Assignment 3

Clustering

Dr. Adams

Introduction

The third and final assignment in our course is different from assignment one or two. In assignment three, you are provided with a geojson that contains Ecodistricts with a number of environmental and hydrological variables, and you are required to determine the approach to address the following research question. The format of the assignment is a report.

Research Question

Identify 3 spatially-contiguous clusters of Ecodistricts in the St. Lawrence River Basin. The purpose of this work is to identify Ecodistrict clusters based on environmental and hydrological conditions that are associated with stream flow. This analysis is being conducted to identify three clusters that will each receive a new water flow gauge in one of their rivers.

Learning Objectives

- Problem Solving
- Critical Thinking
- Reading and Interpretation
- Data Management
- Research Design
- Professional Writing

Report Requirements

The report must include the following sections:

1. Methodology (300 words)
2. Results (500 words)
    - Plus necessary figures and tables.
3. Appendix A - R Code

The report must address the following points:

1. The final three regions must be contiguous.
    - Spatially constrained clustering should be applied.
2. You must select 6 variables from the dataset to use in your analysis.
    - The variable choice must be justified (Methodology Section)
        - Pay attention to correlations.
3. The report should detail if the three clusters are the same without a contiguity constraint.
    - A table is very useful to demonstrate the difference.
4. A map of the regions, which indicates the three clusters.
5. Provide x,y coordinates for the spatial centre of each cluster.
    - Include these locations on the map.

Details on the data, including the description of variables is provided in:

Adams, M. D., Kanaroglou, P. S., & Coulibaly, P. (2016). Spatially constrained clustering of ecological units to facilitate the design of integrated water monitoring networks in the St. Lawrence Basin. *International Journal of Geographical Information Science*, 30(2), 390-404.

Marking Key

The assignment is graded out of 10. The grading is based on the report being used in a professional setting. Completion of all the requirements receives a grade of 7.5 / 10. Achieving a grade above a 7.5 would require an additional figure, table or section that provides insight into the research question.

- 10: Above and beyond the objective of the project and provided multiple examples of exceptional value added information that highlights additional insight about the topic.
- 9: Above and beyond the objective of the project and provided exceptional value added information that highlights the topic.
- 8: All the necessary information that is *easily* understood and includes all the necessary components.
- 7: Basic completion of all the requirements.
- 6: Completion of most requirements.
- 5: Completion of many requirements.
- 4: Completion of few requirements.
- 3 or lower: Incomplete