Lab Report

Title: Lab 0
Notice: Dr. Bryan Runck
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Project Repository: https://github.com/YaxuanSeanZhang/MGIS_ARCGIS
Google Drive Link:
Time Spent: 8 hrs

Abstract
This lab compares three different tools in the Esri ecosystem by doing the same buffer activity. The steps are described in the Method part and the comparison is discussed.

Problem Statement

The Esri ecosystem has many different ways to access the same underlying functionality. This lab needs to create buffer for a road network by using three different tools: ArcPro, Jupyter Notebooks in ArcPro, and Jupyter Notebooks in ArcOnline. By doing this, we can compare and contrast different tools in the Esri ecosystem.

Input Data

This historic dataset represents road centerlines for all public roads within the state of Minnesota as of 2012[1].

Table 1. Input Data

#	Title	Purpose in Analysis	Link to Source
1	Minnesota Roads	Raw input dataset for routing analysis from MNDOT	Mn Geospatial Commons

Methods

- **ArcPro**
  1. Download shapefile data from the website;
  2. Open ArcPro and create a new Map project;
  3. Go to Map tab, click Add Data and add road shapefile
  4. Go to Analysis -> Tools -> Analysis Tools -> Buffer, and perform buffer analysis, set distance as 1 kilometer

- **Jupyter Notebooks in ArcPro**
  1. Open ArcPro and create a new project;
  2. Go to Insert -> New Notebook to create a new Jupyter Notebook
  3. Write code and perform buffer analysis (python code is in the lab0 repo)

- **Jupyter Notebooks in ArcOnline**
  1. Sign in ArcOnline
  2. Go to Notebook tab and click New Notebook -> Standard
  3. Write code and perform buffer analysis (need GIS package instead of arcpy)

Results

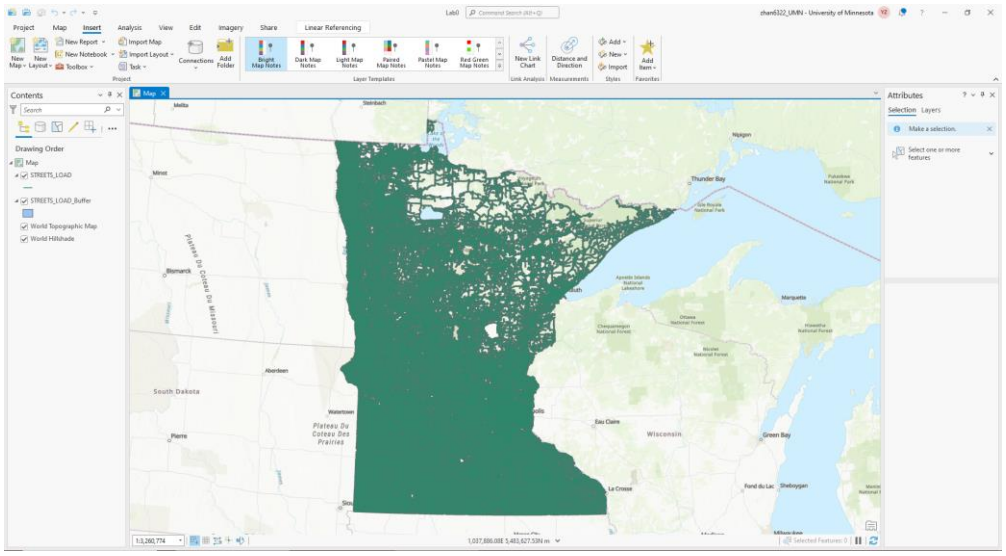
ArcPro GUI is simpler since you only need to click the button and the interface is very straightforward. It is also good for data visualization (zoom-in & zoom-out)

Jupyter Notebooks in ArcPro and Jupyter Notebooks in ArcOnline are similar. Basically, you write Python code and use the arcpy/gis package to perform buffer analysis. The nice thing is you can download data via api/url so you don't have to manually download data from the website

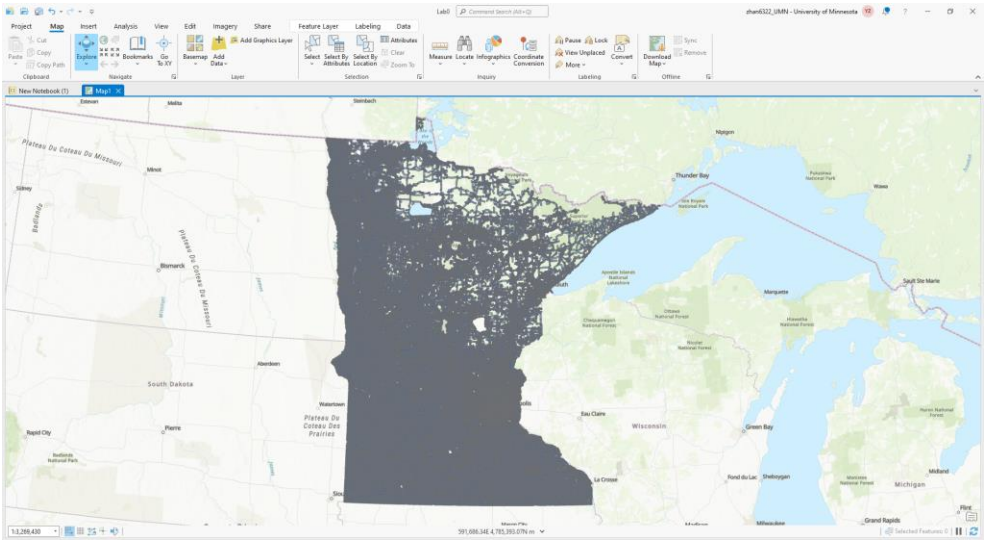
Results Verification

The buffer results are:

- **ArcPro**



- **Jupyter Notebooks in ArcPro**



- **Jupyter Notebooks in ArcOnline**

The results are the same since we set the same parameter when we do the buffer analysis (1 km)

Discussion and Conclusion

- **GitHub:**
  In lab 0, I learned how to use git bash. In this way, I can create folders and upload codes on my local computer and just push the change I made to GitHub. Git bash makes it easier to manage my GitHub repo.

  It took me a while to get to know git bash. After watching the tutorial video, it went pretty well.

- **ArcPro, Jupyter Notebooks, and ArcOnline**
  I am pretty familiar with ArcPro. I also did Arc II last semester but it took me some time to pick up Jupyter Notebook in ArcPro.

References

[1] Minnesota Department of Transportation (MnDOT). "Minnesota Transportation Roads (MnDOT) - Trans_Roads_MnDOT_TIS." Minnesota Geospatial Commons. [URL: https://gisdata.mn.gov/dataset/trans-roads-mndot-tis].

Self-score

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	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	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	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	20
		100	100