Lab Report

Title: Lab 0
Notice: Dr. Bryan Runck
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Date: 9/9/2023

Project Repository: https://github.com/TzuYuMa/GIS5571.git
Google Drive Link: no
Time Spent: 10 hours (not including Esri training)

Abstract

Section 1: Github.com
Get more familiar with Github by the tutorial (https://docs.github.com/get-started).
Section 2: ArcPro, Jupyter Notebooks, and ArcOnline
Using three tools to buffer the road network dataset.

Problem Statement

The Esri ecosystem has many ways to access the same underlying functionality. Your objective is to compare and contrast performing the same simple activity - buffer a network dataset - using three different tools: ArcPro, Jupyter Notebooks in ArcPro, and Jupyter Notebooks in ArcOnline.

Table 1. <Data Info>

#	Requirement	Defined As	(Spatial) Data	Attribute Data	Dataset	Preparation
1	Road network	The data collected by MnDOT	Road geometry		Mn GeoSpatial Commons	

Input Data

Roads, Minnesota, 2012 data was from the Transportation Department at Minnesota GeoSpatial Commons. This data includes Interstate, US Highway, Minnesota Highway, County State Aid Highway, County Road, Township Road, etc.

Table 2. <Data source>

#	Title	Purpose in Analysis	Link to Source
1	Minnesota Roads	The data represent the route network as reported to MnDOT following the construction season ending in 2012.	Mn GeoSpatial Commons

Methods

ArcPro

input the dataset into ArcPro, open the Geoprocessing tool, select Buffer, and fill out the required table, then run the tool.

Jupyter Notebooks in ArcPro
Open the Notebooks in ArcPro, insert the code, then run the Notebook.

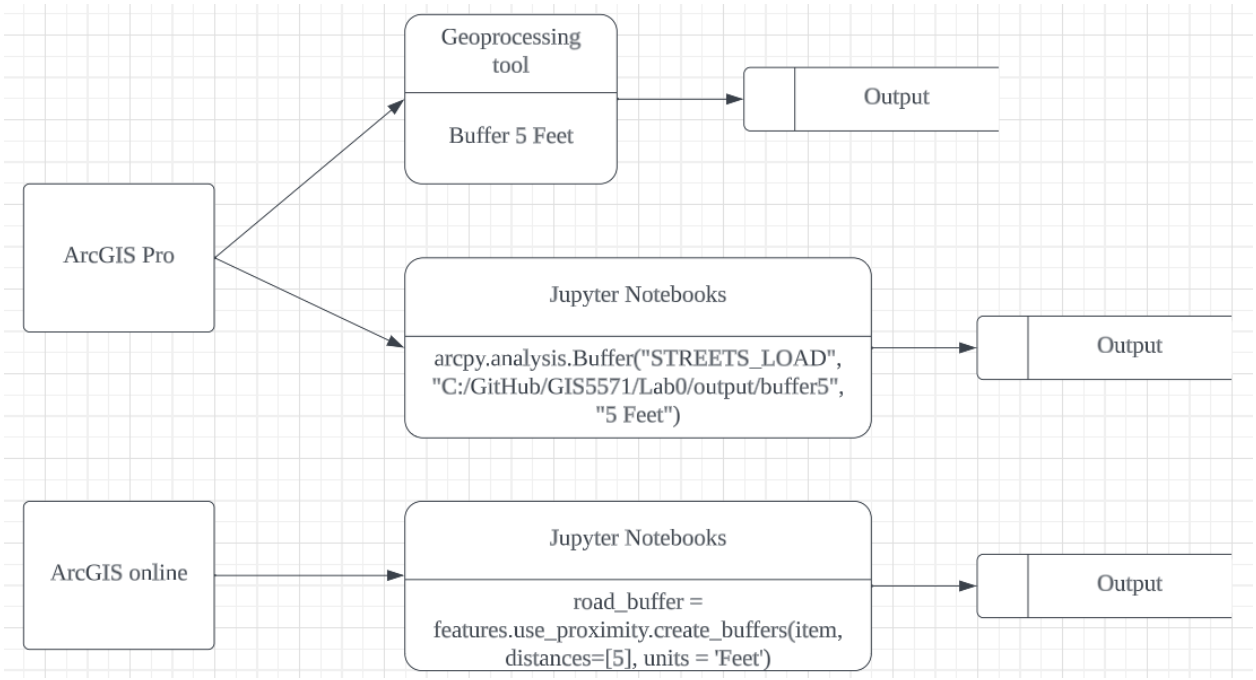
```
import arcpy

arcpy.env.workspace = "C:/GitHub/GIS5571/Lab0/shp_trans_roads_mndot_tis"
arcpy.analysis.Buffer("STREETS_LOAD", "C:/GitHub/GIS5571/Lab0/output/buffer5", "5
Feet")
```

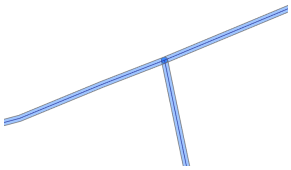
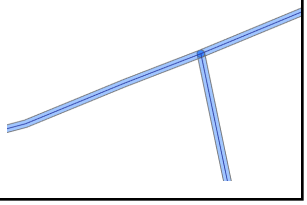
Jupyter Notebooks in ArcOnline
Upload the dataset (ZIP file) to ArcOnline. Open Notebook, insert the code below, then run.

```
# Item Added From Toolbar
# Title: shp_trans_roads_mndot_tis0910 | Type: Feature Service | Owner:
ma000551_UMN
item = gis.content.get("845cf6334e6c442bb11ee23cc1dec8c7")
item

from arcgis import features
road_buffer = features.use_proximity.create_buffers(item, distances=[5], units = 'Feet')
```



Results

	speed	required skills	result
ArcPro	fastest	no	
Jupyter Notebooks in ArcPro	medium	Python	

Jupyter Notebooks in ArcOnline	lowest	Python	

Results Verification
I used Cross-Validation to verify my results. Since I used the same data in three ways - ArcPro tool, Jupyter Notebooks in ArcPro, and Jupyter Notebooks in ArcOnline, they all came out with the same results.

Discussion and Conclusion
Section 1: GitHub
Since last semester, I had a course that also utilized GitHub. Setting up the GitHub account went smoothly; however, I had never used Git Bash before. It took me a while to figure out how to open it and follow the tutorial to type the code inside.

Section 2: ArcPro, Jupyter Notebooks, and ArcOnline
In this section, I found that working with ArcPro was a smoother experience for me due to my familiarity with it. However, when I switched to Notebooks in ArcOnline, I encountered an error message that read, "Failed to publish analysis results as a feature collection because one of the output layers contains more than 9999 features. To retain all features, it's necessary to save your results as a feature layer." Consequently, I invested additional time in troubleshooting this error. I subsequently edited the dataset to ensure that the number of features was below the 9999 limit.

References
No

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	24	24

	connection from data to results to discussion and conclusion **(12 points)**.		
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