Lecture 23: GIS Analytical Functionality (VII)

Topics:

Summary of GIS Analysis (computer demo)

Reference:
ArcInfo Help System

1. Introduction:
2. Measurement Operations:
3. Connectivity Operations:
4. Spatial Interpolation Operations:
5. Digital Terrain Analyses:
6. Statistical Analysis:
7. Spatial Overlay:

8. Summary of GIS Analysis (Computer Demo):

8.1 Measurement

8.1.1 Distance:

8.1.1.1 Vector:

8.1.1.1 Point to point:

(1) ToolBox version:
   (a) ArcMap->Arc Tool Box->Analysis Tools->Proximity->Point Distance

(b) Use Microsoft Access to open the result file
(2) Workstation version:

(a) `pointdistance` wells wells welldist
(b) list welldist

8.1.1.1.2 Point to line:

(1) Tool box version:

(a) ArcMap->Arc Tool Box->Analysis Tools->Proximity->Near

(b) Open the attribute table of the input feature layer (point layer) to see the results.

(2) Workstation version:

(a) `near` wells roads line 5000 to_roads
(b) list to_roads.pat

8.1.1.2 Raster:

\[ \text{roads\_dist} = \text{costdistance} (\text{roads\_src, pixel\_size}) \]

\[ \text{display} \ 9999 \]

\[ \text{mapextent} \ \text{roads\_dist} \]

\[ \text{gridpaint} \ \text{roads\_dist} \# \text{linear} \# \text{gray} \]

\[ \text{linecolor} \ 2 \]

\[ \text{arcs} \ \text{roads} \]

8.1.2 Perimeter and Area:
Vector:
   list soils.pat
Raster:
   soils_perim = zonalstats (soils_rast, zonalperimeter (soils_rast), mean, data)
   list soils_perim
   (the values in the mean are the perimeters of patches with the same label where
   they are connected or not)

8.2 Connectivity

Connected components in raster:
   soils_conn = regiongroup (soils_rast, #, EIGHT, WITHIN, #, LINK)
   list soils_conn.vat
   (number of records increased due to the fact that patches have to be connected)
   soils_perim2 = zonalstats (soils_conn, zonalperimeter (soils_conn), mean, data)
   list soils_perim2
   (compare the perimeter values for patch 1 and for the others)

Buffer:
   buffer roads roads_buff # # 50 # LINE

8.3 Spatial Interpolation

Inverse distance:
   mineral = pointinterp (samples, value, 1, IDW, 2, 0, circle, 20)
   mapextent mineral
   gridpaint mineral # linear # gray
   points samples

Nearest Neighbour:
   Mineral1 = pointinterp (samples, value, 1, IDW, 100, 0, circle, 20)
   clear
   gridpaint roads_dist # linear # gray
   points samples

8.4 Digital Terrain Analysis

Shaded relief:
   shd_relief = hillshade (lubdem, 315, 45, all)
   (change the azimuth to a different value, such as 135)

Slope and Aspect
   (look at the help system for details)

8.5 Statistical Analysis
\[ \text{depth\_mean} = \text{zonalstats\ (partitions, soil\_depth, MEAN, DATA)} \]
\[ \text{list depth\_mean} \]

\[ \text{depth\_std} = \text{zonalstats\ (partitions, soil\_depth, STD, DATA)} \]
\[ \text{list depth\_std} \]

8.6 Overlay

- \textit{clip:} keep the features in the clip coverage
- \textit{erase:} keep the features outside the erase coverage
- \textit{identity:} keep the features in the input coverage
- \textit{intersect:} keep only the features in both coverages
- \textit{union:} keep the features in either coverages