

UNIVERSITI TEKNOLOGI MARA

**ASSESSMENT OF UNMANNED
AERIAL VEHICLE (UAV)
PHOTOGRAMMETRY TOWARDS
SHIPPING CONTAINER COUNTING**

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MSc

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of the requirements for the degree of
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ABSTRACT

Shipping container counting at depot in Malaysia is carried out manually. It is considered as labour intensive especially when large number of shipping container is involved. In this study, combinations of UAV images and geo-processing software are utilized for shipping container counting approach. UAV images are post-processed using photogrammetric technique to create Digital Surface Model (DSM) which represents ground and above surface feature's elevations. The constructed DSM is filtered to produce the Digital Terrain Model (DTM) that represents ground surface. The container's candidates are then isolated by subtracting the DTM from DSM to generate a normalized DSM (nDSM). Knowing the standard dimensions of container, the number of container can be precisely extracted. The assessment is carried out based on five (5) accuracy levels of processing settings: Highest, High, Medium, Low and Lowest. The actual total number of containers is known based on verification by manual counting on-site. Highest to Low accuracy level of processing settings contributed to 100% of counting accuracy. Additionally, the Root-Mean-Square Error (RMSE) of container surface area modelling achieved within $\pm 1.330\text{m}^2$ to $\pm 2.703\text{m}^2$ for Highest processing settings. As for RMSE of container height modelling, within $\pm 0.236\text{m}$ to $\pm 0.520\text{m}$ is achieved for Highest processing settings. The optimum processing settings is proposed for certain requirements with specific constraints. The proposed technique is a high value in shipping container counting at depot for a diversity of uses.

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