
Several Fundamentals in Implementing Spatial Statistics in GIS: Using Centographic Measures as Examples

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Abstract

Significant research effort has been focusing on using GIS for advanced spatial statistics, modeling, and simulation. This paper argues that even though GIS have great potential to facilitate sophisticated spatial modeling and spatial statistics, the simple but important theme of combining spatial information with statistical analysis has not received enough attention and should not be neglected. This paper discusses how different types of geographic information can be derived from and stored in GIS with special attention on location information. Other types of geographic information such as spatial relationship and connectivity are derivatives of simple location information and are briefly discussed. Using a set of centographic measures - a subset of spatial statistics, this paper demonstrates how statistical techniques can be combined with geographic information such as longitude and latitude of points in analyses. Some of these techniques also utilize attribute data of the point locations in conjunction with locational information. As long as geographic information is extracted from GIS and made accessible to users, the GIS environment provides great potential to develop new spatial analytical methods by directly manipulating geographic information alone or together with attribute data. Using locational and attribute data of selected U.S. cities as an example, this paper shows how spatial mean, spatial median, standard distance and deviational ellipse are derived in a GIS environment.
