

Chicago Infrastructure: Deficits & Disparities

Team 1: Wayne Mitchell, Michelle Moody, Yiran Zhang, Deidra Lebron



TABLE OF CONTENTS

01

02

03

04

05

INTRODUCTION

Michelle

EDA & RESEARCH OBJECTIVES

Wayne

ANALYSIS

Deidra: potholes
Michelle: graffiti
Yiran: vacancy

CONCLUSIONS

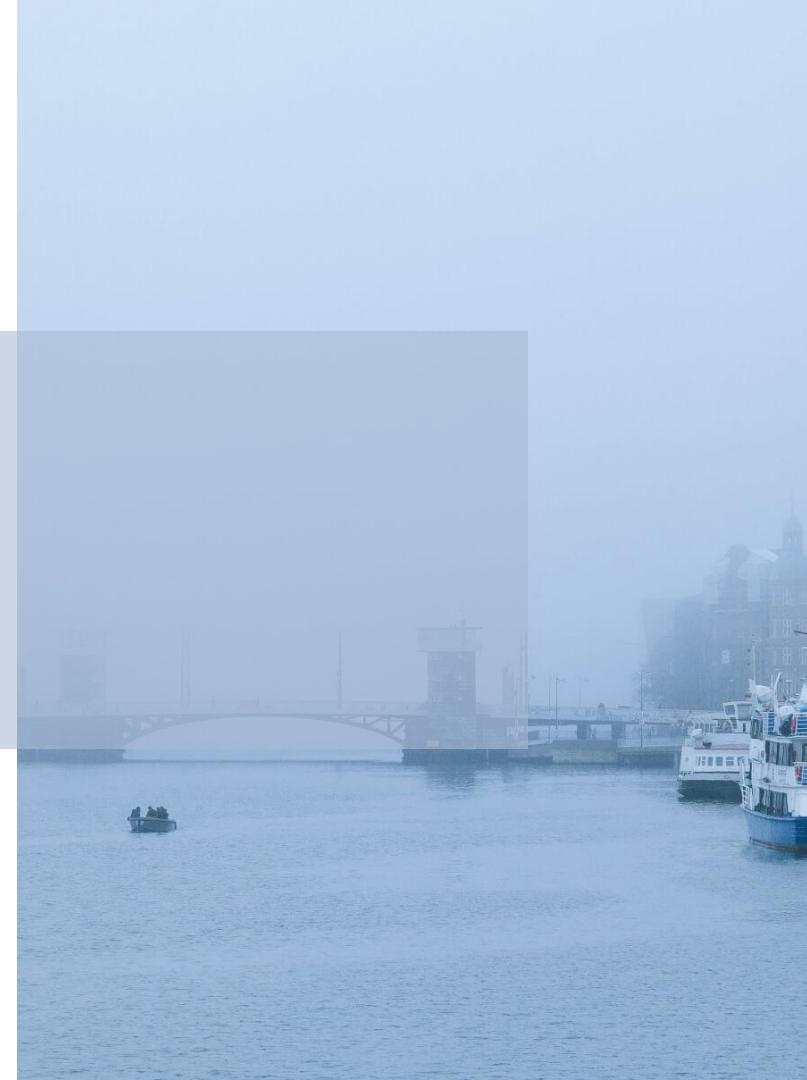
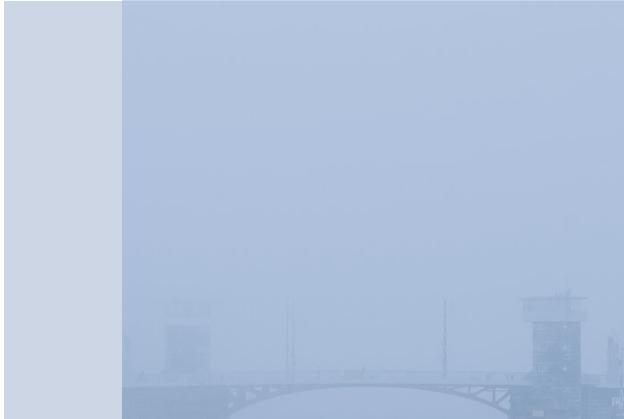
Yiran

LESSONS LEARNED & FUTURE DIRECTIONS

All

GO-Gitters

Deidra Lebron
Wayne Mitchell
Michelle Moody
Yiran Zhang



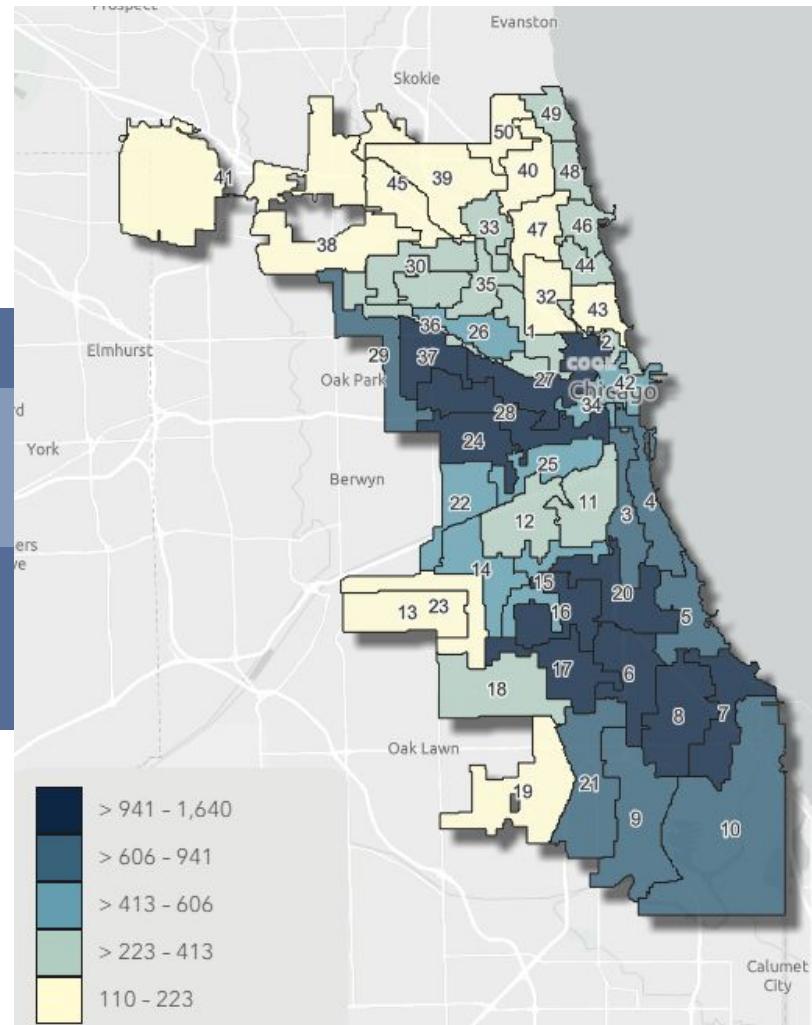


01

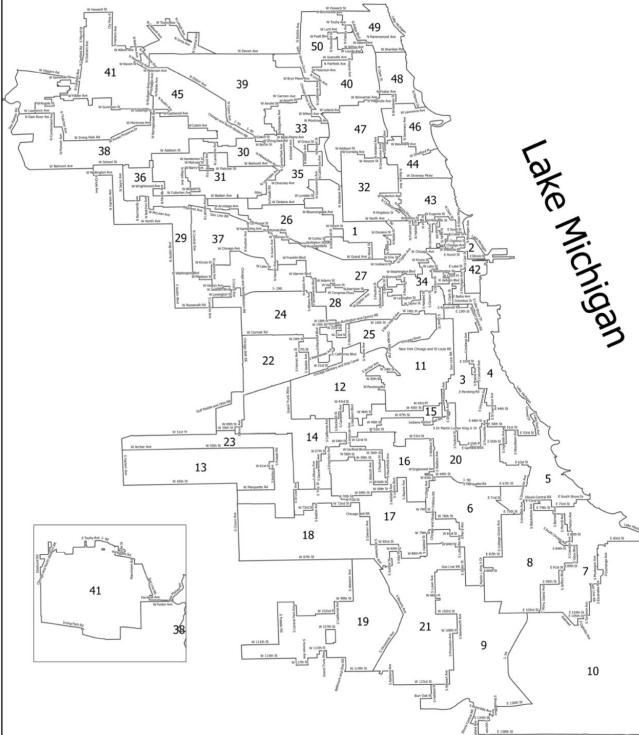
INTRODUCTION

Investigating the overlap of crimes in Chicago
with neighborhood disinvestment indicators
(e.g., graffiti, unfilled potholes, trash/activity in
vacant lots or buildings)

WARD MAP OF CHICAGO



Ward Map of the City of Chicago



Board of Elections - City of Chicago
69 W Washington, Suite 600, Chicago, IL 60602
312-269-7900
www.chicagoelections.gov

These aldermanic ward maps are current as of the
redistricting exercise conducted by the Chicago City
Council on May 19, 2002, and the wards are subject to
change and/or possible corrections. Please check
periodically for updated maps.

0 0.5 1.0 1.5 2.0 2.5 Miles

Chicago is divided into
fifty (50) wards, the
boundaries of which are
drawn using current
census data.

AUDIENCE



Community activists

Community activists who care about public safety and how public dollars are spent.



Alderpersons

Alderpersons, as elected representatives to Chicago City Council, are responsible for the city's financial stewardship & well-being



Concerned community members

Certain community members may be more concerned about infrastructure & crime than average.



Potential home buyers

Potential home buyers more often than not will look up neighborhood crime statistics, spending data, schools, etc to inform their decisions



Real estate industry

Similar to potential home buyers, real estate actors need to stay abreast of property value impacts & indicators



HYPOTHESIS:

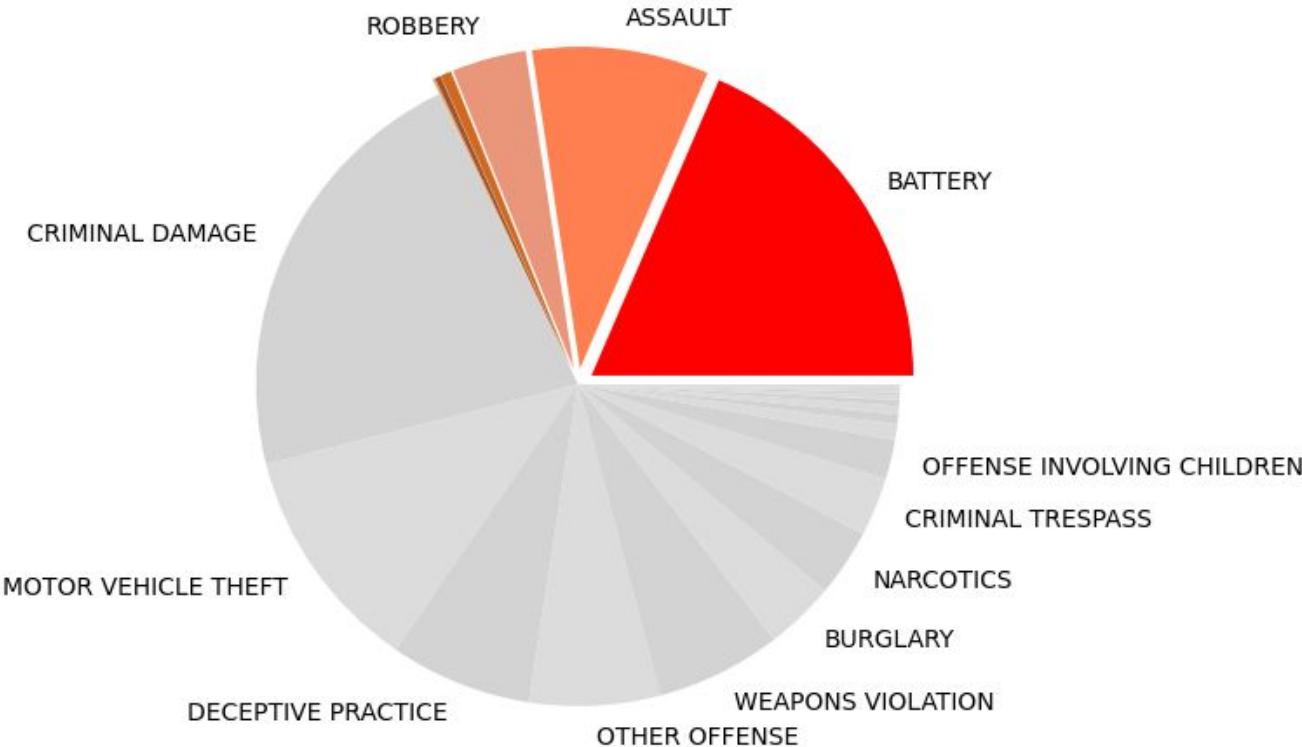
Crime is NOT tied to neighborhood infrastructure disinvestment indicators.

EDA

Wayne Mitchell



CRIME PIE CHART



BATTERY

17%

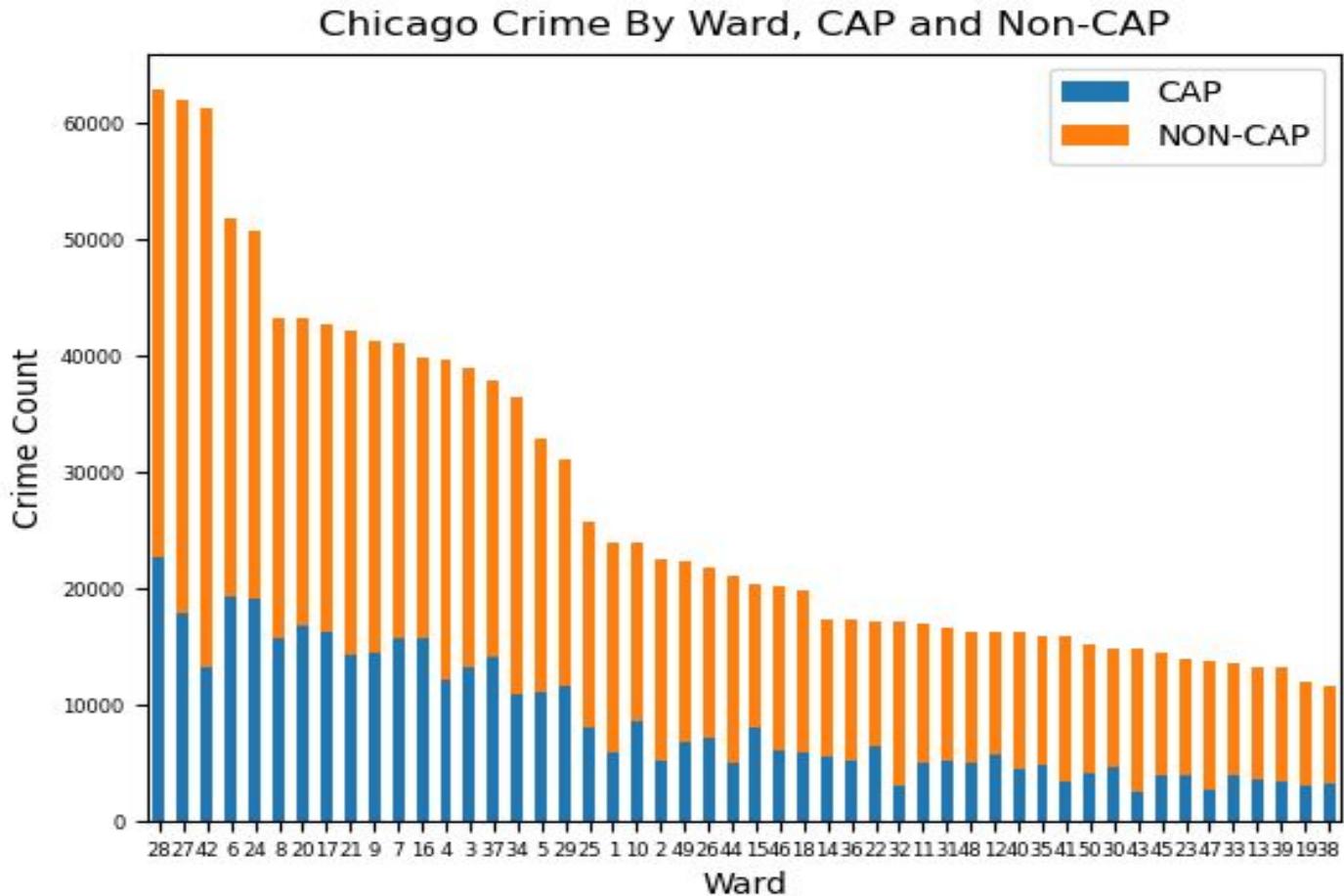
CRIMINAL
DAMAGE

22%

OTHER CAP

17%

Crimes Breakdown by Ward



RESEARCH OBJECTIVES



02

DATASETS USED

CHICAGO CRIME DATABASE

All crimes reported in the City of Chicago from midnight January 1, 2019 through October 10, 2024

CHICAGO 311 SERVICE CALLS: graffiti removal

All 311 service requests for graffiti removal services from January 1, 2019 through October 10, 2024

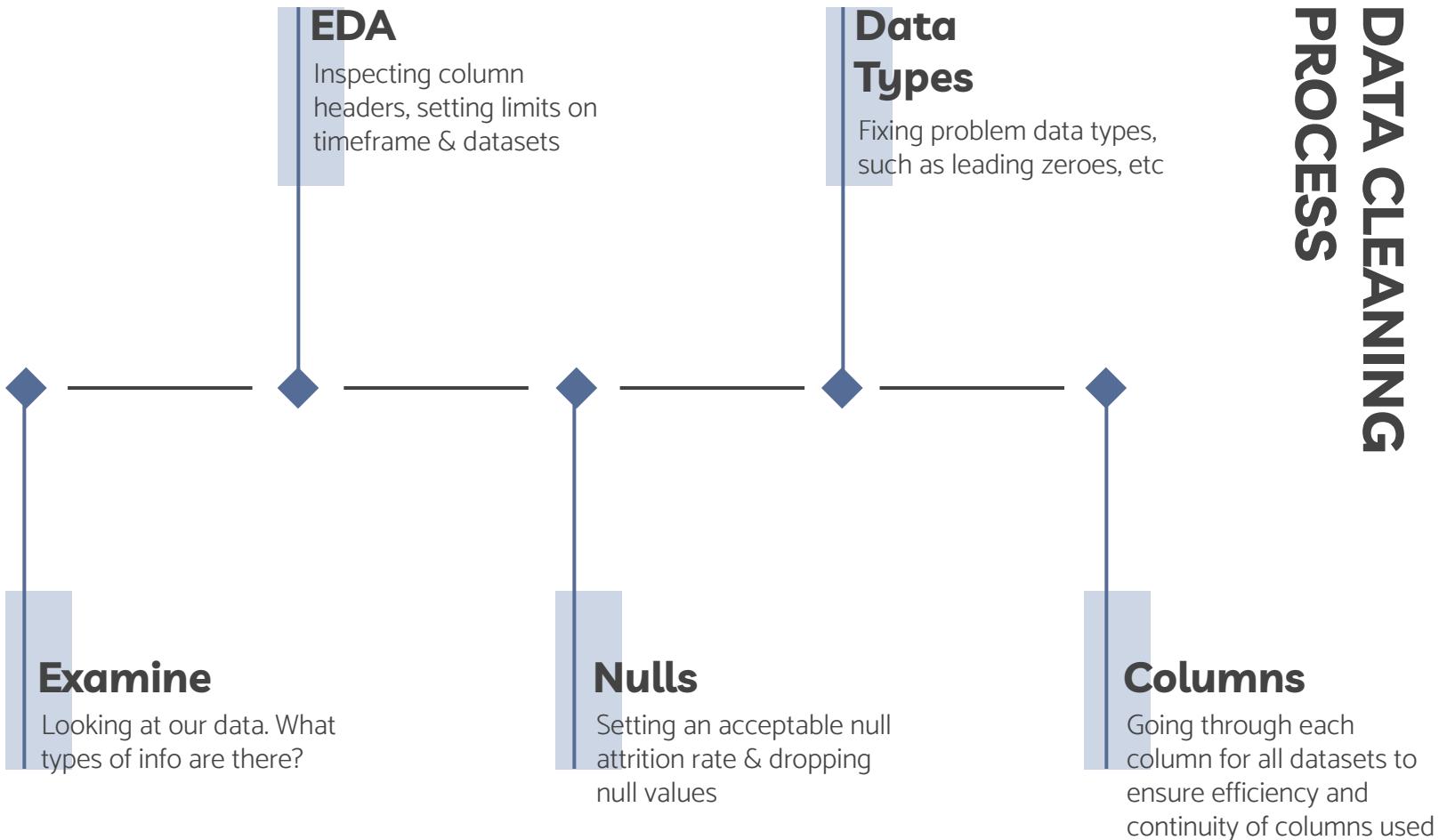
CHICAGO 311 SERVICE CALLS: pothole repair

All 311 service requests for pothole or road repair patching from January 1, 2019 through October 10, 2024

CHICAGO 311 SERVICE CALLS: vacant lot/building

All 311 service requests pertaining to vacant lots and vacant buildings (e.g. trash in vacant lots, activity in vacant buildings) from January 1, 2019 through October 10, 2024

DATA CLEANING PROCESS



POTHOLE

Deidra Lebron



POTHOLEs: the process



OCCURRENCE

Potholes appear mostly on arterial streets (which carry the most vehicles), and under bridges and viaducts, areas where water often collects.

PROCESS

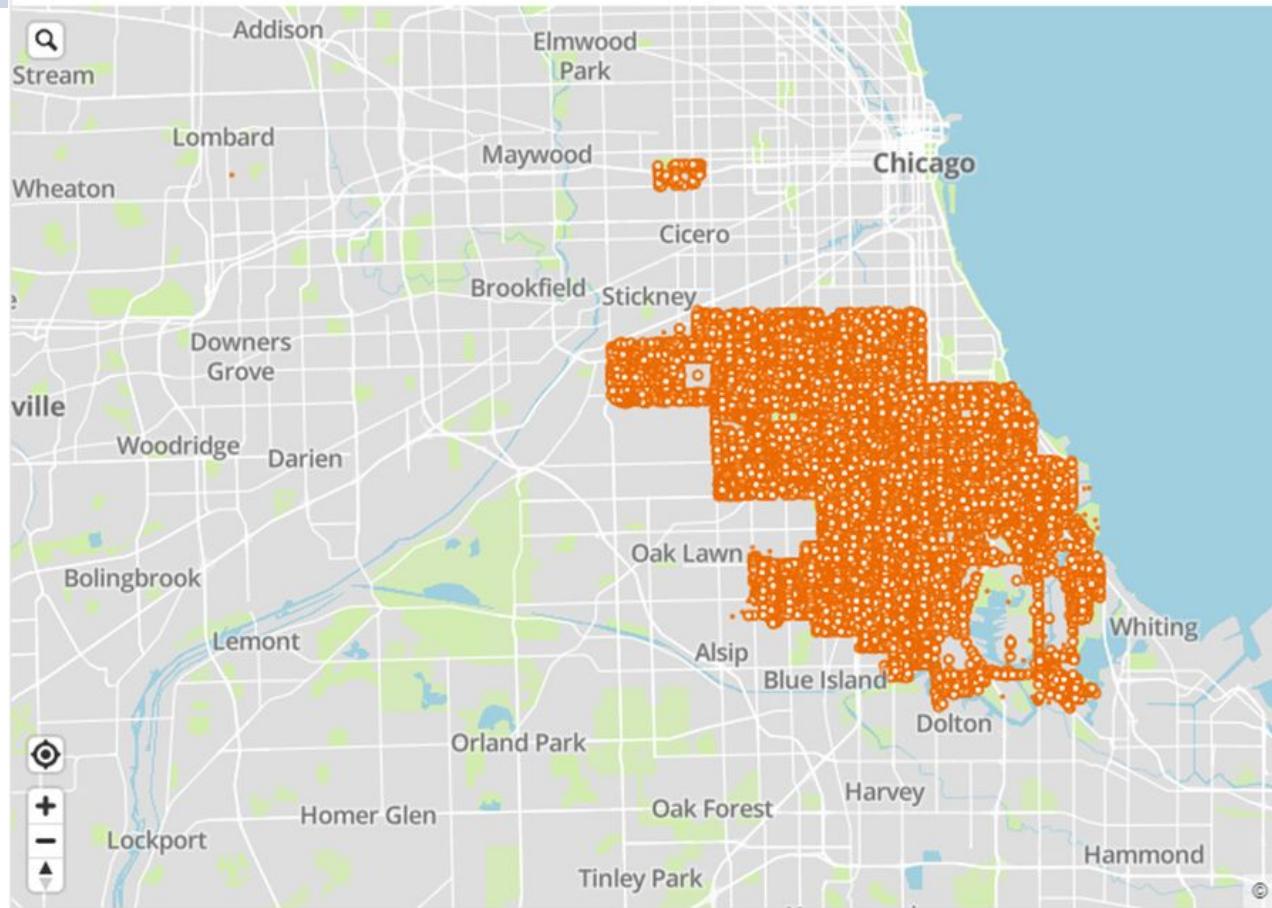
After receiving 311 notifications of needed pothole repairs, the Chicago Department of Transportation (CDOT) uses a computerized mapping and tracking system to identify pothole locations and schedule crews most efficiently. Using that map, managers determine routings for each crew that will allow them to fill the most potholes possible. Night and weekend crews repair high-traffic areas when traffic is lightest, which maximizes efficiency and minimizes traffic impacts.

311 PORTAL

The 311 call portal documents the time complaints were placed and the actual date and time the potholes were repaired.

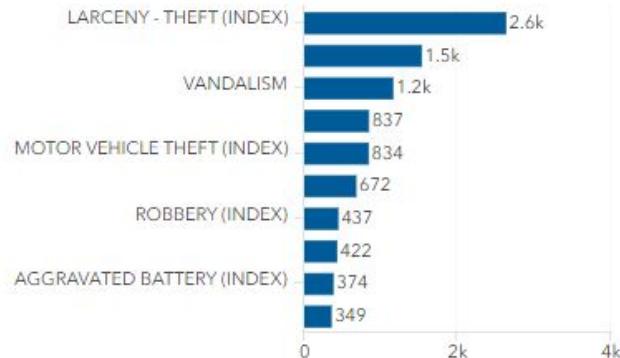
Potholes Patched - Previous Seven Days

This map shows potholes patched in the previous seven days, based on the corresponding 311 service requests at <https://data.cityofchicago.org/>

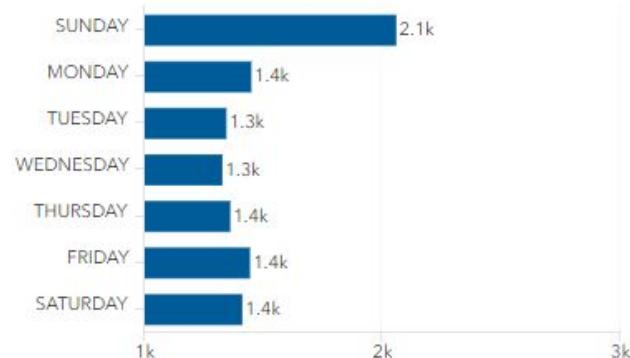


CRIME OVERVIEW

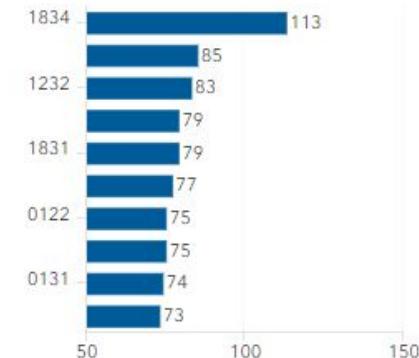
Top 10 Crimes



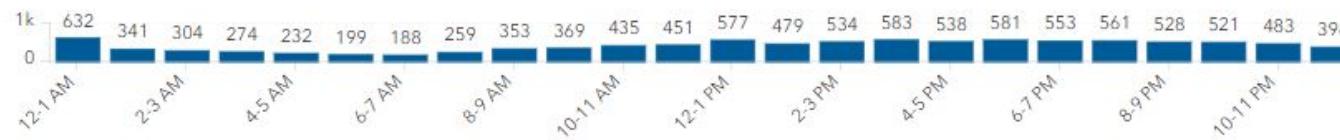
Crime by Day of Week



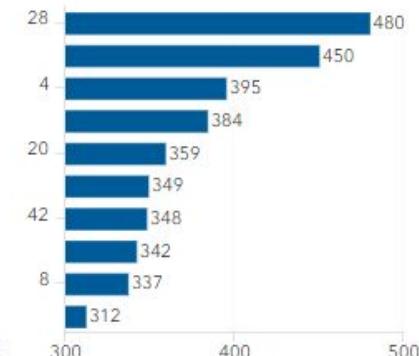
Crime by Beat (Top 10)



Crime by Time of Day



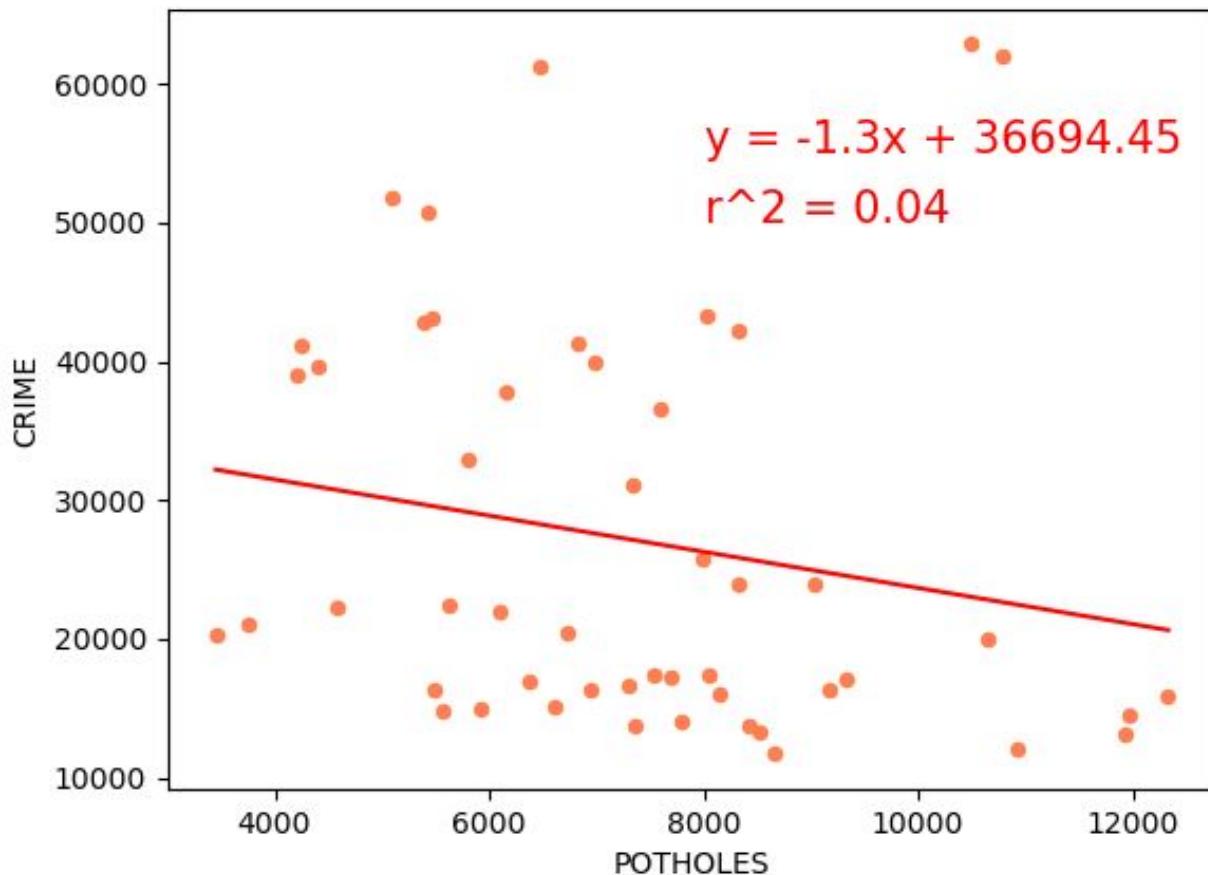
Crime by Ward (Top 10)



Crime over Time



CORRELATION?





GRAFFITI

Michelle Moody

HOW MIGHT GRAFFITI RELATE TO CRIME?



Indicator of Neighborhood Health

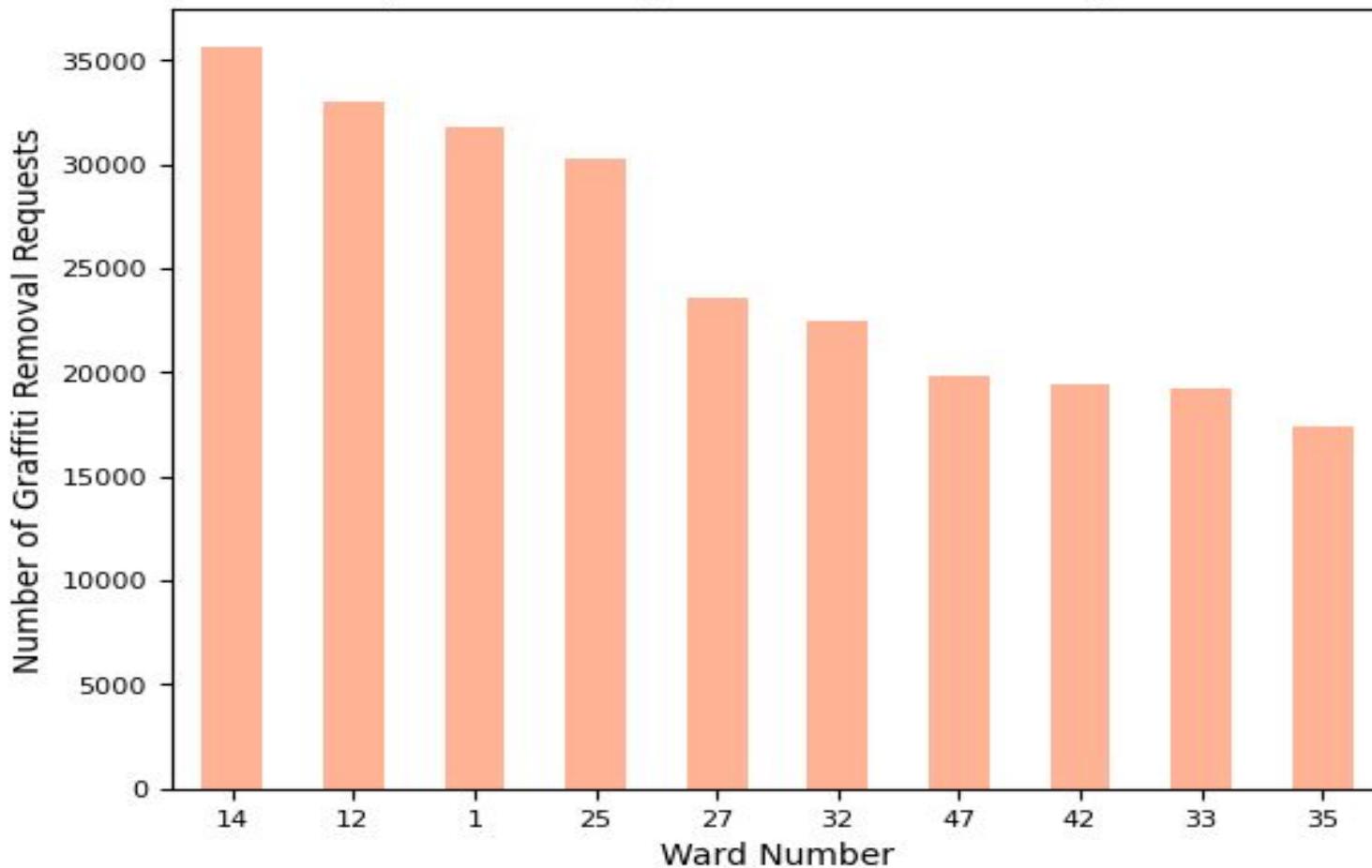
Frequent graffiti can signal a lack of resources or community investment. This neglect can foster conditions that contribute to higher crime rates, such as loitering, vandalism, or drug-related activities.

Use in Gang-Related Activities

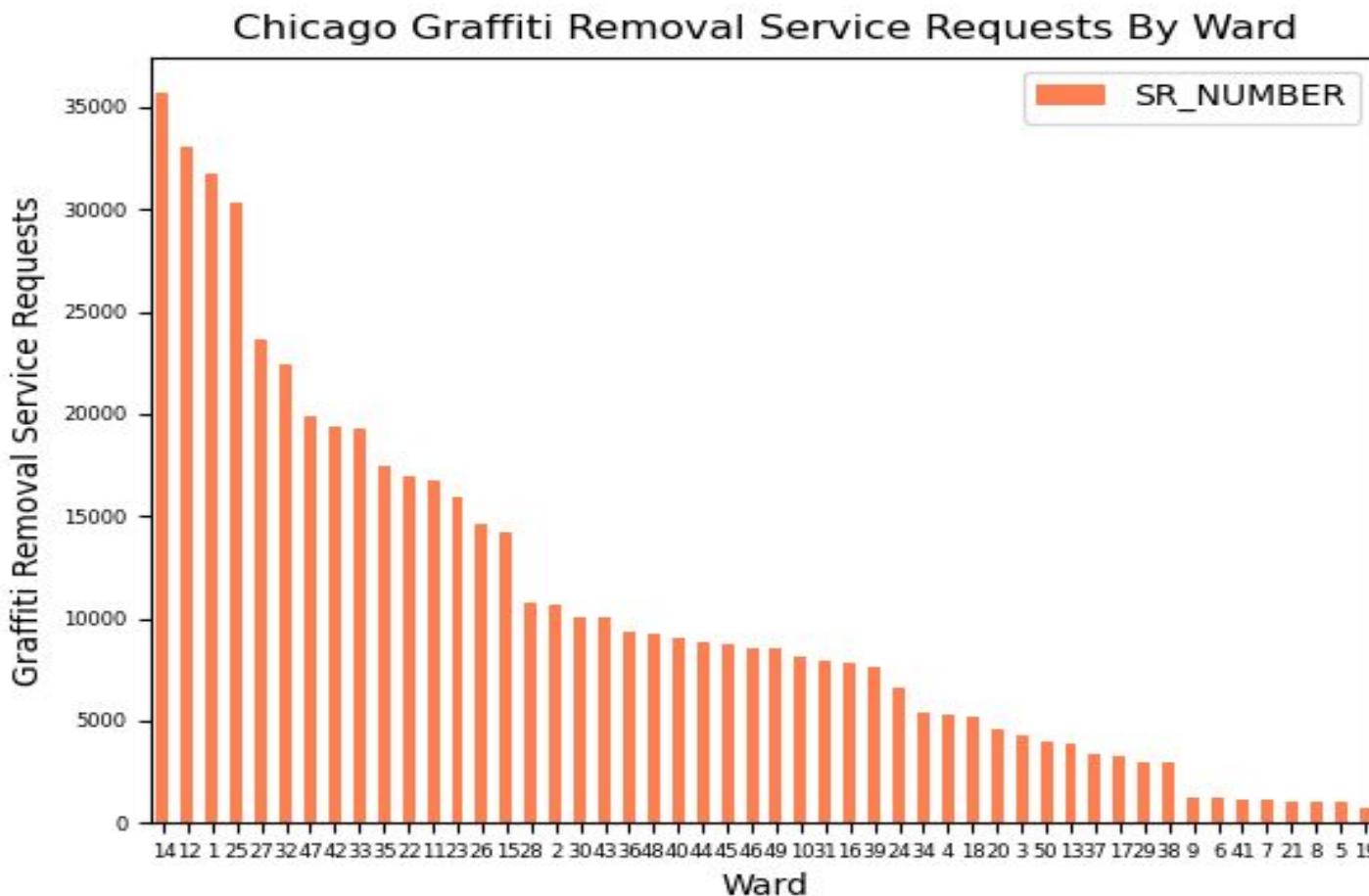
In some cases, graffiti may be used by gangs to mark territory or communicate messages. An increase in gang-related graffiti could indicate areas where gang activity is more prevalent, which may correlate with higher rates of violent crime, such as assaults, shootings, or homicides.

TOP 10 GRAFFITI

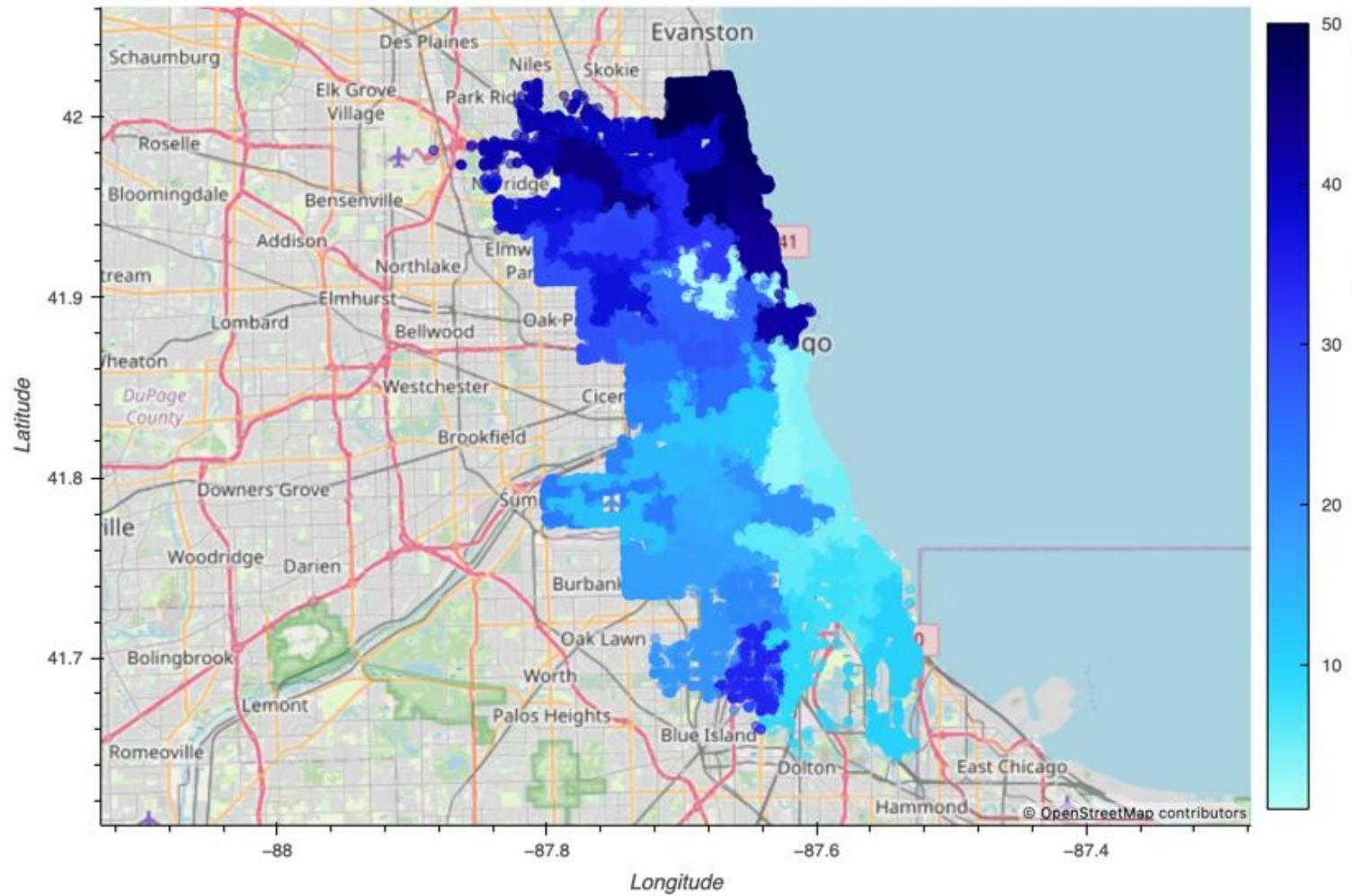
Top 10 Wards by Graffiti Removal Requests



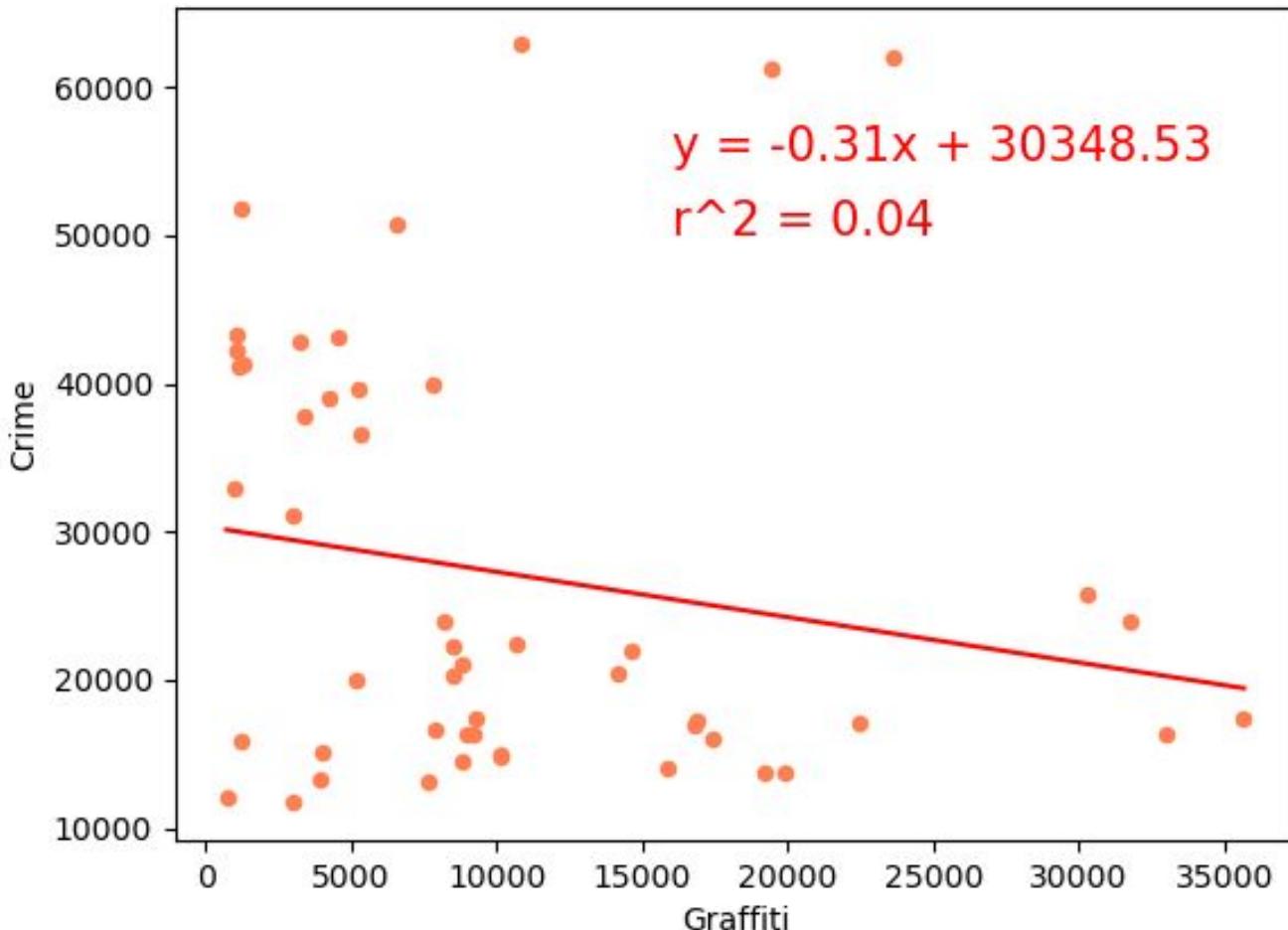
WARD DATA



MAP OF GRAFFITI REMOVAL REQUESTS BY WARD



CORRELATION?





VACANT LOTS & BUILDINGS

Yiran Zhang

WHY LOOK AT VACANCIES?



VACANT LOTS

Trash on vacant lots can be an indicator of city disinvestment (no regular upkeep). This type of 311 service request goes to the “streets and sanitation” department.

VACANT BUILDINGS

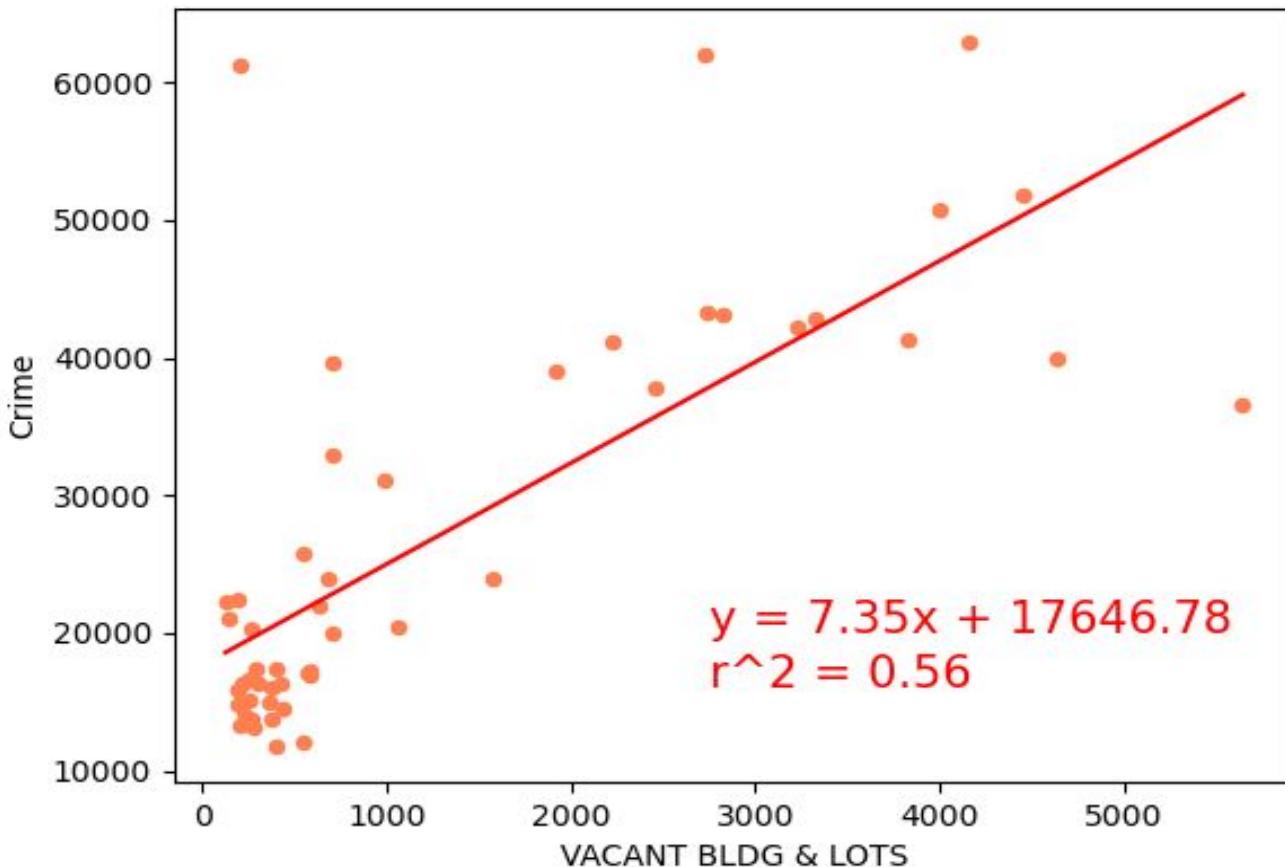
Vacant or abandoned buildings can be a sign of population drain and general municipal disinvestment. Can also add to the “broken windows” theory.



ACTIVITY IN VACANT BUILDINGS

Activity in or around vacant buildings can go largely unnoticed in areas with lower populations, and can pose issues in areas with higher population density, as these sites are ideal for gang activity or other disruptive behavior.

CORRELATION!



RESULTS

Top 10 Vacancy & Crime Report Wards Comparison

Vacancy Wards	34	16	6	28	24	9	17	21	20	8
Crime Wards	28	27	42	6	24	8	20	17	21	9

CONCLUSIONS



GRAFFITI & POTHOLEs

There is no correlation between the number of graffiti or pothole complaints in Chicago wards and the number of crimes reported in those wards. This can be due to 2 confounding variables that were not investigated in this analysis: gang activity and median household income.

VACANT LOTS & BUILDINGS



There is relatively stronger correlation between the number of vacant building and vacant lot service requests in Chicago wards and the number of crimes reported in those wards. This can be due to a number of variables, including gang activity and bias toward residents who are aware of both 311 & the ability to report.

LESSONS LEARNED

DATA

Data from online databases that rely on many “hands” to input and/or process may not always be in the most “clean” or optimal form

PYTHON ASSUMPTIONS

In creating scatterplots using 2 sets of data, Python’s default is to match highest data point from one to highest of the other



Spearman Rank Correlation vs Linear Regression

CORRELATION

Community Areas vs Wards: wards are based on census data and can change over time, while the 77 community areas are determined by geography only

CHICAGO

CREDITS

go_gitters.roles()

- EDA, cleaned all csv files, statistical tests, linreg figures Wayne Mitchell
- Report, graffiti & pothole analysis, final Jupyter notebook Michelle Moody
- CSV pulls, vacancy analysis, repo clean, README, slide deck Yiran Zhang
- Crime graphic, pothole research Deidra Lebron

