Introduction to GIS with ArcGIS Pro

Spatial Analysis:
Answering Questions with Analysis Tools

Session 17

Palash Basak, PhD

Lecture Outline

- Introduction & Recap (5 minutes)
- Answering Questions with Analysis Tools (45 minutes)
- Guided Exercise & Q&A (10 minutes)

Week 7: Working with Tabular Data

- **Class 13:** Creating Features from Tabular Data
- **Class 14:** Associating Tabular Data (Joins and Relates)

Week 8: Editing Features and Attributes

- **Class 15:** Creating Features by Digitizing
- **Class 16:** Modifying Existing Features

Week 9: Spatial Analysis

- **Class 17:** Answering Questions with Analysis Tools (Buffer, Extract)
- **Class 18:** Performing Overlay Analysis (Intersect, Spatial Join)

Week 10: Page Layouts and Sharing

- **Class 19:** Creating a Page Layout
- **Class 20:** Sharing with ArcGIS Pro & Course Wrap-up
- **Milestone:** Assignment 2 (Mini-Project) will be assigned.

Recap of Season 15 &

- Creating Features by Digitizing
- Modifying Existing Features

Answering Questions with Analysis Tools

in ArcGIS Pro

Spatial Analysis

Spatial analysis is the process of examining geographic data to find relationships, patterns, and insights that help answer questions and solve problems.

It is a process of examining the locations, attributes, patterns, and relationships of features in spatial data to address a question or gain useful knowledge.

Spatial analysis is a method of advanced spatial modeling that assists with terrain modeling, finding suitable locations and routes, discovering spatial patterns, and performing hydrologic and statistical analysis.

https://support.esri.com/en-us/gis-dictionary/spatial-analysis

Geoprocessing

Geoprocessing is a framework and set of tools for processing geographic and related data.

The comprehensive suite of geoprocessing tools can be used to perform spatial analysis or manage GIS data in an automated way.

Geoprocessing is for everyone who uses ArcGIS Pro.

Whether you are a new or advanced user, geoprocessing will likely be an essential part of your day-to-day work.

https://pro.arcgis.com/en/pro-app/3.4/help/analysis/geoprocessing/basics/what-is-geoprocessing-.htm

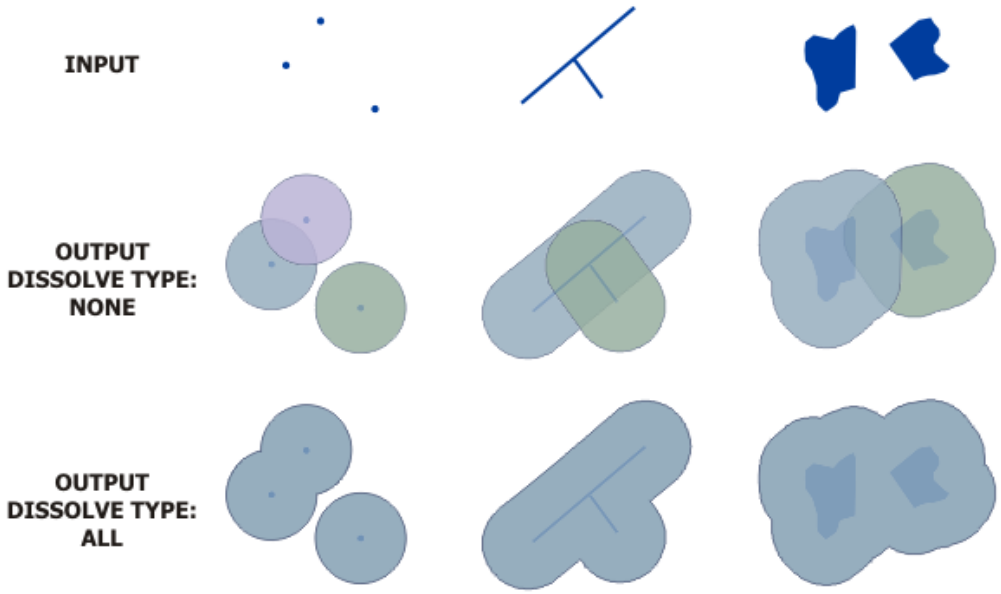
Geoprocessing *cont…*

A typical geoprocessing tool performs an operation on a dataset such as a feature class, raster, or table, and creates a resulting output dataset.

For example, the Buffer tool takes features as input, creates buffer areas around the features to a specified distance, and writes those buffer areas to a new output dataset.

Buffer Analysis

Creates buffer polygons around input features to a specified distance.



https://pro.arcgis.com/en/pro-app/3.4/tool-reference/analysis/buffer.htm

Analysis toolbox

Toolset	Description
Extract	GIS datasets often contain more data than you need. Tools in the Extract toolset let you select features and attributes in a feature class or table based on a query (SQL expression) or spatial and attribute extraction. The output features and attributes are stored in a feature class or table.
General	The General toolset contains a tool for calculating weights using the pairwise comparison method.
Overlay	The Overlay toolset contains tools to overlay multiple feature classes to combine, erase, modify, or update spatial features, resulting in a new feature class. New information is created when overlaying one set of features with another. All of the overlay operations involve joining two sets of features into a single set of features to identify spatial relationships between the input features.
Pairwise Overlay	The Pairwise Overlay toolset contains tools that provide an alternative to a number of classic overlay tools for functional and performance considerations.
Proximity	The Proximity toolset contains tools that are used to determine the proximity of features within one or more feature classes or between two feature classes. These tools can identify features that are closest to one another or calculate the distances between or around them.
Statistics	The Statistics toolset contains tools that perform standard statistical analysis (such as mean, minimum, maximum, and standard deviation) on attribute data as well as tools that calculate area, length, and count statistics for overlapping and neighboring features. The toolset also includes the Enrich tool that adds demographic facts like population or landscape facts like percent forested to your data.

https://pro.arcgis.com/en/pro-app/latest/tool-reference/analysis/an-overview-of-the-analysis-toolbox.htm

Performing Spatial Analysis using Python Script

All spatial analysis or geoprocessing tasks can be performed using Python scripting.

Python scripting makes it possible to automate workflows in ArcGIS Pro.

References

The Power of Where: How Spatial Analysis Leads to Insight

https://www.esri.com/arcgis-blog/products/product/analytics/the-power-of-where-how-spatial-analysis-leads-to-insight

Get started with Python in ArcGIS Pro

https://learn.arcgis.com/en/projects/get-started-with-python-in-arcgis-pro/

Exercise

Exercise

1. Find which districts are within 200 kilometers of Dhaka.
2. Calculate the total population of those districts.

Preview for Season 18

Spatial Analysis: Performing Overlay Analysis