Investigating the impact of redlining in Chicago

The Group Formerly Known As Prince:
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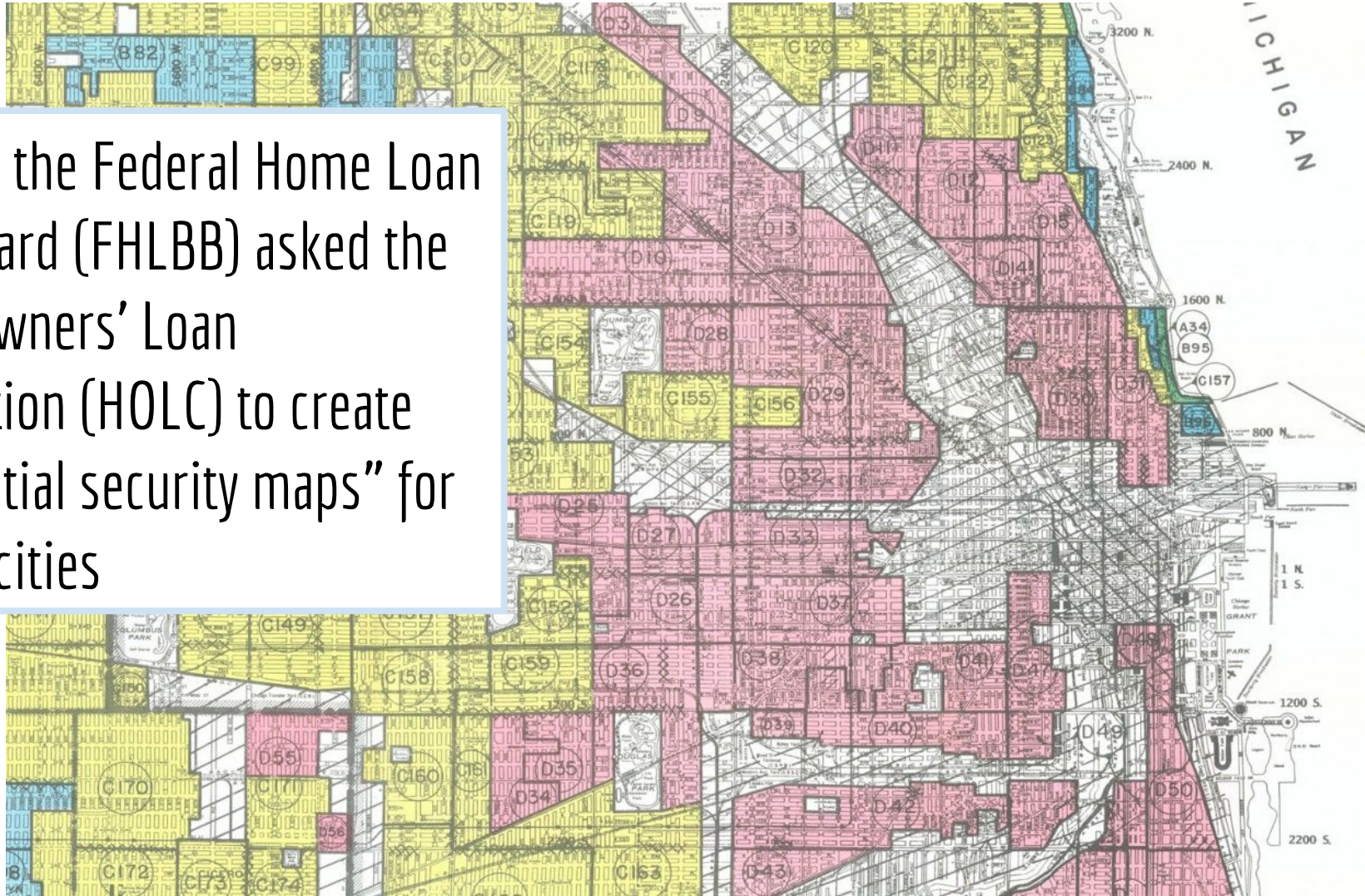
Agenda

1. Project introduction and overview
   - Redlining overview and brief literature review
   - Project goals
   - Project overview
2. Methods
3. Website demonstration
4. Conclusion

In 1935, the Federal Home Loan Bank Board (FHLBB) asked the Home Owners' Loan Corporation (HOLC) to create "residential security maps" for 239 US cities



HOLC's map of Chicago

HOLC's maps categorized cities based on "desirability" to inform loan and mortgage decisions

Unsurprisingly, race played a significant role in HOLC's district categorization

A copy of Tacoma's original HOLC appraisal

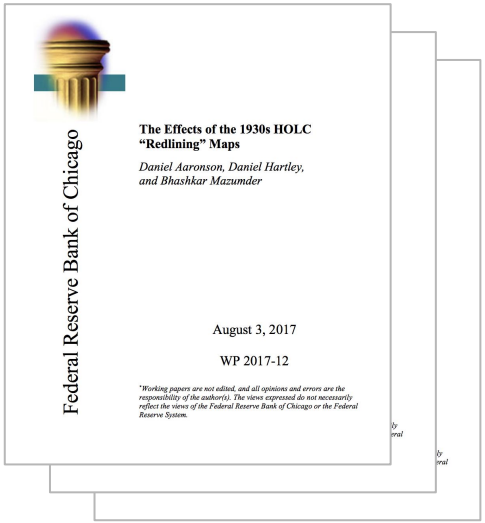
3. BUILDINGS:

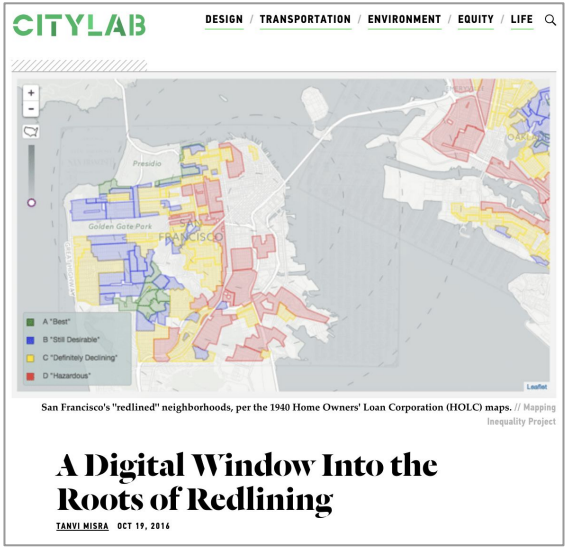
	PREDOMINATING 90 %	OTHER TYPE 10 %	OTHER TYPE ____ %
a. Type	4 & 5 room	Miscellaneous	
b. Construction	frame		
c. Average Age	15 Years	____ Years	____ Years
d. Repair	poor to fair		
ancy	95 %	____ %	____ %
ownership	50 %	____ %	____ %
ructed past yr.	None		
Price range	$1000 to $2500 100%	$____ 100%	$____ 100%
Price range	$500 to $1500 60 %	$____ %	$____ %
Price range	$800 to $2000 80 %	$____ %	$____ %
demand	$1500 - fair	$____	$____
l. Activity	fair		
m. 1929 Rent range	$10 to $25 100%	$____ 100%	$____ 100%
n. 1933 Rent range	$5.00 to $12 50 %	$____ %	$____ %
o. 1937 Rent range	$12 to $20 95 %	$____ %	$____ %
p. Rental demand	$15 good	$____	$____
q. Activity	good		

4. AVAILABILITY OF MORTGAGE FUNDS: a. Home purchase limited ; b. Home building limited

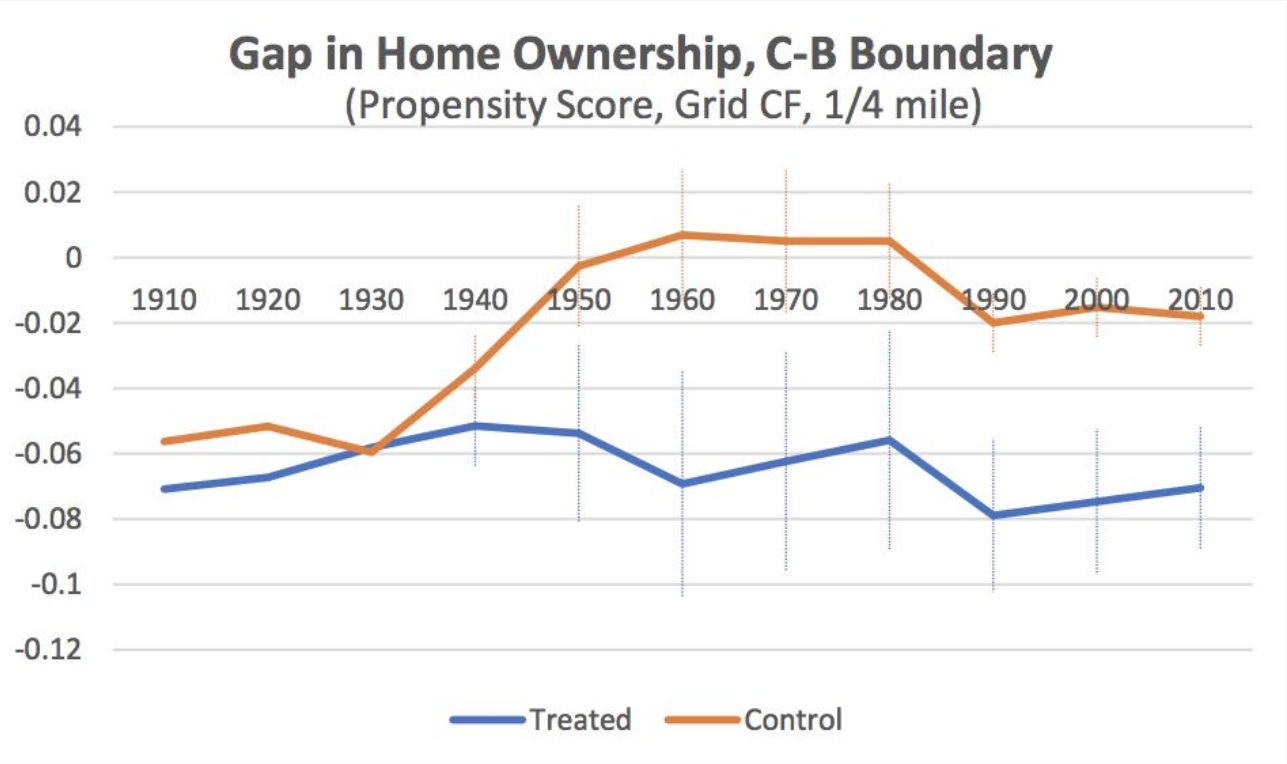
5. CLARIFYING REMARKS: This might be classed as a 'Low Yellow' area were it not for the presence of the number of Negroes and low class Foreign families who reside in the area. Lot values run from $2.00 to $5.00 per front foot.

HOLC redlining has shaped the US, even though it is no longer legal





Redlining has had a long-lasting impact



Chicago Fed's redlining paper examined these effects

Project questions

How can we measure the effect of redlining in Chicago?

How can we visualize the impact of redlining in Chicago?

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2. Methods
   - Data sources
   - Analysis
   - Implementation
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Data came from a variety of sources

IPUMS USA

- 1940s-1980s tract-level census data
- 1990s-2010 block-level census data

MAPPING INEQUALITY

https://dsl.richmond.edu/panorama/

- Redlining district shapefiles

https://www.chicagohealthatlas.org/

- Health data that we eventually had to discard

Discussions with experts informed our approach

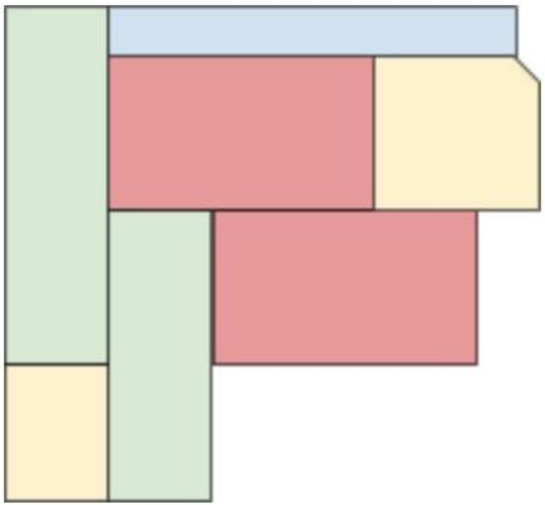
- **Christopher Berry:** met to discuss potential methodology
- **Chicago Fed:** emailed to discuss potential data sources
- **Jamie Saxon:** met to discuss potential visualization technologies

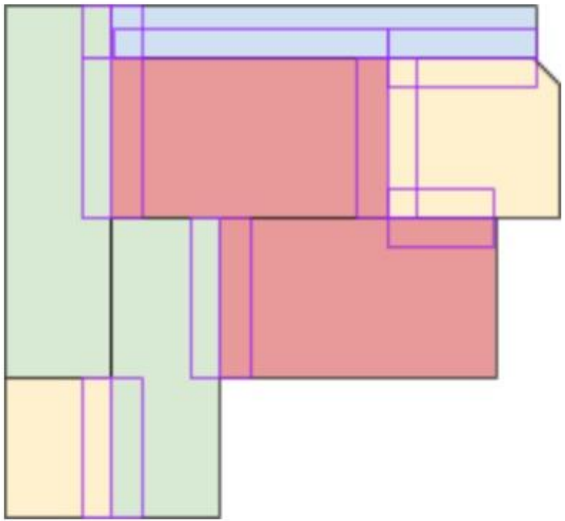
Methodology: Analysis

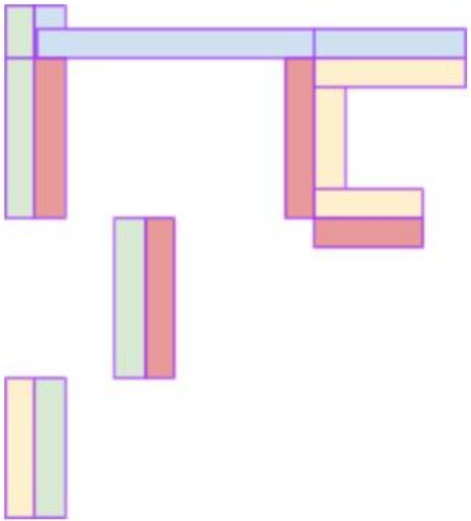
Approach: border discontinuity

Methodology: Analysis

Creating “boundary buffer” areas

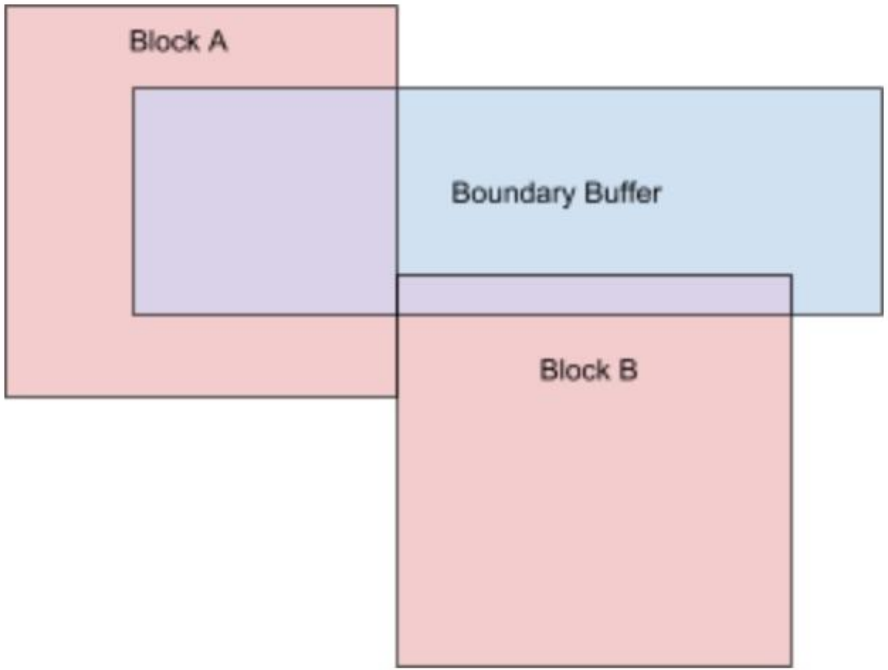






Methodology: Analysis

Identifying census unit: boundary buffer overlap

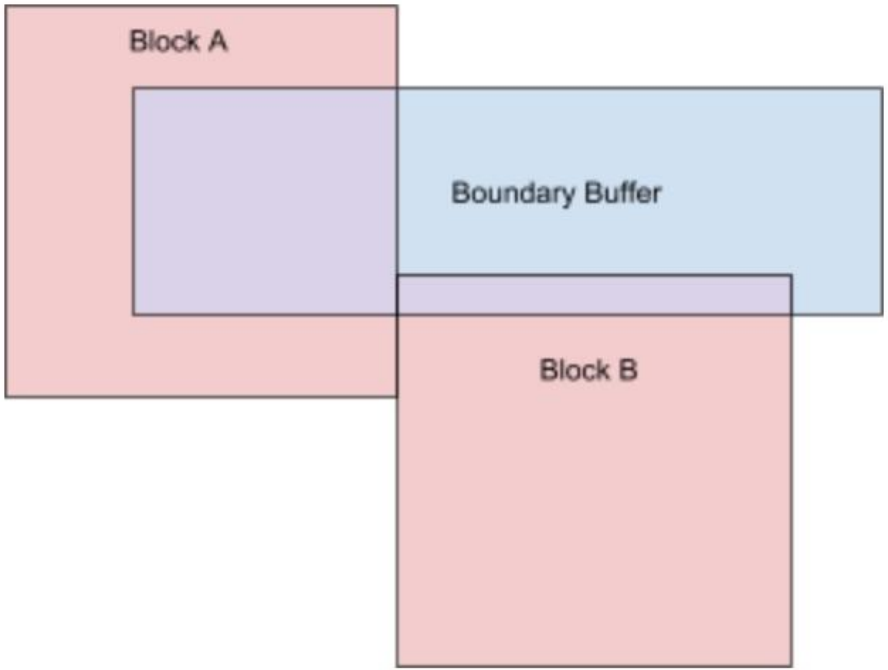


Overlap thresholds from Aaronson et. al:

- 50% area of census unit for blocks
- 15% area of census unit for tracts

Methodology: Analysis

Identifying census unit: boundary buffer overlap



Overlap thresholds from Aaronson et. al:

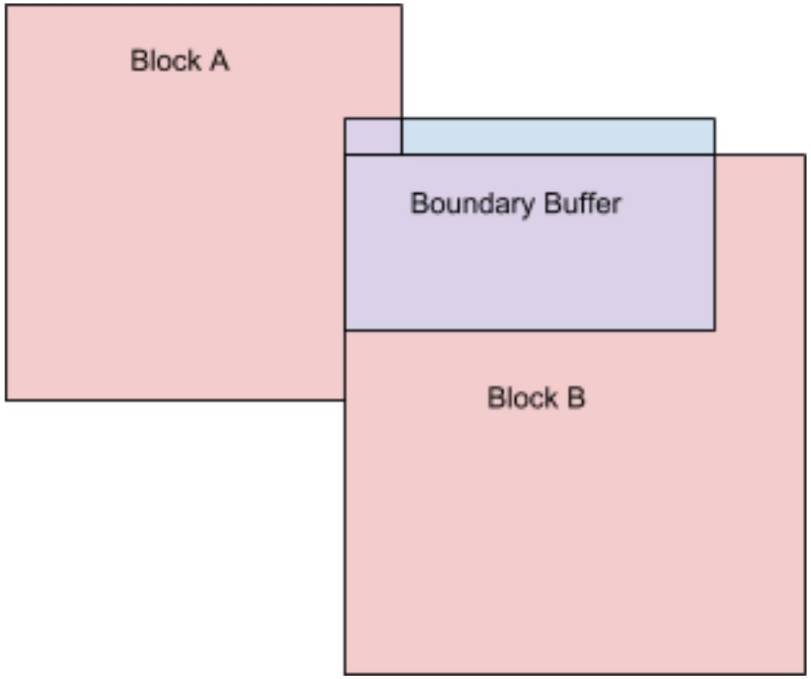
- 50% area of census unit for blocks
- 15% area of census unit for tracts

Missing data Aaronson et al:

- 1940: lose 75% of observations

Methodology: Analysis

Challenge: balancing sample size with rigor



Overlap thresholds from Aaronson et. al:

- 15% area of census unit for blocks
- 50% area of census unit for tracts
- 70% area of boundary buffer

Missing data:

- 1940: lose 49% observations
- Overall: lose 17% observations

Recalculate each year because census boundaries change

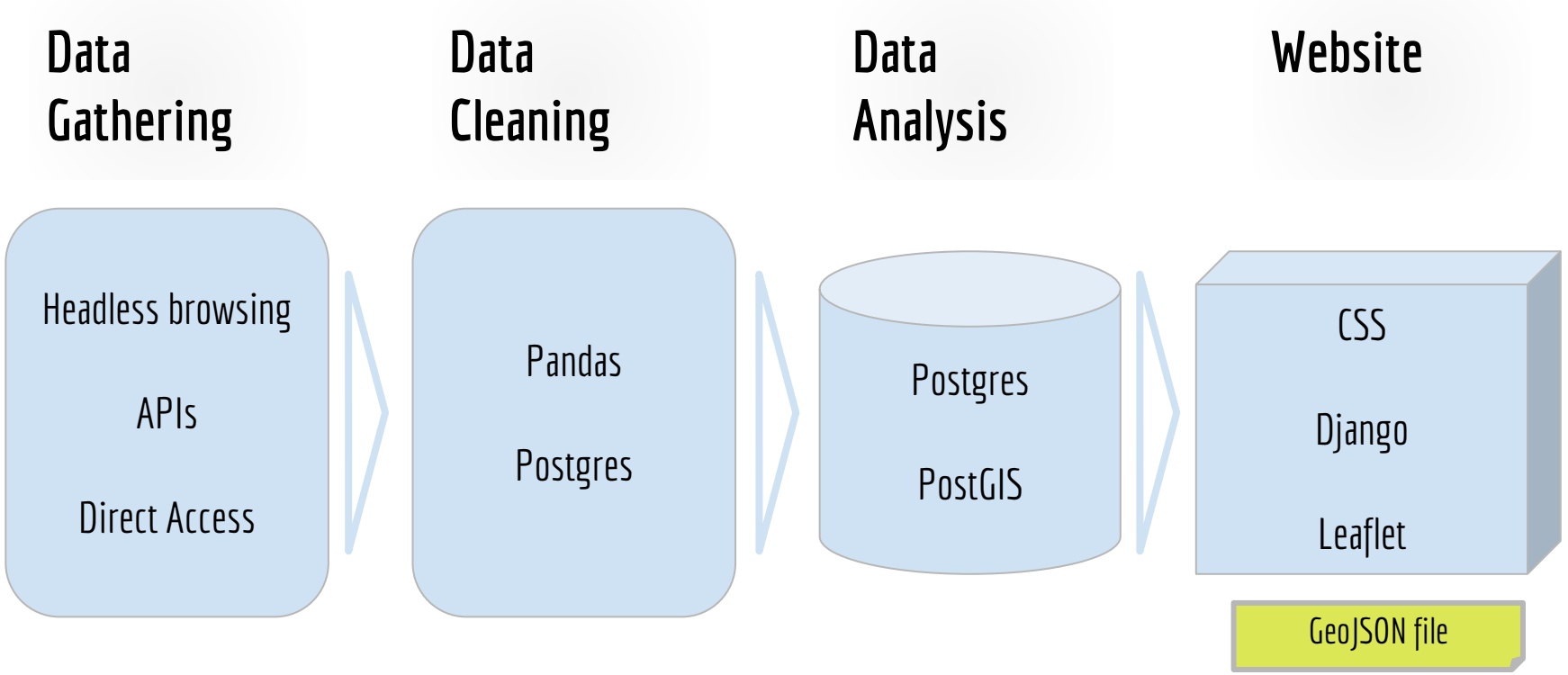
Methodology: Analysis

Calculating boundary buffer statistics

- Weighted averages by census unit total population
- Standardize Median because given in nominal dollars:

  norm_med = median - avg(median)/ stddev(median)

System Design



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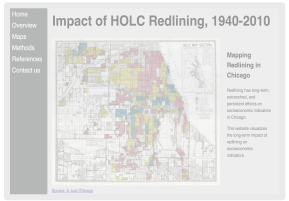
Website demonstration

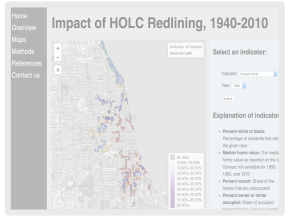
- Website is designed to be viewed on a 1000px screen. In theory, this is easily convertible to smartphone accessibility
- We are not going to visit every single page on the site

Website demonstration

Pages we **will** visit

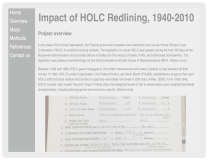


Home page

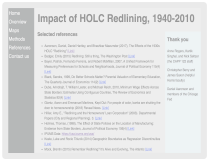


Interactive map

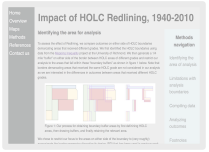
Pages we **won't** visit



Overview



References



Methods

Contact us

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1. Project introduction and overview
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   - Challenges during implementation
   - Next steps

Implementation challenges

- Not all of the data we wanted is available for all years
  - Information collected by the census has changed since 1940
  - Block-level data is unavailable prior to 1990
  - Integrating non-census data proved impractical
- Integrating web development services proved challenging
  - We had to use: HTML, CSS, Django, Postgres, Leaflet, Python, JavaScript
- Backend analysis was complex and time-consuming
  - Sought to balance rigor with complexity

Next steps

- Include additional data/analysis
  - Crime data
  - Educational attainment
  - Difference analysis
- Replicate in other cities

Thank you!

- Our “experts”
- CS 122 staff:
  - AMR
  - Kartik
  - Nick