

Image Segmentation and Classification in ArcGIS Pro

Wencelaus Simiyu

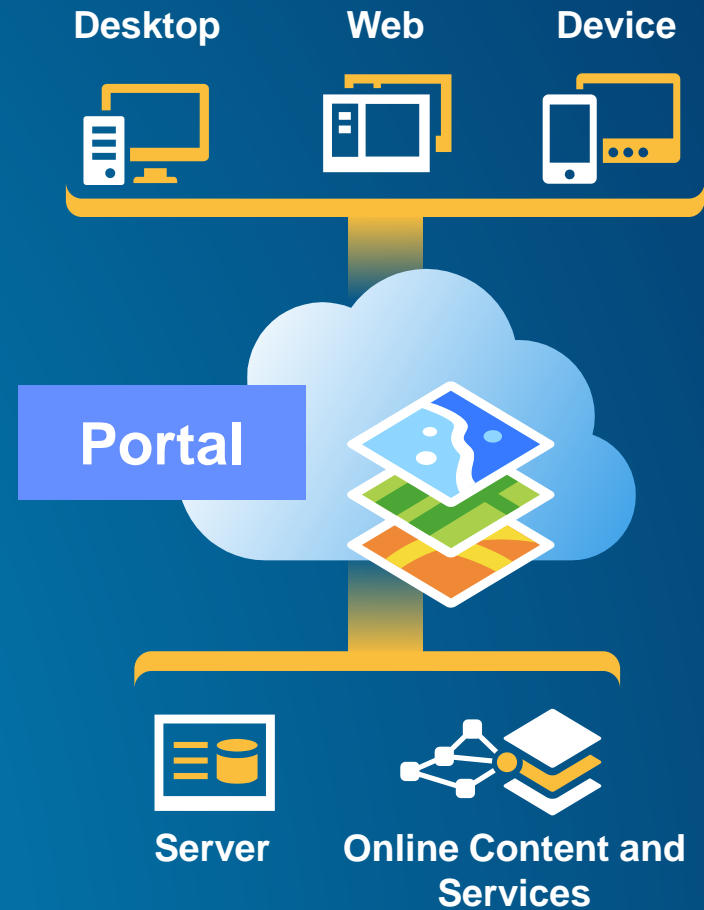
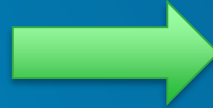
Overview

- **ArcGIS Architecture**
- **Classification workflow**
- **Classification tools in the Image Analyst and Spatial Analyst**
- **Classification wizard**
- **Segmentation**
- **Supervised classification workflow**
- **Unsupervised classification workflow**
- **Demo**

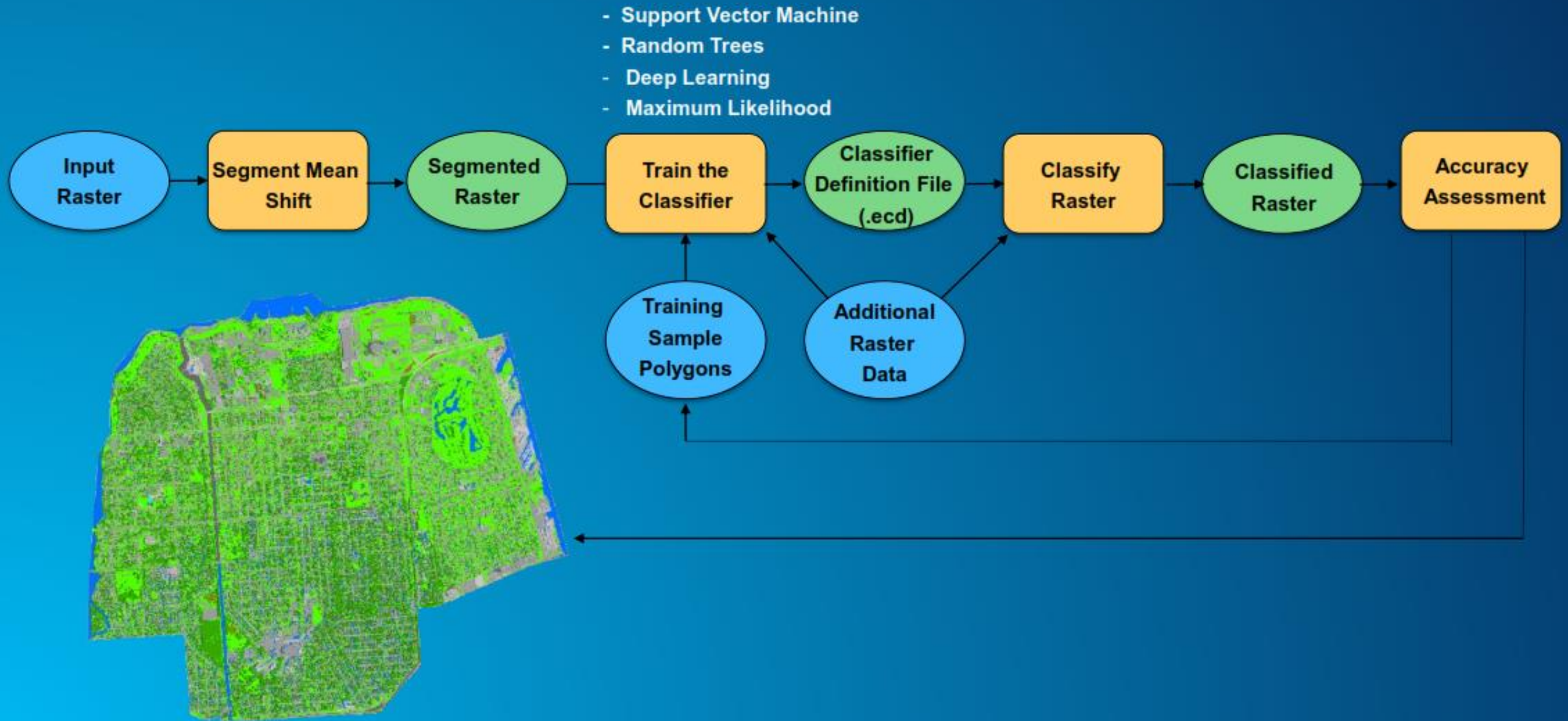
ArcGIS

It is an integrated web GIS platform

Allows organizations to manage their GIS platform, facilitate sharing, and provide access to content and capabilities



Conceptual Supervised Classification Workflow



Segmentation and Classification Geoprocessing tools

- **Image Analyst Toolbox**
- **Tools included support the entire classification workflow**
 - **Segmentation**
 - **Training Sample collection and editing**
 - **Classifiers (Supervised and Unsupervised)**
 - **Class merging and editing**
 - **Accuracy assessment**

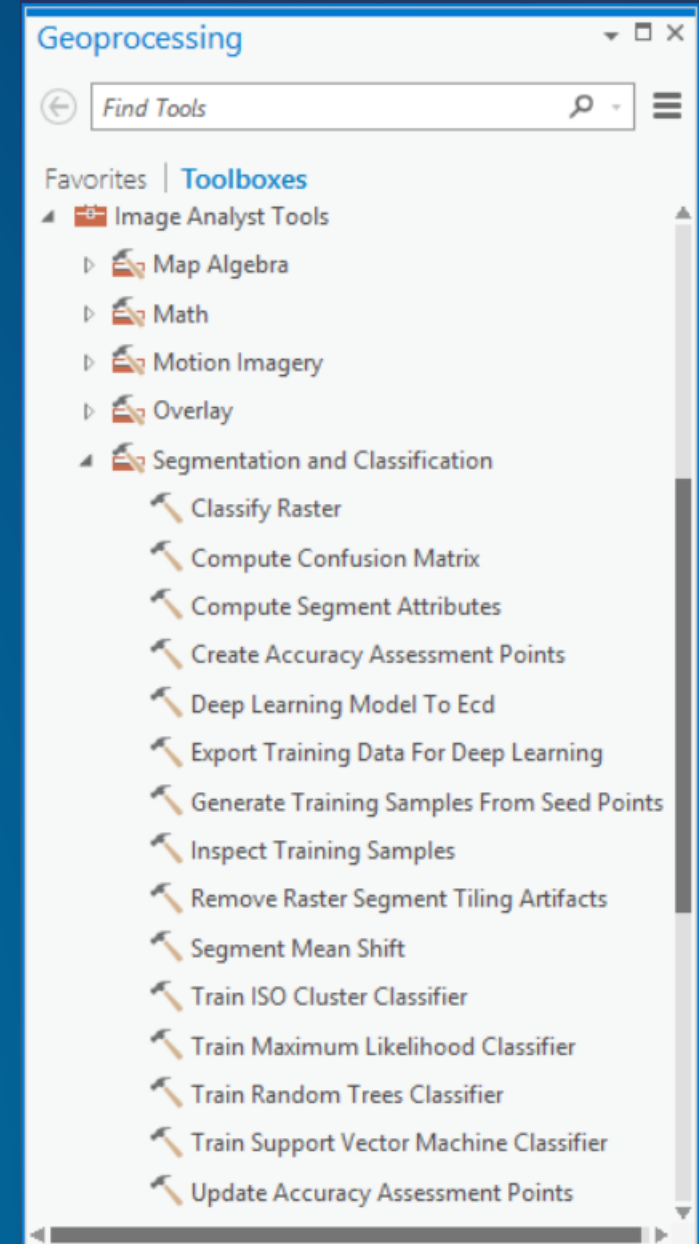


Image Classification Wizard

- **Guided workflow for all major classification steps**
 - **Configure your classification project**
 - **Set up image segmentation**
 - **Training Sample Manager**
 - **Train the classifier**
 - **Image Classification**
 - **Merge Classes**
 - **Accuracy assessment**
 - **Reclassifier**

Image Classification Wizard

● ○ ○ ○ ○ ○ ○ ○ ● ○
Configure

Classification Method
Supervised

Classification Type
Object based

Classification Schema
[Empty field]

Output Location
C:\ArcGIS\Projects\ClassificationOutputs.gdb

Optional

Segmented Image
[Empty field]

Training Samples
[Empty field]

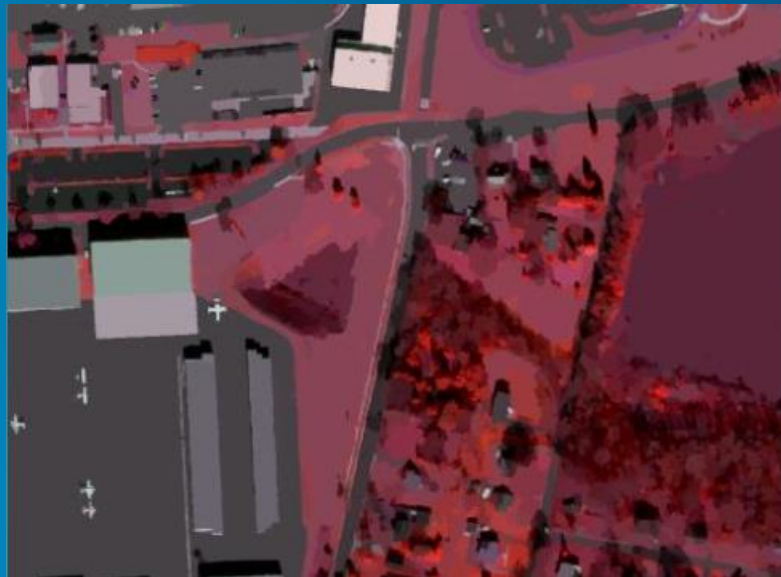
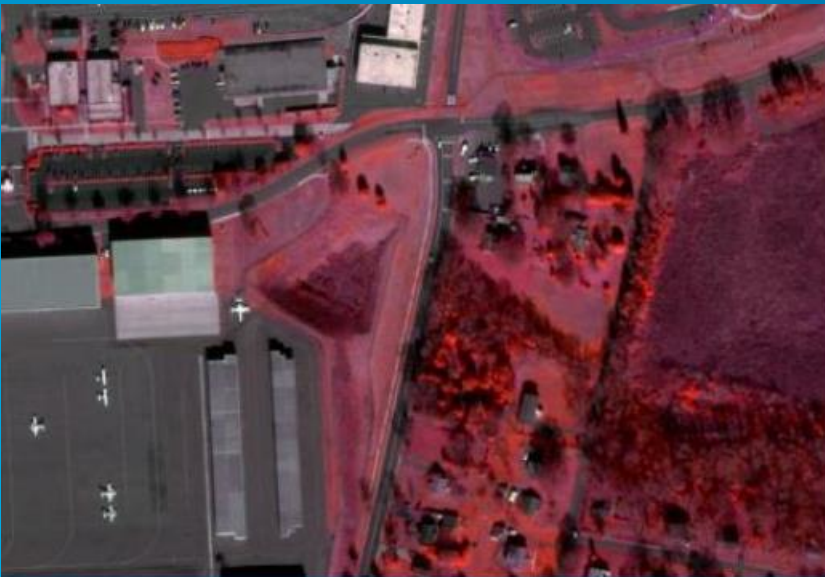
Reference Dataset
[Empty field]

Next >

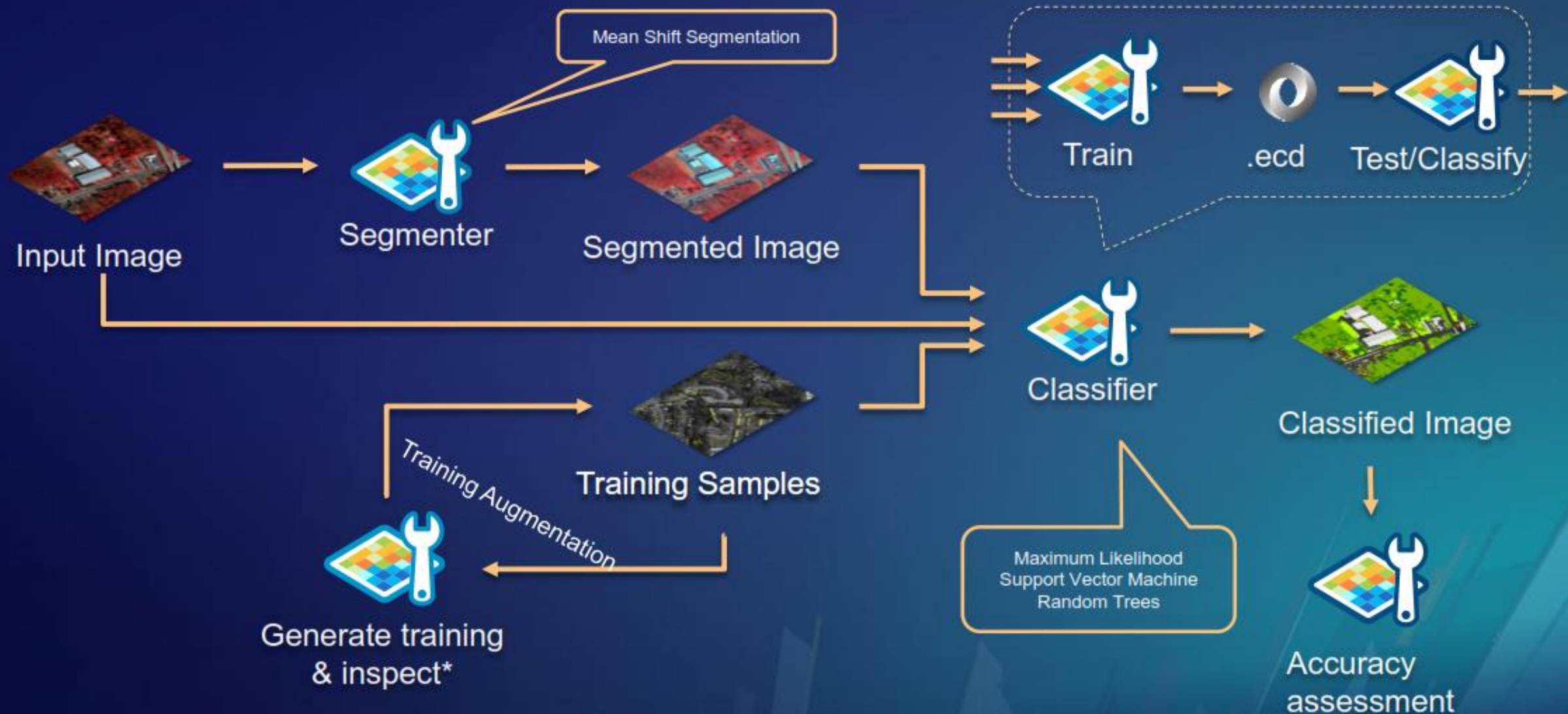
Catalog Create Features Geoprocessing Image Classification Wizard

Segmentation

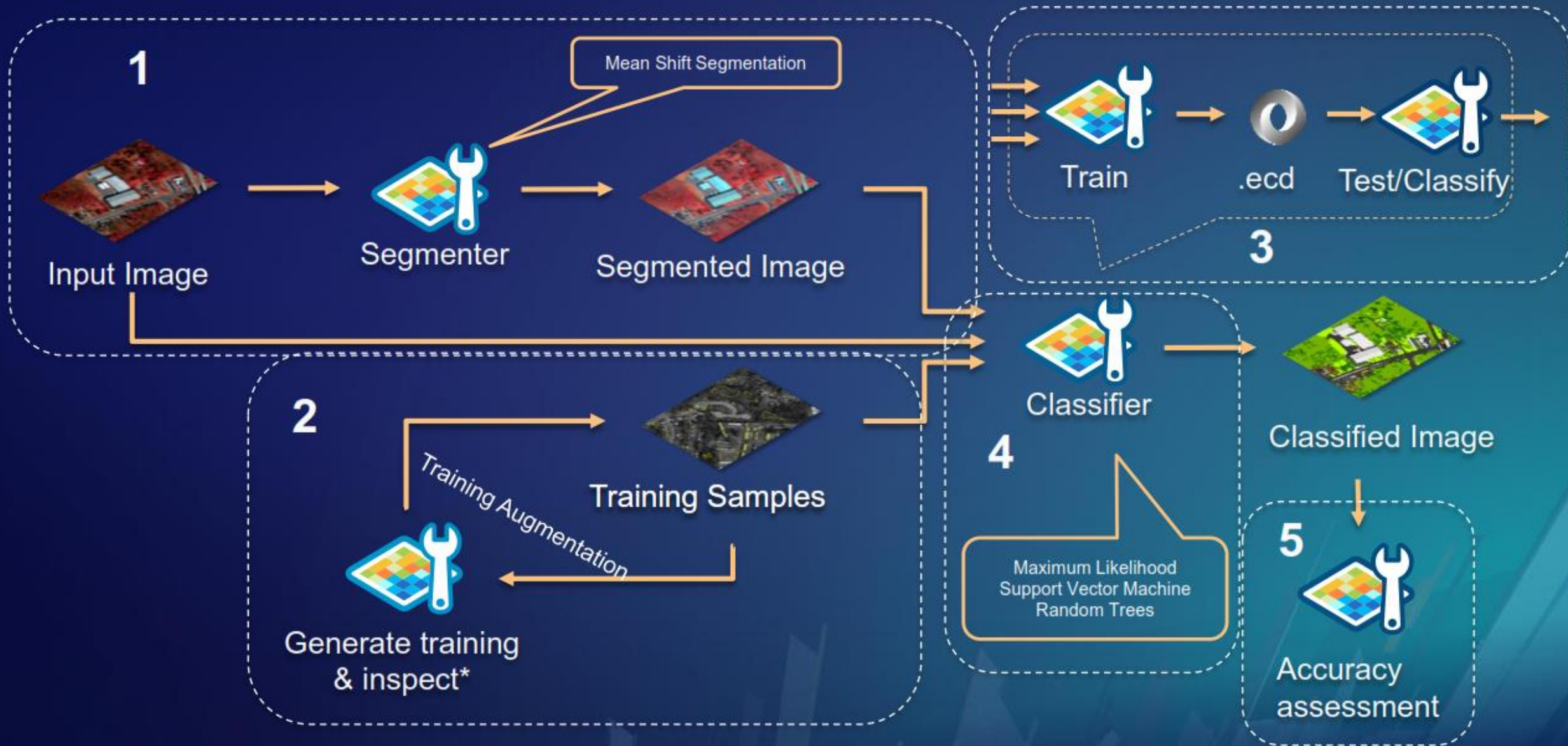
- Preserves the object edges
- Provides object specific values
- It is a pre-processing step
- It needs to be tuned to the production requirements



Supervised Image Classification



5 main steps comprising Supervised Image Classification



Step I – Image Segmentation

- **Input a 3 band, 8-bit image**
- **Use raster function to test segmentation parameters**
 - WYSIWYG
 - Use the bands that discriminate your features of interest best
- **Apply segmentation parameters in ArcGIS Pro**



Step II – Training Samples Management

- Define the classification schema
- Collect training sample polygons
- Generate training samples automatically from a class map or GIS feature layer
- Inspect training samples using cross validation



Step III – Train the Classifier

- **Select your classification method**

- Support Vector Machine (SVM)
- Random Trees
- Maximum Likelihood
- Iso Cluster

- **Inputs include:**

- Segmented raster dataset
- Additional raster dataset such as DEM or any other ancillary data
- Training samples
- Segment attributes – color, mean, std. dev. Compactness, rectangularity, count (size)

- **Output is an Esri Classifier Definition file (.ecd)**

- contains all the definitions for the classifier of choice



Step IV – Classify the image

- **Perform image classification**

- Support Vector Machine (SVM)
- Random Trees
- Maximum Likelihood
- Iso Cluster

- **Inputs include:**

- Segmented raster dataset
- Additional raster dataset such as DEM or any other ancillary data
- Training samples
- Segment attributes – color, mean, std. dev. Compactness, rectangularity, count (size)



Step V – Accuracy assessment

- Perform classification accuracy assessment
- Compares class map with ground reference
 - Sampling strategies – Random, Stratified Random, Equalized Stratified Random
 - Confusion Matrix for User (Type I) and Provider Error (Type II)



Unsupervised Image Classification

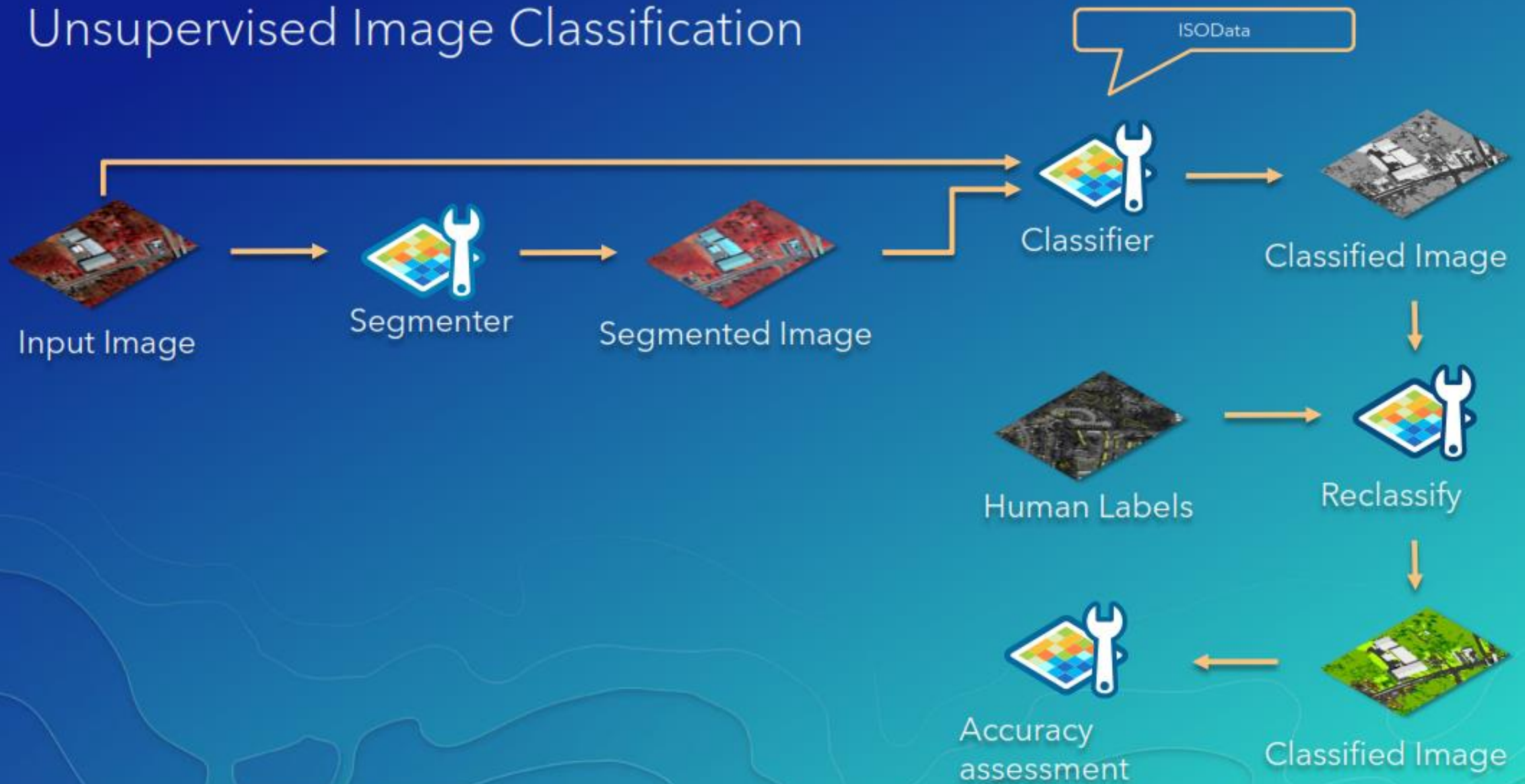




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