Image Analysis in ArcGIS Pro

Douglas Ronoh
Remmy Kesis

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Overview

• The ArcGIS Platform
• Why Use Imagery?
• Imagery Workflow
• What is Image Classification?
• Demo 1
• Image Analysis: NDVI
• Mosaic Datasets
• Raster Functions
• Demo 2
• Resources
ArcGIS Is a Platform
Enabling Web GIS Everywhere

Simple
Integrated
Open

Available in the Cloud . . .
. . . and On-Premises
Why use Imagery?

- To Enrich our Maps
- To Understand the World
- To Extract GIS Feature Data
Imagery Workflow

Collection

Raster Types

Imagery Native Form

Harvests Metadata

Mosaic Dataset

ArcGIS Server

Image Service

ArcGIS Desktop

Raster Functions

Raster Products

Points to the original Imagery
What is Image Classification?
## Types of image classification

<table>
<thead>
<tr>
<th>Type of classification</th>
<th>How class is identified</th>
<th>What is classified</th>
<th>Spatial resolution of raster</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unsupervised</td>
<td>User input after processing</td>
<td>Land use/land cover</td>
<td>Coarse</td>
</tr>
<tr>
<td>Supervised</td>
<td>Training samples of spectrally pure surfaces</td>
<td>Land use/land cover</td>
<td>Coarse or fine</td>
</tr>
<tr>
<td>Object-oriented</td>
<td>Training samples of specific features</td>
<td>Features</td>
<td>Fine</td>
</tr>
</tbody>
</table>
Supervised classification

User identifies classes through spectrally pure training samples before classification.

Results are generalized and combined through reclassification.

Coarse or fine resolutions.
Demo 1
Performing Supervised Image Classification
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Image Analysis
Normalized Difference Vegetation Index (NDVI)

• NDVI is a simple graphical indicator that can be used to analyze remote sensing measurements.
• Goal is to assess whether the target being observed contains live green vegetation or not.
Mosaic Datasets

Source raster stored in a folder

Mosaic dataset stored in a geodatabase

Large image collections

Mosaic dataset

Desktop
Raster Functions

- Apply algorithm on-the-fly to a raster/image layer
- Can be applied to a pixel or block of pixels
- Raster functions can be chained
- Used by developers to extend ArcGIS image processing
Image Processing: Raster functions

- Raster functions can:
  - Transform the data
  - Alter symbology properties
  - Replicate geoprocessing tools

<table>
<thead>
<tr>
<th>Quality</th>
<th>Geoprocessing tool</th>
<th>Raster function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Has quick processing speed</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Does not modify input data</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Adjusts input parameters after processing</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Can be used in process chain</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>
Demo 2

Analysis of Imagery using a Raster Function Chain

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Resources

Get started with Image and Raster Processing

Landsat Imagery in ArcGIS Pro

Understanding Segmentation and Classification

Measuring Vegetation (NDVI & EVI)
- http://earthobservatory.nasa.gov/Features/MeasuringVegetation/