



**Esri International User Conference | San Diego, CA**  
**Technical Workshops | \*\*\*\*\***

## **Performing Image Classification**

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# Outline

- **Supervised classification**
- **Demonstration**
- **Unsupervised classification**
- **Demonstration**

## **Problem 1: Supervised classification**

- **We want to create a map of land-use types**
- **We have a multi-band raster**
- **We can identify several of the different land-use types on the image from knowledge of the area**
- **It would be very time consuming to manually classify each cell into a land-use type**

## **Problem 1: Supervised classification**

- **We know that each land-use type generally has a unique spectral signature**
- **From the locations we have identified the land-use types we wish to classify the areas not yet identified into the classes (as closely as possible)**

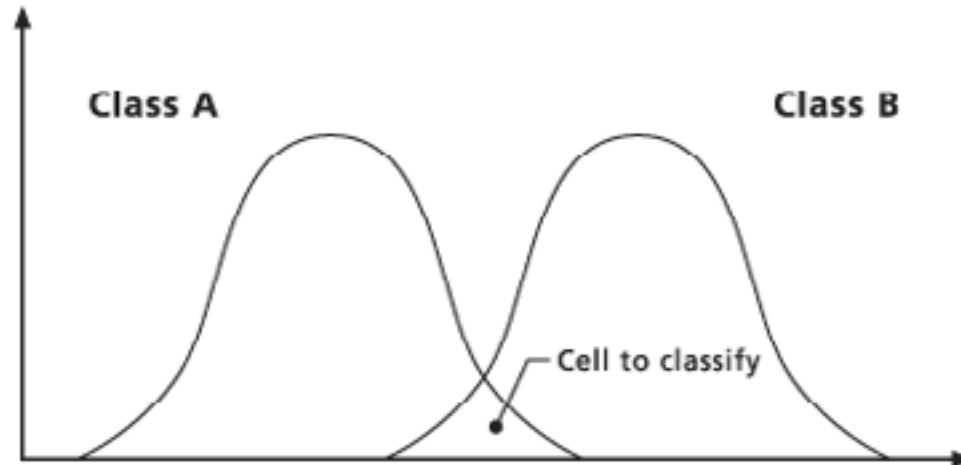
# **The supervised classification process**

- **Identify the locations of the land-use types (classes) by drawing polygons around them – create training sets**
  - **Define the classes**
  - **Make sure you get full representation of the class**
- **Calculate the statistics of the cells for each class to define the characteristics of the class – calculate signatures**

# The supervised classification process

- **Determine if the classes are unique enough or if you need additional classes – evaluate signatures**
  - If the statistics for two classes are very similar it will be difficult to differentiate between the classes
  - If you do not have enough classes to represent all the different classes in the study area, certain locations will be assigned to the class that it is statistically closest to
- **Using the statistics from the signature file, classify the entire satellite image**
- **Validate the results**

## Performing the classification



# Classification tools

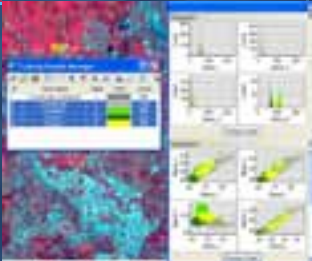
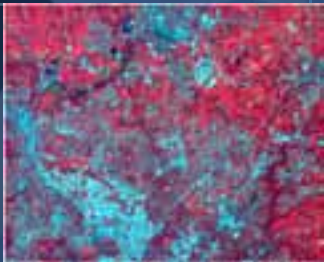
- **Individual tools in the Multivariate Toolbox**
- **Classification toolbar**
  - **Creates training samples**
  - **Calculates signature files**
  - **Edits the signature files**
  - **Classifies the data**
    - **Supervised**
    - **Unsupervised**



# Demo 1: Classification

Classification toolbar

Supervised classification



## **Problem 2: Unsupervised classification**

- **We wish to map an area into 10 levels of forest productivity for timber extraction**
- **We know that forest productivity can be determined by certain criteria (e.g., slope and aspect)**
- **We do not know which areas should belong to each class but we do know that similar levels of productivity have similar characteristics relative to the input criteria**

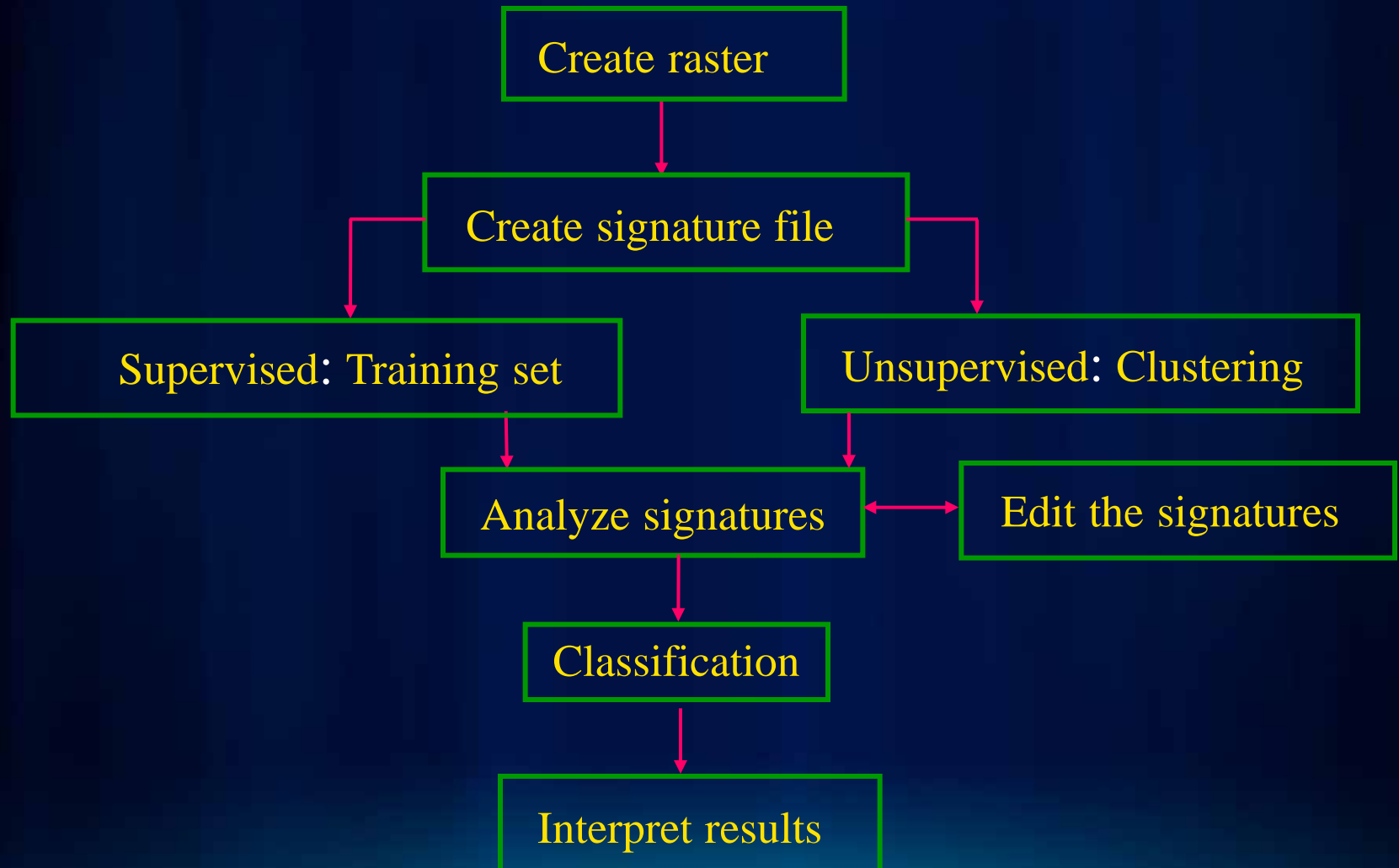
# **The unsupervised classification**

- **Determine which data layers (the criteria) that are to be used to determine forest productivity**
- **Define the number of clusters to group the area into**
- **Create and evaluate the clusters**
- **Classify the entire study area into the clusters**
- **Interpret the results**

## **Difference in creating classes and clusters**

- **Supervised – define the classes by training samples**
- **Unsupervised – identify the number of clusters**

# Multivariate Analysis review

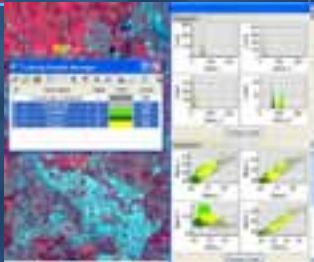
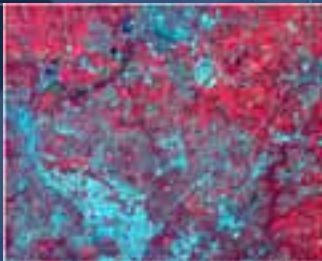


# Demo 2: Classification

Unsupervised classification

Creating clusters

Performing the classification





# ArcGIS Spatial Analyst Technical Sessions

- **An Introduction - Rm 1 A/B**

**Tuesday, July 12, 8:30AM – 9:45AM**

**Thursday, July 14, 10:15AM – 11:30AM**

- **Suitability Modeling - Rm 1 A/B**

**Tuesday, July 12, 1:30PM – 2:45PM**

**Thursday, July 14, 8:30AM – 9:45AM**

- **Dynamic Simulation Modeling – Rm 5 A/B**

**Wednesday, July 13, 8:30AM – 9:45AM**

- **Raster Analysis with Python – Rm 6C**

**Tuesday, July 12, 3:15PM – 4:30PM**

**Wednesday, July 13, 3:15PM – 4:30PM**

- **Creating Surfaces – Rm 5 A/B**

**Wednesday, July 13, 1:30PM – 2:45PM**

# **ArcGIS Spatial Analyst Short Technical Sessions**

- **Creating Watersheds and Stream Networks – Rm 6A**  
**Tuesday, July 12, 10:40AM – 11:00AM**
- **Performing Image Classification – Rm 6B**  
**Tuesday, July 12, 8:30AM – 8:50AM**
- **Performing Regression Analysis Using Raster Data – 6B**  
**Tuesday, July 12, 8:55AM – 9:15AM**



## **Demo Theater Presentations – Exhibit Hall C**

- **Modeling Rooftop Solar Energy Potential**

**Tuesday, July 12, 3:30PM – 4:00PM**

- **Surface Interpolation in ArcGIS**

**Wednesday, July 13, 9:00AM – 10:00AM**

- **Getting Started with Map Algebra**

**Wednesday, July 13, 10:00AM – 11:00AM**

- **Agent-Based Modeling**

**Wednesday, July 13, 5:30PM – 6:00PM**

**Open to Questions**

**...Thank You!**

**Please fill the evaluation form.**

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