RMIT UNIVERSITY

3D Understorey Canopy Reporting

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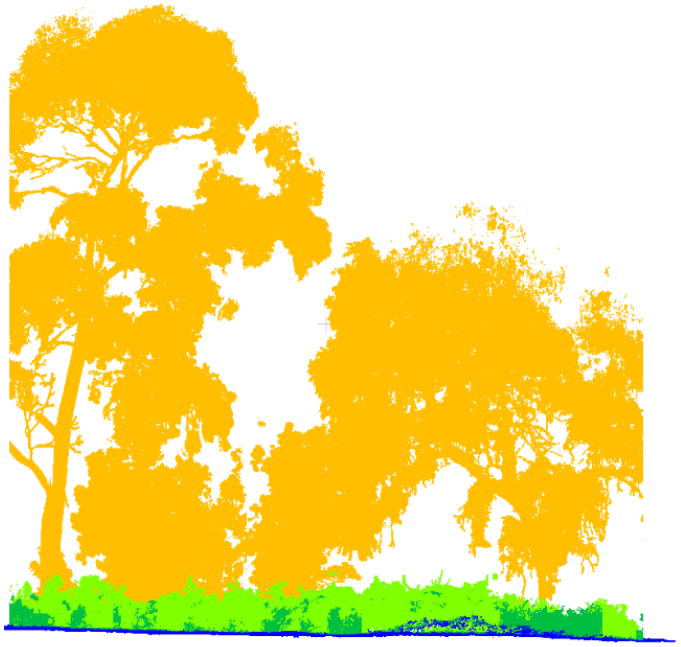
Urban forest structures are defined by the spatial arrangement between vegetation and the built environment, within urban areas. These are often shaped by urban forest strategies that are defined by the relationship between anthropogenic and natural processes in the city. The desire to ascertain net benefits derived from urban forest vegetation toward the built environment has motivated researchers to develop ways to quantify these forest structures.

There are two basic approaches of quantifying structures in the urban forest, namely through aerial- and ground-based assessments. Aerial-based assessments have matured to deliver sophisticated reporting of forest canopy cover. Urban forest managers are able to estimate and evaluate the ecosystem services provided by trees through quantitative measurements using imagery and lidar.

In contrast, the means for measuring understorey canopy, and for valuing the ecosystem services it provides, are comparatively limited. Models exist for predicting understorey cover, biomass and carbon stock on a very broad scale. In turn, the prevalent method to quantify understorey cover relies upon manual area measurements, identification and recording of species.

This work proposes an alternative method to quantify and identify understorey vegetation through the classification of the 3D point cloud information acquired by terrestrial laser scanners. The result of this study discusses the benefits and limitations in utilising the data to report cover areas, visualising heights and discern between ground, understorey vegetation and tree stands.

The work involves arborists, geospatial scientists and landscape architects to map vegetation in the Australian Native Garden in the City of Melbourne. In doing so, we aim to fill the gap between the intricacies of manual reporting and limitations of air-based assessments. This project contributes to the ongoing efforts embarked by the local governments in monitoring and setting targets for understorey cover, as they have been doing with tree canopy cover.



Point cloud acquired from Trimble TX-8 laser scanner. Classification of understorey vegetation according to three vegetation classes <1 m (Blue), 1-2 m (Green) & >2 m (Yellow).

Point cloud acquired from FARO Laser Scanner Focus S150. Colourised point cloud acquired from three scan locations (blue, red, green) in plan view.