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GEOGRAPHICAL INFORMATION SYSTEMS

Spatial Analysis (Part 1)

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OUTCOMES

- By the end of this chapter, students should be able to:
  - ✓ Explain the basic concept of spatial analysis
  - ✓ Understand the difference of each type of spatial analysis according to specific needs
  - ✓ Suggest what type of spatial analysis needed based on specific problems

What is spatial analysis?

- Spatial analysis allows us to interact/communicate with a GIS system in order to answer questions that will support decision making process

- Without spatial analysis, data from a GIS system CANNOT be turned into useful information.

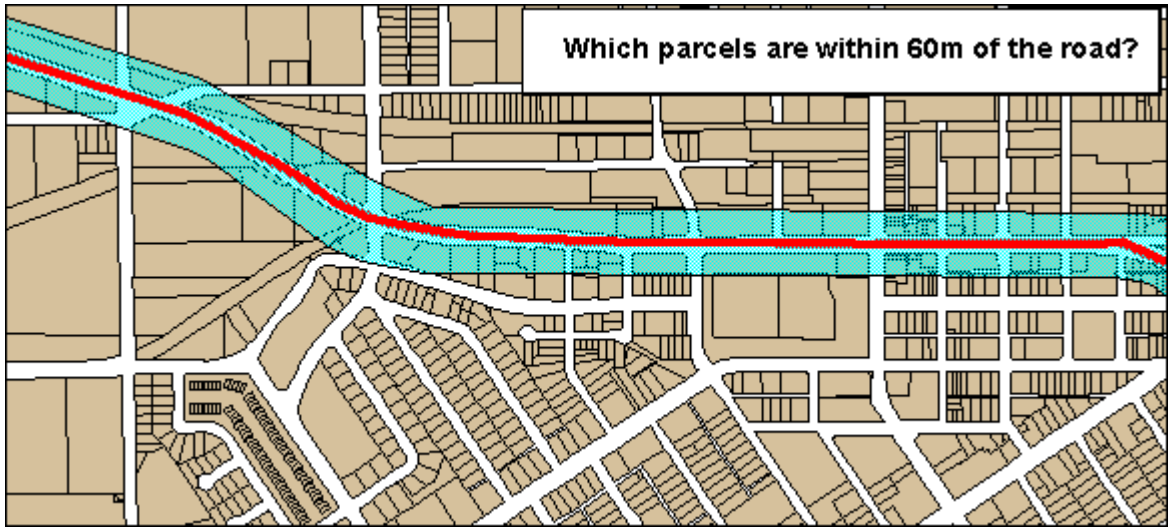
Categories of Spatial Analysis

- There are 5 common categories of spatial analysis:

  - ✓ Proximity Analysis
  - ✓ Overlay Analysis
  - ✓ Statistical Analysis
  - ✓ Temporal Analysis
  - ✓ Network Analysis

Proximity Analysis

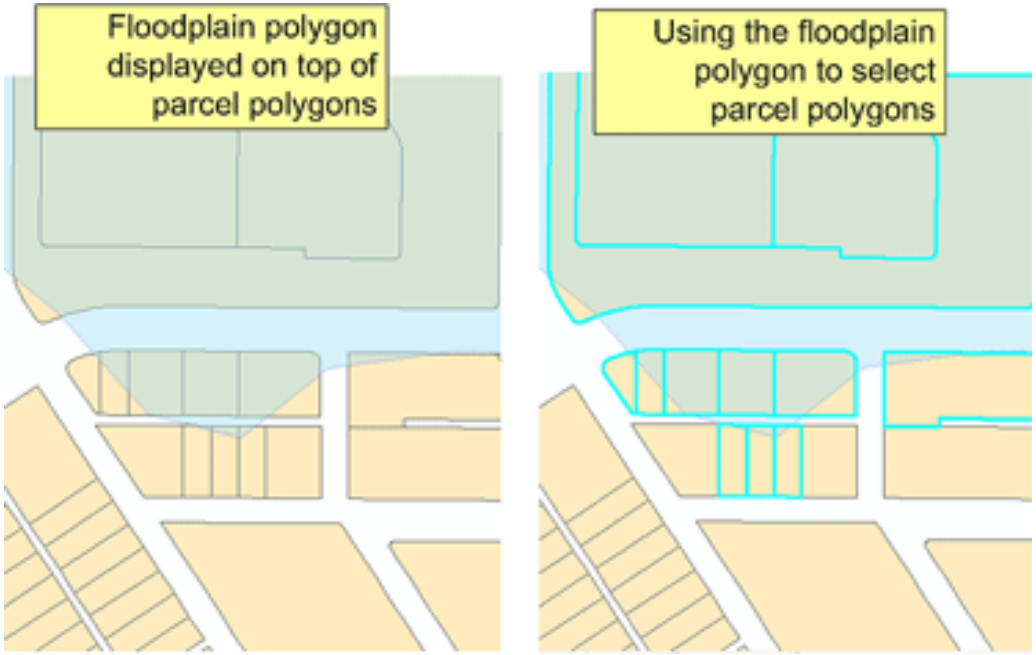
- One of the basic analyses in GIS
- It is used to determine the relationship between a feature and its neighbours.
- Can be performed by using ‘buffer’ and ‘ruler’.



Source of picture: http://planet.botany.uwc.ac.za/nisl/gis/gis_primer/page_36.htm

Overlay Analysis

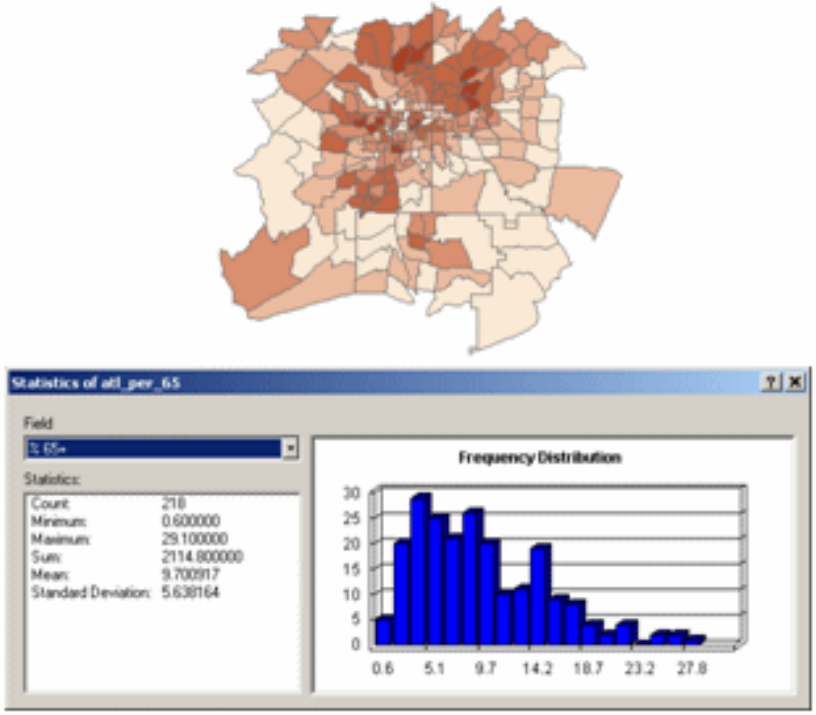
- Performed by combining multiple layers to extract the common features between the layers.
- Can be performed using ‘buffer’, ‘merge’ (depends on needs)



Source of picture: http://resources.esri.com/help/9.3/arcgisdesktop/com/gp_toolref/geoprocessing/overlay_analysis.htm

Statistical Analysis

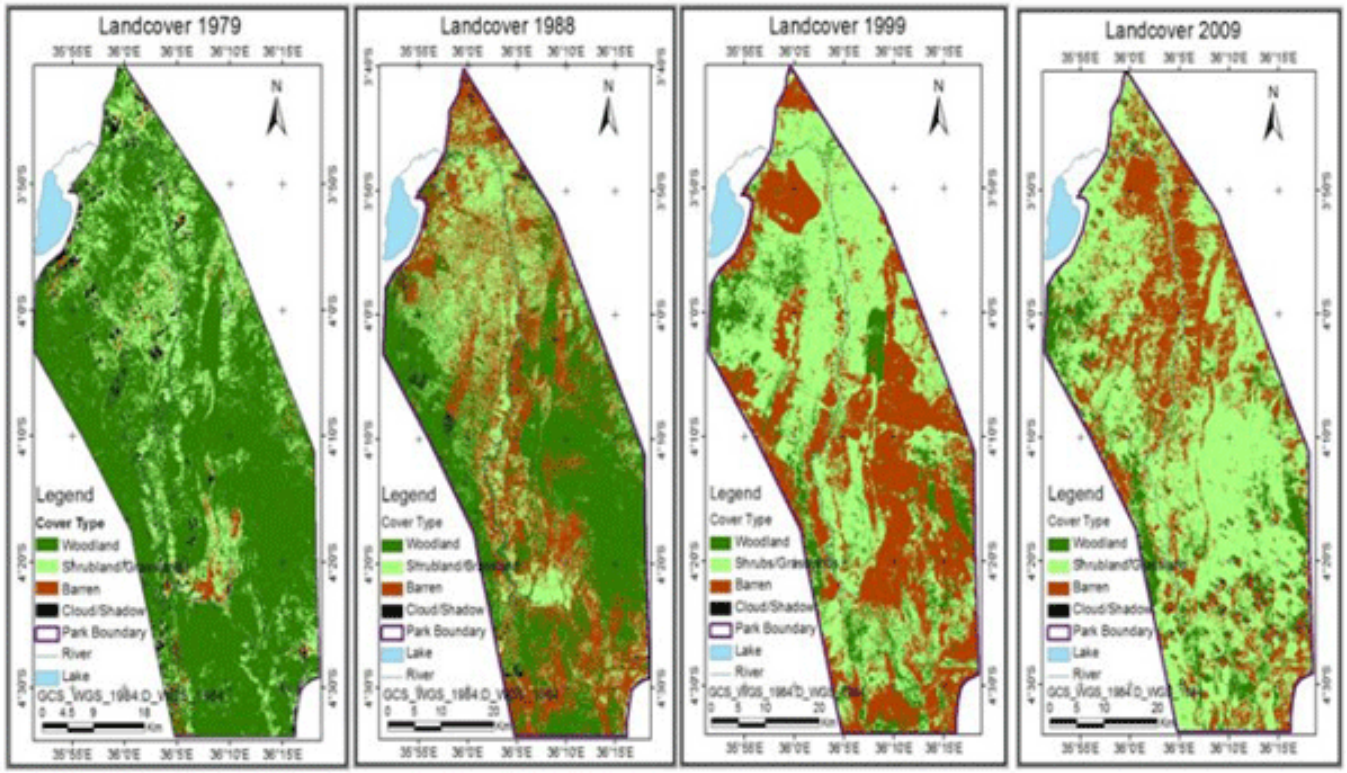
- Applicable both on spatial and non-spatial data
- Used to analyse attribute values associated with spatial feature.



Source of picture: http://resources.esri.com/help/9.3/arcgisengine/java/gp_toolref/geoprocessing/statistical_analysis.htm

Temporal Analysis

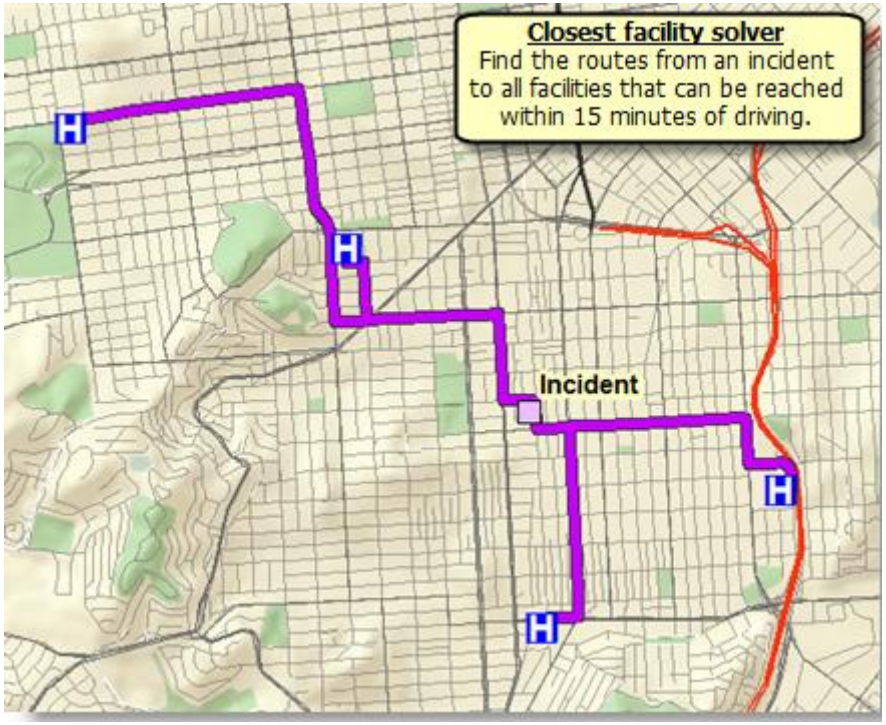
- Used to analyse data that is associated with time/date (when)
- Useful to observe changes over time



Source of picture: https://www.gislounge.com/time-and-gis/

Network Analysis

- Useful to solve problems that involve network. For example, find the fastest route from an accident to a hospital, or find the closest hospital to the accident, or combination of both.



Source of picture: http://desktop.arcgis.com/en/arcmap/latest/extensions/network-analyst/types-of-network-analyses.htm

Think GIS way…

An explosion happens in an industrial area. The affected area is approximately 1km radius. All occupiers need to be evacuated to nearest communal area. What are the spatial analyses involved?

Source of picture: pixabay.com