Exploring the Correlation between Environmental & Demographic Indexes across the US

By Emily Yarvis



Roadmap

1 Introduction:

Environmental Justice? Whats that?

Discovery:
Initial findings and Data

Exploration
Who is truly most effected and why?

Conclusion:
Why do we care?



Introduction

Explaining Environmental Justice

Environmental Discrimination

In 2019 60 million individuals died due to particulate matter in the air around the world



Environmental Discrimination

In 2019 60 million individuals died due to particulate matter in the air around the world



Research Question:

What is the correlation between environmental and demographic indicators across the US?

Environmental Indicators

Factor #	Factor
1	Particulate Matter
2	Ozone
3	Diesel
4	Air Toxics Cancer Risk
5	Air Toxics Respiratory Hazard Index

Factor #	Factor
6	Toxic Releases to Air
7	Traffic Proximity and Volume
8	Lead paint indicator
9	Superfund proximity
10	RMP Proximity

Factor #	Factor
11	Hazardous Waste Proximity
12	Underground Storage Tank Indicator
13	Wastewater Discharge Indicator

Demographic Indicators

Factor #	Factor
1	Demographic Index
2	Supplemental Demographic Index
3	BIPOC Pop.
4	Low Income Pop.
5	Unemployed Pop.
6	Limited English Speaking Households Pop.
7	Less Then High School Education Pop.

Demographic Index- Factor 13

% Low Income Pop. + % BIPOC Pop.



Factor:

Particulate Matter (pm 2.5)

Annual average PM2.5 levels in air

Ozone

Average of the annual top ten daily maximum 8-hour ozone concentrations in air

Diesel

Diesel particulate matter level in air

Air Toxics Cancer Risk

Lifetime cancer risk from inhalation of air toxics

Air Toxics Resp. Hazard Index Ratio of exposure concentration to health-based reference

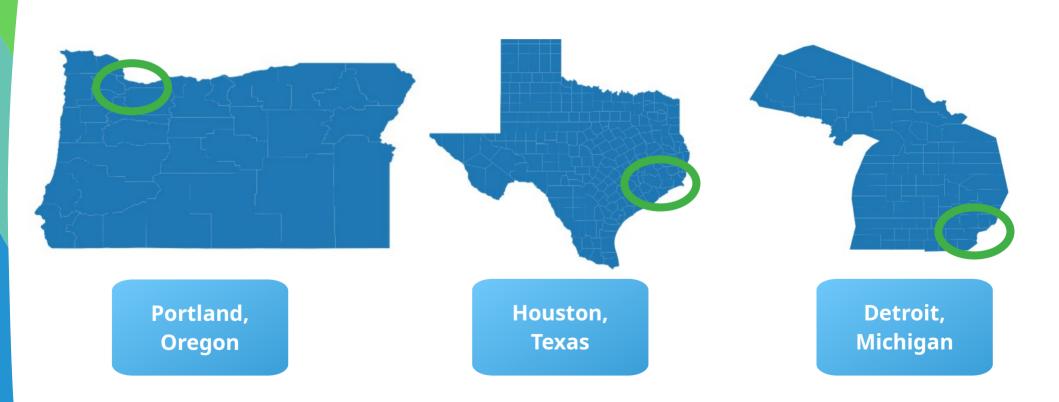
concentration



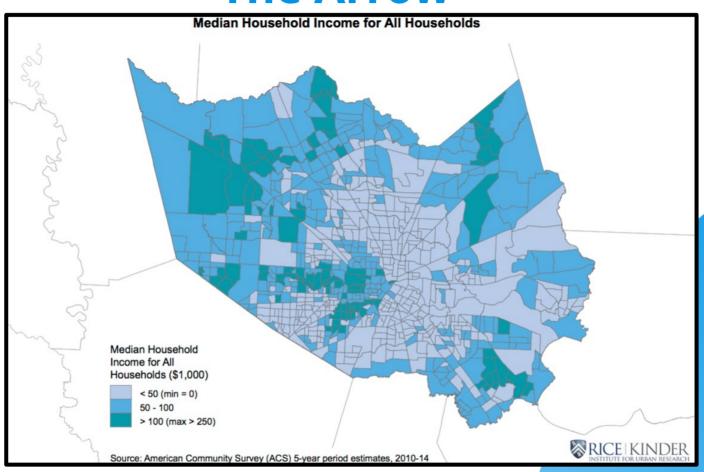
Discovery

Initial Research and Findings

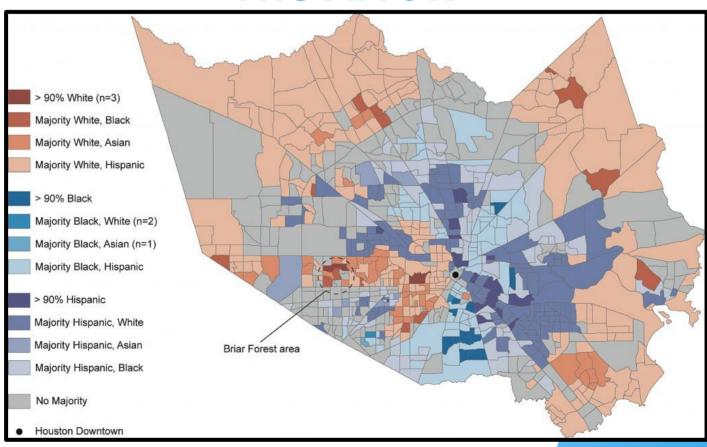
Initial Chosen States

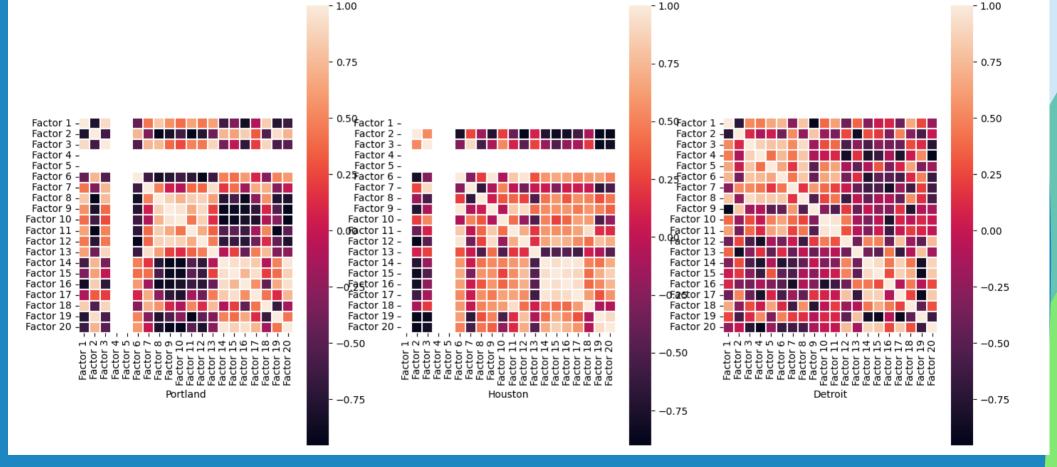


The Arrow



The Arrow





Factor 1 -	1	0.87	-0.7	-0.41	-0.71	0.52	-0.033	0.47	0.16	0.0072	-0.51	-0.047	0.34	0.57	0.43	0.66	0.33	0.41	0.16	0.29
Factor 2 -	0.87	1	-0.48	-0.057	-0.42	0.81	0.024	0.086	0.43	-0.12	-0.6	-0.35	0.57	0.43	0.33	0.52	0.2	0.046	0.37	0.34
Factor 3 -	-0.7	-0.48	1	0.82	0.93	-0.0038	0.45	-0.52	0.23	0.14	0.6	-0.29	0.095	-0.7	-0.51	-0.78	-0.45	-0.49	-0.066	-0.34
Factor 4 -	-0.41	-0.057	0.82	1	0.87	0.42	0.27	-0.54	0.49	-0.016	0.31	-0.67	0.34	-0.56	-0.39	-0.55	-0.51	-0.62	0.33	-0.075
Factor 5 -	-0.71	-0.42	0.93	0.87	1	0.093	0.22	-0.57	0.27	0.099	0.54	-0.35	0.11	-0.65	-0.4	-0.72	-0.43	-0.51	0.15	-0.14
Factor 6 -	0.52	0.81	-0.0038	0.42	0.093	1	0.1	-0.2	0.82	-0.094	-0.23	-0.49	0.73	0.2	0.28	0.25	0.071	-0.24	0.65	0.44
Factor 7 -	-0.033	0.024	0.45	0.27	0.22	0.1	1	-0.24	0.16	0.12	0.23	-0.062	0.15	-0.091	-0.2	-0.16	0.061	-0.17	-0.3	-0.32
Factor 8 -	0.47	0.086	-0.52	-0.54	-0.57	-0.2	-0.24	1	-0.26	0.31	0.082	0.43	-0.4	0.45	0.43	0.43	0.43	0.67	-0.14	0.15
Factor 9 -	0.16	0.43	0.23	0.49	0.27	0.82	0.16	-0.26	1	0.0085	0.13	-0.24	0.68	0.08	0.2	0.083	0.051	-0.34	0.62	0.35
Factor 10 -	0.0072	-0.12	0.14	-0.016	0.099	-0.094	0.12	0.31	0.0085	1	0.47	0.49	-0.18	-0.13	-0.12	-0.19	-0.018	0.051	-0.23	-0.2
Factor 11 -	-0.51	-0.6	0.6	0.31	0.54	-0.23	0.23	0.082	0.13	0.47	1	0.32	-0.14	-0.37	-0.2	-0.48	-0.1	-0.026	-0.21	-0.21
Factor 12 -	-0.047	-0.35	-0.29	-0.67	-0.35	-0.49	-0.062	0.43	-0.24	0.49	0.32	1	-0.37	0.18	0.19	0.073	0.35	0.31	-0.27	0.017
Factor 13 -	0.34		0.095	0.34	0.11	0.73	0.15	-0.4	0.68	-0.18	-0.14	-0.37	1	-0.2	-0.19	-0.11	-0.33	-0.22	0.32	-0.066
Factor 14 -	0.57	0.43	-0.7	-0.56	-0.65	0.2	-0.091	0.45	0.08	-0.13	-0.37	0.18	-0.2	1	0.91	0.96	0.9		0.24	0.62
Factor 15 -	0.43	0.33	-0.51	-0.39	-0.4	0.28	-0.2	0.43	0.2	-0.12	-0.2	0.19	-0.19	0.91	1	0.83	0.89	0.49	0.48	0.81
Factor 16 -	0.66	0.52	-0.78	-0.55	-0.72	0.25	-0.16	0.43	0.083	-0.19	-0.48	0.073	-0.11	0.96	0.83	1	0.76	0.51	0.28	0.59
Factor 17 -	0.33	0.2	-0.45	-0.51	-0.43	0.071	0.061	0.43	0.051	-0.018	-0.1	0.35	-0.33	0.9	0.89	0.76	1	0.52	0.11	0.55
Factor 18 -	0.41	0.046	-0.49	-0.62	-0.51	-0.24	-0.17	0.67	-0.34	0.051	-0.026	0.31	-0.22	0.54	0.49	0.51	0.52	1	-0.29	0.022
Factor 19 -	0.16	0.37	-0.066	0.33	0.15	0.65	-0.3	-0.14	0.62	-0.23	-0.21	-0.27	0.32	0.24	0.48	0.28	0.11	-0.29	1	0.82
Factor 20 -	0.29	0.34	-0.34	-0.075	-0.14	0.44	-0.32	0.15	0.35	-0.2	-0.21	0.017	-0.066	0.62	0.81	0.59	0.55	0.022	0.82	1
	or 1 -	or 2 -	or 3 -	or 4 -	or 5 -	or 6 -	or 7 -	or 8 -	or 9 -	r 10 -	111-	r 12 -	r 13-	r 14 -	r 15 -	16 -	r 17 -	18-	- 19 -	r 20 -
	Factor	Factor	Factor	Factor	Factor	Factor	Factor	Factor	Factor	actor	actor	actor	actor	actor	actor	actor	actor	actor	actor	actor

- 0.8 - 0.6 - 0.4 - 0.2 - 0.0 - -0.2 - -0.4

- -0.6

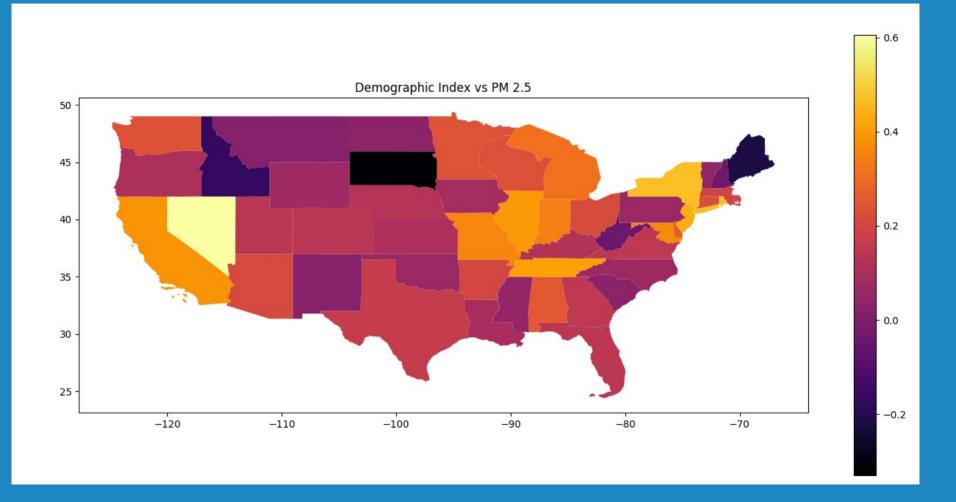
Factor 1 -	1	0.87	-0.7	-0.41	-0.71	0.52	-0.033	0.47	0.16	0.0072	-0.51	-0.04	0.34	0.57	0.43	0.66	0.33	0.41	0.16	0.29
Factor 2 -	0.87	1	-0.48	-0.057	-0.42	0.81	0.024	0.086	0.43	-0.12	-0.6	-0. 5).43	0.33	0.52	0.2	0.046	0.37	0.34
Factor 3 -	-0.7	-0.48	1	0.82	0.93	-0.0038	0.45	-0.52	0.23	0.14	0.6	-0 29	0.095	-).7	-0.51	-0.78	-0.45	-0.49	-0.066	-0.34
Factor 4 -	-0.41	-0.057	0.82	1	0.87	0.42	0.27	-0.54	0.49	-0.016	0.31	-0 67	0.34	-(.56	-0.39	-0.55	-0.51	-0.62	0.33	-0.075
Factor 5 -	-0.71	-0.42	0.93	0.87	1	0.093	0.22	-0.57	0.27	0.099	0.54	-0.35	0.11	-0.65	-0.4	-0.72	-0.43	-0.51	0.15	-0.14
Factor 6 -	0.52	0.81	-0.0038	0.42	0.093	1	0.1	-0.2	0.82	-0.094	-0.23	-0.4	0.73	0.2	0.28	0.25	0.071	-0.24	0.65	0.44
Factor 7 -	-0.033	0.024	0.45	0.27	0.22	0.1	1	-0.24	0.16	0.12	0.23	-0.062	0.15	-0.091	-0.2	-0.16	0.061	-0.17	-0.3	-0.32
Factor 8 -	0.47	0.086	-0.52	-0.54	-0.57	-0.2	-0.24	1	-0.26	0.31	0.082	0.43	-0.4	0.45	0.43	0.43	0.43	0.67	-0.14	0.15
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Factor 10 -	0.0072	-0.12	0.14	-0.016	0.099	-0.094	0.12	0.31	0.0085	1	0.47	0.49	-0.18	-0.13	-0.12	-0.19	-0.018	0.051	-0.23	-0.2
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Factor 1: -	0.34	0.57	0.095	0.34	0.11	0. 73	0.15	-0.4	0.68	-0.18	-0.14	-0.37	1	-0.2	-0.19	-0.11	-0.33	-0.22	0.32	-0.066
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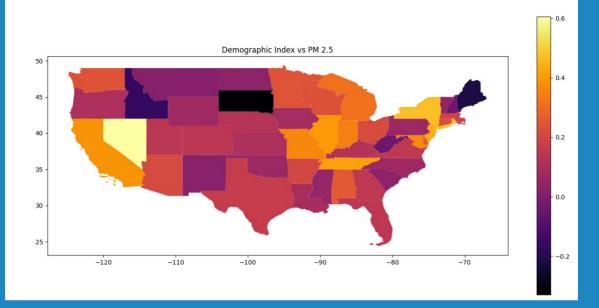
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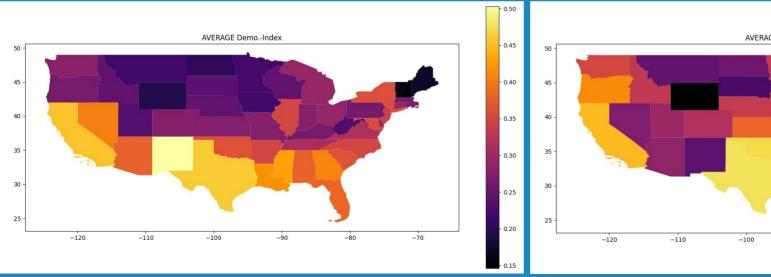


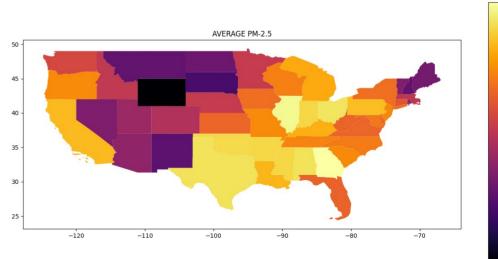
ExplorationFurther Findings

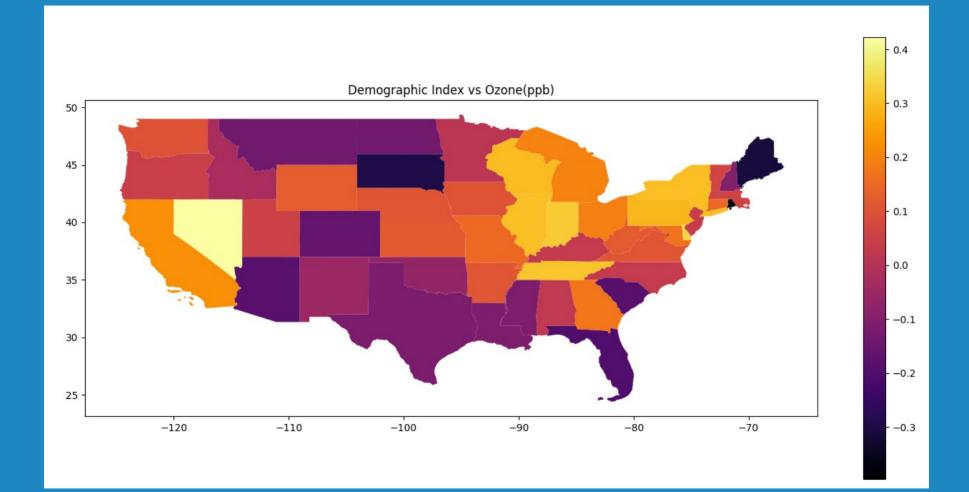
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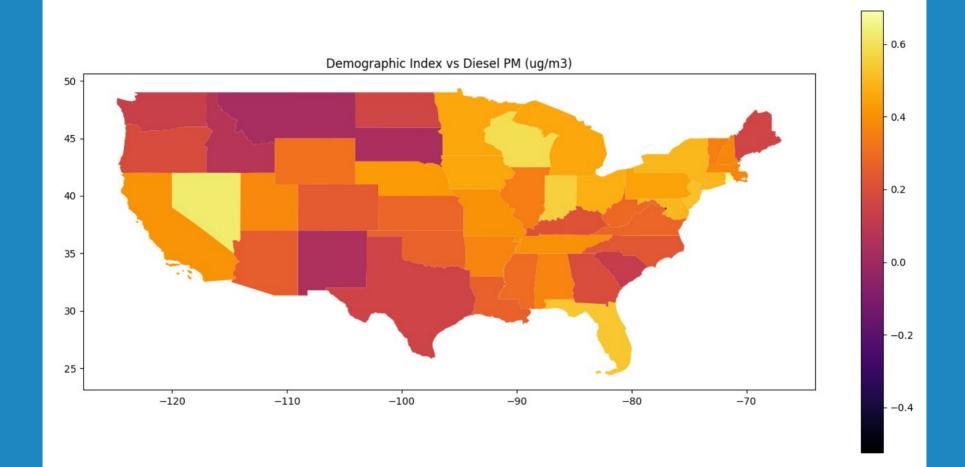


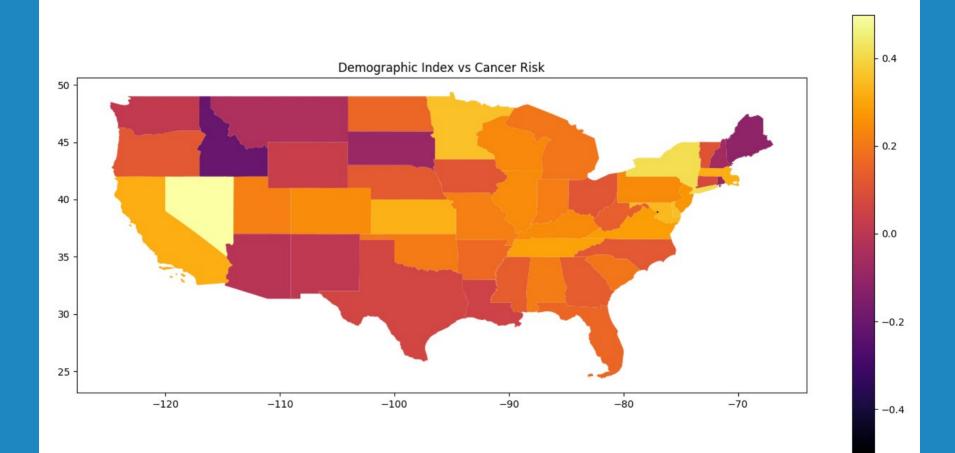


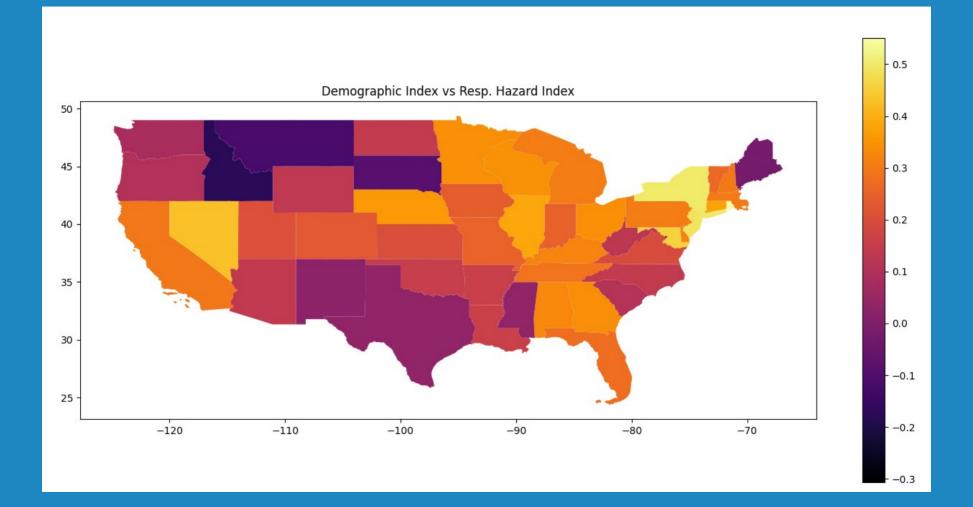














Conclusion

Why Do We Care