Lab Report

Title: Lab 0 – Comparing and Contrasting Workflows Across the Esri Ecosystem
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Project Repository: *https://github.com/cart0588/GIS5571*
Google Drive Link: *https://drive.google.com/drive/folders/1bWGp9N-2fsK5o_oWevz1wAkuZS1dK_gj?usp=sharing*
Time Spent: *6.25 hours*

Abstract

This lab report will explore the ways in which different aspects of the Esri system allow you to perform the same simple activity: buffering a network dataset. Using a road centerline shapefile, showing all roads in Aitkin County, Minnesota and acquired from the Minnesota Geospatial Commons, the buffer capability in ArcGIS Pro and in Notebooks in ArcGIS Pro and ArcGIS Online will be compared and contrasted.

These three softwares have largely similar processes, but different interfaces and packages available. For example, while Notebooks in ArcGIS Pro allow for the use of arcpy, only Advanced notebooks in ArcGIS Online offer the same functionality.

This report will demonstrate three separate workflows that result in the same result; producing a 200m buffer around the aforementioned road centerline dataset. Discussion will follow, addressing complications, frustrations, and aspirations for the upcoming semester.

Problem Statement

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

I'll be aiming to create a 200m buffer around a shapefile of road centerlines in Aitkin County, Minnesota in ArcPro and with a Jupyter Notebook in ArcPro and ArcOnline.

Input Data

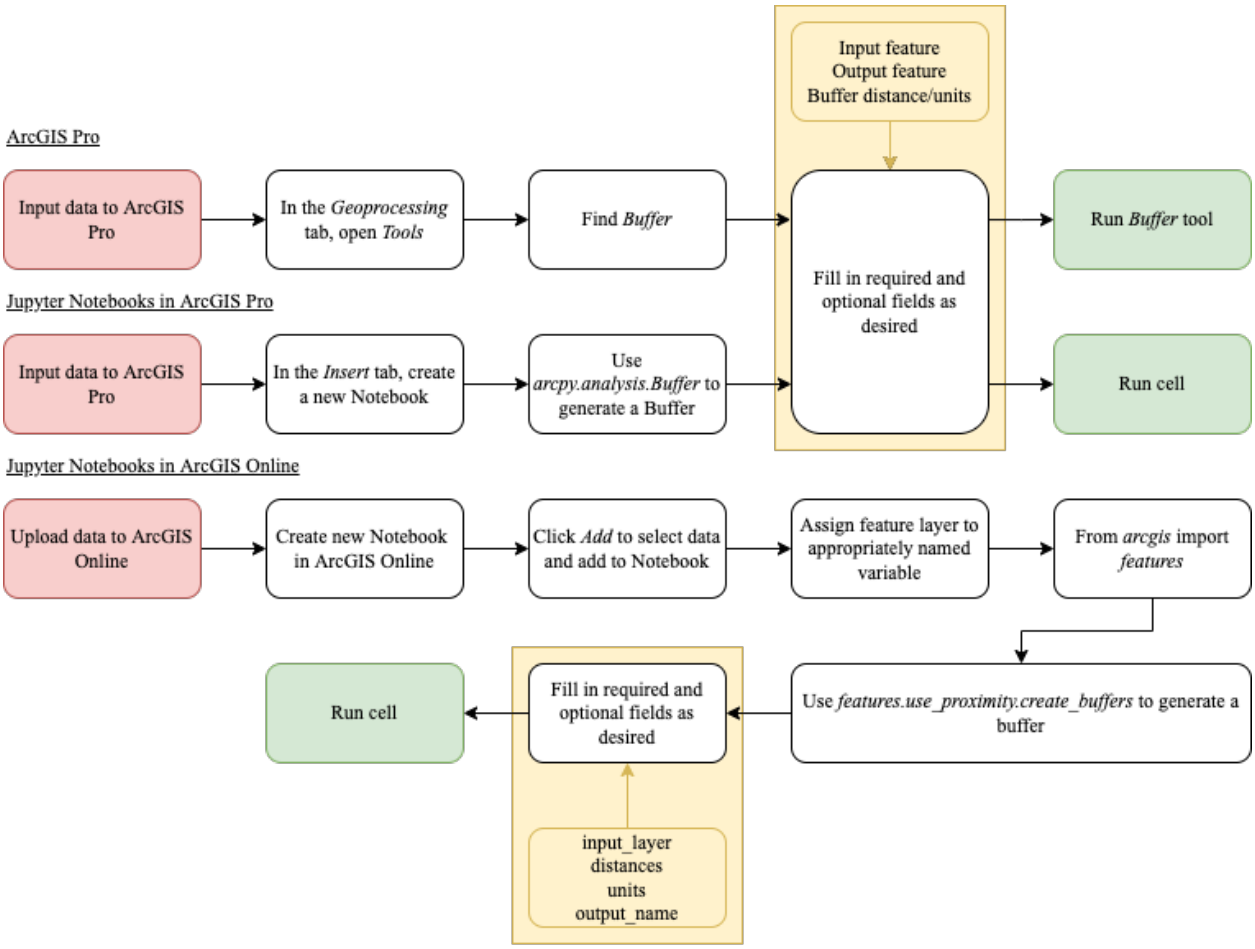
Shapefile of road centerlines in Aitkin County, Minnesota, mapped for Enhanced 911 purposes.

Table 2. Data Sources used for Lab 0

#	Title	Purpose in Analysis	Link to Source
1	Road Centerlines, Aitkin County, Minnesota	Raw input dataset from which buffers will be generated (shapefile)	Minnesota Geospatial Commons

Methods

Where **red** boxes indicate data input, **yellow** boxes indicate variable selection for the buffer, and **green** boxes indicate output.



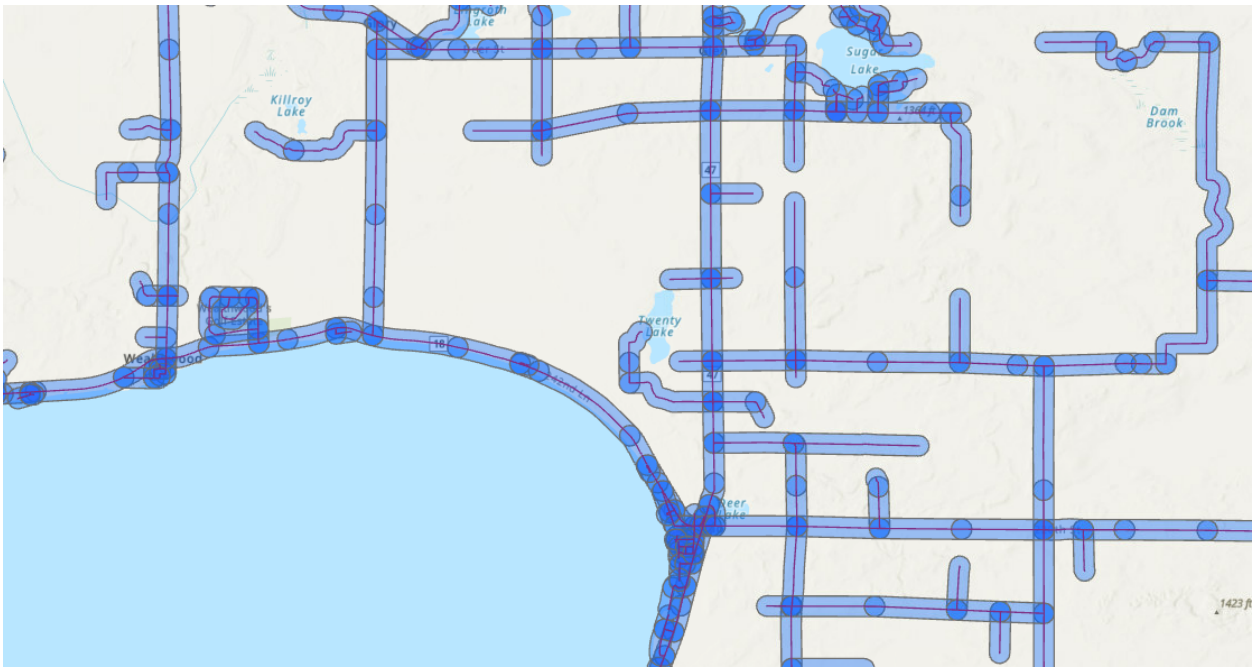
Code

System	Code
Notebooks in ArcPro	`arcpy.analysis.Buffer("rcl", "rcl_Buffer_NotebooksPro", "200 Meters")`
Notebooks in ArcOnline	`features.use_proximity.create_buffers(input_layer = rcl, distances =[200], units = 'Meters', output_name = 'rcl_Buffer_NotebooksOnline')`

Results

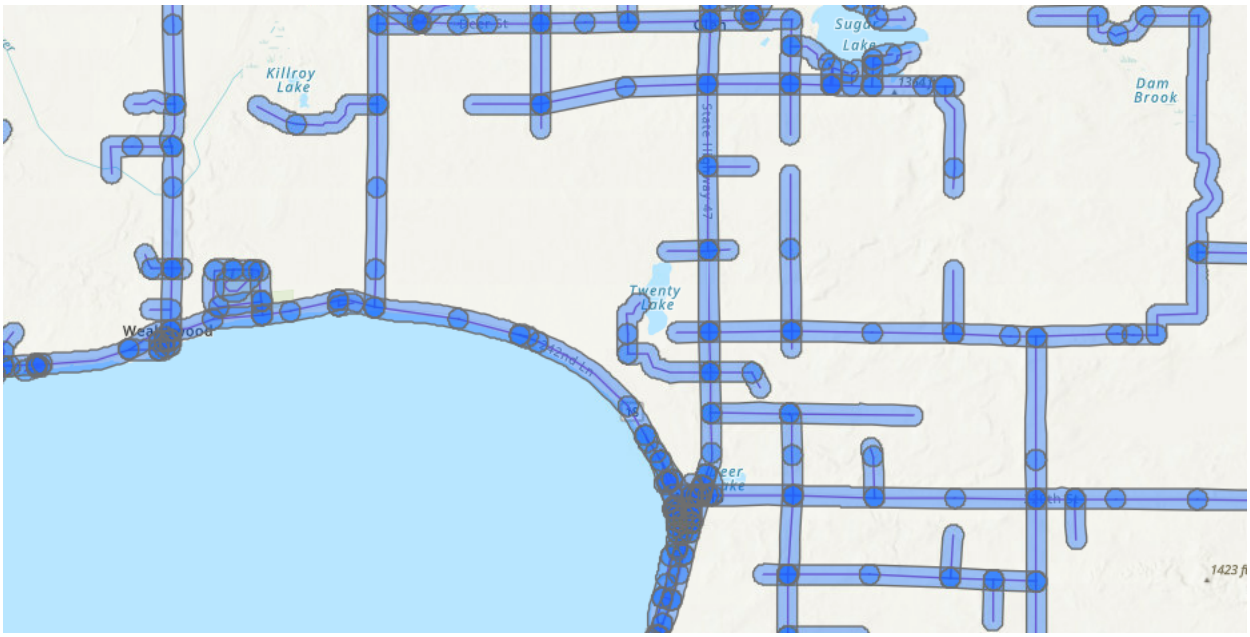
ArcGIS Pro

Viewable at: https://drive.google.com/drive/folders/1FY5N6itX3Ai3_oFOllOHB91gS8fYIKde?usp=sharing



Notebooks in ArcGIS Pro
Viewable at: https://drive.google.com/drive/folders/1FY5N6itX3Ai3_oFOllOHB91gS8fYIKde?usp=sharing

Notebooks in ArcGIS Online
Viewable at: https://arcg.is/18jbn2



Results Verification

All three processes produced the same output, which can be visually confirmed as correct (please note, screenshots from maps have different scales).

Discussion and Conclusion

GitHub

GitHub is a platform that I have only used very briefly in the past, and never in enough depth to feel comfortable. I appreciate the 'branch' system, allowing for iterative and collaborative work that improves on prior products or builds.

The hardest part of the GitHub section of this Lab was learning how to clone a repo onto my local machine. I ended up downloading GitHub Desktop to allow for easier interfacing and kind of 'brute forced' my way through the process to see what worked and what didn't. I'm looking forward to using GitHub more and gaining more confidence with it, so that I no longer have to rely on a crude, exploratory, trial-and-error approach to uploading Word documents!

ArcGIS Pro

This was the easy bit! ArcGIS is a software that I am comfortable using, especially for basic tasks like creating a buffer.

Jupyter Notebooks in ArcGIS Pro

After some initial frustrations with this, and some more 'brute forcing' my way through the task, I realized I was actually over-complicating things! The integration of Notebooks into ArcPro seems like a super useful feature that I didn't even know existed, let alone have any experience with. After my initial poke around in the interface though, one line of code later and I had a new feature class created, identical to the one that took about many more button presses using the Geoprocessing tab. I can't wait to see what else is possible with Notebooks in ArcPro.

Jupyter Notebooks in ArcGIS Online

This is the method with which I struggled the most; partly because the workflows and interfaces used in ArcGIS Online are the least familiar to me, but also because the *arcgis.features* package seemed less intuitive to me than the *arcpy.analysis*. Whenever I try to use ArcOnline I always end up frustrated, although I do see the potential benefits when working collaboratively and in the sense that it's a 'simpler' interface.

I discovered that you can use *arcpy* in Online, but only in an 'Advanced' workbook, which seems like an arbitrary limitation to me. I'd be interested to know the reasons behind that; technical, licensing, other? I guess my frustrations with the Notebooks in ArcOnline compared to ArcPro are less about the Notebooks and more about the fact that I just like ArcPro and dislike ArcOnline, but I'm looking forward to getting more experience with ArcOnline and hopefully getting over my initial hesitations towards it.

References

Road Centerlines, Aitkin County, Minnesota - Minnesota Geospatial Commons. (2022). Retrieved 21 September 2022, from https://gisdata.mn.gov/dataset/us-mn-co-aitkin-trans-road-centerlines

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	**10**
		100	**100**