**Question**

**1. Describe in your own words how Moran’s I is calculated**

Moran's I value is equal to the value of the regression coefficient (slope) with one independent variable and one dependent variable. In Lap, the independent variable is the (observation) value of the variable in each State I selected, and the dependent variable, lagged value, is the average of (observation) value of neighbors with applied SWM.

**2. Describe in your own words: what is a spatially-lagged variable?**

It means that the value of the variable has been passed(moved or influenced) from/to the adjacent regions(neighbors). In Lap, it is the weighted average of the neighbor States’ values for that variable.

**3. How does your analysis in this lab (as simple as it is) differ by how you have formalized W (e.g., space, neighbors) in two different methods? How might it affect analysis?**

We applied contiguity-based (Queen) and Inverse Distance Weighting methods to formalize neighbors' weighting in this lab. In the former case, if counties are in contact with each other, they become neighbors, and the weights of the neighbors chosen in this way are formalized equally. However, since the inverse distance weighting method chooses the neighbors based on distance to the center of the neighboring counties and formalize the weights based on the inverse distance, the farther the distance is, the less the weight (influence) is. In my lab, the *p*-value and Moran's I value for the two methods were similar, but if it is applied inappropriate distance to the center of the neighboring polygon, the number of neighbors chosen, and weights formalized may be different. This may lead to completely different results than expected. Therefore, it may be important to apply distances in consideration of various factors (road network, transportation system, population, etc.).

**4. What does it mean if an observation falls in the “H-L” quadrant? Why might it be useful to detect such occurances?**

An observation falling in the “H-L” quadrant means that the area(region), having high observation values though, is surrounded by region(s) with low observation value. The table below shows the counties included in my Lab sorted by *p*-value and quadrant.

(453 counties)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| p-value | Below 0.01 | 0.01-0.05 | 0.05-0.10 | 0.10-0.50 | Above 0.50 |
| L-L | 23 | 23 | 17 | 85 | 45 |
| L-H | 4 | 3 | 2 | 17 | 19 |
| H-L | - | 1 | 2 | 27 | 24 |
| H-H | 31 | 27 | 10 | 61 | 32 |

The “H-L” quadrant is a spatial area where observation value appears high, dissimilar to the surroundings observed low. Based on my Lab, the *p*-values are relatively high, which is not statistically significant. Therefore, depending on whether the observation is a negative or positive phenomenon, when taking preventive and development measures, it is useful to detect such occurances because it can be areas or regions where effective results can be achieved with the same efforts.