information System cut across different disciplines and health is not an exception. In Nigeria, one of the major causative agent of bad health is hunger. This is very much associated with the level of starvation that the country faces. Over 75 percent of the Nigerian population lives below the poverty line which means they lack the required nutrients that will be needed to boost the body immune system to fight off common diseases. Capturing this large section of the population is still elusive considering the geographical fragmentation of this demography. Through GIS application to capture the geographical location of this socially disadvantage segment with respect to their accessibility to good schools, roads, health care system and other social infrastructure we can use it to determine their susceptibility to health challenges. It can also serve as a pointer for policy towards hunger eradication.

Presenter(s)   Akintunde Hareef Akerele   Managing Partner/Head GIS   Sterne-Bau Resources Ltd./FoodCli

I am the Managing Partner and Head of GIS unit at Sterne-Bau Resources Ltd.

Rukayat Anike Opeloyeru   Teacher and Hunger Advocate   Sterne-Bau Resources

I am a teacher and hunger advocate that volunteers for FoodClique Support Initiative.

15:10   *Mapping Soil Carbon: Getting Down to Earth on Food Security and Climate Change*

What if we could be producing food sustainably and mitigating climate change at the same time? Carbon farming is the answer, which is when agricultural practices are used with the intent of sequestering carbon in the soil. This also improves soil organic matter which improves crop yield. First however, we must know how to measure carbon within our soil. This is where my research came in. One of my methods uses the wavelengths that were reflected from a farm's soils and obtained by a multispectral sensor attached to drone. Using this data, I applied regression analysis on band ratio indices. My other method uses applies Empirical Bayesian Kriging among the soil samples that were collected from that same farm.The one using reflectance data was more detailed at the field scale, improving carbon variability. The other one was able to predict carbon at the farm scale with slightly higher accuracy. This is beneficial for the farmer and our environment.

Presenter(s)   Elora Tarlo   Recent graduate from Trent Unive   Trent University

I am a recent graduate in environemental resource science and studies from Trent University. I have a strong interest in sustainable agricultural practices as a growing population and climate change have demanded innovation from that area. I hope to help people bond with nature while promoting biological diversity and sustainable ecosystems.

15:30   *Use of Deep Residual/Dense Network for Tree Species Classification from High Resolution UAV Images*

In forest management,tree species identification at individual tree level is certainly a challenging problem.Recently,remote sensing and particularly unmanned aerial vehicles(UAV)provide a great potential to monitor tree species diversity by acquiring high resolution imagery on forests for detailed characterization of canopies.In this work,we are developing a Convolutional Neural Network(CNN)based approach to classify forest tree species through high resolution RGB images acquired with a simple consumer grade camera mounted on a UAV platform.This work explores the ability of deep CNN networks,such as ResNet,to identify tree species.The images were acquired over three years varying in several acquisition parameters like season,time,illumination and angle to train the network.For this work,we have selected five softwood species from the Petawawa Research Forest area and propose to generate a spatial classified map at individual tree level.The methodology and results will be discussed.

Presenter(s)   Sowmya Natesan   PhD student   York University

Sowmya Natesan is a PhD student in Geomatics Engineering, York University. She received her Master's degree in Remote Sensing. She is skilled in Unmanned aerial vehicles (UAV) and satellite image processing, Geographic Information Systems and Deep learning. Her research is on Deep learning approach for Tree species classification using UAVs.

Debates Room   Data & Semantics

13:50   *Geo Semantics Exchange (GSX)*

Did you know that about 80% of the data we collect daily contains geolocations? A rising dilemma in data is the spatial relationship disconnect between geospatial datasets. How does a computer know that a road segment intersects a parcel and is close to five points of interest? While such facts can be determined with standard geoprocessing tools (i.e. intersect), the task becomes increasingly complex and time consuming when handling large and varied geospatial datasets. These challenges only increase when handling near real-time data for "smart city" initiatives. Our vision is to address this by enabling semantic querying within the ArcGIS Enterprise platform. Toward this, we developed a hybrid full-stack prototype that uses data from Esri Canada's GFX, is operated by ArcGIS Enterprise and Python, and is powered by the iCity Ontologies. Future development efforts will focus on automated dataset verification, integration of external data, and providing support for NextGen 911.

Presenter(s)   Megan Katsumi   Postdoctoral Fellow   University of Toronto - St. George

Megan Katsumi is a post-doctoral fellow with the University of Toronto Enterprise Integration Lab, and the Transportation Research Institute (UTTRI) Group. Currently, Megan's research is concerned with the development of a set of ontologies and reasoning services to support urban informatics.

Hasan Bayanouni   iCity-ITSoS Team Leader   University of Toronto - St. George

Hasan Bayanouni, Ph.D. is a Team leader of (iCity-ITSoS) project at University of Toronto. Hasan has worked

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14:10   *Utilizing Curated Contributor Content in the Living Atlas & the Community Map*

ArcGIS Online contains millions of items of content from around the world – so much, in fact, that it's hard to know what's out there and what's useful. Esri's Living Atlas and the Community Map of Canada are built using the latest and best in curated, authoritative, contributor content from across the country and around the world and both make a great starting point into exploring the wider world of user submitted content. Learn what the Living Atlas and the Community Map of Canada are, how they can be accessed and used in your own projects and how you can contribute your own content to both.

Presenter(s)   Paul Heersink   Program Manager, Community M   Esri Canada

Paul Heersink is a cartographer and Program Manager of Esri Canada's Community Maps Program: an initiative that is aiming to build a seamless topographic basemap using contributor data. He has over 15 years of cartographic experience, working in both the public and private sectors.

Debates Room   Disaster Management

13:05 *Developing a Spontaneous Volunteers Management ArcGIS Web Application System for Major Disasters & Emergencies in Ontario*

During major disaster and emergency events significant number of individuals known as Spontaneous Volunteers (SV) offer or provide labor in an unplanned fashion. Effective use of SV in emergencies is a challenge for emergency management agencies due to a number of legal, institutional, managerial, and operational issues. Emerging technologies such as Arc GIS Online Web Application can help addressing some of these challenges by enabling SV to easily register and provide their information including location and by allowing SV managers to better identify, classify, coordinate, and allocate SV to areas and operations that need these resources most. This paper presents a SV management system for Ontario developed with arcGIS Online Webapp Builder. The SV management system will be tested in the City of Brampton during an emergency exercise, and then finalized and provided to the emergency management community for adaptation on SV management during future disaster and emergency responses.

Presenter(s) Ali Asgary   Associate Professor   York University

Ali Asgary is an associate professor of disaster and emergency management at York University's Disaster & Emergency Management program. He is also the associate director of Advanced Disaster, Emergency and Rapid Response Simulation (ADERSIM)

Wondwosen Agune   Master Student   York University

Wondwosen Agune is a master candidate in York University's Disaster & Emergency Management Program.

13:25 *Harnessing Chaos: Using Agent-Based Modelling to Study the Effects of Poor Decision-Making during Building Evacuation*

Building evacuation in the case of a fire is a chaotic event. While exit signs and evacuation plans help to provide order and guidance to occupants, they are not effective in cases where smoke clouds vision and the event can cause disorientation and even panic. Furthermore, some exit routes may become crowded and form choke points that slow down evacuation and increase the risk of mortality. In an effort to produce dynamic exit strategies that can redirect occupants to possibly further, but more optimal exits, we used agent-based modelling (ABM) to simulate building evacuation and to measure the effect of choke points on evacuation efficiency. ABM allowed us to simulate different agent behaviours and interactions to reproduce the emergent "chaos" of building evacuation. We used this model to develop and test dynamic exit strategies based on those measurement to improve the rate at which occupants can exit a building safely.

Presenter(s) Jeffrey Katan   Student   Université de Montréal

Debates Room   Modelling Transportation

14:50   *Pre-Processing of 3D Point Clouds for Automated Railway Track Extraction*

Considering the importance of building railway GIS, we developed an algorithm module for the automated railway track extraction from dense survey LIDAR point cloud. In this module, railway track points are segmented in a local window by its distribution, and the Kalman filter was used to extract railway tracks. Despite its great success in many tests, the accuracy of track extraction was severely decreased in regions where a large number of noise points existed. In this work, we present a pre-processing method for filtering out the noise points in dense point cloud acquired at a railway site. The proposed pre-processing method consists of two steps: (1) random sub-sampling of point cloud, and (2) removing remaining noisy points on 3D region-of-interest along the tracks. Results showed that the proposed method can accurately filter out unwanted noisy points, which leads to performance improvements on the automated railway track extraction module.

Presenter(s)   Harry Kim   Student   York University

I am a student studying statistics and have interest in applying machine learning/ deep learning into GIS field, such as semantic segmentation or automotive driving system. I am currently working as research assistant at York University.

15:10   *Using Level of Traffic Stress to Understand Cycling Behaviour and Improve Cyclist Safety*

Between 2006 and 2017, 890 cyclists died in Canada, averaging 74 deaths per year. Collisions with motor vehicles made up 73% of these fatal cycling events. As a result, transportation agencies have shifted their focus to investing in safe cycling infrastructure. Mekuria et al. (2012) proposed level of traffic stress (LTS) as one such method to improve cycling safety. Four levels comprise the LTS classification system. These levels range from LTS 1 (safe for all cyclists) to LTS 4 (hazardous to most cyclists). Despite SoBi Hamilton's success as a bicycle sharing program, there are a lot of key gaps that exist in the road network that impact the safety of cyclists. SoBi bikes are GPS-equipped, meaning each bike's movement can be traced from the start of the trip to the end of the trip. This research project seeks to understand cycling behaviour of SoBi users by modelling LTS against user ridership to identify whether SoBi users are cycling on road segments of low or high LTS.

Presenter(s)   Raj Ubhi   Student   McMaster University

Master's Student and Esri Canada Centres of Excellence Student Associate at McMaster University's Transportation Research Lab.

15:30   *Extracting Pedestrian Activities and Tours from Smartphone Data: A Trajectory-Based Gps Analysis*

To gain a better representation of walking travel behavior, activity-trip detection plays an essential role in analyzing pedestrians' GPS trajectories. However, pedestrians generally perform multi-purposes and multi-stops by facing more alternatives regarding the complexity of the built environments. Pedestrian tour as a function of walking trip-chaining and land use patterns, provide a more adequate way to represent walking travel behavior. Activity-tour detection from empirically derived data needs further exploration. As such, this study uses several defining characteristics of smartphone-based GPS data such as dwell-time threshold, speed threshold, circuitous trajectories regarding the directness of travel to identify the distribution of pedestrian activities. Land use map matching is used to identify the purposes of pedestrian activities. The related walking trips, sequence, frequency, and duration of pedestrian activities are linked to infer the pedestrian tours.

Presenter(s)   Xiaomeng Xu   PhD Student   University of Waterloo

Xiaomeng Xu, a PhD candidate working under the supervision of Dr. Jeff Casello in School of Planning, University of Waterloo. Her research uses automatically-collected trip data to study pedestrians' travel behaviour for use in planning studies.

Debates Room   Teaching with GIS

10:35 *Spatial and Critical Thinking in Research and Instruction: Status, Challenges, and Opportunities*

Join Geographer and Educator Joseph Kerski as we discuss the status of spatial and critical thinking in research and instruction in primary, secondary, and higher education around the world. This lively presentation will include 5 Major Advancements in Education aiding teaching and learning with geotechnologies, 5 Major Advancements in Society aiding geotechnologies in education, 5 trends important in the 2020s in location analytics, progress made and present challenges, opportunities ahead, and how we can assess whether we are successful.

Presenter(s) Joseph Kerski   Education Manager and Universit   Esri University of Denver N Park Un

Joseph Kerski is a geographer focused on GIS in education, serving in government, nonprofit, industry, and academia.

10:55 *Incorporating Client-Based Learning in a New GIS Curriculum*

At the Centre of Geographic Sciences, we believe that industry-based projects are the best method to educate our students. These projects create an actual career situation where we work directly with industry partners to solve their geomatics-related problems. With this year's development of new, modern programs in Cartography, GIS, and Community and Environmental Planning, and the updating of our Advanced Diploma curriculum, we are increasing the client-based project work our students engage in, while weaving theory and technical lessons throughout. This talk will discuss several successful client projects our students have completed, and our plans for future development and implementation of this model.

Presenter(s) Martha Bostwick   Faculty   Centre of Geographic Sciences - NS

Martha Bostwick (SMU '98, COGS '00) spent 17 years designing maps for the Ed Pub, travel, and tourism industries. Joining the Geographic Sciences Faculty at COGS in '17, she teaches courses in Cartography and GIS. Involved in the North American Cartographic Information Society since '10, she is now on the Executive Board as Associate Business Mgr.

11:15 *Introductory Spatial Analysis Exercise for Business Students Using SAP Predictive Analytics and Esri ArcGIS*

This is a presentation of a geospatial analysis exercise developed for non-technical business students in a Business Analytics course. In this exercise students learn to extract, clean and format crime, census, and location data from the city of Calgary and integrate it using SAP Predictive Analytics. Students learn to display and visually analyze crime and population data on a map of the city using the Esri ArcGIS add-on. Students also learn to identify seasonality and trends in the data and perform some basic forecasting. Finally, students learn how to use ArcGIS Online to perform some advanced location analytics like measuring driving distances and identifying routes from police stations to high crime areas.

Presenter(s) Hossam Ali-Hassan   Associate Professor   York University, Glendon campus

Dr. Hossam Ali-Hassan is an Associate Professor of Business Administration at York University, Glendon campus. His current research interests include business analytics, data literacy, experiential learning, social media, social capital, and job performance. Prior to his academic career, he worked for many years as a technologist and consultant.

Michael Bliemel   Dean   Ontario Tech University

Dr. Michael Bliemel is a Professor in MIS and Dean of the Faculty of Business and Information Technology at