



Tree Species Identification Using High Resolution Remotely-Sensed Data

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Commission No. 5



Introduction



- Tree species identification has become a needed assessment nowadays due to certain trees such as timber and rubber species that have high commercial values (Omar et al., 2010).
- There are many methods that have been studied by many researchers to determine tree species.
- Extraction of spectral reflectance based on high resolution imagery is only partially successful due to complexity and unpredictable pattern or arrangements of trees in natural rainforest.
- This research aims to determine tree species identification using high resolution remotely-sensed data.



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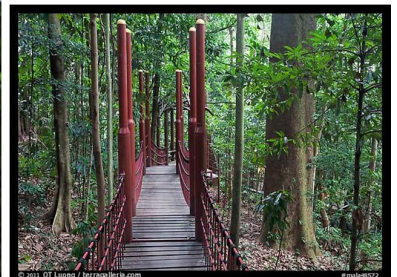


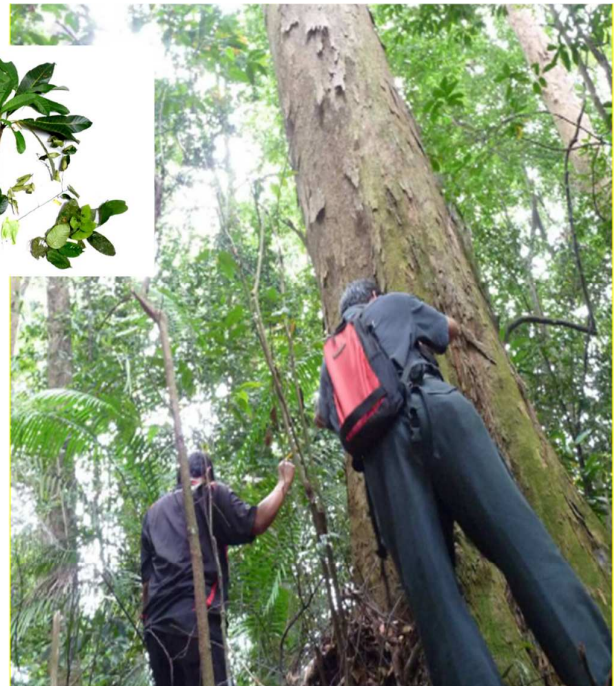
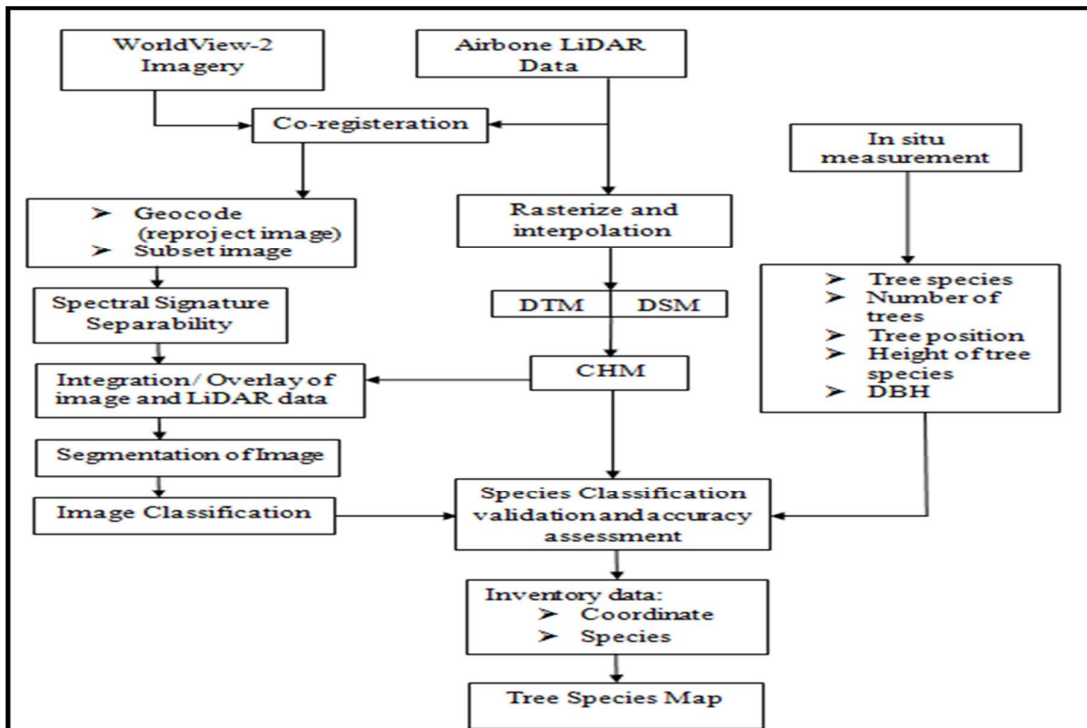


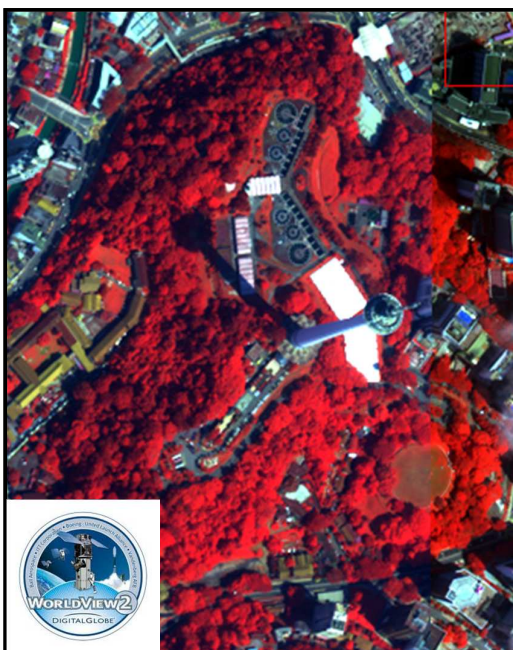
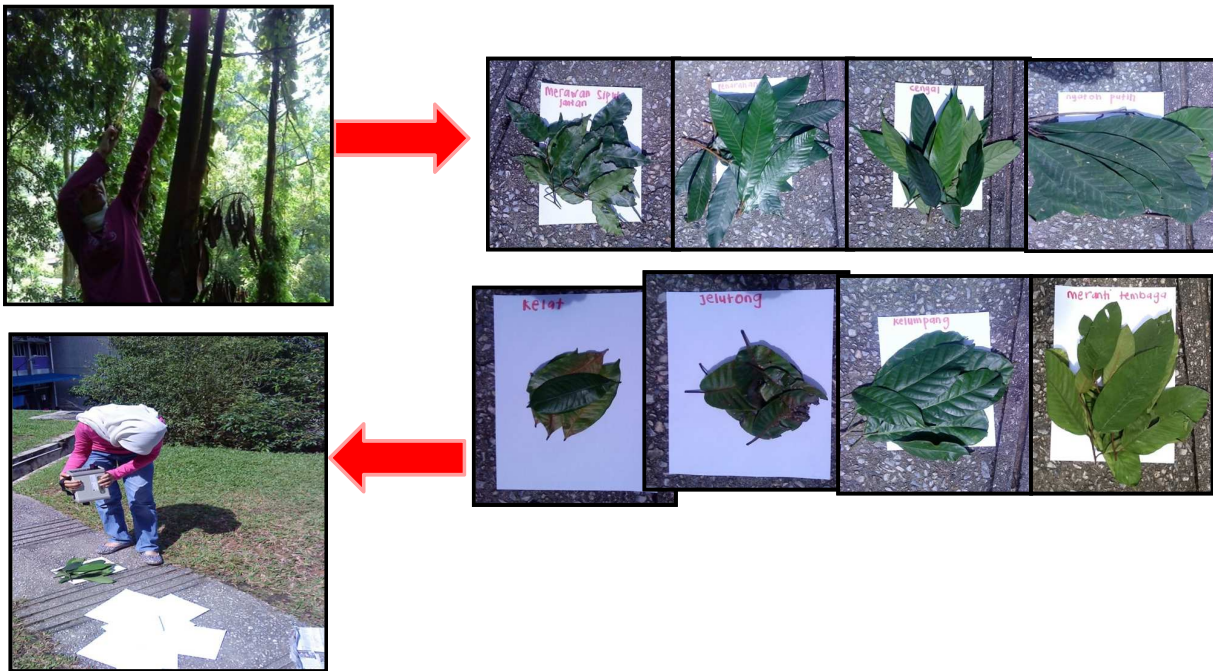
- ❖ **Bukit Nanas Forest Reserve** , Kuala Lumpur, oldest permanent forest reserve in Malaysia.
- ❖ Earlier known as Bucket Weld Forest Reserve and was declared as a forest reserve in 1906.
- ❖ Recognized as one of the protected areas in World Heritage Program where the IUCN Management Category and classified as “Ia” (Strict Nature Reserve).



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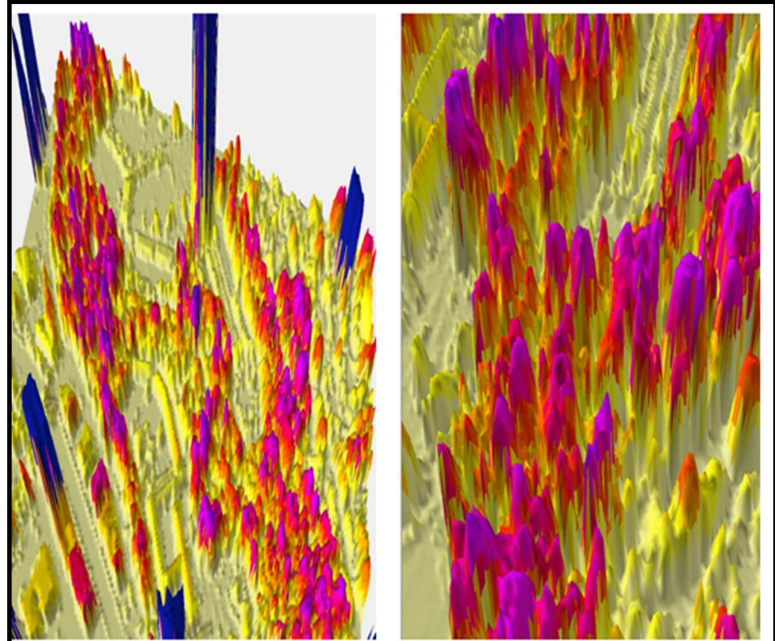
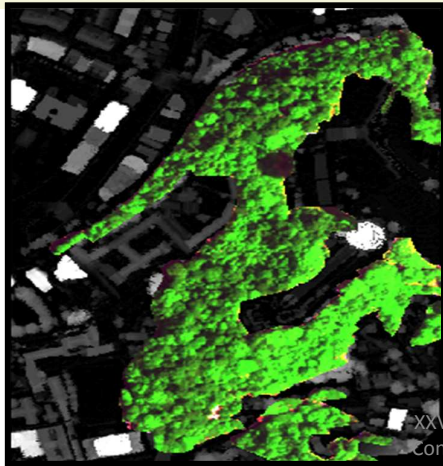
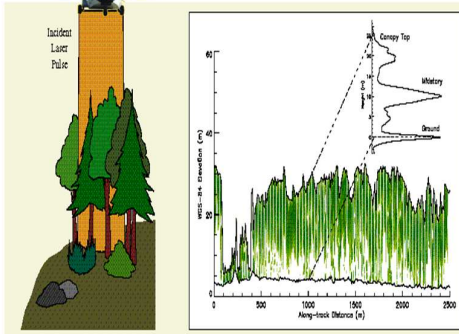






- WorldView-2 sensor will provide a high resolution Panchromatic (0.46m) band and eight (8) Multispectral bands; four (4) standard colors (red, green, blue, and near-infrared 1) and four (4) new bands (coastal, yellow, red edge, and near-infrared 2).

Airborne LiDAR



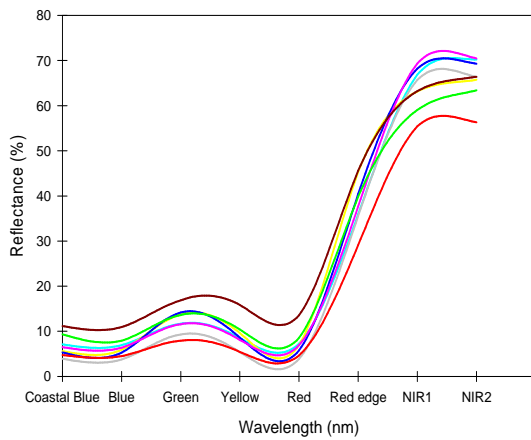
(a) CHM derived from DTM and DSM

(b) CHM in 3D view (target height)

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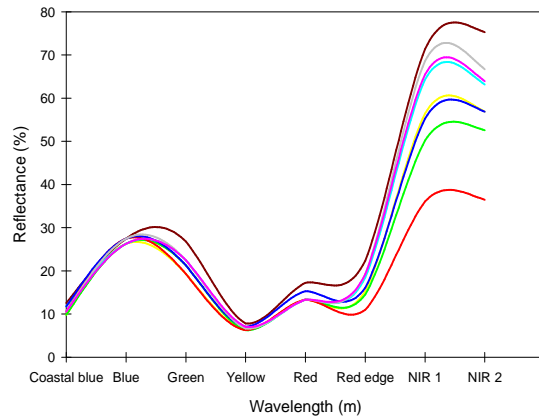
Spectral reflectance

Spectral Reflectance of Each Sample Species
(Spectra Vista GER 1500 Spectroradiometer)



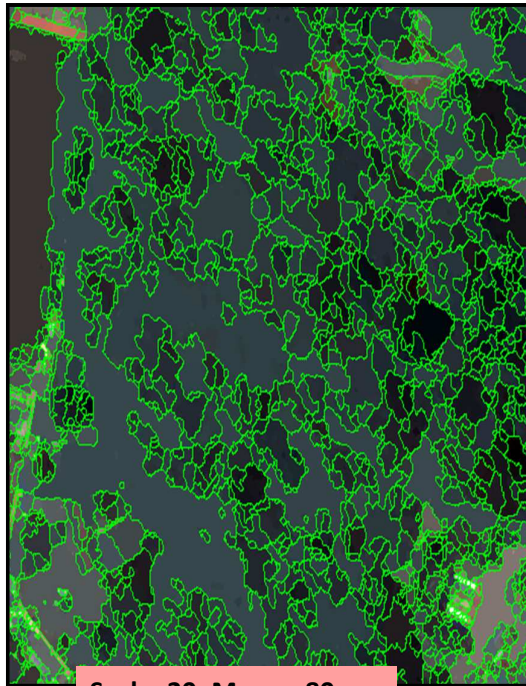
- Hopea Odorata Roxb
- Shorea Leprosula
- Neobalanocarpus Heimii
- Gymnacranthera bancana (Ihig.) Sinclair
- Rusty Sterculia
- Palaquium Rostratum
- Eugenia Oleina
- Dyera Costulata

WV2- Spectral Reflectance
data for each sample species

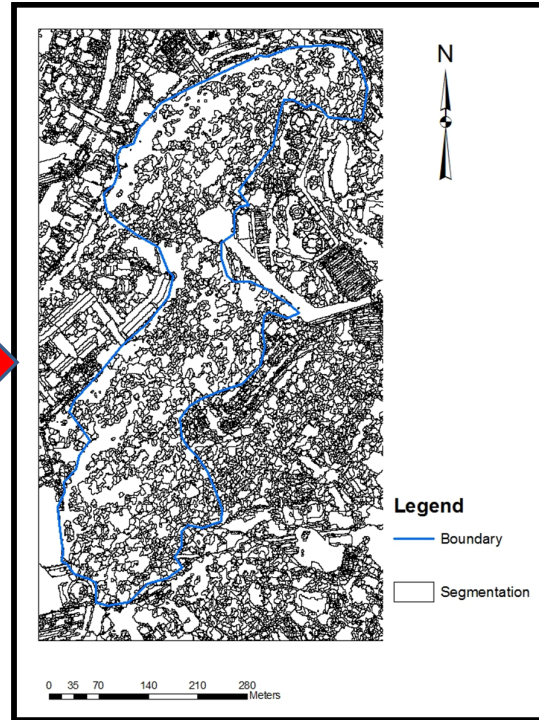


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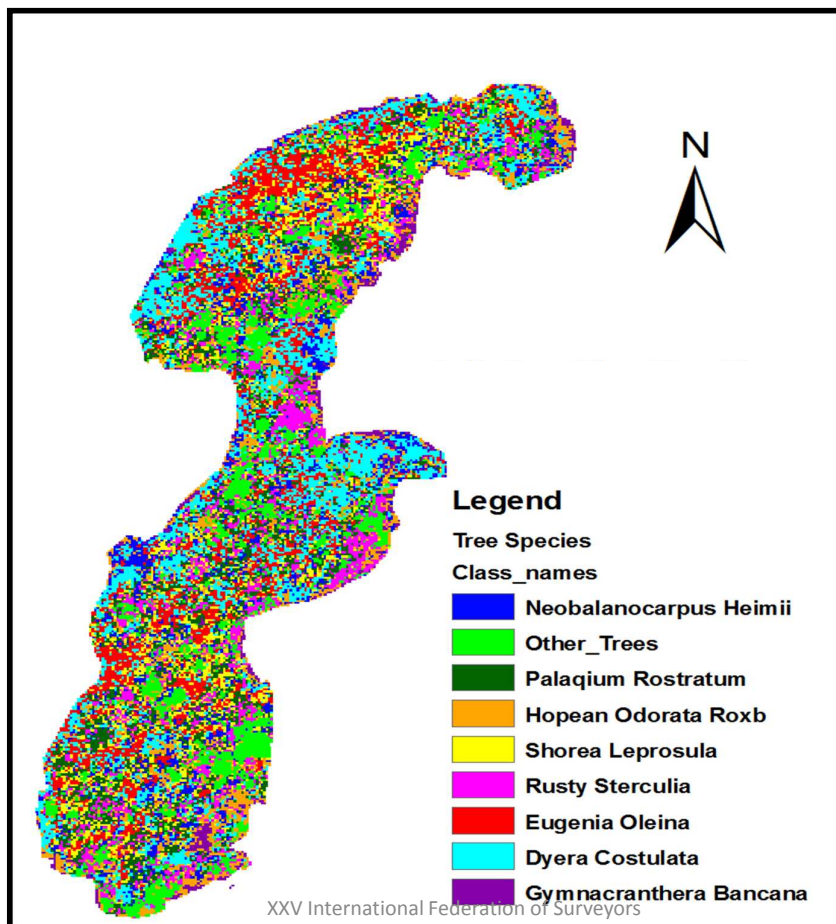
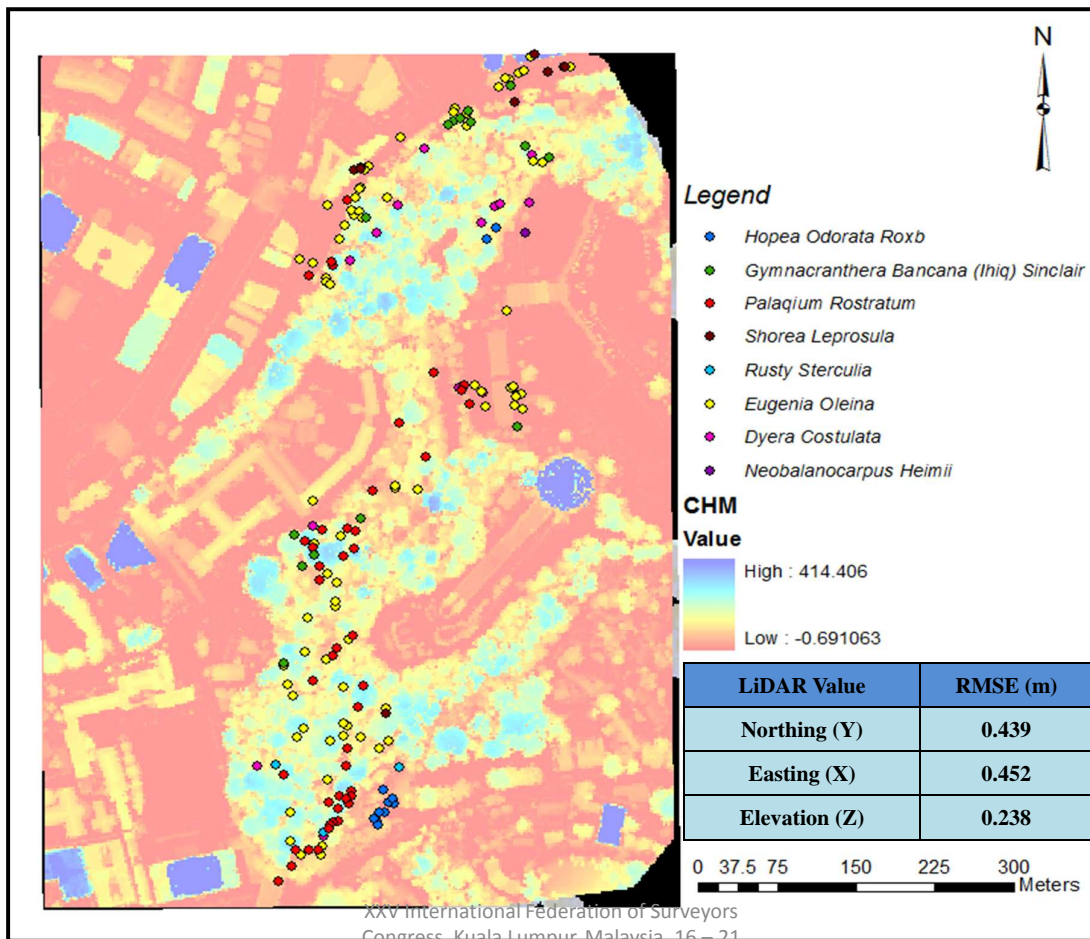


Scale: 20, Merge: 80



Field Validation

- Total numbers of 188 trees which include the Hopean Odorata Roxb (Merawan Siput Jantan), Shorea Leprosula (Meranti Tembaga), Neobalanocarpus Heimii (Cengal), Gymnacranthera Bancana (Ihiq) Sinclair (Penarahan), Rusty Sterculia (Kelumpang), Palaquium Rostratum (Nyatoh Putih), Eugenia Oleina (Kelat) and Dyera Costulata (Jelutong).



- WorldView 2 satellite imagery and airborne LiDAR data provide a very promising remote-sensing sources for determination of tree species of the study area.
- In tropical forest, segmentation of individual trees was complex due to the pattern of arrangements of tree species.
- For further research, other field data is needed in order to achieve higher accuracy which can be used in forest tree identification and mapping.

- Financial assistance from Malaysian Land Surveyors Board (LJT).
- Forestry Department, Malaysia.
- Forest Research Institute Malaysia (FRIM).



Thank you for your attention!

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