Study Guide for GIST 4302/5302 (Spatial Analysis and Modeling)

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Statistics tools

1. Histogram and cumulative histogram
2. How to draw a histogram given a list of numbers

Pitfalls of spatial data

1. What is modifiable areal unit problem (MAUP)?
2. Can you give a real world example of MAUP?

Point pattern analysis

1. Mean center, median center, standard distance and ellipsoid distance
2. Kernel density estimation, Quadrat method
3. What are K and G curves, and how are connected to the distances between points?
4. What does complete spatial randomness mean and why we need it?

Areal data analysis

1. Different ways to define spatial neighborhood and spatial weight matrix
2. Moran'I and how to interpret Moran'I plot
3. What information can we get from local version of Moran'I?

Spatial interpolation

1. How to represent a spatial field (e.g., elevation, temperature) in GIS?
2. Deterministic interpolation methods: nearest neighbor, natural neighbors, inverse distance weighted (IDW), spatial spline and triangulation
3. Kriging Semivariogram (or covariogram): range, sill and nugget effects What is advantage of kriging interpolation methods compared to the above deterministic methods
4. How to compare the accuracy of different interpolation methods?

Spatial uncertainty

1. Uncertainty is unavoidable in any measurements, geospatial data are not exceptions.

General

1. We focused on three different types of geospatial data: point pattern, areal data and geostatistical data (interpolation). What tools we used to measure the spatial autocorrelation (or spatial pattern) for each of them?