GIST 4302/5302: Spatial Analysis and Modeling

Review

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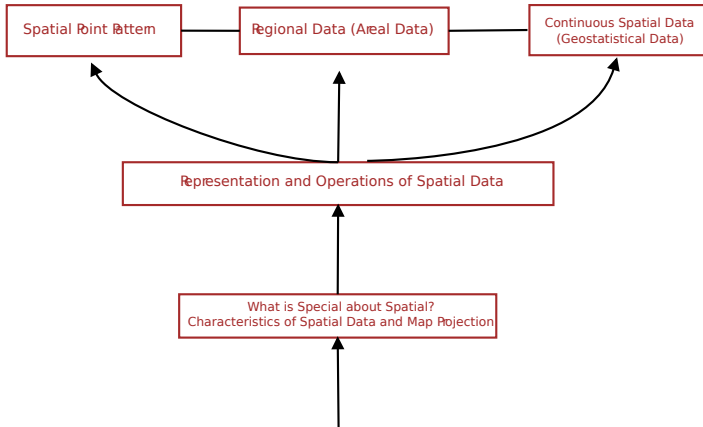http://www.spatial.ttu.edu

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Spatial Point Pattern — Regional Data (Areal Data) — Continuous Spatial Data (Geostatistical Data)

Representation and Operations of Spatial Data

What is Special about Spatial?
Characteristics of Spatial Data and Map Projection

Map Projection

- Elements in map projection
  - datum
  - developable surface
  - projection
- Distortions
  - distance
  - shape
  - area
  - direction
- how to choose map projections?
  - depending on purposes, you may need to preserve a certain spatial property - most commonly shape or area - to achieve that purpose

Characteristics of spatial data

- spatial (auto/cross-)correlation (spatial context or spatial pattern in different context)
- spatial heterogeneity
  - Simpson paradox in a spatial setting
- fractal behaviors
  - scale issues
  - measuring the length of coastline of Maine
  - travel traces of 'ants' vs. 'elephant'

Data types

- spatial point pattern
- areal data
- geostatistical data
- network data

Representations of spatial data (i.e., spatial database basics)

- object-based
    - geometric primitives: points, lines and polygons
    - convex hull, Voronoi diagram (dual graph of Delaunay triangulation)
    - vector analysis
        - point-in-polygon
        - buffer
        - spatial query
        - overlay, spatial join
    - data structures for spatial data
        - spaghetti models
        - NAA

Representations of spatial data (i.e., spatial database basics)

- field-based
  - representation: points, contours, raster/lattice, triangulation (Delaunay triangulation)
  - raster analysis:
    - local operators: map algebra
    - focal operators: focal statistics, aspect, slope
    - zonal operators: zonal statistics, viewshed, watershed analysis

Model builder

- Automate processing, graphic programming, reproducibility

Exam format

- Thursday 12:30-1:30pm
- open books and open notes, but access to any digital devices (e.g, phones, tables, computers) are not allowed
- multiple choices (multiple correct answers) plus writing questions

Thank you, any questions/comments