Lab Calibration of Hyperspectral Radiometer and Field Measurements

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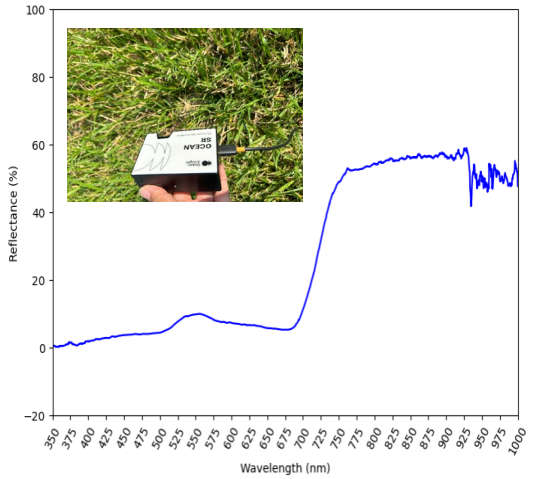
Objectives

- Operate optical spectrometer to collect reflectance data using a certified reflectance standard
- Analyze reflectance data across different natural and man-made samples, and identify sources of error during laboratory and field measurements
- Prepare hyperspectral field measurements to support satellite sensor calibration

Results

- Set up and carry out lab calibration of miniature hyperspectral radiometer
- Field measurements of hyperspectral measurements of different ground targets
- Developed python modules for data visualization and analysis

Spectral reflectance of Grass from field measurement



Equipment and Setup

Reflectance Measurement with Hyperspectral Radiometer

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Ocean Insight
Miniature Spectrometer
SR-2XR250-25
(200 to 1100 nm, 1.7 nm resolution)

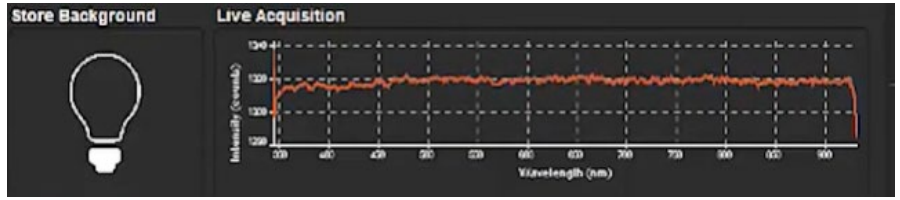
Dark Spectrum → Reference Spectrum → Sample Measurement

Reflectance Calibration

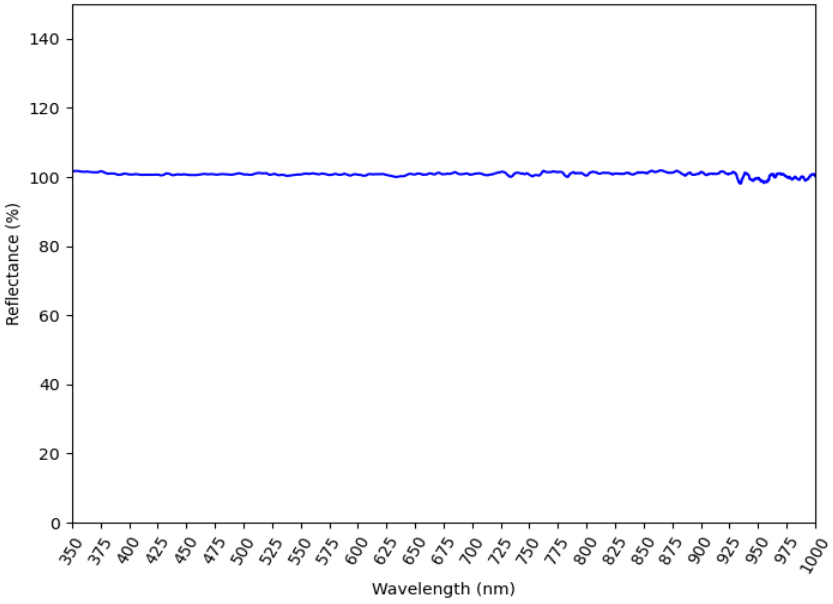
$$T(\%) = \frac{S_\lambda - D_\lambda}{R_\lambda - D_\lambda} \times 100$$

Where:
T = Sample Reflectance (%)
S_λ = Sample intensity at wavelength λ
D_λ = Background intensity at wavelength λ
R_λ = Reference intensity at wavelength λ

D_λ – Example Dark Spectrum



R_λ – Reference Solar Diffuser Spectrum (Uncalibrated)



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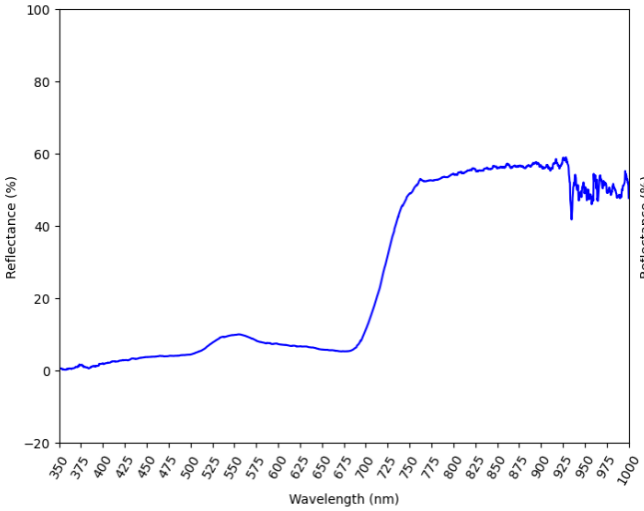
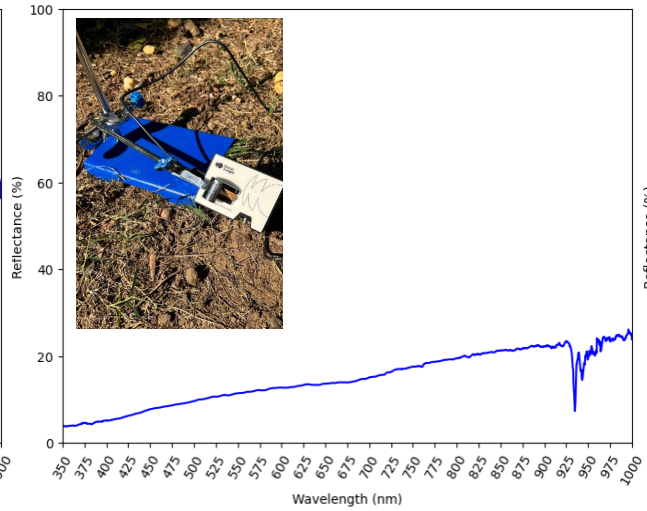
Spectrometer Measurement Analysis of Different Ground Targets

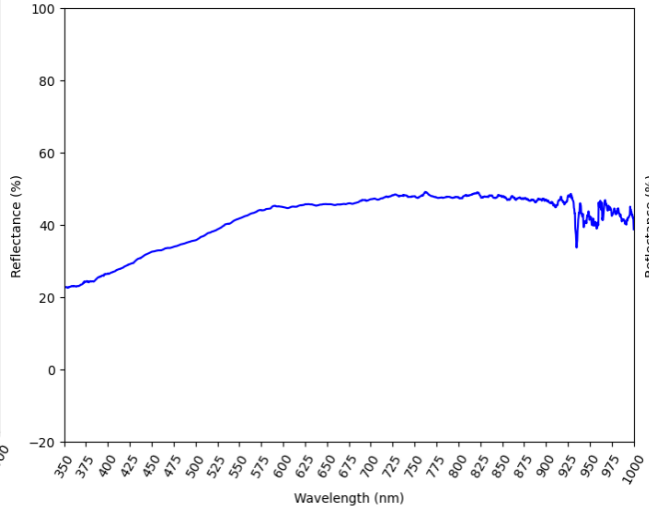
Grass



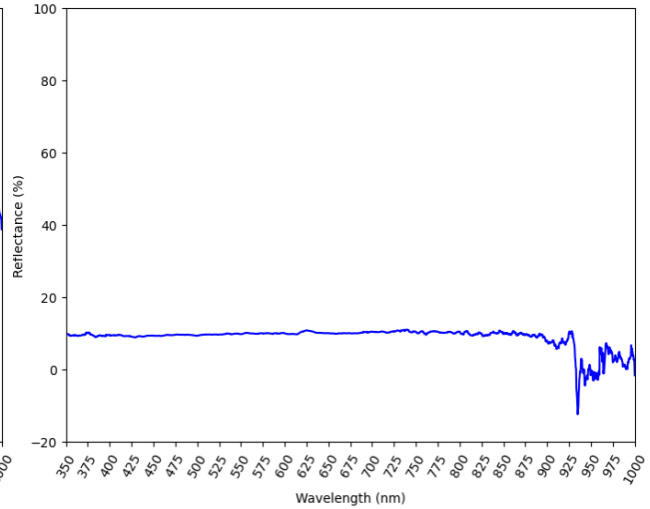
Soil



Concrete



Asphalt



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Thank you

Questions?