Lab 0 Report

Title: Comparison of three different environments with performing the same analysis
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Author: Liang-Ting Chen
Date: Feb 3, 2021

Project Repository:

https://github.com/chen6761/GIS5571.git

Abstract

In the lab, I will do the same analysis in three different environments, ArcPro, Jupyter Notebooks in ArcPro, and Jupyter Notebooks in ArcOnline to discuss the difference between them. Each environment has its advantage in the analysis.

Problem Statement

There are many methods to do the same analysis via Esri software. I will buffer the road network through ArcPro, Jupyter Notebooks in ArcPro, and Jupyter Notebooks in ArcOnline to compare the difference between. I think the result might be the same, however, the convenience and efficiency of operation might be different.

Table 1. The requirement data

#	Requirement	Defined As	Spatial Data	Attribute Data	Dataset	Preparation
1	Road network	Raw input dataset	Road geometry		MNGeo	

Input Data

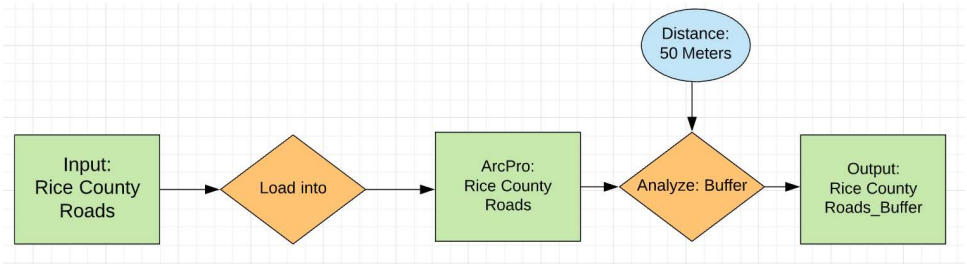
In the lab, I choose the road network in Rice County to present the buffer analysis.

Table 2. The input data

#	Title	Purpose in Analysis	Link to Source
1	Rice County Roads	Execute the buffer analysis	MNGeo

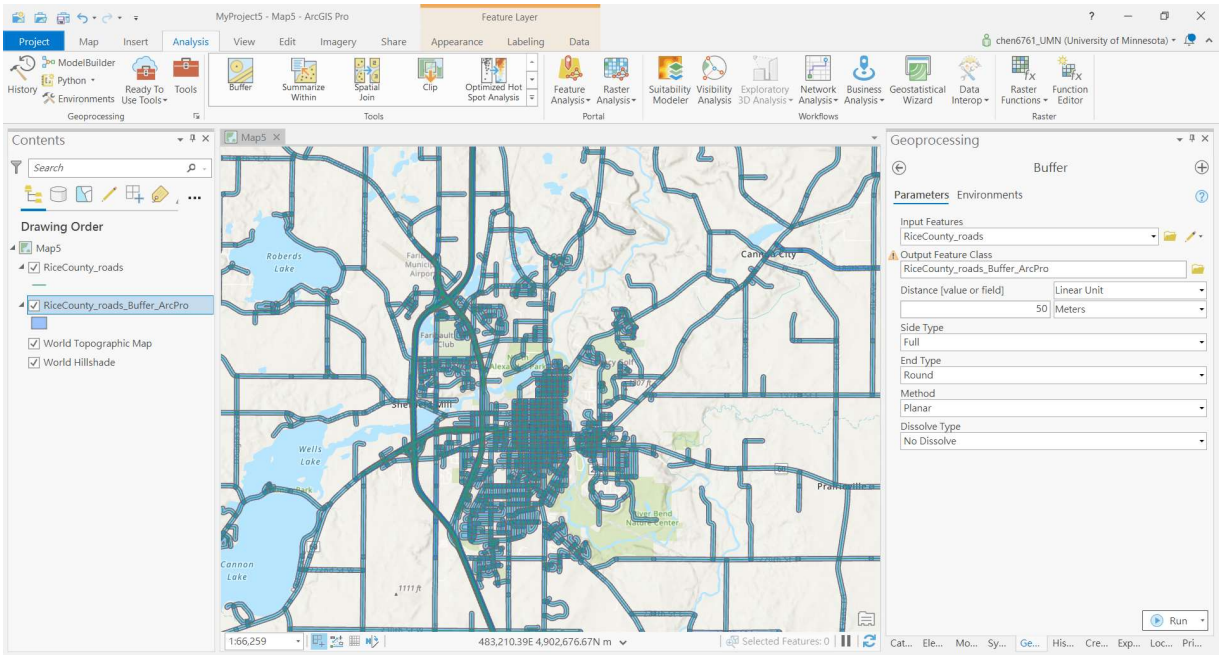
Methods

ArcPro

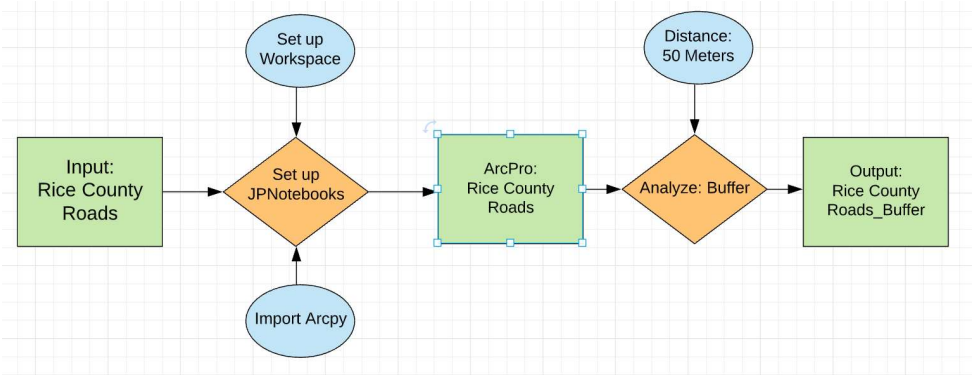


1. Load the Rice County Roads dataset by adding the new folder connection.

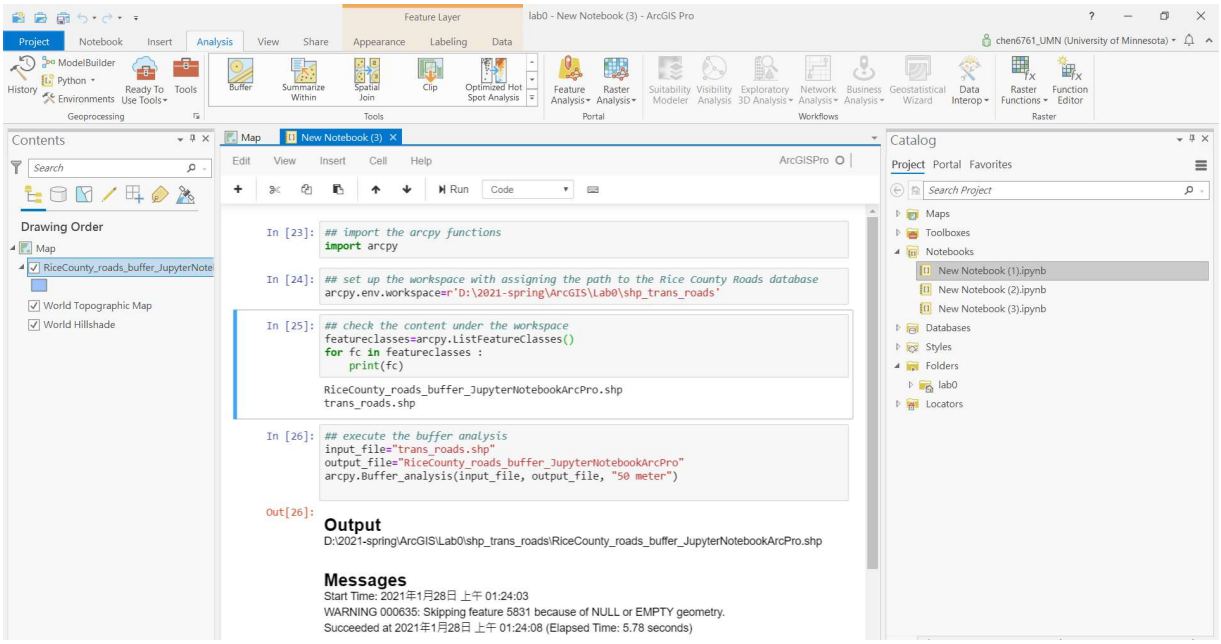
2. Execute the buffer under the analysis tab by entering the parameters.

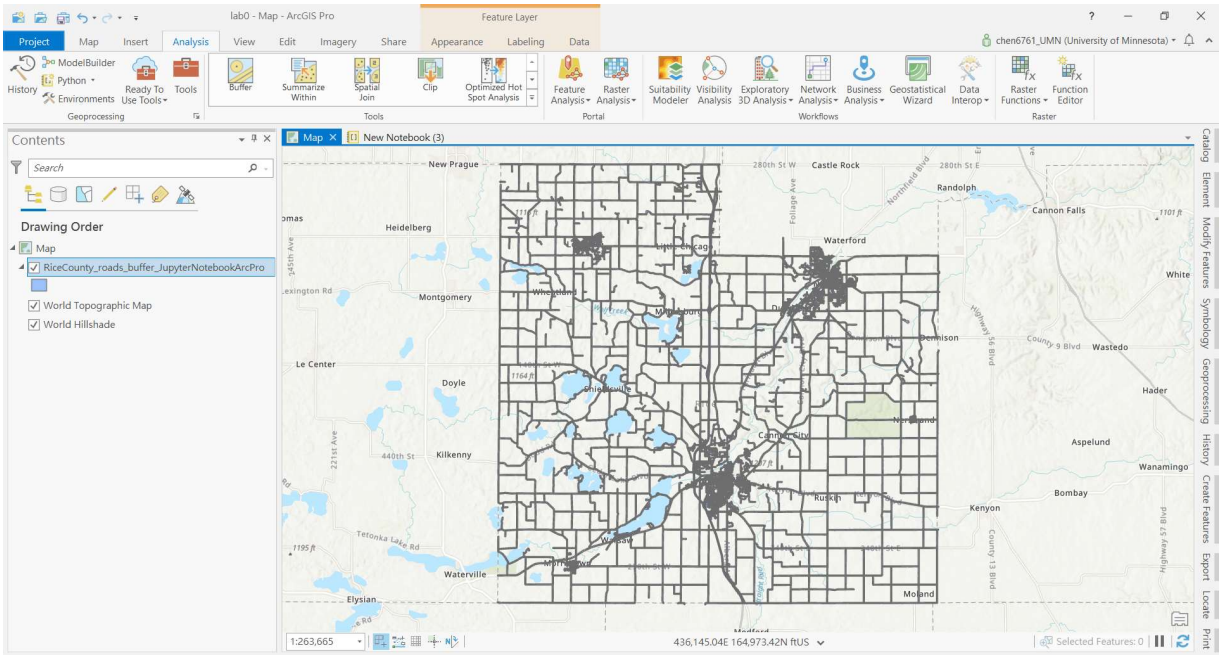


Jupyter Notebooks in ArcPro

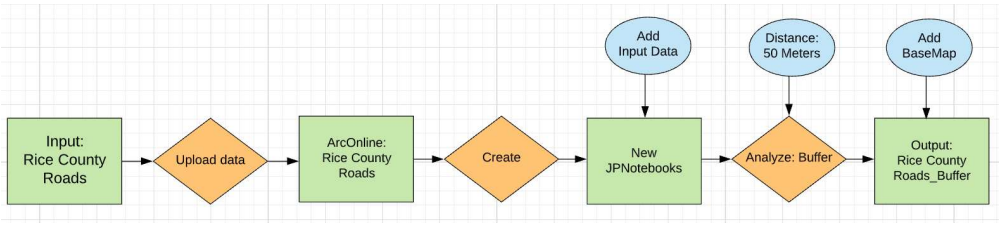


1. Import arcpy functions
2. Set up workspace
3. Execute the buffer analysis (*Buffer (Analysis)—ArcGIS Pro | Documentation*, 2020)

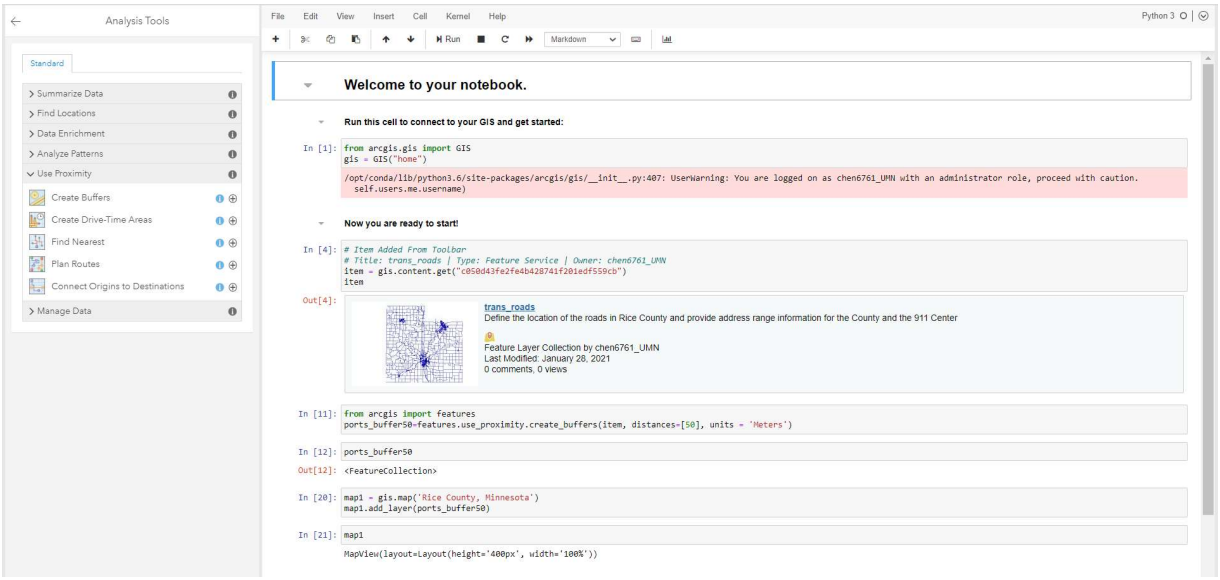


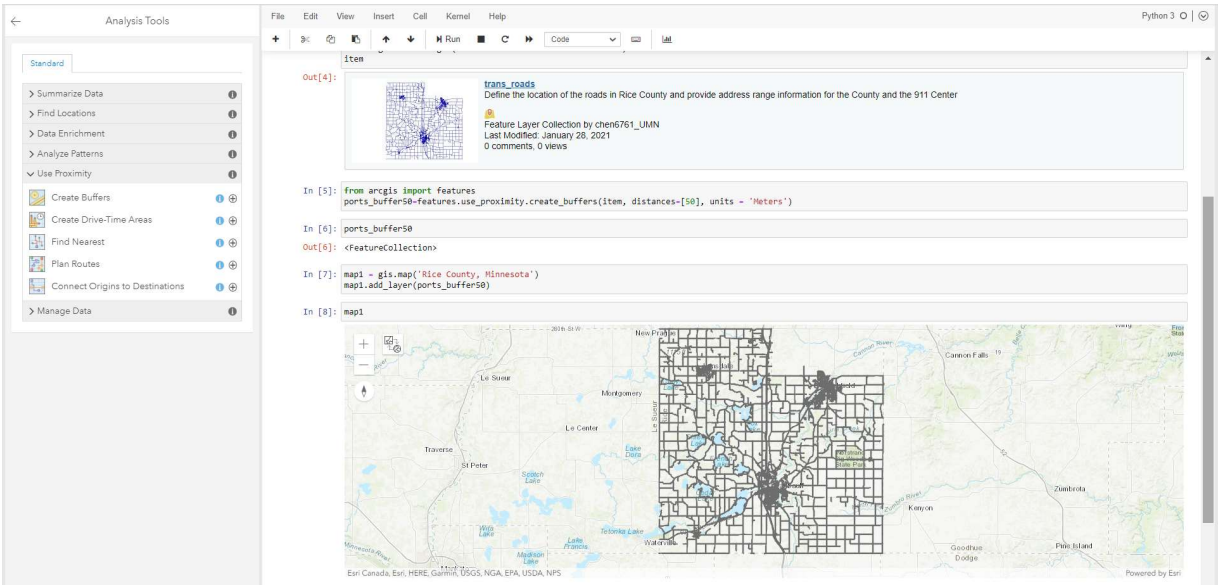


Jupyter Notebooks in ArcOnline



1. Upload the dataset to my ArcOnline content
2. Open a new notebook
3. Add the item from the left side menu
4. Add the buffer analysis from the left side menu
5. Set the parameter and execute (*Proximity Analysis | ArcGIS for Developers*, 2020)


Analysis Tools
Standard
Summarize Data
Find Locations
Data Enrichment
Analyze Patterns
Use Proximity
Create Buffers
Create Drive-Time Areas
Find Nearest
Plan Routes
Connect Origins to Destinations
Manage Data
File Edit View Insert Cell Kernel Help
Python 3
Run
Markdown
Welcome to your notebook.
Run this cell to connect to your GIS and get started:
In [1]: from arcgis.gis import GIS
gis = GIS("home")
/opt/conda/lib/python3.6/site-packages/arcgis/gis/__init__.py:407: UserWarning: You are logged on as chen6761_UMN with an administrator role, proceed with caution.
self.users.me.username)
Now you are ready to start!
In [4]: # Item Added From Toolbar
# Title: trans_roads | Type: Feature Service | Owner: chen6761_UMN
item = gis.content.get("c050d43fe2fe4b428741f201edf559cb")
item
Out[4]:
trans_roads
Define the location of the roads in Rice County and provide address range information for the County and the 911 Center
Feature Layer Collection by chen6761_UMN
Last Modified: January 28, 2021
0 comments, 0 views
In [11]: from arcgis import features
ports_buffer50=features.use_proximity.create_buffers(item, distances=[50], units = 'Meters')
In [12]: ports_buffer50
Out[12]: <FeatureCollection>
In [20]: map1 = gis.map('Rice County, Minnesota')
map1.add_layer(ports_buffer50)
In [21]: map1
MapView(layout=Layout(height='400px', width='100%'))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Code
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Out[4]:
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Last Modified: January 28, 2021
0 comments, 0 views
In [5]: from arcgis import features
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In [6]: ports_buffer50
Out[6]: <FeatureCollection>
In [7]: map1 = gis.map('Rice County, Minnesota')
map1.add_layer(ports_buffer50)
In [8]: map1
New Prague
Cannon Falls
Le Sueur
Montgomery
Le Center
Traverse
St Peter
Zumbrota
Kenyon
Waterville
Esri Canada, Esri, HERE, Garmin, USGS, NGA, EPA, USDA, NPS
Powered by Esri

Results

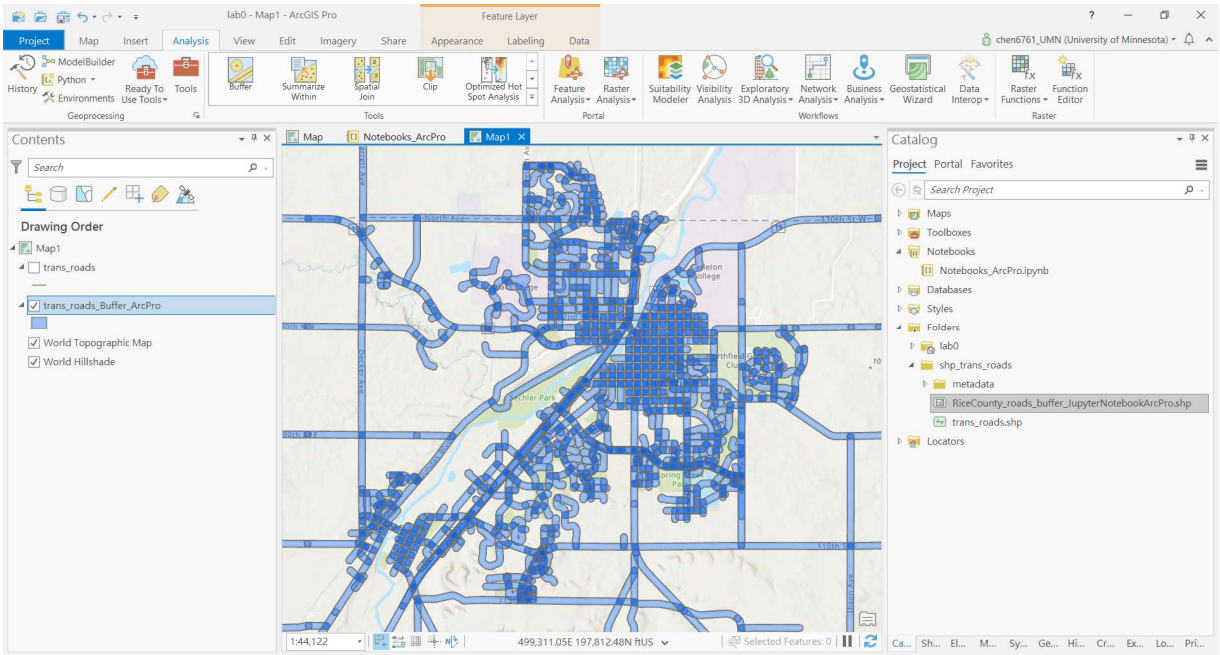
	Intuitive	Efficiency	Shareable	Less Preparation
ArcPro	1	2	2	2
JupyterNBArcPro	3	1		1
JupyterNBArcOnline	2	3	1	3

For the intuition, I think the ArcPro is the easiest to use because of its GUI interface. The Jupyter Notebooks in ArcPro is with the highest efficiency of analysis because it can finish all the work with coding. The Jupyter Notebooks in ArcOnline is the easiest one to share the result with others, however, it needs more preparation because users need to upload the dataset first.

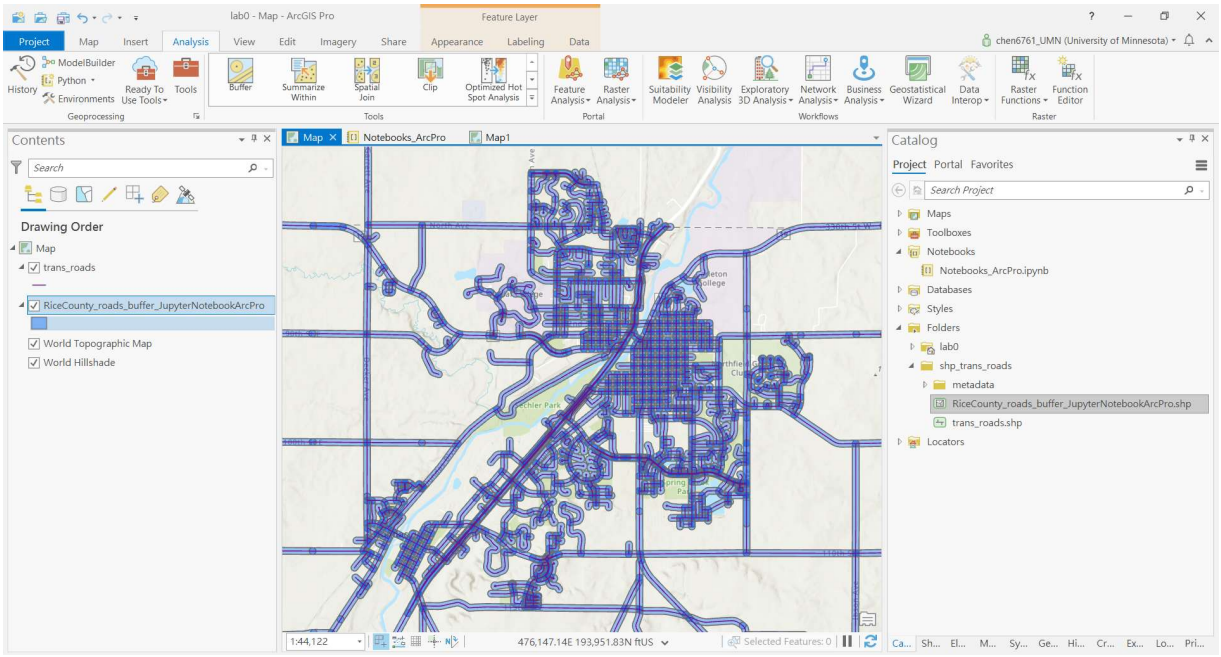
Results Verification

I set all the buffer analysis with the same parameter, 50 meters. So, I can check my result by examining them on the same kind of map.

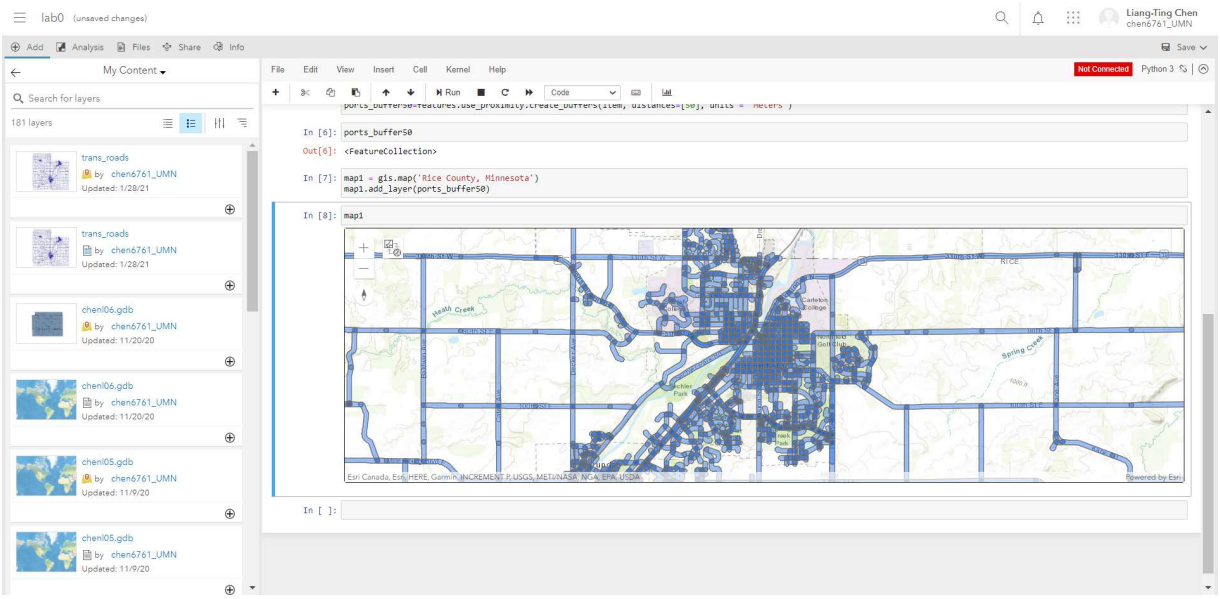
ArcPro



JupyterNotebook in ArcPro



JupyterNotebook in ArcOnline



Discussion and Conclusion

Section 1 – GitHub

It is a good chance for me to review how to work in GitHub. I did not meet problems in this section because I used GitHub to finish the project with my teammate last semester. We used the clone, add, commit, push, request, merge, and pull several times to make sure we did not overlap other's work by accident.

Section 2

I used the ArcPro and Jupyter Notebooks in ArcPro before, and it gave me a chance to review how to use these tools, including setting up the workspace, loading the target shapefile, and executing the analysis. However, it is my first time using Jupyter Notebooks in ArcOnline, but I am glad that I have this opportunity to learn it. I find this environment is between the original Jupyter Notebooks and ArcPro. It can add the codes by clicking the function in the menu, like the GUI interface, however, I need to set the parameters by entering the code, like I used to do in the Jupyter Notebooks. It is a quite new environment for me, but it is helpful for me to make some attributes analysis online.

Overall, I think the best thing for ArcPro is its GUI interface that I do not need to worry about any code error. The advance for the Jupyter Notebooks in ArcPro is that I can easily load the source with few codes and the speed of execution is faster if I am more familiar with the code. The Jupyter Notebooks in ArcOnline is the most convenient one to share my result with other.

References

Buffer (Analysis)—ArcGIS Pro | Documentation. (2020). Esri. https://pro.arcgis.com/en/pro-app/latest/tool-reference/analysis/buffer.htm

Proximity analysis | ArcGIS for Developers. (2020). Esri. https://developers.arcgis.com/python/guide/performing-proximity-analysis-on-feature-data/

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	22
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	26
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	96