

## **Application call for a thesis-based M.Eng. Position**

Join our research team in exploring the transformative potential of artificial intelligence in the resource industry. The successful candidate will work on deploying deep-learning techniques to detect and monitor mining activities using high-resolution remote sensing images.

### **Project title:**

Autonomous detection and classification of mining activities using high resolution remote sensing images.

### **Brief description:**

The mining and metal industry significantly impacts the mining nations' economies and socioeconomic prosperity. Despite such socioeconomic importance, the mining and metal industry poses significant environmental and health risks relating to day-to-day operations and accidents. Among many challenges, environmental, social, and governance (ESG) remains the number one challenge for the mining industry. Mining nations across the globe adopt various frameworks to regulate mining activities and minimize the adverse effects of mining-related activities. Nevertheless, full transparency, visibility, and accountability across the entire life cycle of the mine operation have yet to be achieved. The situation is worse in some developing countries where many illegal or informal mining operations occur due to a lack of regulations and governance. Such mining activities sometimes breach areas of high conservation values and high watershed stress, which are home to vast biodiversity. All these factors demand a reliable and cost-effective approach to monitor country-wide mining operations which support features such as (1) automated detection of mining activities, (2) monitoring and maintenance of mining infrastructures, (3) provide reliable data for environment risk assessments, and (4) generate and monitor mine management and rehabilitation planning. As the conventional, manual on-site investigations are laborious, inefficient, and do not update timely, this research project investigates using novel deep learning algorithms and remote sensing data to automatically detect, classify, and monitor mining activities.

As a part of this project, you will have opportunity to:

- explore the domain of satellite images (access, process and analyse),
- design and deploy AI algorithms for detection and classification of mining activities,
- create spatiotemporal data set to study environmental risk associated with the mining activities, and
- learn and practice efficient and widely accepted research dissemination techniques.

### **Supervisors:**

- Dr. Thumeera Wanasinghe, and (<https://scholar.google.ca/citations?user=8zxeZCIAAAAJ&hl=en> )
- Dr. Weimin Huang (<https://www.engr.mun.ca/~weimin/>, [https://scholar.google.ca/citations?user=OA\\_WgVEAAAAJ&hl=en](https://scholar.google.ca/citations?user=OA_WgVEAAAAJ&hl=en) )

### **Qualifications:**

- Bachelor of engineering or science degree (Specializing in Computer Engineering/Computer Science/Telecommunication Engineering/Electrical or Electronics Engineering) with Second Class Upper division or higher.
- Background in artificial intelligence and image processing.
- Knowledge of programming in Python, Matlab or C++.
- Ability to pursue independent research and work as part of a multidisciplinary team.
- IELTS overall band of 6.5 with each band above 6.0.
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**Application Deadline:** April 15, 2024

**Start Date:** September 2024,

Interested candidates please send your CV, transcripts, and any publications (if any) to:  
thumeerawa@mun.ca