

## Faculty of Engineering

### Summer Research Program 2022-2023

Project Title: Structural identification using digital image correlation, signal processing method and AI technology

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#### Objective

Measuring structural performance using digital image correlation (DIC) and identifying the dynamic properties of the structure via signal processing method and AI technology.

#### Project Details

With the fourth industrial revolution, smart cities have emerged as a possible solution to sustainability problems deriving from rapid urbanization. Advanced technologies to monitor the infrastructure are considered imperative for a sustainable future. Recently, the vibration-based method has been commonly used owing to its non-destructive nature. The emergence of non-contact test techniques, such as high-speed cameras with DIC algorithms, has enabled the full-field measurement of the structure and eliminated the process of installing sensors, e.g., accelerometers. Because of the direct relationship of structural stiffness, mass, damping, etc., to the dynamic properties of the structure, e.g., natural frequency, mode shapes, etc., any structural damage will result in permanent changes in the characteristics of vibrations. Therefore, it is crucial to identify the dynamic properties of the structure with a proper signal processing method and AI technology. In this project, the students will design a simple structure and investigate the dynamic properties of the structure. Via this project, the students will gain a fundamental understanding of the structural dynamics in structural health monitoring as well as acquire skills in image analysis, data processing, coding, and the advanced application of signal processing and AI technology in engineering.

#### Prerequisites

NA

#### Additional Information

Applicants may be required to attend an interview.