

Yongfei Lu. Dec. 9th, 2022

Airbnb Search & Recommendation System

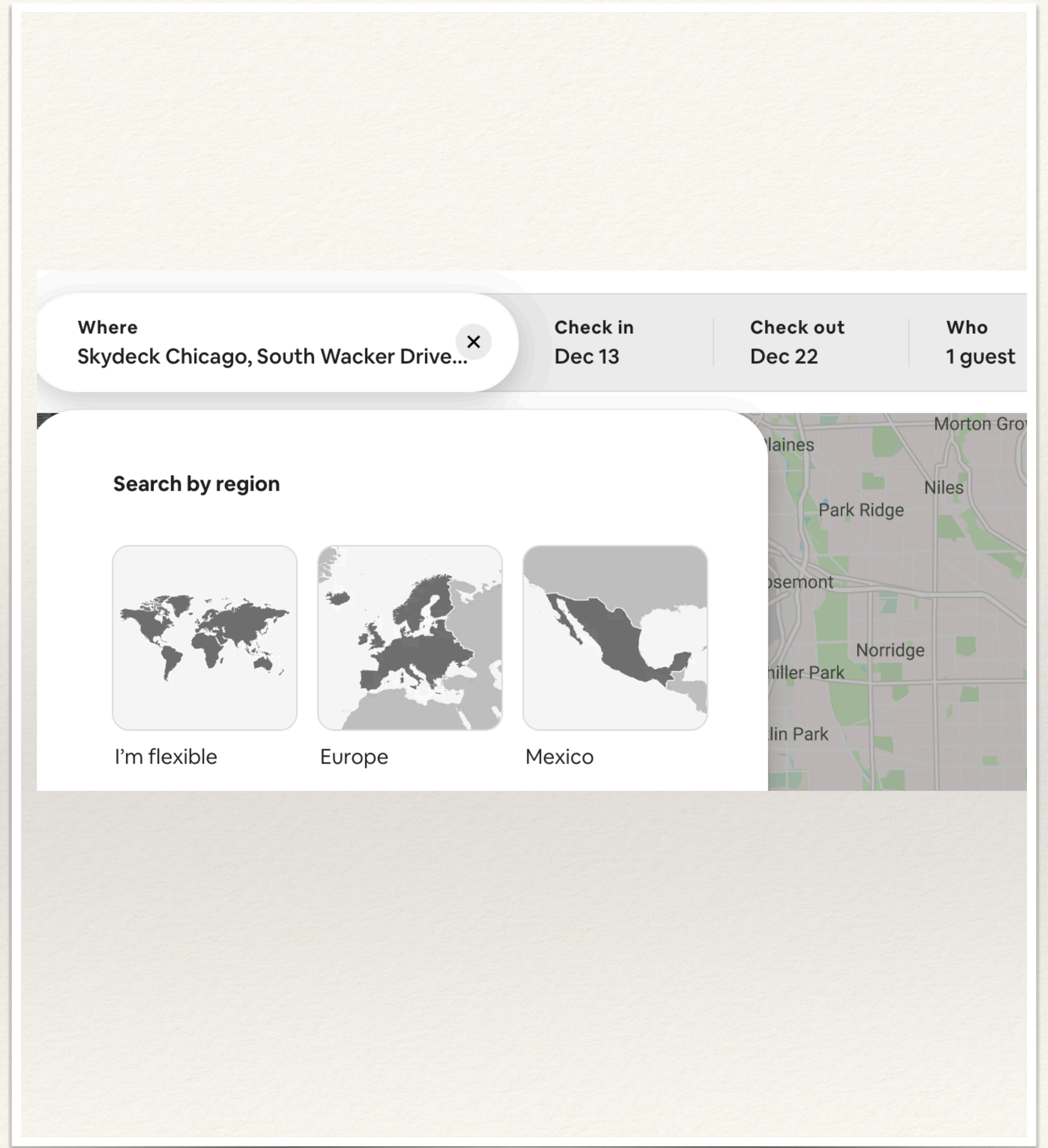
A tiny improvement with free text query
and social economic information provided

Airbnb

What to improve?

Should provide more convenience for new travelers:

1. Free Text Search like "Best scenic place in Chicago", "Places with great lake view" — More Intuitive
2. Provide socioeconomic information to help decision making: neighborhood level crime, income and demographic info



How to Improve? — free text query

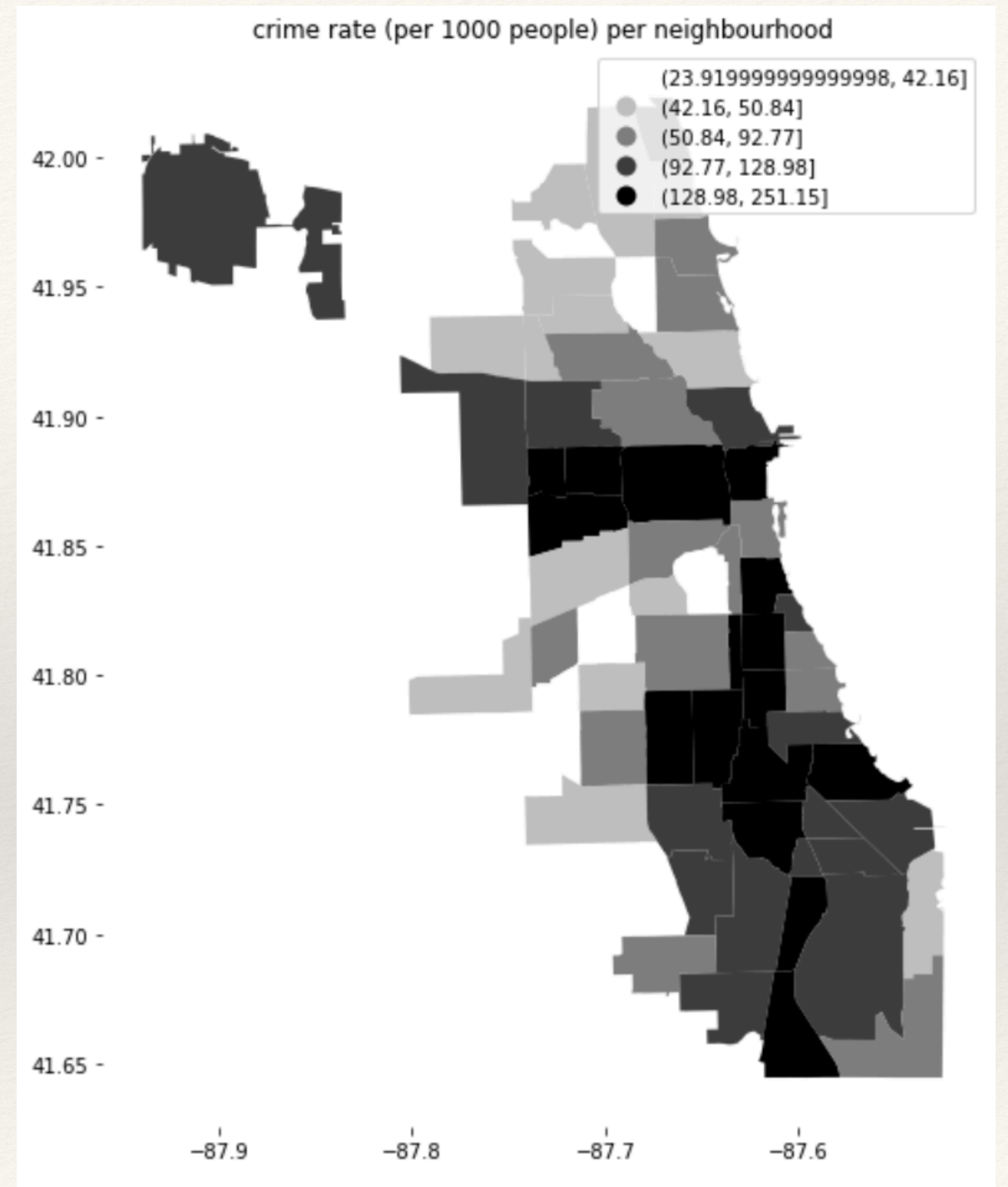
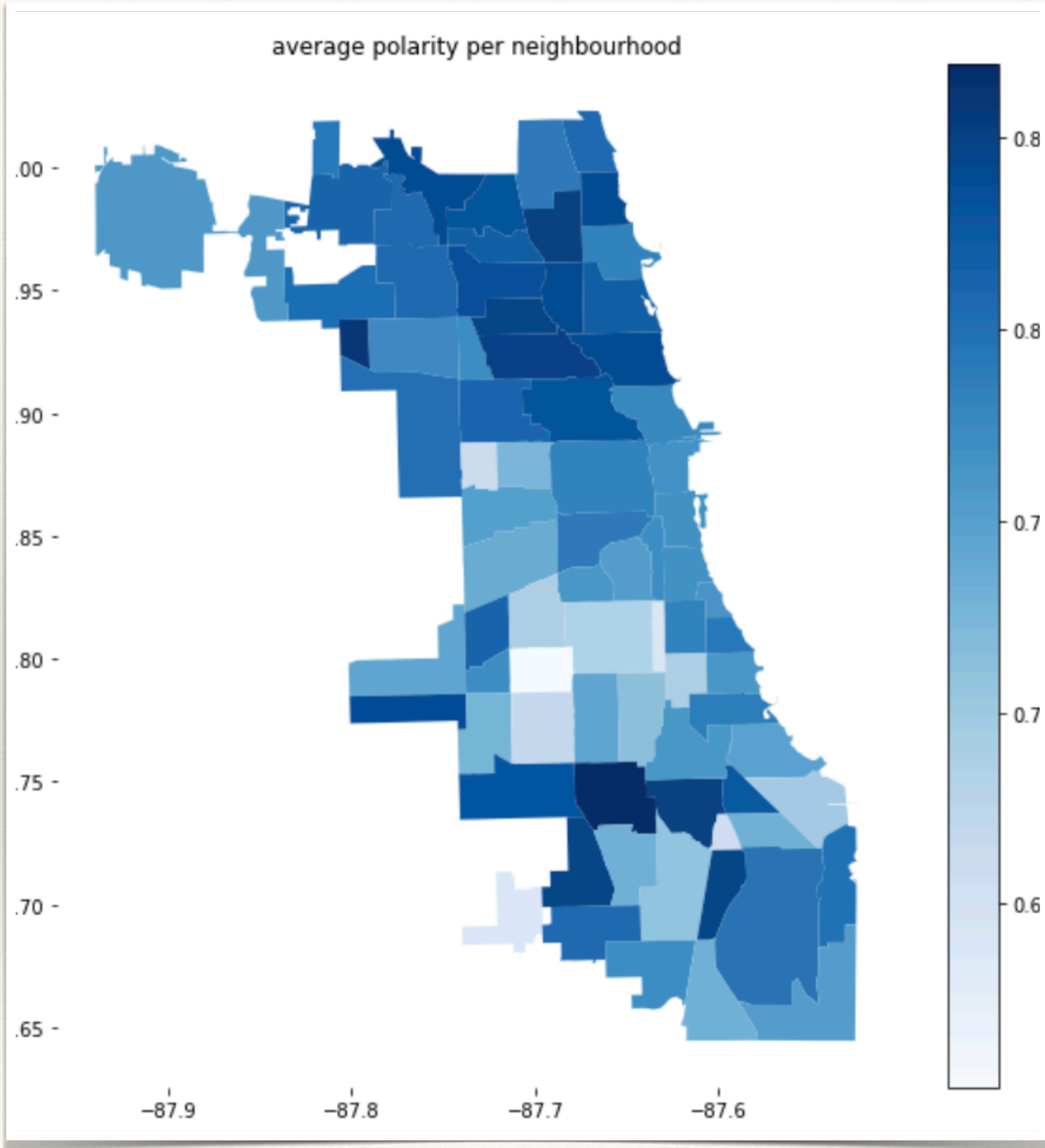
- ❖ Data: Chicago Airbnb listing dataset from insideairbnb.com
- ❖ ElasticSearch: create index on listing description and facilitate search

id	name	description	neighbourhood_cleansed	latitude	longitude	picture_1
2384	Hyde Park - Walk to UChicago	You are invited to be the sole Airbnb guest in my vintage, 2nd floor co-op guest room. This Hyde Park location is convenient for visiting The University of Chicago or attending a convention or conference at McCormick Place. The listing is 1 block from the eastern border of UChicago, a 7 minute ...	Hyde Park	41.787900	-87.587800	https://a0.muscache.com/pictures/acf6b3c0-47f2-463e-902d13dfd66668f.jpg
7126	Tiny Studio Apartment 94 Walk Score	A very small studio in a wonderful neighborhood. The spaceThis is a very small studio apartment with a private entrance. The apartment is located on the rear half of our first floor. It has its own entrance. It consists of a kitchen and a very small bedroom with a queen sized bed and bathroom w...	West Town	41.901660	-87.680210	https://a0.muscache.com/pictures/51073/16c81c7e_original.jpg

How to Improve? — recommendation system

- ❖ Data: Chicago Airbnb listing and review dataset from insideairbnb.com
- ❖ User-Based Collaborative Filtering + Sentiment Analysis: personalised recommendations
- ❖ Comment Sentiment Analysis: NLTK's **Vader** lexicon and pre-trained sentiment analysis tool
- ❖ Collaborative Filtering: Singular Value Decomposition (SVD) to pinpoint user preference (MAE: 0.15)

id	name	description	neighbourhood_cleansed	latitude	longitude	picture_1
2384	Hyde Park - Walk to UChicago	You are invited to be the sole Airbnb guest in my vintage, 2nd floor co-op guest room. This Hyde Park location is convenient for visiting The University of Chicago or attending a convention or conference at McCormick Place. The listing is 1 block from the eastern border of UChicago, a 7 minute ...	Hyde Park	41.787900	-87.587800	https://a0.muscache.com/pictures/acf6b3c0-47f2-463e-902d13dfd66668f.jpg
7126	Tiny Studio Apartment 94 Walk Score	A very small studio in a wonderful neighborhood. The spaceThis is a very small studio apartment with a private entrance. The apartment is located on the rear half of our first floor. It has its own entrance. It consists of a kitchen and a very small bedroom with a queen sized bed and bathroom w...	West Town	41.901660	-87.680210	https://a0.muscache.com/pictures/51073/16c81c7e_original.jpg

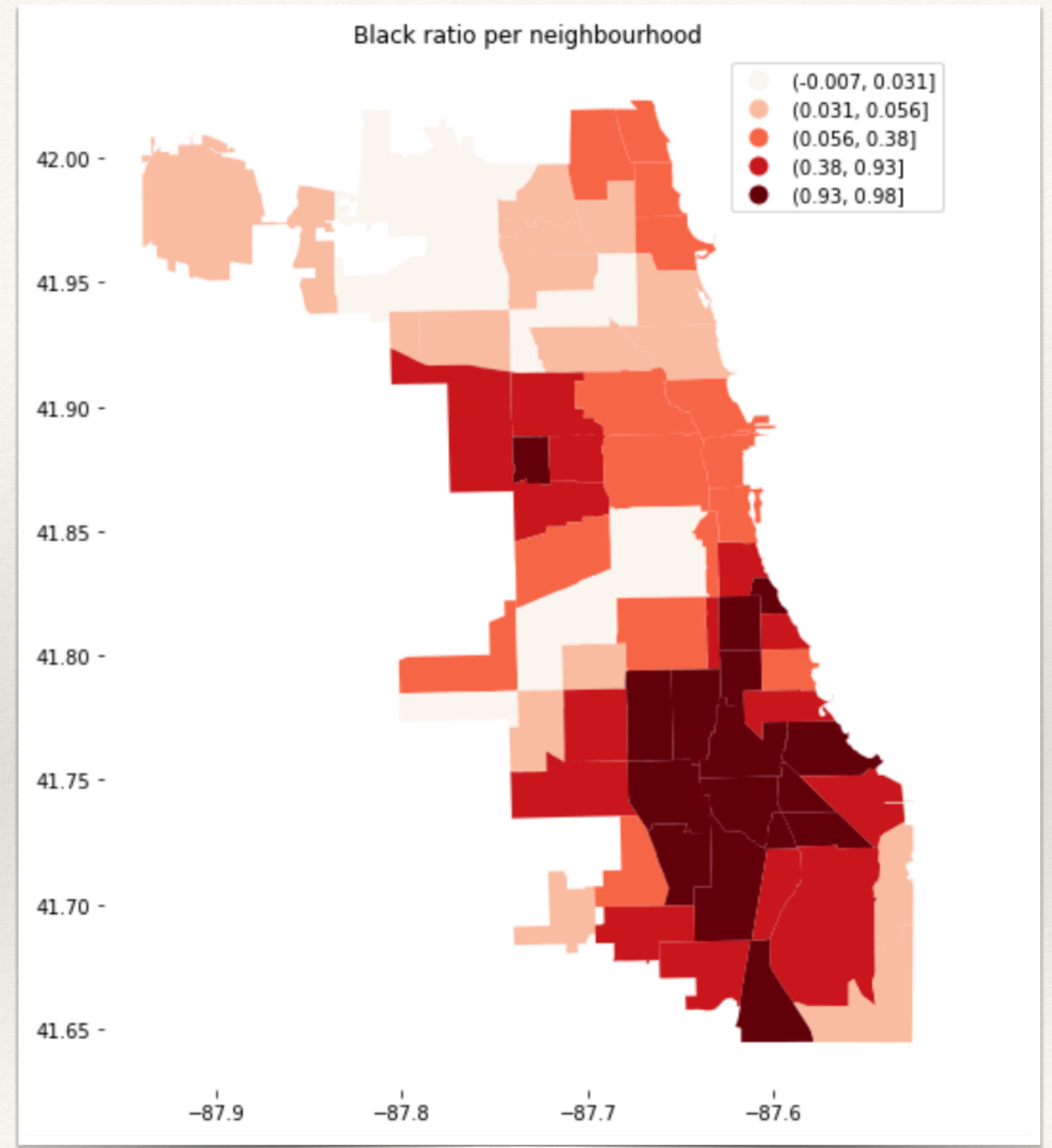


Lorem Ipsum Dolor

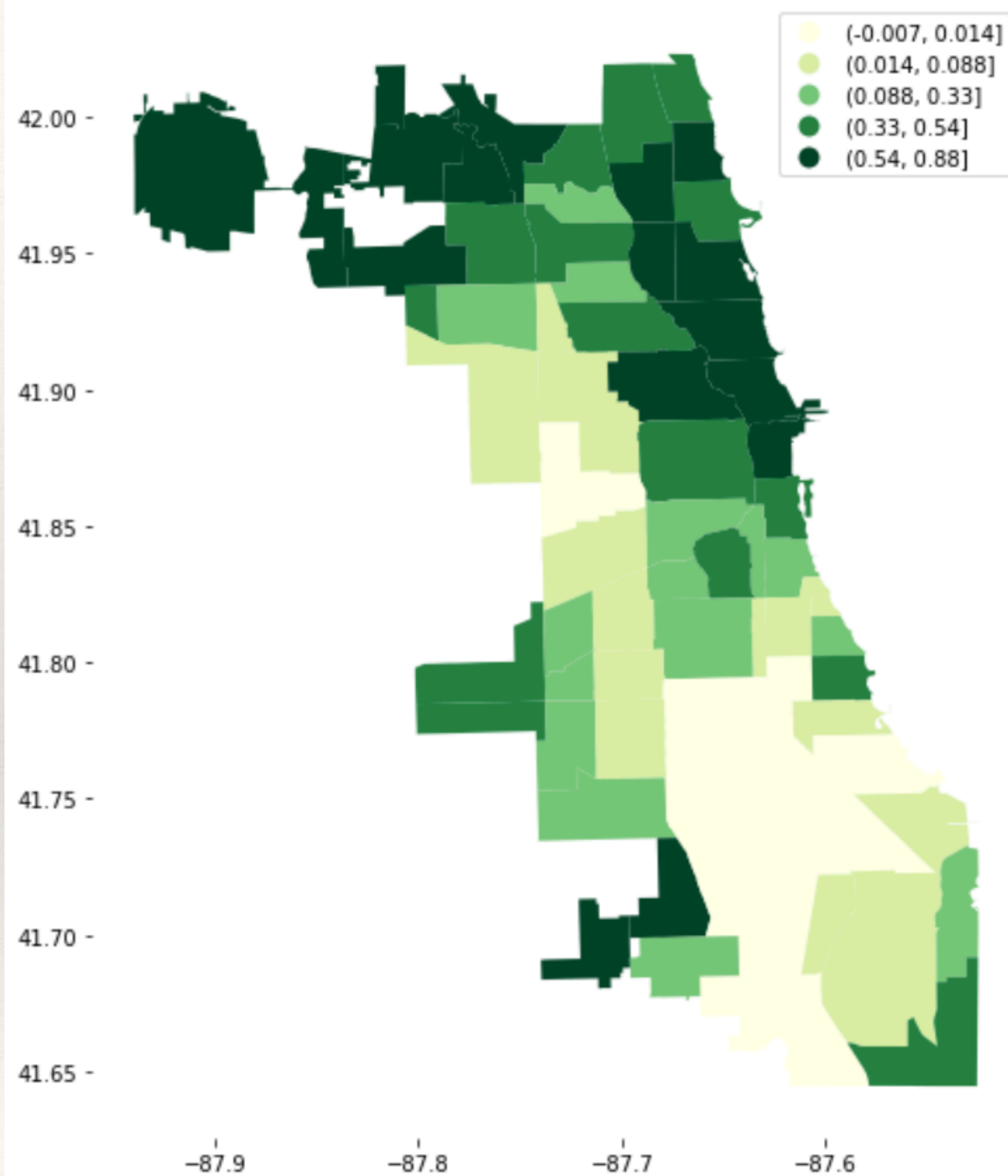
How to Improve? — geospatial maps

Data: crime and demographic data from Chicago Data Portal

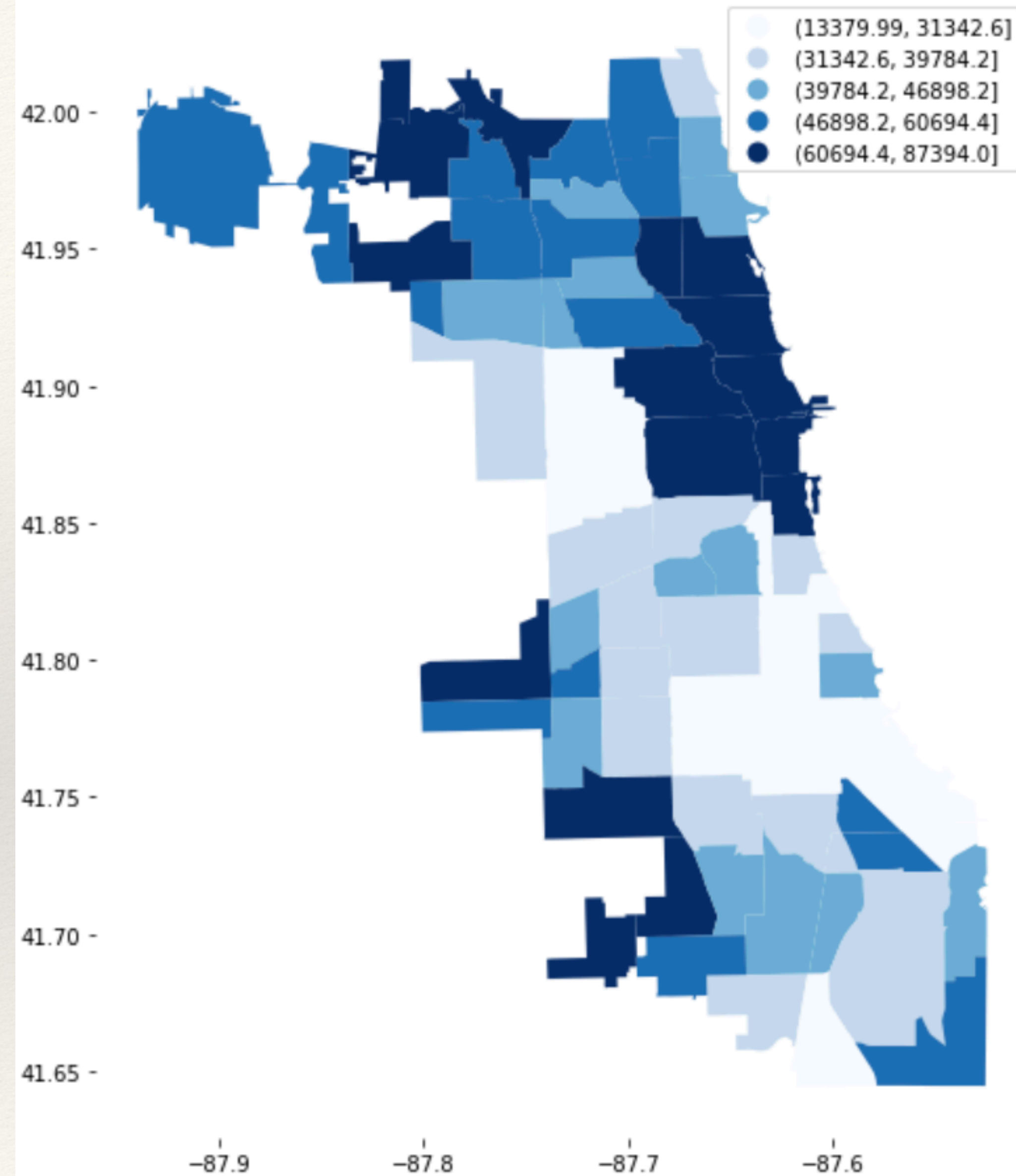
Maps: neighborhood level crime, income, population maps



White ratio per neighbourhood



Average income per neighbourhood



Project Demo



Summary

- ❖ Search Engine: Elasticsearch
- ❖ Recommendation System: CF (SVD), Sentiment Analysis
- ❖ Geospatial Maps: data from Chicago Data Portal
- ❖ Front-end: React + Flask

“Thank you for listening!”

Dev. 9th, 2022