

Crime severity correlation with sports, culture, and religious venues counts

A 2019 Washington DC study

Problem

Hypothesis: more educated people and more spiritual people would commence less crimes; education and spirituality level is linked to the culture, religious, and sports (inversely) venues counts

Approach:

- Calculate crime severity score for the Washington DC neighborhood clusters
- Calculate the count of culture, spiritual, and sports venues for the Washington DC neighborhood clusters
- Use linear regression to estimate the statistical significance of the appropriate venue counts influence on crime severity

Data

- Coordinates of culture and sports objects: Foursquare service
- Washington DC neighborhood coordinates: ArcGIS
- Crime rates: Opendata DC for 2019 (1641 records)
- Washington DC Cluster to neighborhood mapping: Opendata DC
- Crime severity scores: Office for National Statistics, UK

Methodology I

Crime Dataset

1. Obtain Crime cases dataset with Neighborhood clusters
2. Obtain Crime severity scores table
3. Map crime types between 1 and 2
4. Calculate crime severity scores in the Crime cases dataset

Venue Dataset

1. Obtain mapping between Neighborhood clusters and Neighborhoods
2. Obtain Neighborhood coordinates
3. Obtain venue lists for the Neighborhoods
4. Filter venue lists for the target venue categories
5. Calculate venue counts per neighborhood cluster

Influence estimation

1. Build a linear regression model
2. Estimate coefficient influence from the linear model
3. Calculate correlation coefficients between crime types and venue counts

Methodology II

Crime severity score per Neighborhood cluster

*score = sum(crime_type_severity_score*crime_type_cases) for all crime types*

Linear model

*crime score = W1*culture_venues + W2*sports_venues + W3*spiritual_venues + C*

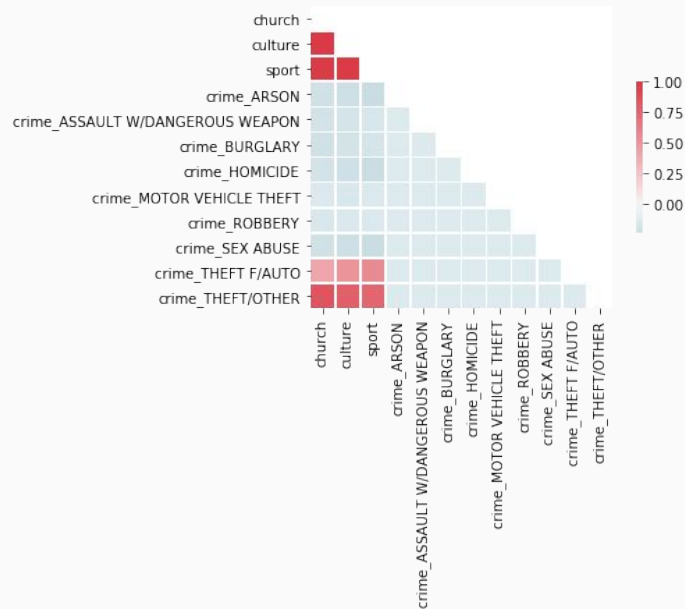
Results: crime severity vs. venue counts

	coef	std err	t	P> t 	[0.025	0.975]
const	2.662e+04	5749.002	4.630	0.000	1.5e+04	3.83e+04
church	641.5834	460.168	1.394	0.172	-291.681	1574.848
culture	-84.6749	39.947	-2.120	0.041	-165.691	-3.659
sport	89.6720	25.484	3.519	0.001	37.987	141.357

R-squared:

0.301

Results: crime types correlation with venue counts



Conclusions

- Crime severity rates display a positive correlation with sports venues count and negative correlation with culture venues counts
- No statistically significant correlation was found between crime severity rates and religious venues counts
- In the areas with many sports, culture, and religious venues theft rates are much higher than in other areas