Building a machine learning model to map aquatic vegetation in the Chesapeake Bay using Landsat 8 satellite imagery

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Objectives:

- Colocate in-situ data of submerged aquatic vegetation (SAV) in the Chesapeake Bay using Landsat 8
- Train machine learning to map SAV area and density

Methods:

- *Python*: data formatting, analysis, machine learning
- *Google Earth Engine:* satellite data extraction
- *QGIS*: visualizing results

Results:

- Matched Virginia Institute of Marine Science in-situ data with Landsat 8 satellite data
- Pytorch model tested on new Chesapeake Bay data

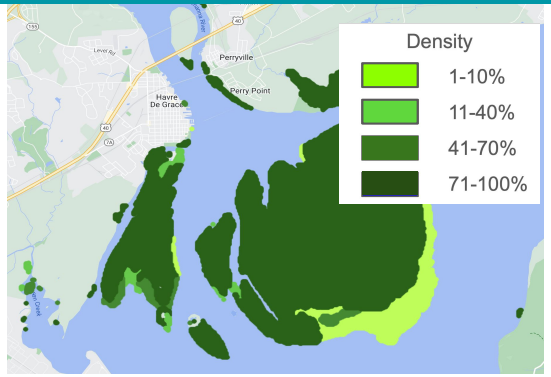

Fig. 1: Reference indication of seagrass density

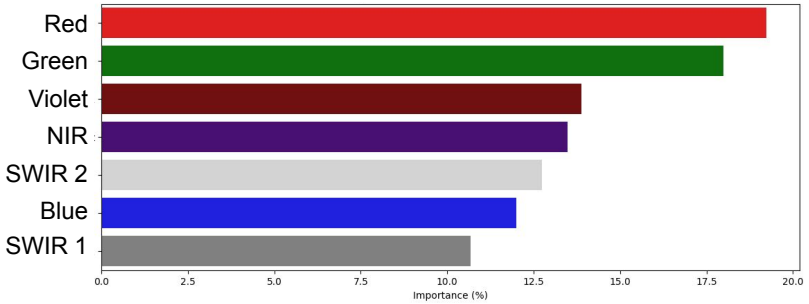

Fig. 2: Feature importance for each spectral band as determined using Random Forest

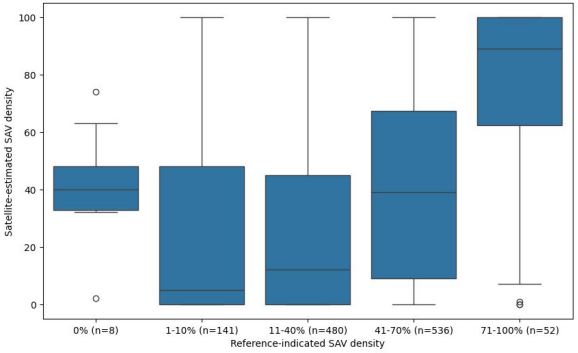

Fig. 3: Satellite-classified & reference-indicated SAV density across five density classes

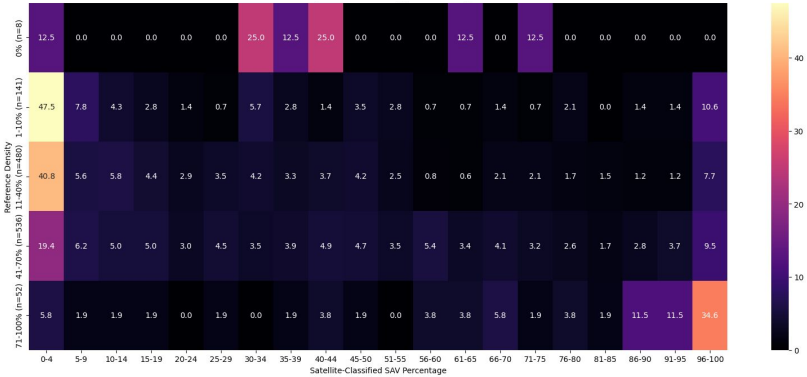

Fig. 4: Heatmap of polygons classified using Pytorch displaying the distribution of estimated classification within each density class