

Spatial Autocorrelation Calculator (SpAut)

SpAut is a GIS application used to calculate the spatial autocorrelation of a dataset using the Moran index.

Functionality

Currently SpAut can handle the following file formats.

- txt file
- Excel file
- Shapefile

SpAut can calculate the Moran index using the following metrics.

- Euclidean
- Suppreum
- Manhattan

In addition to calculating the spatial autocorrelation on the points alone, up to 5 grids, with different cell sizes, can be placed over the points, and the Moran index can be calculated for each grid alone, as well for all the grids combined.

All the data pertaining to the settings are saved and outputted to a file upon completion of the calculations. Table 1 contains a brief description of each setting that is saved to the file and Table 2 contains a brief description of the settings for each grid that is saved.

Table 1: Saved Settings

Setting	Description
Input File	Filename of the input file in which the data came from
Number of Grids	The number of grids with different cell sizes
X Coordinate	Column name containing the X coordinate of each point
Y Coordinate	Column name containing the Y coordinate of each point
Attribute	Name of the attribute in which spatial autocorrelation is computed on
E Moran Index	The value calculated without grids or with all of the grids combined with Euclidean metric
S Moran Index	The value calculated without grids or with all of the grids combined with Suppreum metric
M Moran Index	The value calculated without grids or with all of the grids combined with Manhattan metric

Table 2: Grid Settings

Setting	Description
Grid Number	Sequential number which represents the grid (1-5)
X Coordinate Max	The X coordinate of the north-western most corner of the grid
Y Coordinate Max	The Y coordinate of the north-western most corner of the grid
X Coordinate Min	The X coordinate of the south-eastern most corner of the grid
Y Coordinate Min	The Y coordinate of the south-eastern most corner of the grid
Cell Width	The width and height of each cell
Columns	Number of columns in the grid
Rows	Number of rows in the grid
E Moran Index	The value calculated for that grid in Euclidean
S Moran Index	The value calculated for that grid in Suppremmum
M Moran Index	The value calculated for that grid in Manhattan
Weight	The weight formula used (currently only supports the weight based on the area, will add a couple more weight options)

Currently the data is printed to a plain text file in the format:

Setting Name: Setting value

I plan to change this to an XML-like format that way the data is easier to read and work with.

The amount of data that can be processed depends on how many cells you have in each grid. If the cells are too small, out of memory errors do occur. A possible solution to this is to create a temporary file to store the data in while it is being processed. This will allow the program to work with more data, however it will compromise performance.

Work In Progress

Graphical User Interface

The following are features that will be added to the GUI.

- Graphic visualization of the data
- Ability to select grid corners by clicking on screen
- View settings and results in organized format

Other Features

In addition to the GUI, I plan to allow the user to enter a range of corner points, and cell lengths. The program will then sequentially calculate Moran's index using each of the settings in the range. It will then record the results of all of these trials and create a graph displaying the results.