

## Faculty of Engineering

### Summer Research Program 2024-2025

#### Project Title:

Advancing intelligent built environments with ML and AI

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#### Objective

This project aims to explore the interdisciplinary field of intelligent built environments, with a particular emphasis on employing machine learning and artificial intelligence to improve the dynamic interactions within built spaces and their human and natural contexts. The specific topic of the project is intentionally adaptable and will be tailored to fit the expertise of the selected student, as long as the topic can align with the sustainable development of the built environments. This topic is particularly suited for students who are passionate about multidisciplinary research and are considering further academic pursuits in a PhD program dedicated to developing resource-efficient and human-centric built environments.

#### Project Details

The built environment plays a crucial role in both resource efficiency and human-centric considerations, with machine learning (ML) and artificial intelligence (AI) significantly enhancing these aspects. From a resource efficiency perspective, ML and AI refine energy management by automating heating, cooling, and many other mechanical systems, reducing both environmental impacts and operational costs. Additionally, these technologies promote the use of recycled materials and sustainable construction practices by forecasting material requirements and optimizing resource allocation, thus lessening pollution and waste and contributing to sustainable urban development and climate action. From a human-centric viewpoint, ML and AI improve physical and mental health by dynamically adjusting indoor environmental conditions based on real-time feedback. They also enhance accessibility and safety in spaces by employing predictive analytics to meet the diverse needs of various populations, thereby fostering equality and inclusivity. In short, there are substantial opportunities to leverage ML and AI in built environments. I welcome further discussions to pinpoint the specific research topic you would like to pursue.

#### Prerequisites

Students from all disciplines are welcome, but advanced knowledge in ML/AI or related fields is essential. Prior experience in the field of built environments is not required, as the supervision team will provide necessary expertise and data. Previous experience in academic research is advantageous, but it is not a prerequisite.

#### Additional Information

If you have a keen interest in this project, I encourage you to contact me for a meeting to discuss your interests and explore potential synergies.