



National Risk Index Analysis

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Agenda



Business/Research Problem

Goal: identify communities at high risk of environmental disasters to better prepare the country for before, during, and after disasters occur.



- Counties in the United States vary greatly in the likelihood of suffering from natural disasters depending upon various environmental, economic, and social risk factors
- Using various data sources, obtain a range of indices and recalculate the risk factor of U.S. communities in order to prepare them for future disasters
- Perform clustering algorithms to identify the areas in the United States that require the most preparation for disasters

Data and Scope

The data used for the project comes from various sources with most of them collected by government agencies including FEMA and the CDC.



FEMA

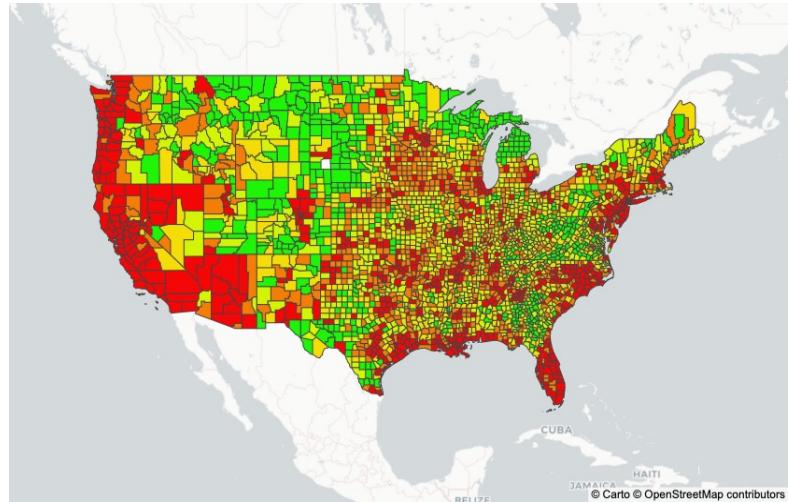


**University of Wisconsin
Population Health Institute**
SCHOOL OF MEDICINE AND PUBLIC HEALTH

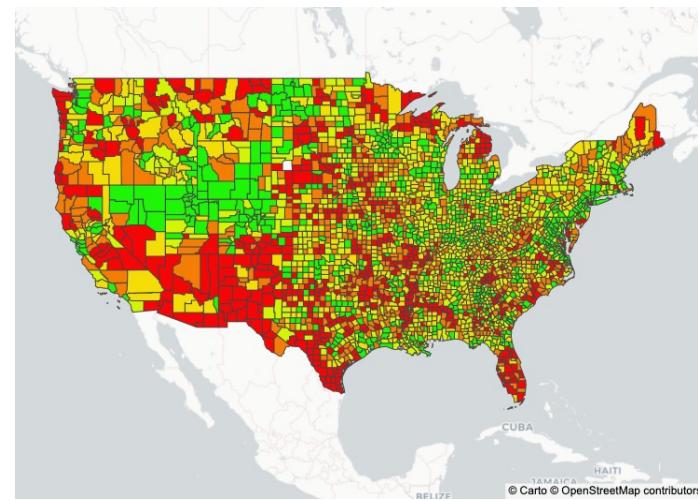
- Social Vulnerability
- Comm. Resilience
- Expected Annual Loss
- Disaster Data
- Social Vulnerability Index
(detailed information)
- County Level Health Rankings

Exploratory Data Analysis

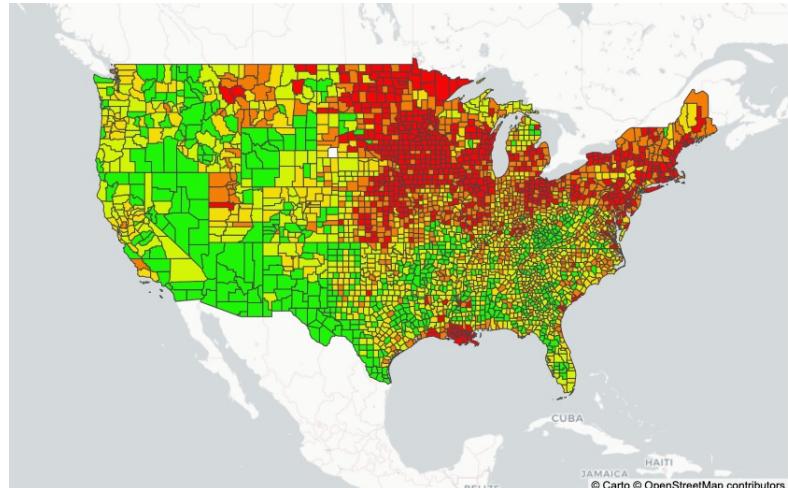
Expected Annual Loss



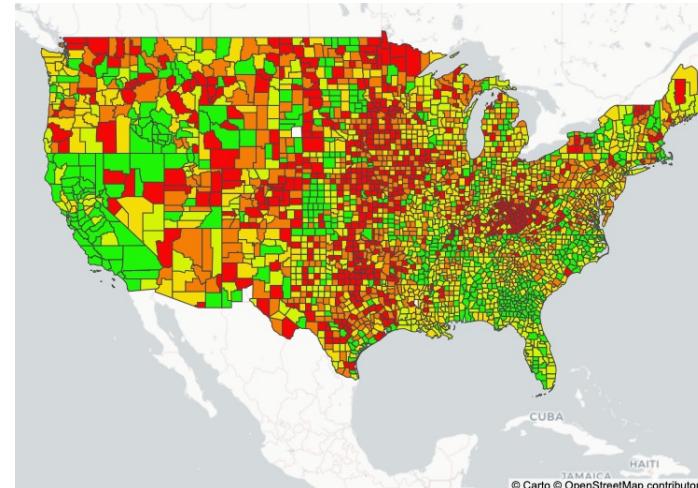
Social Vulnerability Score



Resilience Score

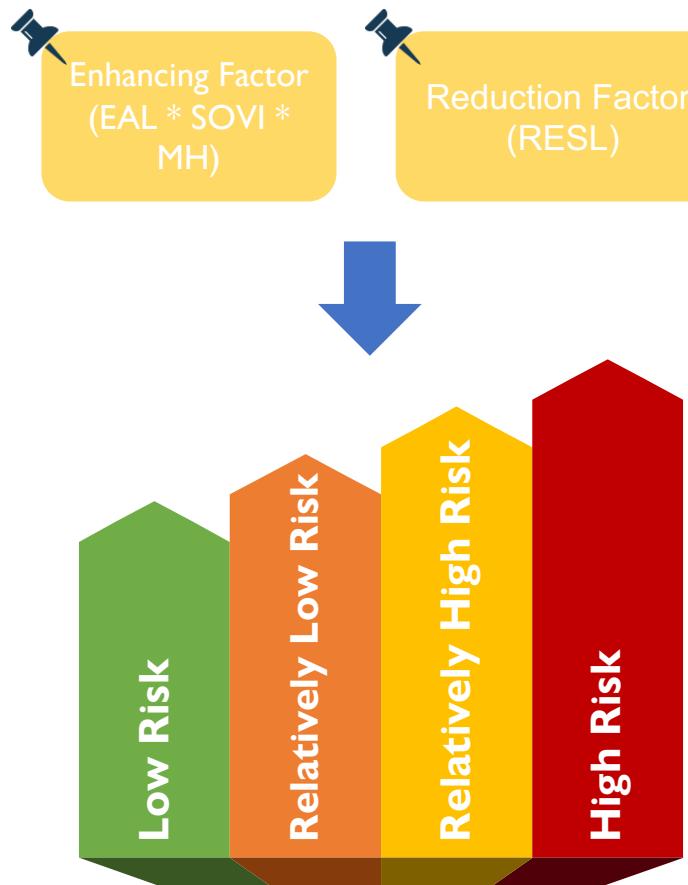


Mental Health Score

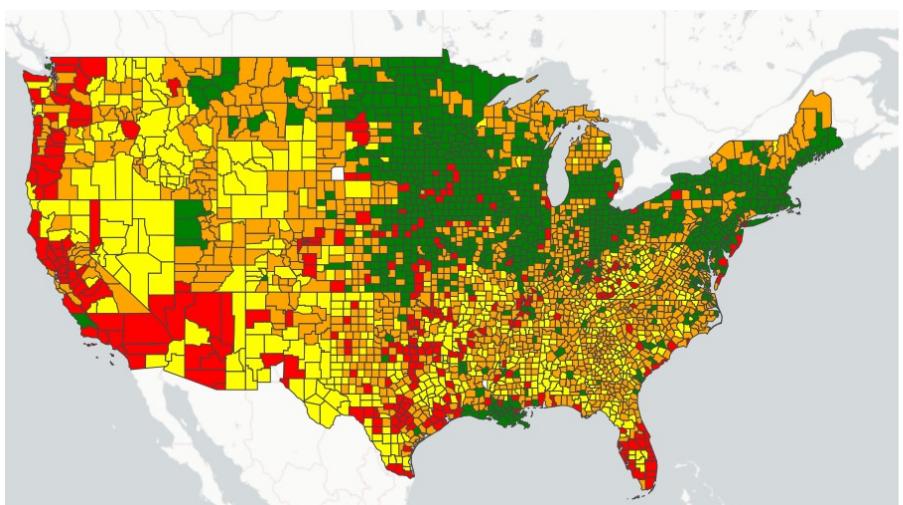


ML Models: Clustering

K-Means Clustering



	K-Mean Clustering	Hierachal Clustering	DBSCAN
Ease of Implementation			
Interpretability			



Conclusion & Next Steps



- From the implementation of clustering we could categorize the counties into four based on the amount of risk
- The two clusters with high enhancing factors and low reduction factors are showing the counties where more resources and help must be provided.
- As part of next steps, there are two things we want to improve upon:
- Collect more data around the intangible costs associated with natural disasters. Data around productivity, supply chain disruptions etc.
- Formulate a more robust method to measure the impact on mental health and other intangible costs.

Appendix 1: Datasets & Resources

Datasets & Resources:

1. FEMA National Risk Index Documentation

- https://www.fema.gov/sites/default/files/documents/fema_national-risk-index_technical-documentation.pdf
- <https://hazards.fema.gov/nri/>
- https://www.sc.edu/study/colleges_schools/artsandsciences/centers_and_institutes/hvri/data_and_resources/bric/index.php

2. CDC Social Vulnerability Index:

- https://www.atsdr.cdc.gov/placeandhealth/svi/data_documentation_download.html

3. Mental Health Index:

- <https://www.fema.gov/openfema-data-page/disaster-declarations-summaries-v2>
- <https://www.countyhealthrankings.org/explore-health-rankings/measures-data-sources/county-health-rankings-model?componentType=health-outcome&componentId=6>

Appendix 2: Meet the Team



**Hyunjae
Cho**



**Tyga
Numata**



**Priyank
Shroff**



**Bhadri
Vaidhyanathan**

Appendix 3: Data and Scope

The data used for the project comes from various sources with most of them collected by government agencies including FEMA and the CDC.

Agency	Location	Data Collected	Description
 FEMA	Washington, DC	<ul style="list-style-type: none">Social VulnerabilityComm. ResilienceExpected Annual LossDisaster Data	<ul style="list-style-type: none">Founded 1979Agency under Department of Homeland SecurityPurpose is to respond to disasters in the U.S. that exhausts community resources
	Atlanta, GA	<ul style="list-style-type: none">Social Vulnerability Index (detailed information)	<ul style="list-style-type: none">Founded 1946National public health agency of the U.S.Focused on protection of public health and safety through control and prevention of illnesses
 University of Wisconsin Population Health Institute SCHOOL OF MEDICINE AND PUBLIC HEALTH	Madison, WI	<ul style="list-style-type: none">County Level Health Rankings	<ul style="list-style-type: none">University founded 1848Department focused on improving health outcomes for all demographics in the U.S.