Wildfire Fuel Characterization in Subtropical Ecosystems Using Ground-based SLAM LiDAR

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Problems

Fuels available to wildfires have **never been quantified in Hong Kong**

Traditional wildfire fuel characterization methods are **time consuming and destructive to ecosystems**

Research Question

How can we use mobile terrestrial LiDAR to characterize wildfire fuels?

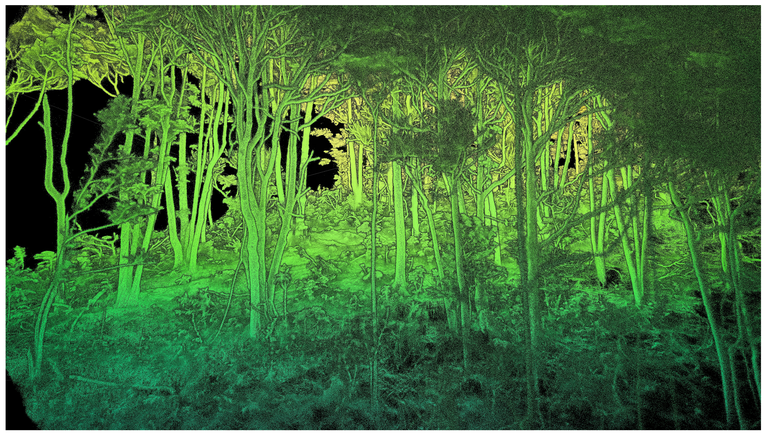


Figure 1: Forests cover 70% of Hong Kong. The study area is a 20x20m forest plot in Kadoorie Farm (shown in red).

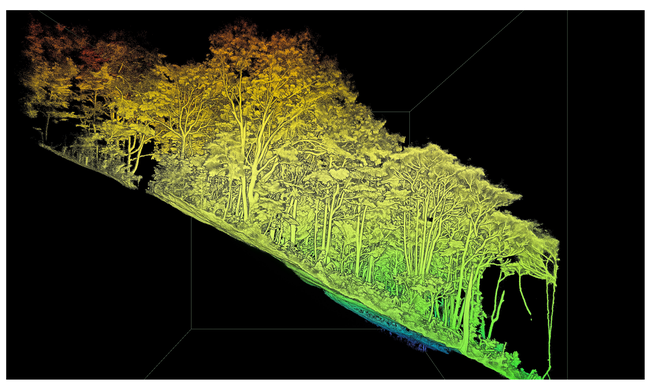
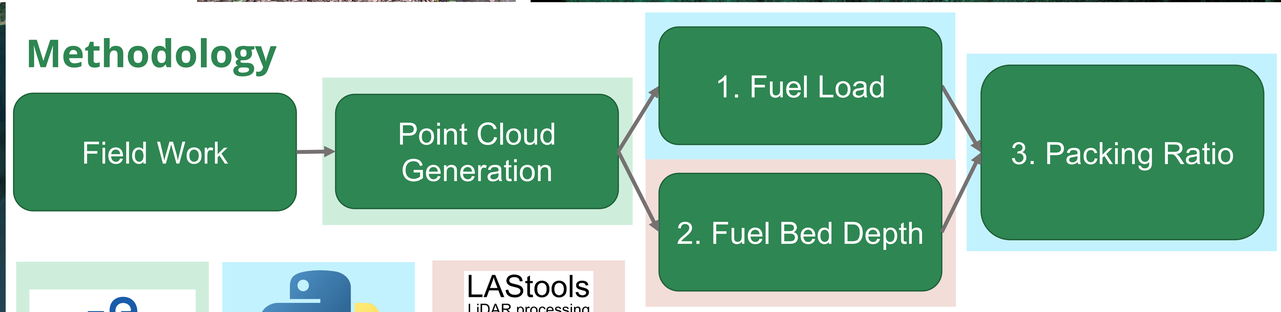


Figure 2: Cross section of the forest plot in Kadoorie Farm. Vegetation within 1m of the soil surface is considered as wildfire fuel.

Methodology



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LAStools LiDAR processing rapidlasso

Figure 3: The Hovermap ST is mounted on a backpack to survey the forest plot.

Figure 4: Hovermap ST SLAM LiDAR with VLP 16 sensor. The range is 100m with an accuracy of +/- 0.33mm. Acquisition speed is up to 300,000 pts/sec.

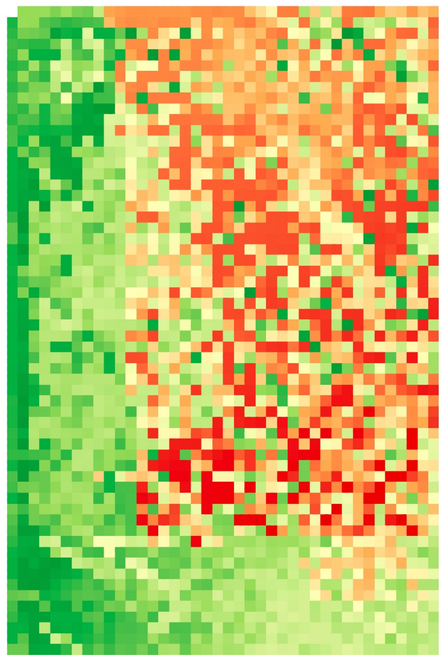


Figure 5: Fuel bed depth results for 0-1m above the soil surface.

Results

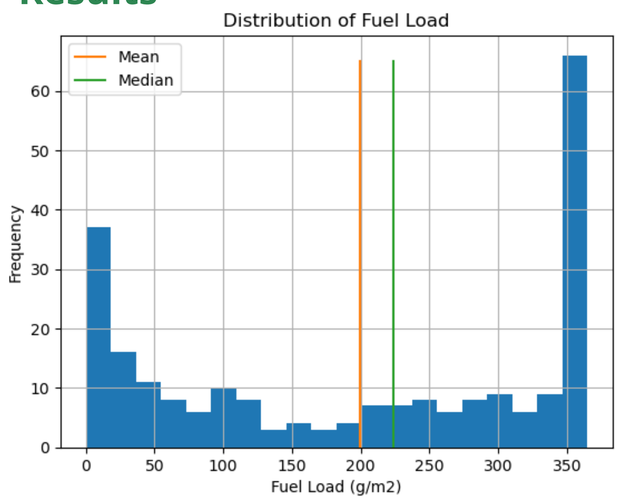
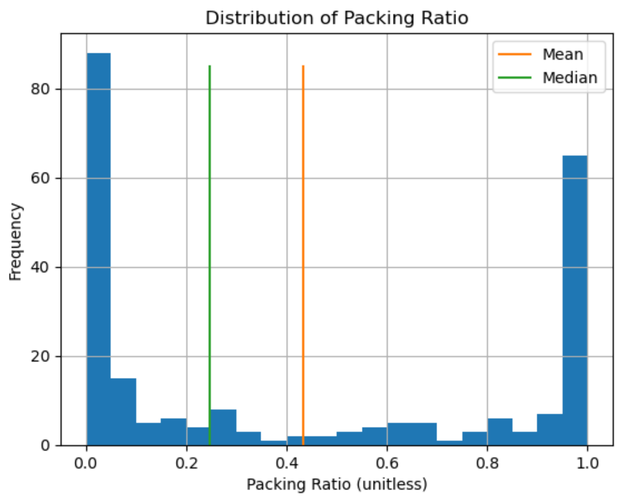


Figure 6 & 7: Fuel load and packing ratio results. The fuel load is comparable to previous studies (Scott and Burgan 2005). The packing ratio distribution shows high frequencies around 0 and 1.



Conclusions

This methodology can be used to characterize wildfire fuels as use for **input to wildfire behavior models**

Further surveying is needed to characterize **grassland and shrublands**

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Photography encouraged