Faculty of Engineering
Summer Research Program 2023-2024

Project Title: Localization of Prefabricated Façade Panel in the Construction of High-Rise Buildings

Supervisor(s): Dr Elahe ABDI

Department: Mechanical and Aerospace Engineering

Email: elahe.abdi@monash.edu

Website profile of project supervisor: https://www.monash.edu/engineering/elaheabdi

Objective

In high-rise construction, the on-site installation of prefabricated façade panel involves precisely aligning the crane suspended module to the attachment position. The conventional process requires workers to manually catch the heavy façade panel before they can guide it into alignment. These uncontrolled transportations may lead to injuries for human workers and damage to the façade panels. The purpose of this project is to enable machinery to do this task, thereby improving safety.

Cameras can be used to capture the location of the swinging panel and the target installation location. However, outdoor lighting conditions (sun, reflections, rain, clouds, etc.) make this task very difficult. The objective of this project is to train a Neural Network to detect the optimal grabbing position (OGP) of a façade panel under close to real life scenarios.

Project Details

The general stages of this project are:
1. Conducting literature review of outdoor glass detection and localization
2. Collect data set and train a Neural Network to detect the OGP of a glass panel
3. Conducting a case study to test the Neural Network for verification

Prerequisites
Current student in Mechatronics (AI)
Basic familiarity with Computer vision techniques
ECE4179 - Neural networks and deep learning

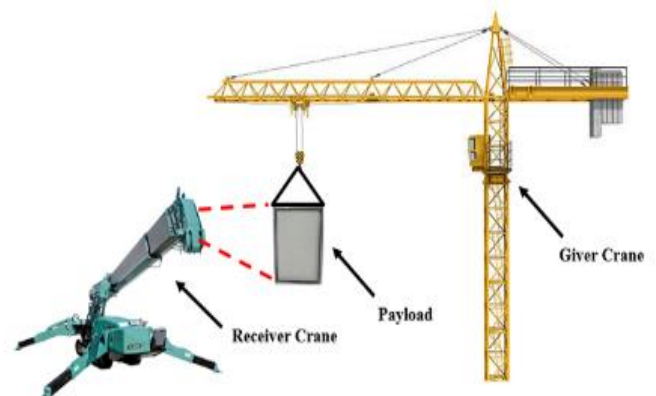### Additional Information
Applicants may be required to attend an interview.

Figure 1. Schematic diagram of a façade lifted by a tower crane