**Lab Report**

Title: Lab 0

Notice: Dr. Bryan Runck

Author: Mohsen Ahmadkhani

Date: 9/20/2021

**Project Repository:**[*https://github.com/mohsen-gis/GIS5571.git*](https://github.com/mohsen-gis/GIS5571.git)

**Google Drive Link:** *<if applicable with data, notebooks, etc.>*

**Time Spent:** *<report to the nearest quarter hour>*

**Abstract**

*250 words max. Clearly summarize the following major sections. Each gets one or two sentences.*

**Problem Statement**

*The St. Paul department of transportation wants to know which building blocks are within the 10 m vicinity of each street in the city. So, they can run a road expansion project accordingly. To perform this spatial analysis we want to experiment, compare and contrast three different products of ESRI namely ArcPy, ArcGIS Pro, and ArcGIS Online.*

*Table 1. The list of required data sets for the proposed study.*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **#** | **Requirement** | **Defined As** | **(Spatial) Data** | **Attribute Data** | **Dataset** | **Preparation** |
| 1 | Foot traffic | Human mobility data by SafeGraph | Location fixes per person | Timestamp | SafeGraph |  |
| 2 | COVID-19 data | The disease case counts (CSV) | - | counts, Fips, date | NY Times | Filter to Minnesota |
| 3 | US County borders | The US administrative boundaries at county level | County-level polygons | Name, Fips | United States Census Bureau | Crop to Minnesota |

**Input Data**

*Describe the data in two paragraphs max. Fill out the table.*

*Table 2. Input data description.*

|  |  |  |  |
| --- | --- | --- | --- |
| **#** | **Title** | **Purpose in Analysis** | **Link to Source** |
| 1 | Foot traffic | Raw input dataset for the mobility analysis in Minnesota | [SafeGraph Smartphone GPS data](https://www.safegraph.com/academics) |
| 2 | COVID-19 data | Raw COVID-19 data from NYTimes Repo for spatial epidemiology research | [NY Times COVID-19 repo](https://github.com/nytimes/covid-19-data) |
| 3 | US County borders | US county-level polygon data to georeference the COVID data and perform spatial analysis | [US counties](https://www.census.gov/geographies/mapping-files/time-series/geo/carto-boundary-file.html) |

**Methods**

*Include a data flow diagram or screenshot from model builder. Do references in line (Rammankutty, 2033). Document any and all steps that you did to the input data in the data flow diagram. Provide natural language description of the most important steps, giving a narrative arc and provide well formatting screenshots with a boarder and centered throughout.*

*Resources on Data Flow Diagrams:*

* [*https://www.visual-paradigm.com/tutorials/data-flow-diagram-dfd.jsp*](https://www.visual-paradigm.com/tutorials/data-flow-diagram-dfd.jsp)
* [*https://www.lucidchart.com/pages/data-flow-diagram/how-to-make-a-dfd*](https://www.lucidchart.com/pages/data-flow-diagram/how-to-make-a-dfd)

*Figure 1. Data flow diagram.*

*If appropriate, add in pseudo-code describing model algorithms and/or objects. If using mathematical equations, create a clear mapping between the reference equation, pseudo-code, and actual implementation in a programming language.*

**Results**

*Show the results in figures and maps. Describe how they address the problem statement.*

*Follow best practice for map design, coloring, etc.*

**Results Verification**

*How do you know your results are correct? This can be a qualitative or quantitative verification.*

**Discussion and Conclusion**

*What did you learn? How does it relate to the main problem?*

***GitHub***

*I was already familiar with GitHub from a few previous projects. However, it’d been a while since I used the git commands to put my files in a repository. In the process, it worked well when I used git clone, git pull, and git add ., however, it failed when I tried to git push. It was facing an authentication failure as a fatal error. After reading the Git documentation [1], I learned that the authentication policies have been changed since August 13th, 2021. In the sense that I no longer was able to access my repositories using my regular password. Instead, I generated a token and used it for git operations (i.e., git push and git commit).*

**References**

1. Matthew Langlois, *Token authentication requirements for Git operations* [accessed on September 21, 2021] <https://github.blog/2020-12-15-token-authentication-requirements-for-git-operations/>

**Self-score**

*Fill out this rubric for yourself and include it in your lab report. The same rubric will be used to generate a grade in proportion to the points assigned in the syllabus to the assignment.*

|  |  |  |  |
| --- | --- | --- | --- |
| **Category** | **Description** | **Points Possible** | **Score** |
| **Structural Elements** | All elements of a lab report are included **(2 points each)**:  Title, Notice: Dr. Bryan Runck, Author, Project Repository, Date, Abstract, Problem Statement, Input Data w/ tables, Methods w/ Data, Flow Diagrams, Results, Results Verification, Discussion and Conclusion, References in common format, Self-score | 28 |  |
| **Clarity of Content** | Each element above is executed at a professional level so that someone can understand the goal, data, methods, results, and their validity and implications in a 5 minute reading at a cursory-level, and in a 30 minute meeting at a deep level **(12 points)**. There is a clear connection from data to results to discussion and conclusion **(12 points)**. | 24 |  |
| **Reproducibility** | Results are completely reproducible by someone with basic GIS training. There is no ambiguity in data flow or rationale for data operations. Every step is documented and justified. | 28 |  |
| **Verification** | Results are correct in that they have been verified in comparison to some standard. The standard is clearly stated **(10 points)**, the method of comparison is clearly stated **(5 points)**, and the result of verification is clearly stated **(5 points)**. | 20 |  |
|  |  | 100 |  |