



Analyzing Patterns

Average Nearest Neighbor

Analyzing Spatial Patterns

Global calculations

- ❑ Identify the patterns/overall trends of data
- ❑ Compare the feature locations and/or attributes to a theoretical random distribution in order to determine if you have statistically clustering or dispersion
- ❑ Analyzing Patterns toolset

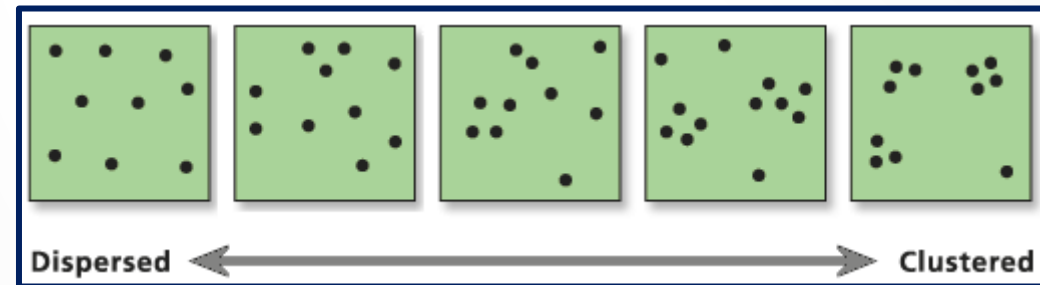
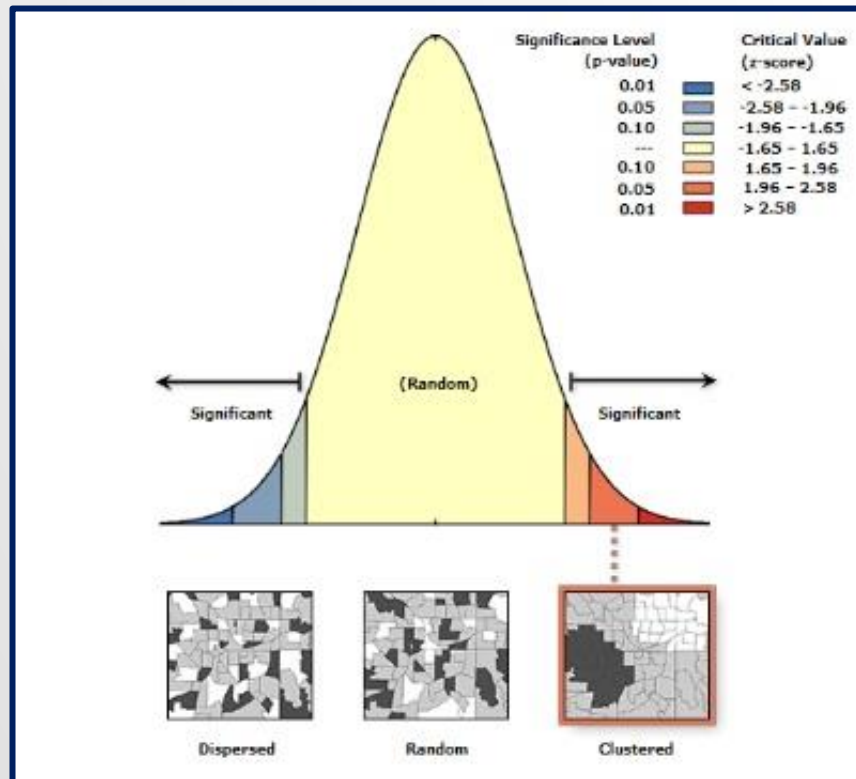
Local calculations

- ❑ Identify the extent and location of clustering or dispersion
- ❑ To answer the question 'where do we have spatial clustering?'
- ❑ Process every feature within the context of its neighboring features in order to determine whether it represents a spatial outlier, or if it is part of a statistically significant spatial cluster.
- ❑ Mapping Clusters toolset

The **Analyzing Patterns toolset** contains methods that are most appropriate for understanding broad spatial patterns and trends

Tool	Description
Average nearest neighbor	Calculates the average distance from every feature to its nearest neighbor based on feature centroids
High/low clustering (Getis-Ord general G)	Measures concentrations of high or low values for a study area
Spatial autocorrelation (global Moran's <i>I</i>)	Measures spatial autocorrelation (clustering or dispersion) based on feature locations and attribute values
Multi-distance spatial cluster analysis (Ripley's <i>K</i> function)	Assesses spatial clustering/dispersion for a set of geographic features over a range of distances

These Analyzing Patterns tools give us ways to measure the degree to which the features are clustered, dispersed, or randomly distributed **across the study area**.

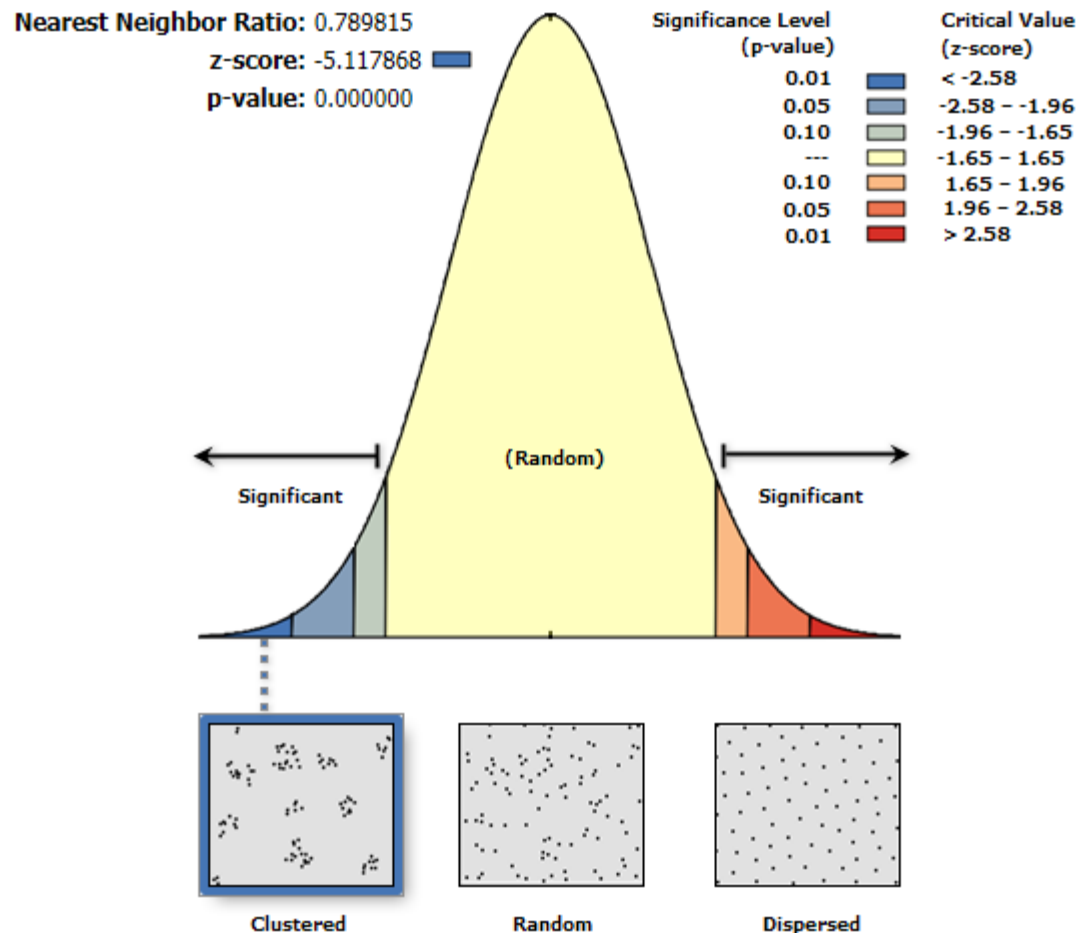


Average Nearest Neighbor

- Calculate a nearest neighbor index based on the average distance from each feature to its nearest neighboring feature.
- This tool returns five values:
 - observed mean distance,
 - expected mean distance,
 - nearest neighbor index,
 - z-score, and
 - p-value.
- If the index (average nearest neighbor ratio) is less than 1, the pattern exhibits clustering.
- If the index is greater than 1, the trend is toward dispersion.

Households

Average Nearest Neighbor Summary

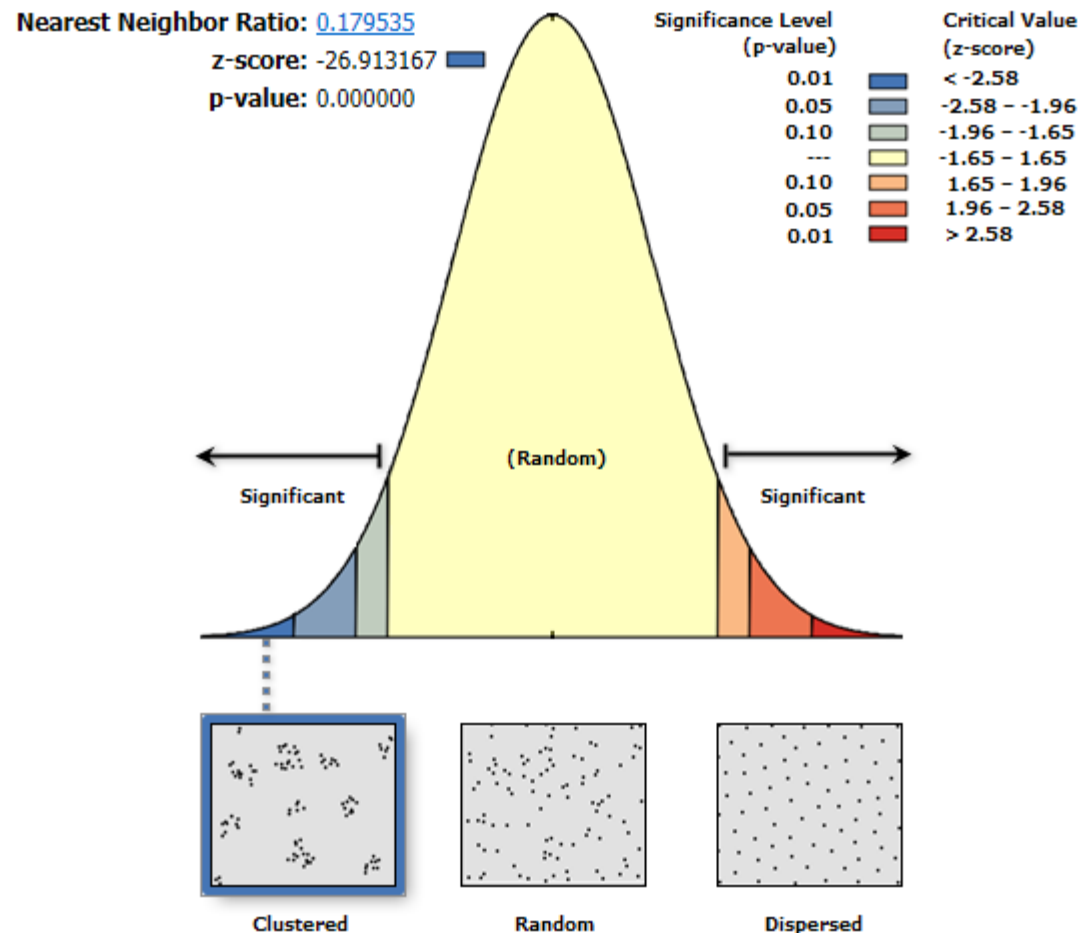


Given the z-score of -5.12, there is a less than 1% likelihood that this clustered pattern could be the result of random chance.

Average Nearest Neighbor Summary

Individual Cases

Average Nearest Neighbor Summary



Given the z-score of -26.91, there is a less than 1% likelihood that this clustered pattern could be the result of random chance.

Average Nearest Neighbor Summary

Compare two reports

- Both Households and Individual Cases indicates statistically significant clustering
- The z-scores are quite different
- For Individual Cases, the z-score is -26.9 and it is only -5.1 for Households
- The clustering is much more intense for the Dengue fever cases than it is for the homes

The spatial pattern of Dengue fever cases is clustered, and that the observed clustering is more pronounced than we would expect, given the underlying clustering of the homes