Hierarchical Map & Discussion:

2020 USA Hierarchical State Clustering of Poverty

Variables Used:
1) # Educational Attainment | Less than high school diploma, 2021 [Education2]
2) # Employment Status | In Civilian Labor Force, Unemployed, 2021 [Employment5]
3) # Poverty Status by Age | In Poverty, 2021 [Poverty2]
4) # Computers in Household | No Computer, 2021 [Computer3]
5) # Internet Subscriptions In Household | No Internet access, 2021 [Internet4]
Note - Variables were Rated and Z-Scored

Clusters
- Low Poverty States
- Moderate Poverty States
- Moderately High Poverty States
- High Poverty States
- Extreme Poverty States

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Projection: WGS 1984
Data Source: US Census Bureau

Note: Alaska, Hawaii, and Puerto Rico not to scale

0   400   800   1,600 Miles
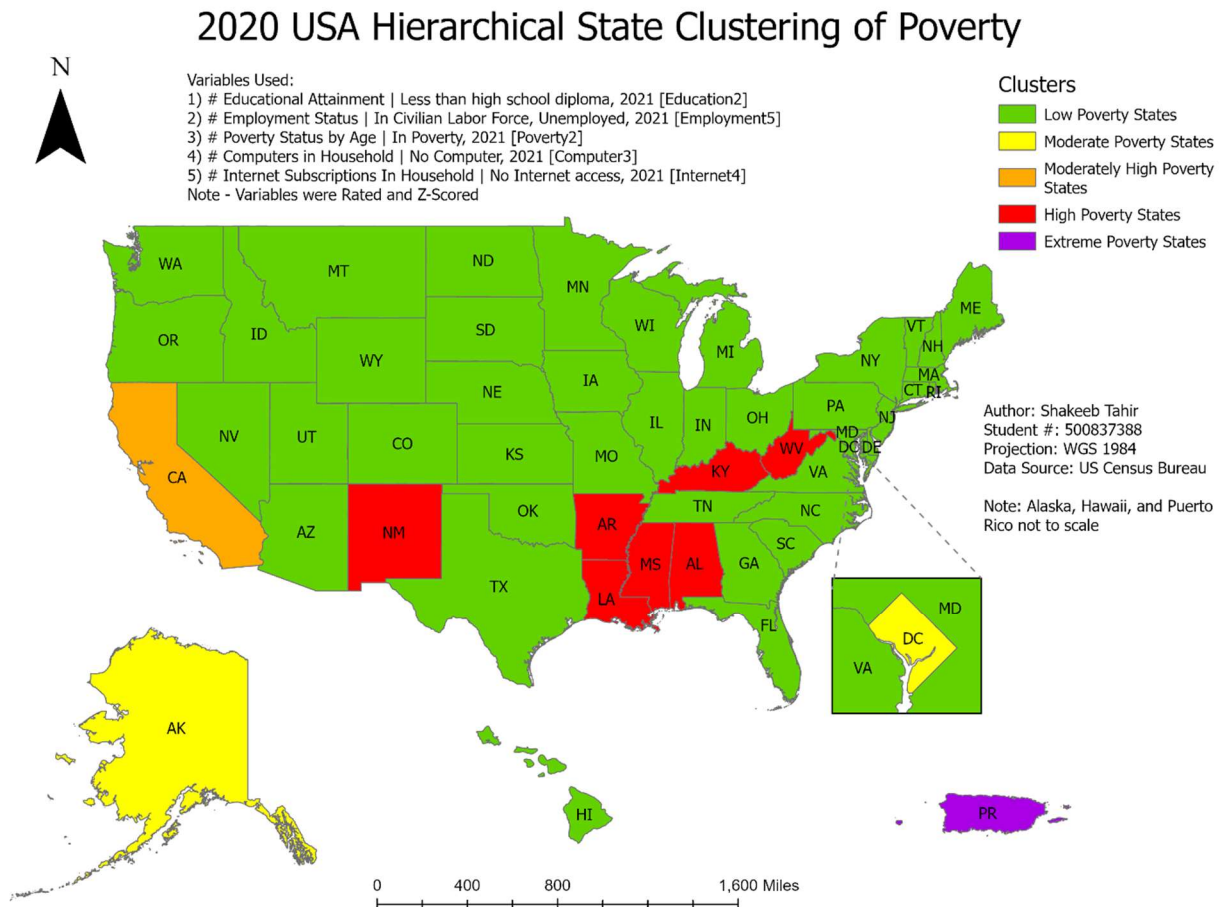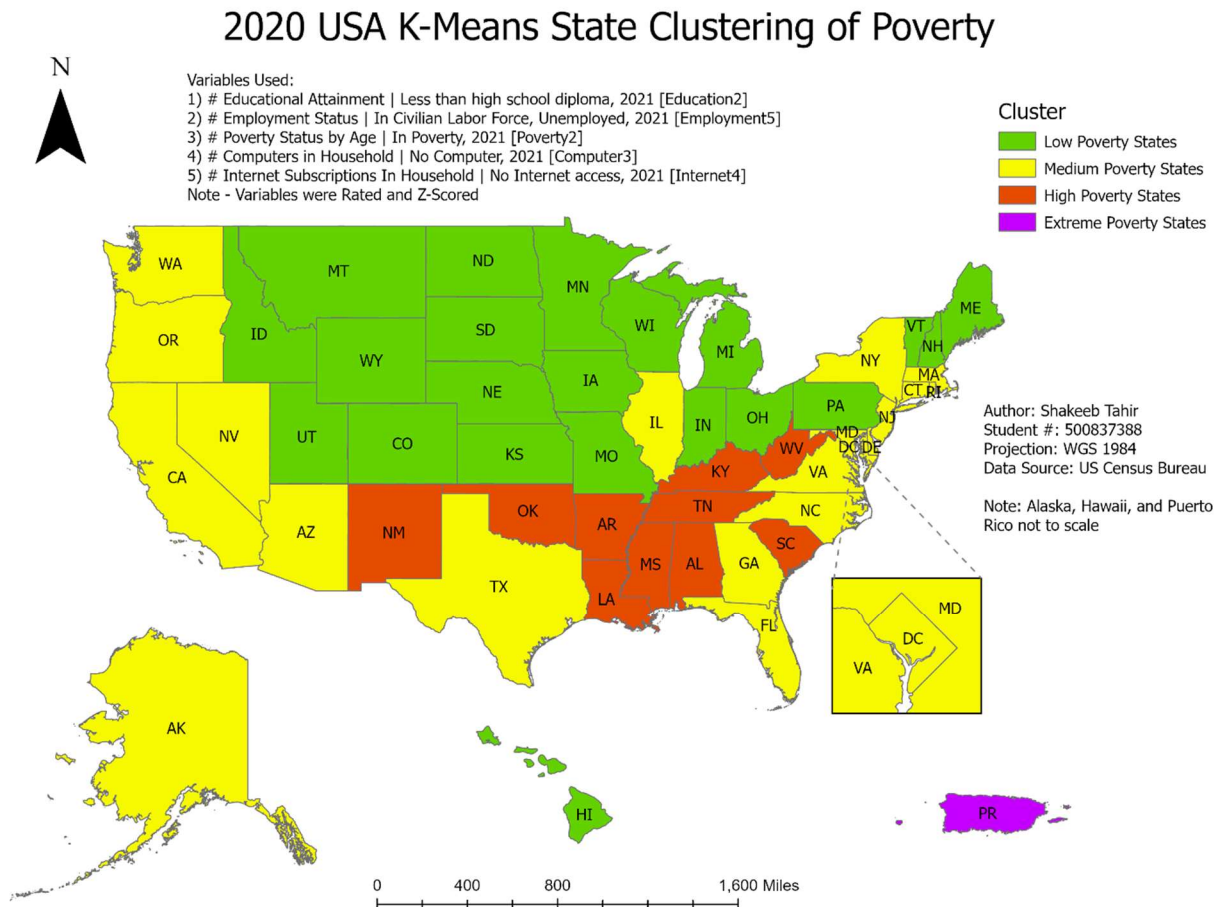
Based on the hierarchical model, we have 5 groups of poverty clusters. Low, Moderate, Moderately High, High, and Extreme. We can see that we have a large number of low poverty states on the map. These are mostly northern contiguous U.S states like Montana, North Dakota, Minnesota, Wisconsin, etc. These states are likely low poverty compared to the other states as these are states that are well diversed economically in industries such as agriculture, manufacturing, and technology and also are more well educated than other states. In terms of moderate poverty states, we can see only Alaska and DC fall into this category. This likely has to do with the high cost of living associated with these states as Alaska is very remote and therefore requires a lot of money in order live in. DC is also home to the government of the U.S and has a large income requirement as the cost of living is higher since government jobs tends to

pay well so the overall cost to live in the state is more expensive than other states such as Iowa or Indiana. California in an outlier on its own as a moderately high poverty state. This is likely due to the fact that California has very high income inequality as it is a tech hub and as such the cost of living there is extremely high. California is also well known to have a large homelessness problem as many homeless people often move to California due to the good weather and relaxed drug laws. Southern states like Alabama, New Mexico, Louisiana all fall into the high poverty category. This is likely due to the fact that these states have a very unproductive economy compared to other states and the education levels in these southern states is also usually near the bottom. As such, with an unproductive economy and low levels of education, many of the people living in these states are in poverty. Puerto Rico falls alone in the extreme poverty state category as almost half the population living there is below the poverty line. This is more than any other state in the U.S and as such it is an extreme outlier that needs its own cluster. Hawaii is interestingly a low poverty state, this is likely due to the economic benefit it receives from tourism.

K-Means Map & Discussion:

2020 USA K-Means State Clustering of Poverty

Variables Used:
1) # Educational Attainment | Less than high school diploma, 2021 [Education2]
2) # Employment Status | In Civilian Labor Force, Unemployed, 2021 [Employment5]
3) # Poverty Status by Age | In Poverty, 2021 [Poverty2]
4) # Computers in Household | No Computer, 2021 [Computer3]
5) # Internet Subscriptions In Household | No Internet access, 2021 [Internet4]
Note - Variables were Rated and Z-Scored

Cluster
- Low Poverty States
- Medium Poverty States
- High Poverty States
- Extreme Poverty States

Author: Shakeeb Tahir
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Projection: WGS 1984
Data Source: US Census Bureau

Note: Alaska, Hawaii, and Puerto Rico not to scale

0 400 800 1,600 Miles

Based on the k-means analysis, we have 4 groups of poverty clusters. Low, Medium, High, and Extreme. The northern US states, specifically in the Midwest tend to fall into the low poverty category as these are well diverse states with diverse economies. These states also have low population density which typically leads to lower costs of living and as such lower rates of poverty. In the medium poverty states, we can see many of the large populous states such as California, Texas, Florida, and New York. These are all states with large populations, so there is often large income disparities where there are few people with lots of wealth and many people living in poverty due to the generally high cost of living. States like Nevada, Arizona, and Oregon also have moderate levels of poverty since they have a mix of economic conditions, with certain urban centers like Phoenix or Las Vegas having high levels of wealth while the

rest of the state is mostly rural and has a lack of economic opportunities. In the high poverty states, we can see the southern states like Alabama, Missouri, Louisiana as well as parts of the rust belt like West Virginia and Tennessee fall into this category. The southern states suffer from a lack of resources like education, and economic opportunities while the rustbelt states have struggled with the effects of deindustrialization and the decline of the manufacturing industry. This has led to rising level of poverty in these states compared to years past. In the extreme poverty case we see Puerto Rico, which is a state that is not fully integrated with the rest of the U.S and is often considered separate. Since it is so far away, it's economy is not similar to anything in the U.S and the state is also largely in debt which further impacts the already extreme level of poverty as most of the population does not have access to any sort of economic opportunities or schooling. Puerto Rico is also very prone to natural disasters which further increases the extreme level of poverty that it already faces as any infrastructural progress made is often wiped out. We see a clear divide between most of the northern states which tend to be low poverty and southern states which tend to be medium or high poverty.