

VulnerabilityMap: An Open Framework for Mapping Vulnerability among Urban Disadvantaged Populations in the United States

Anonymous Submission

A Constructed Dataset

References

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Table 1: Summary of data sources for extracting demographic and neighborhood features.

Feature	Disadvantage Categorization	Spatial Resolution	Time Period	Source
Non-Hispanic white rate	Demographic	CBG	2009-2021	American Community Survey
Disability rate	Demographic	CBG	2009-2021	American Community Survey
Median household income	Demographic	CBG	2009-2021	American Community Survey
Bachelor rate	Demographic	CBG	2009-2021	American Community Survey
Crime rate	Neighborhood	County	2002-2014	[Clarke <i>et al.</i> , 2019]
# Law enforcement organizations	Neighborhood	CT	2003-2017	[Esposito <i>et al.</i> , 2020]
# Polluting sites	Neighborhood	CT, ZCTA	2000-2018	[Finlay <i>et al.</i> , 2022]
# Green space	Neighborhood	CBG	2018-2023	Safegraph Places
# Fast food	Neighborhood	CBG	2018-2023	Safegraph Places
# Education facilities	Neighborhood	CBG	2018-2023	Safegraph Places
# Healthcare	Neighborhood	CBG	2018-2023	Safegraph Places
# Arts and cultural sites	Neighborhood	CBG	2018-2023	Safegraph Places
# Sports facilities	Neighborhood	CBG	2018-2023	Safegraph Places

* CBG: Census Block Group. CT: Census Tract. ZCTA: Zip Code Tabulation Area.

Table 2: Summary of data sources for extracting offline mobility features.

Feature	Disadvantage Categorization	Spatial Resolution	Time Period	Source
# Explored places	Mobility	CBG	2018-2023	Safegraph Patterns
Mobility level	Mobility	CBG	2018-2023	Safegraph Patterns
Avg. distance to green space	Mobility	CBG	2018-2023	Safegraph Places
Avg. distance to fast food	Mobility	CBG	2018-2023	Safegraph Places
Avg. distance to education facilities	Mobility	CBG	2018-2023	Safegraph Places
Avg. distance to healthcare	Mobility	CBG	2018-2023	Safegraph Places
Avg. distance to arts and cultural sites	Mobility	CBG	2018-2023	Safegraph Places
Avg. distance to sports facilities	Mobility	CBG	2018-2023	Safegraph Places
Street connectivity	Mobility	CT, ZCTA	2010	[Ailshire <i>et al.</i> , 2021]

Table 3: Summary of data sources for extracting online social features.

Feature	Disadvantage Categorization	Spatial Resolution	Time Period	Source
Social connections	Social	County	2022	Facebook Data for Good ¹
Long social ties	Social	County, ZCTA	2021	Facebook Data for Good

Table 4: Summary of data sources for extracting vulnerability features.

Feature	Vulnerability Categorization	Spatial Resolution	Time Period	Source
COVID-19 case rate in first 3 months	Shocks	County	2020	[The New York Times, 2021]
COVID-19 death rate in first 3 months	Shocks	County	2020	[The New York Times, 2021]
Urban heat island	Shocks	CT	2017	[Chakraborty <i>et al.</i> , 2020]
Air pollution (PM2.5)	Stresses (Level 1)	CBG	2000-2015	[Wang <i>et al.</i> , 2020]
Energy poverty rate	Stresses (Level 1)	City, County, CT	2016, 2018	[U.S. Department of Energy, 2020]
Visitation to fast food	Stresses (Level 1)	CBG	2018-2023	Safegraph Patterns
Visitation to healthcare	Stresses (Level 1)	CBG	2018-2023	Safegraph Patterns
Visitation to green space	Stresses (Level 1)	CBG	2018-2023	Safegraph Patterns
Visitation to sports facilities	Stresses (Level 1)	CBG	2018-2023	Safegraph Patterns
Social capital	Stresses (Level 2)	County, ZCTA	2022	Facebook Data for Good
Sentiment positivity	Stresses (Level 2)	County, City	2019-2023	[Chai <i>et al.</i> , 2023]
Sentiment stability	Stresses (Level 2)	County, City	2019-2023	[Chai <i>et al.</i> , 2023]
Experienced segregation	Stresses (Level 2)	CBG	2018-2023	Safegraph Patterns
Creative job rate	Stresses (Level 3)	CBG	2009-2021	American Community Survey
# Civic organizations	Stresses (Level 3)	County, ZCTA	2022	Facebook Data for Good
Volunteering rate	Stresses (Level 3)	County, ZCTA	2022	Facebook Data for Good
Neighborhood-school gap	Stresses (Level 3)	CT, ZCTA	2009-2010, 2015-2016	[Gomez-Lopez <i>et al.</i> , 2021]
Visitation to arts and cultural facilities	Stresses (Level 3)	CBG	2018-2023	Safegraph Patterns
Visitation to education facilities	Stresses (Level 3)	CBG	2018-2023	Safegraph Patterns
Percentage of gambling interest	Stresses (Level 3)	County	2023	Facebook Advertisement

* Level 1: physiological stresses; Level 2: Social stresses; Level 3: Self-actualization stresses.