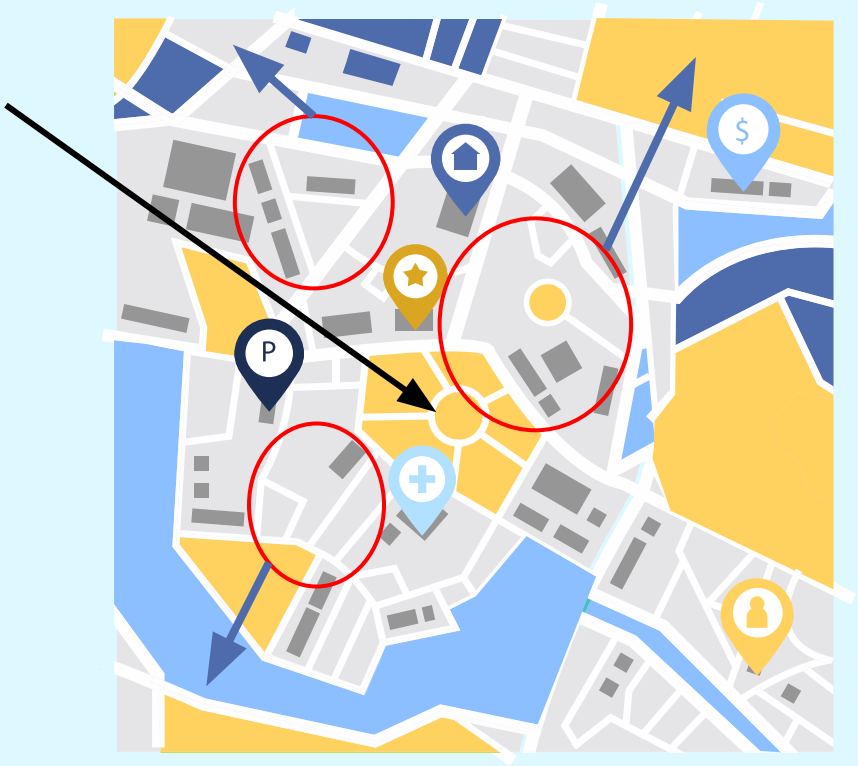
Prepared by Paul Torres

New York City Gentrifying Detector

WHAT IS THE PROBLEM HERE?

OPPORTUNITY

Most jobs are closer to city center



INCREASED VALUE

Nearby desirable locations become expensive

DISPLACEMENT

Vulnerable populations are priced out and must leave

SPREAD

Neighborhoods adjacent to new ‘trendy’ areas are vulnerable

NEIGHBORHOODS BY THE NUMBERS

78%

Average loss of diversity in Williamsburg

3000%

Increase in White-Population in Bedford-Stuyvesant

231

Neighborhoods classified as gentrified by cluster algorithm

17%

Of Census Tracts in Brooklyn classified as gentrified by cluster algorithm

THE PROCESS

0. COLLECTION

U.S. Census Data

1. PROCESSING

Percent Changes

2. CLUSTERING

KMeans & PCA

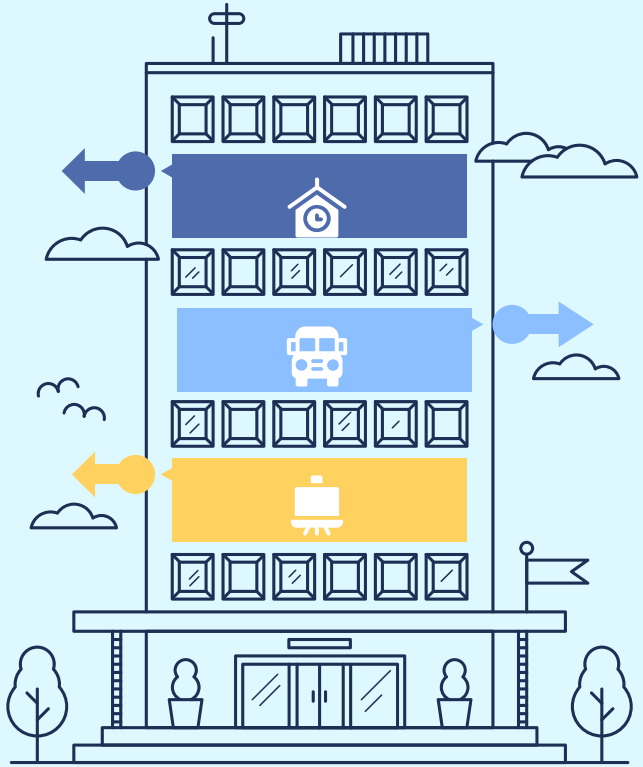
3. EVALUATION

Established Metrics

TAKE A LOOK AT THE DATA

2000 & 2010

U.S. Census Data and American Community Survey



108

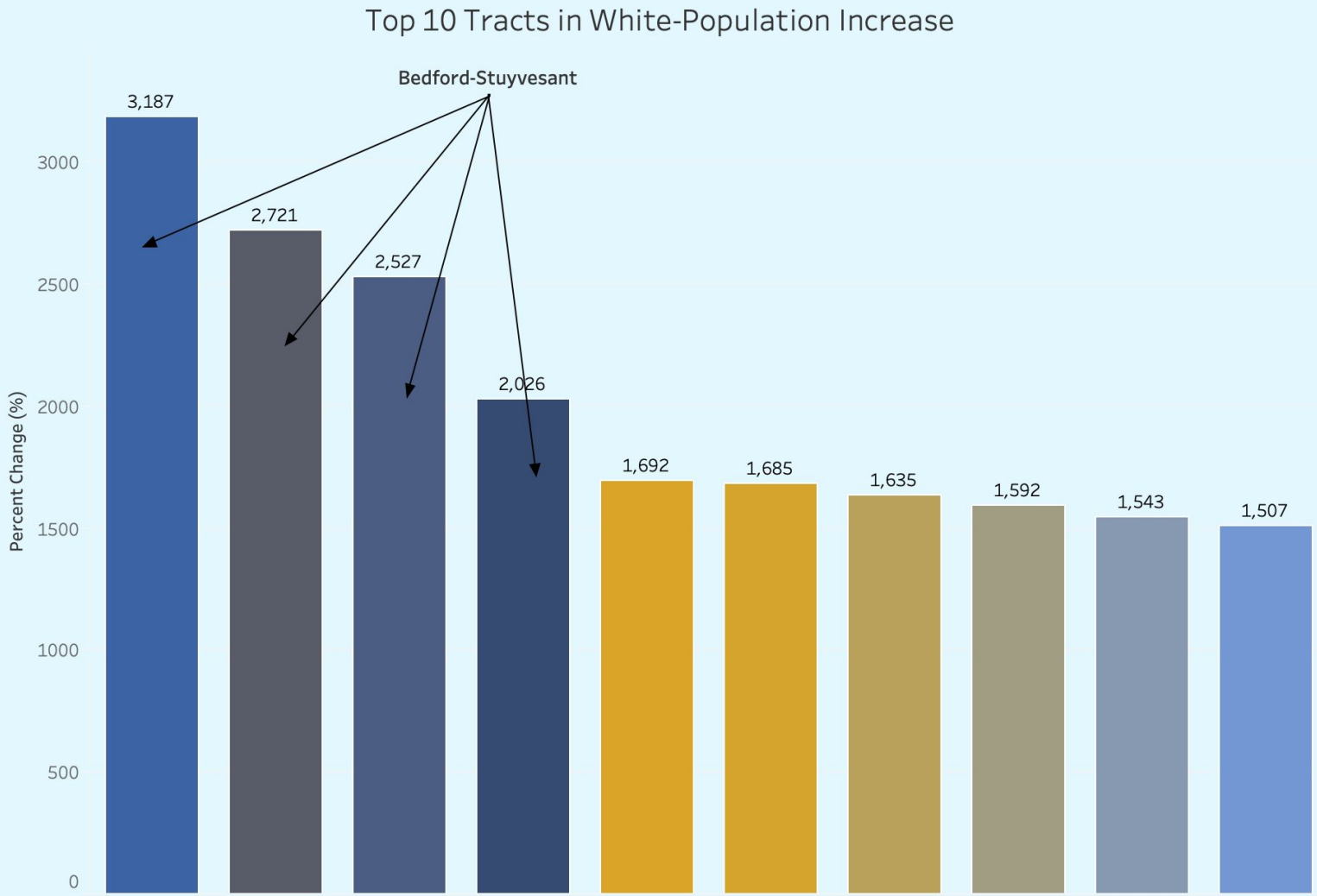
Engineered features involving percent changes

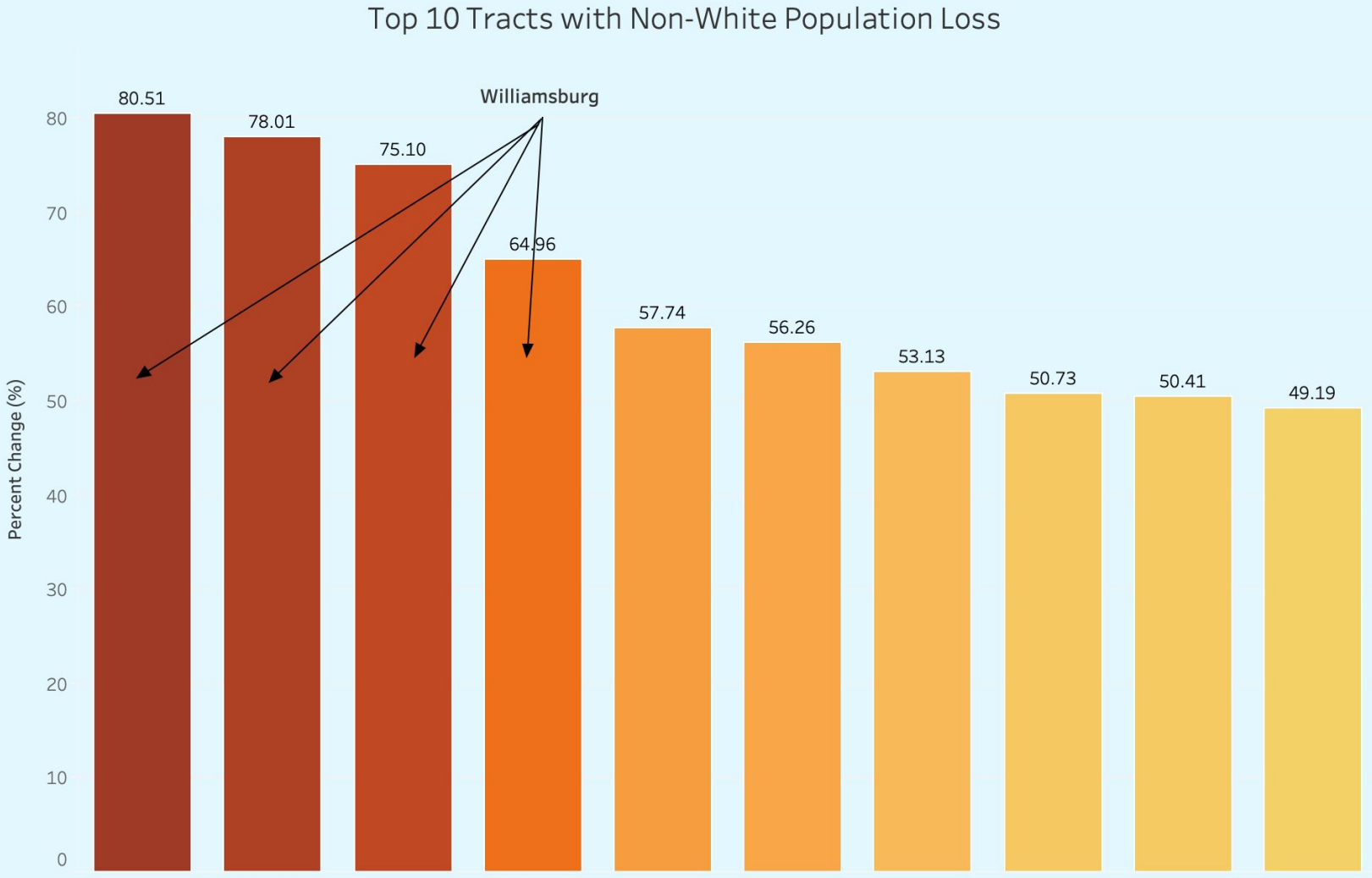
DOMAIN

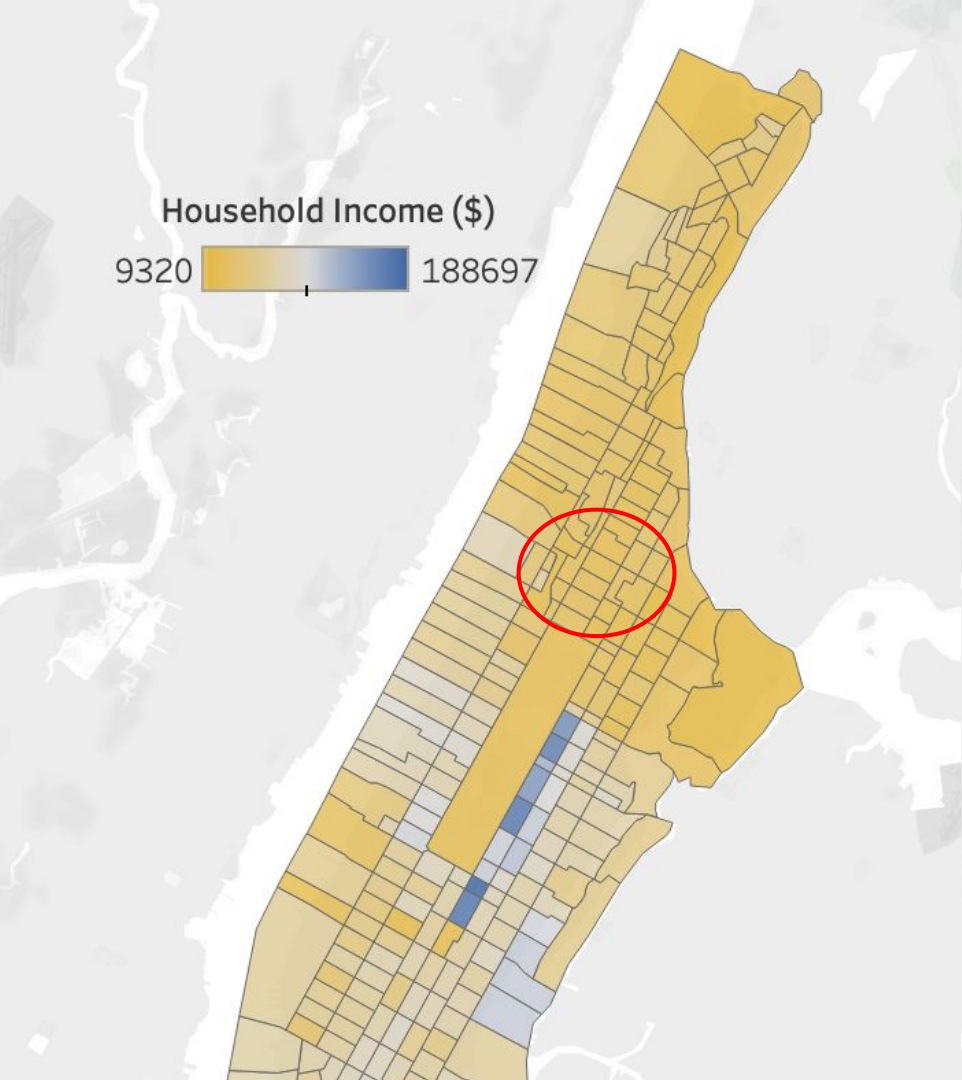
Staten Island was not included due to large differences with other boroughs

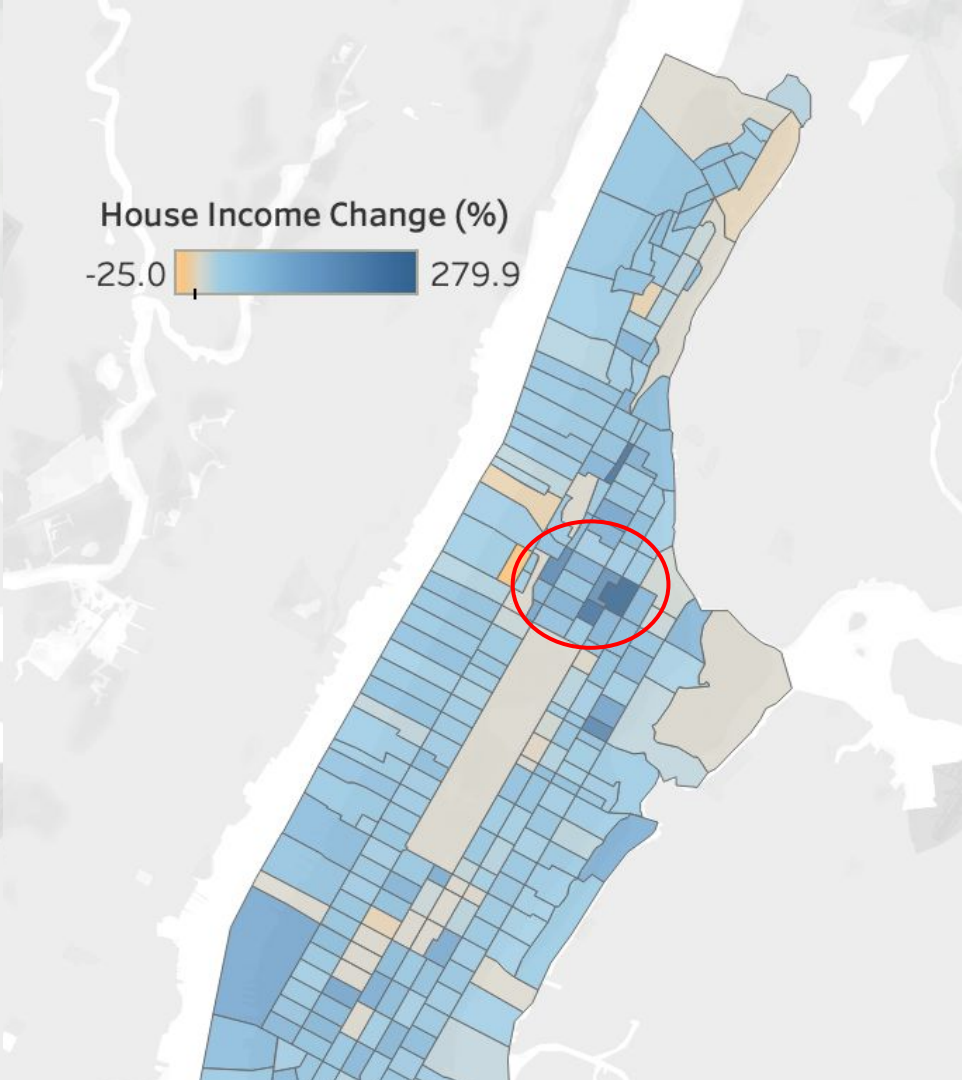
METRICS

New York City by the Numbers


Top 10 Tracts in White-Population Increase
Bedford-Stuyvesant
Percent Change (%)
0
500
1000
1500
2000
2500
3000
3,187
2,721
2,527
2,026
1,692
1,685
1,635
1,592
1,543
1,507


Top 10 Tracts with Non-White Population Loss
Williamsburg
80.51
78.01
75.10
64.96
57.74
56.26
53.13
50.73
50.41
49.19
Percent Change (%)
80
70
60
50
40
30
20
10
0


Household Income ($)
9320
188697


House Income Change (%)
-25.0
279.9

CLUSTERING

- Clustering occurs when you want to group observations on their similarities

- The process is rated based on how closely the observations in clusters are and how far a cluster is from another.

  The ***Silhouette Score***

- Models that will be used are KMeans, HAC, and PCA

SUBSETS

- Clustering loses efficiency when using large numbers of features
- Used metrics previously mentioned (income change, demographic change) as subsets
- Different subsets were used that increased the dimensions

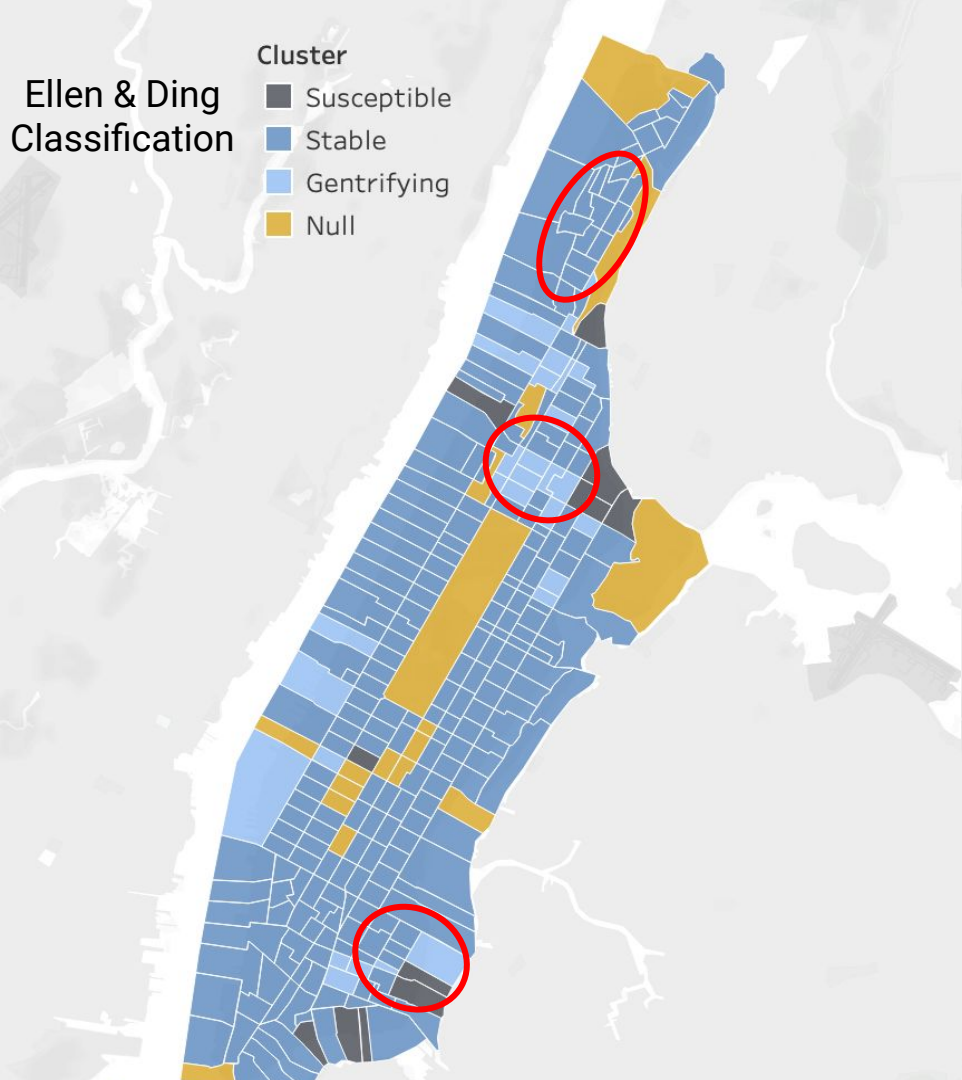
CLUSTERING RESULTS

Model	Description	Features	Silhouette Score
HAC (Subset 1)	Bottoms-Up approach to clustering	Changes in white population, monthly rent, etc	**0.04**
KMeans (Subset 2)	Top-Down clustering approach	Changes in non-white population, home value, etc	**0.40**
PCA (Subset 2)	Vector describing data for best fit	Changes in non-white population, home value, etc	**0.43**

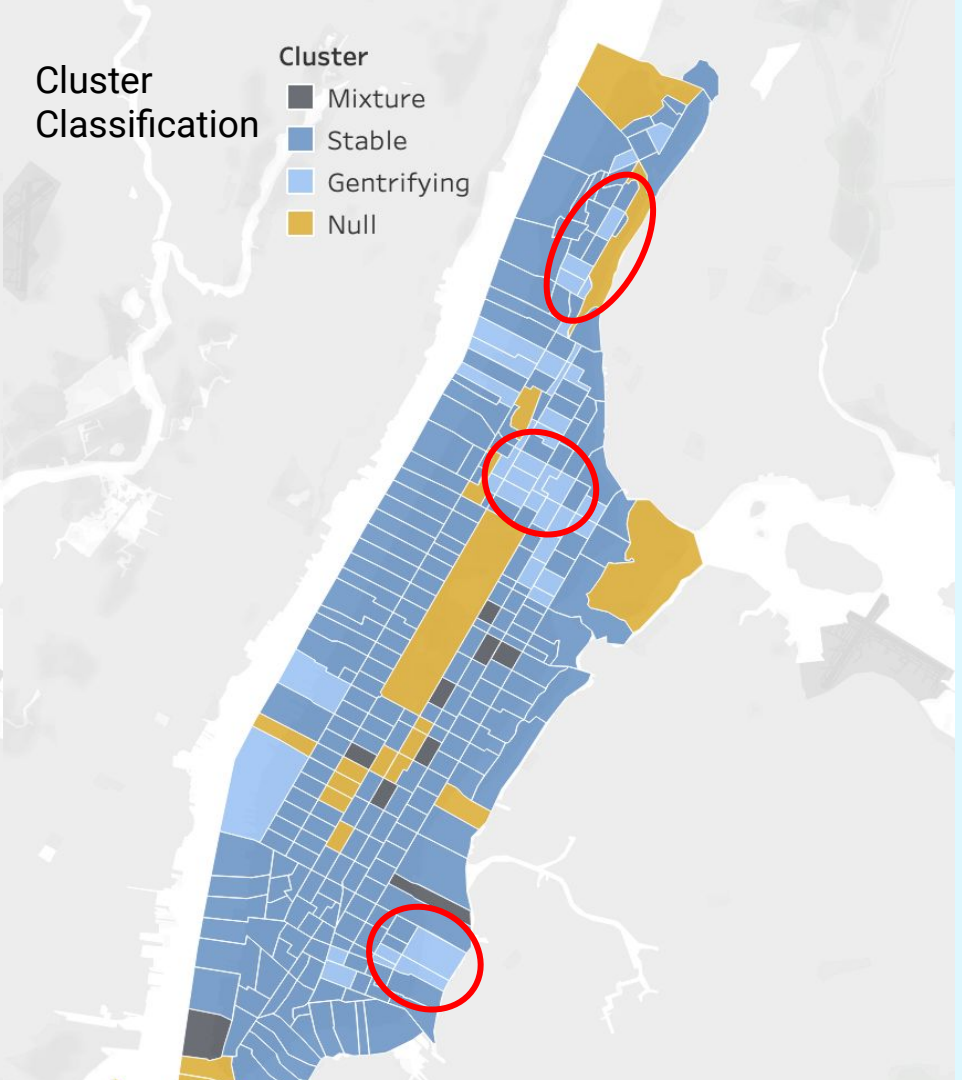
EVALUATION

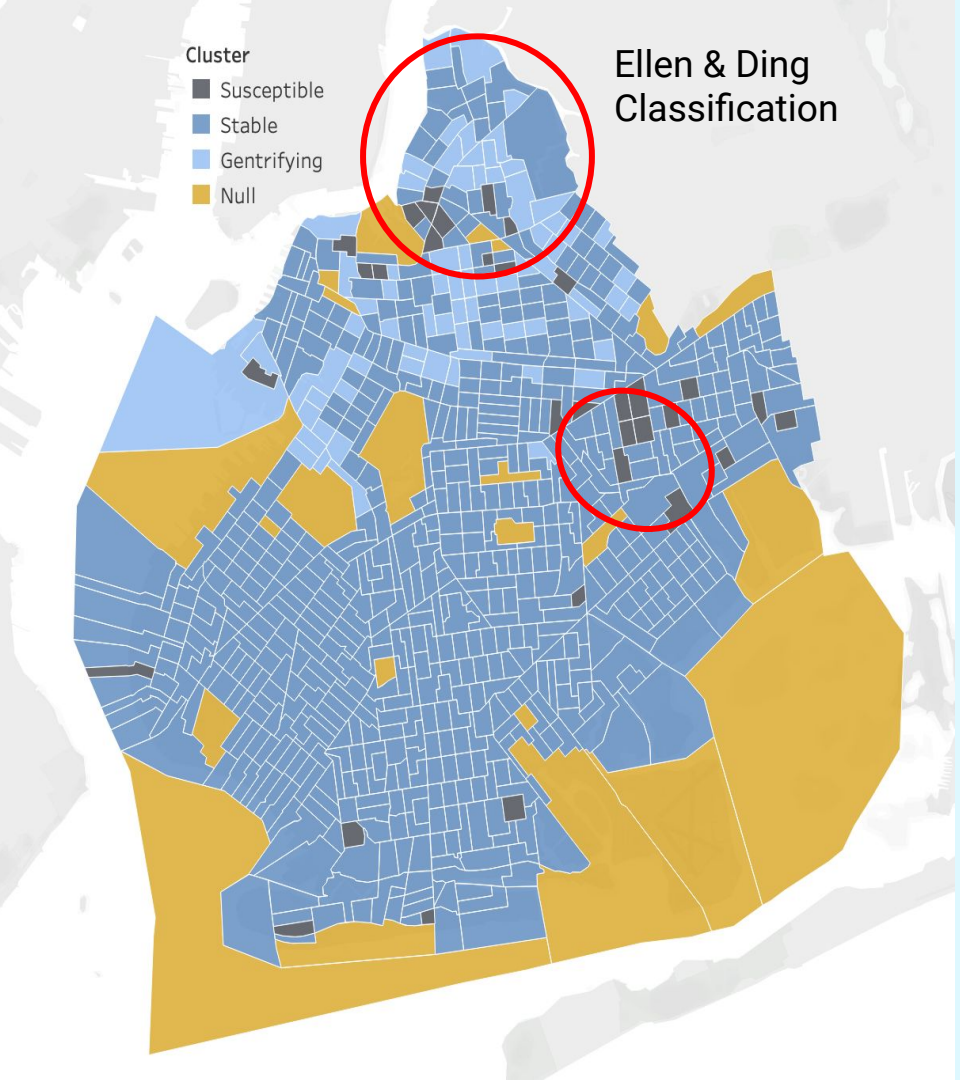
Established Metrics Comparison

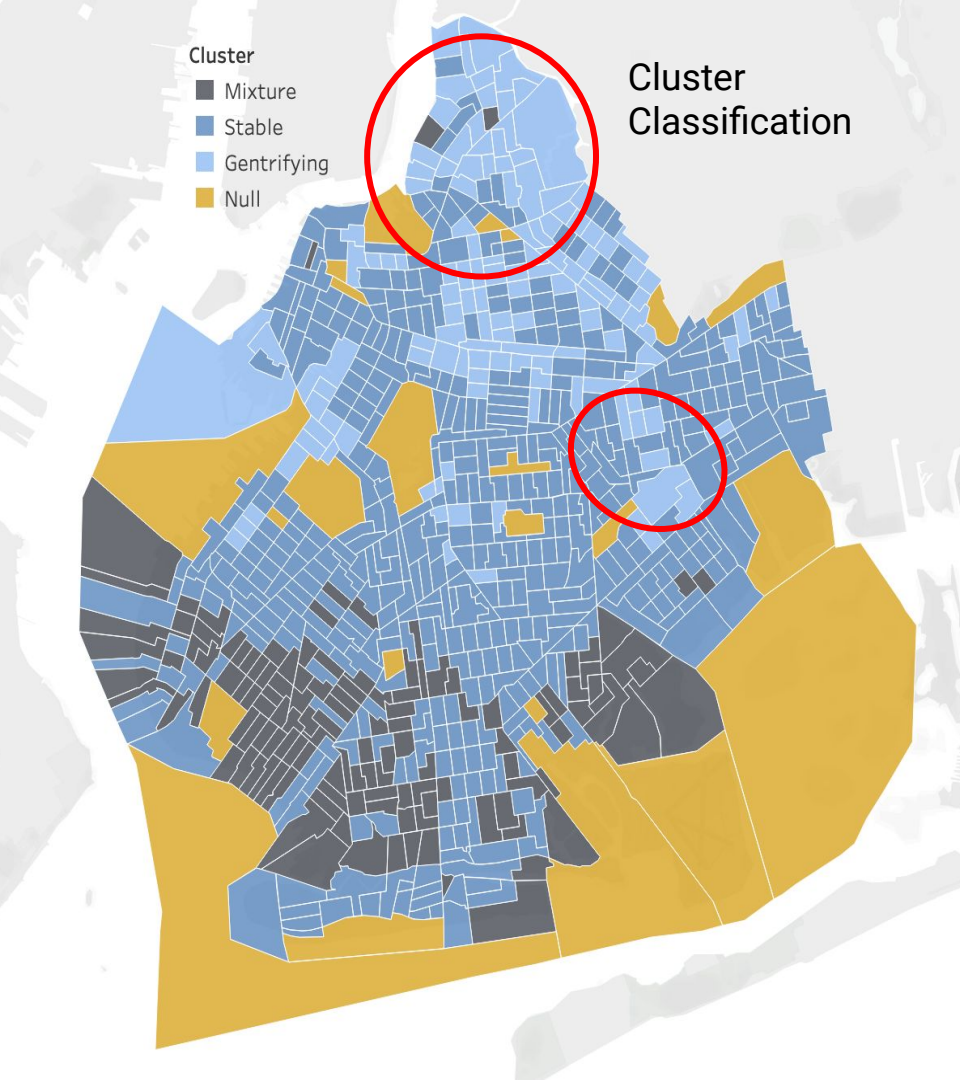
Ellen & Ding Classification



Cluster Classification




Cluster
Susceptible
Stable
Gentrifying
Null
Ellen & Ding
Classification


Cluster
Mixture
Stable
Gentrifying
Null
Cluster
Classification

SIDE BY SIDE COMPARISON

CLUSTERING MODEL

- Provided a snapshot of neighborhoods based on percent change
- Mixture category included misclassified tracts and areas deemed less desirable
- Classified ~12% of tracts as gentrifying

ESTABLISHED METRICS

- Looked for possibility of change based on lower household income
- Susceptible category allowed established metrics to look forward
- Only classified 5% of tracts as gentrifying

RECOMMENDATIONS

- Look at adjacent neighborhoods in order to stem the tide of displacement

- Connect with community groups and housing activists in order to provide services to residents that may be forced out

- Communicate to the appropriate government agencies the warning signs of a gentrified neighborhood in order to stop it

FURTHER WORK

- Include more recent data and use this approach to predict on neighborhoods in the Bronx

- Look to find new data that can be used in models to better predict gentrifying neighborhoods

- Run script that will test every combination of possible subsets to find the best barometer of gentrification

SOURCES

- Gentrification: Framing Our Perceptions *Enterprise Community Partners*
- Daily News: Brooklyn Development
- Longitudinal Tract Database, Brown University
- Saporta Report: How Do Researchers Measure Gentrification
- Georgetown University: Examining the Negative Impacts of Gentrification
- NYC Census Tract Maps

- Images created with ***Tableau***
- Slides by Slidego

Thank You

Questions?

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