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Geog 3050
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Link to code:
https://github.com/geog3050/camring/blob/master/FinalProject/FinalProject_fin.py,

Final Project

Goals

The overarching goal for this project is to write a program that can take two variables and compare the difference between them. Then produce a third map that exemplifies the comparison of the two variables. For this I am going to compare unemployment rates in 2010 to 2018 in Iowa to see if there was a significant noticeable change because of the Trade War between China and the United States at the time which was affecting the sale of various agricultural products, most noticeably soybeans.

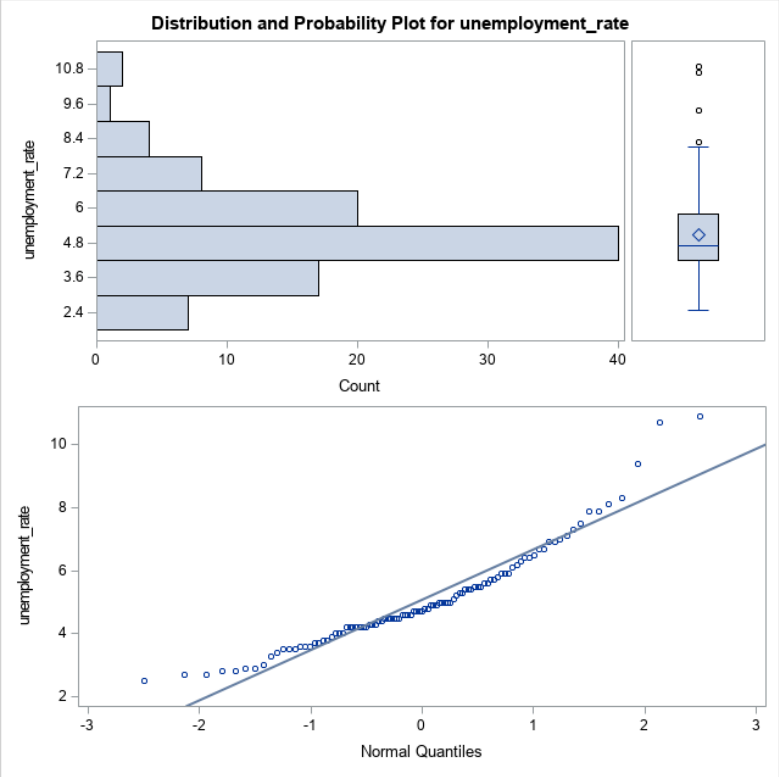
Specific Objectives and Questions

How did the 2018 trade war affect unemployment rates in Iowa? Is the unemployment rate disproportionate in rural communities in Iowa? How has the unemployment rate changed in Iowa from 2010-2016, and where do these changes exist?

Data Collection and Descriptive Statistics

I had initially hypothesized that the unemployment rate would be higher in Iowa in 2018 due to the trade war but after researching and graphing the data I found that it was actually smaller in 2018 than 2010. This could be because the economy was still recovering after the 2008 recession in 2010. But it will be interesting to spatially map the unemployment rate in 2018 to see if it exists more in rural counties or in more urban areas in Iowa. I gathered all the data from the U.S census bureau. I am worried that there might be more hidden variables behind unemployment rate affecting how the data is displayed.

2010 unemployment rate distrubution in Iowa's 99 counties:



Max : 10.9

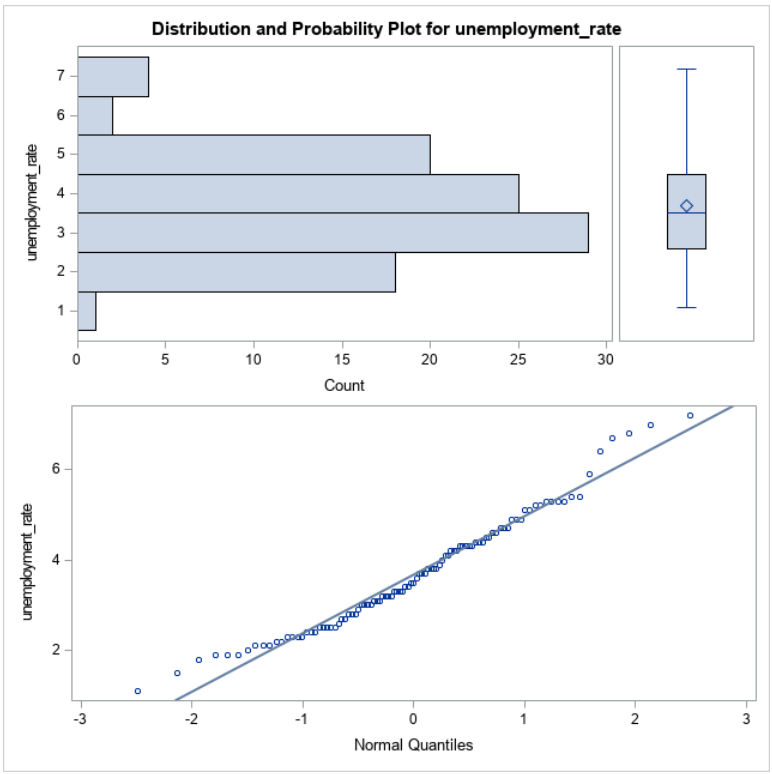
Q3 : 5.8

Median: 4.7

Q1: 4.2

Min: 2.5

2018 unemployment rate distribution in Iowa's 99 counties:



Max 7.2

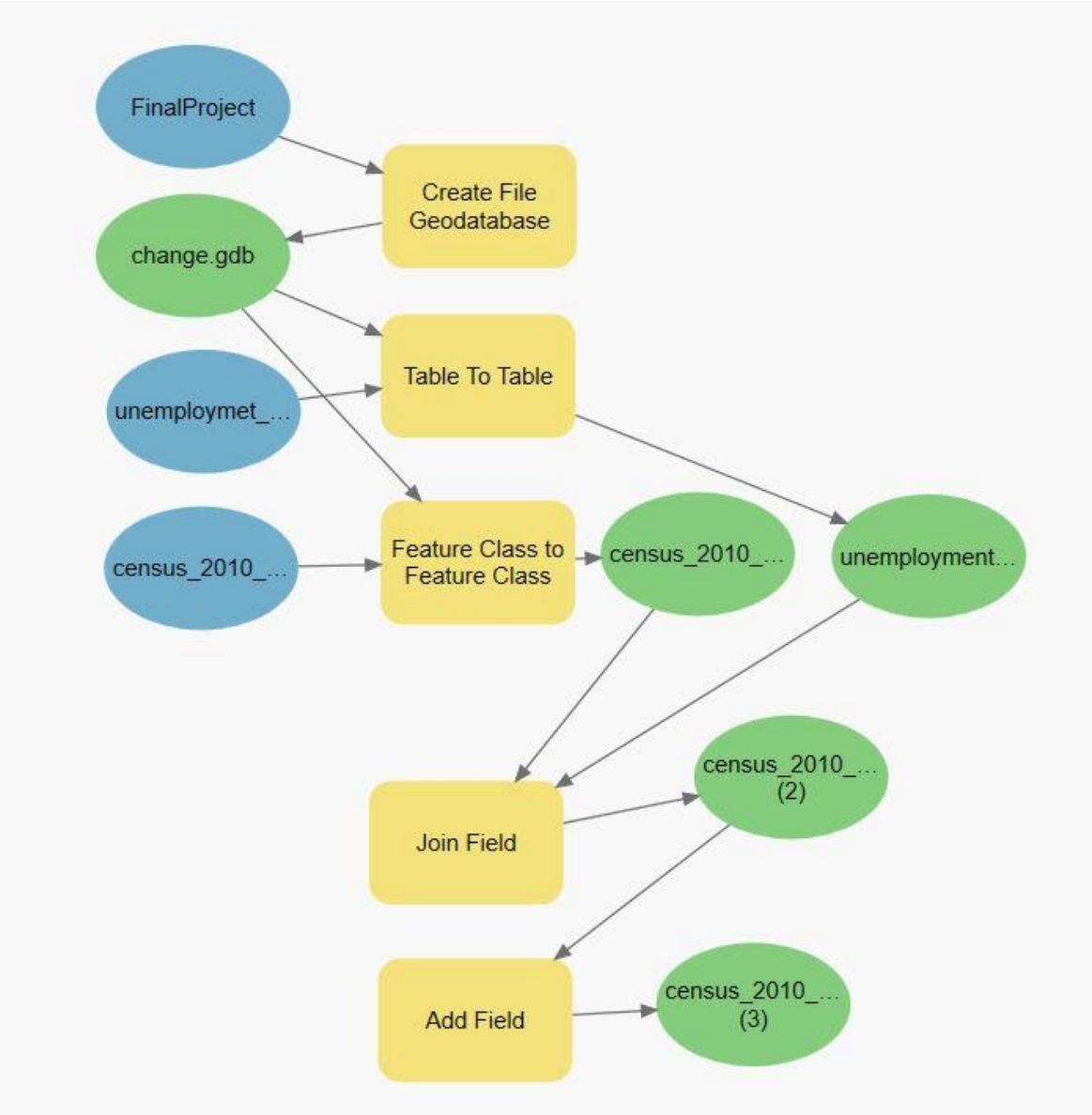
Q3: 4.5

Median: 3.5

Q1: 2.6

Min: 1.1

Workflow model and Methodology



The first thing I did was create a geodatabase then I copied the two files I was using into a geodatabase; I did this because I knew it would be easier to do a join with the table if the table was in a geodatabase. I tried to make the code able to do this with other CSV and shape files.

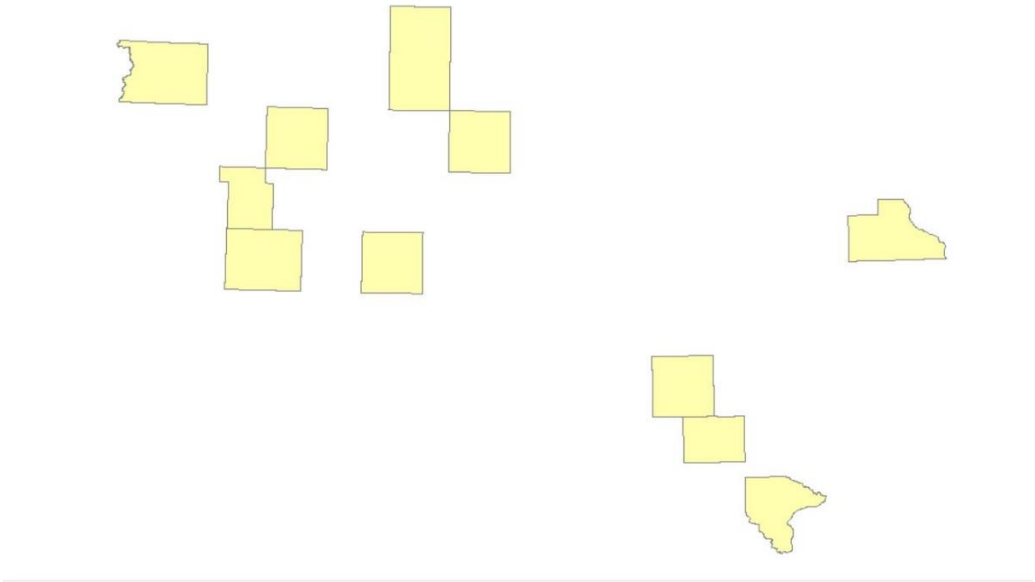
Then I joined the table to the shapefile. Created a new field where I'd put the difference between the two fields contained in the table. From here I used an update cursor to subtract off the initial unemployment rate from the 2018 unemployment rate creating a field which contained the difference between the two. I also used the update cursor to define counties as either rural or urban based on qualifications from the U.S census bureau. So this means, if a county had more than 50,000 people it would be qualified as urban if less than, rural. That defines what counties are rural and urban in the scope of my questions. Then I created a layer which contained all positive changes, meaning the unemployment had increased from 2010 to 2016 and from this layer created a new shapefile in the geodatabase that contained the counties where unemployment rate had increased.

Results

Table output in the final shapefile:

unem_rate_2010	unem_rate_2018	dev_lev	unem_change
3.7	4.3	Rural	0.6
5	5.4	Rural	0.4
4.2	5.3	Rural	1.1
3	3.1	Rural	0.1
4.4	4.9	Rural	0.5
5.4	6.7	Rural	1.3
3.5	4.2	Rural	0.7
4.6	7	Rural	2.4
2.5	2.6	Rural	0.1
4.4	5.3	Rural	0.9
7.1	7.2	Rural	0.1

Layer to shapefile created from code:



The results that I got is eleven counties where the unemployment rate went up from 2010 to 2016. Interestingly enough they are all rural counties. Whether correlation between the trade war is a possibility that requires more statistical analysis. I think you would need some sort of indicator of lost GDP or something that indexes trade value to compare all the variables to see if the relationship is significant enough to draw correlation. I think the code I created applies on very specific scenarios, because it requires that you have a csv table that you want to join to a shapefile. The part that compares two variables could be anything, I did unemployment rate from change from 2010 to 2018. But this change could be like population changes in a city shapefile with districts. If you had the data on a separate table about how the population in each district changed over the years. It would've been interesting to put another layer behind this one that had the outline of Iowa as well to make a map with the shapefile the code created. Overall I don't think it is fair to draw any sort of correlation between the trade war and unemployment rates. This without hindsight and data to determine a correlation. But I do think I successful mapped counties that had an increase in unemployment in eight years.