City Visualization with Traffic Data

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Motivation

- Visualize vehicle traffic in various cities
- Identify popular destinations and any potential hotspots in cities
- Estimate the time it takes to get to a destination

Dataset overview

San Diego Traffic Volumes (2007-2022):

- https://data.sandiego.gov/datasets/traffic-volumes/

San Francisco Traffic Count Data:

- https://www.sfmta.com/reports/sfmta-traffic-count-data

Citibike Data (New York and New Jersey)

- https://s3.amazonaws.com/tripdata/index.html

Dataset attributes

- Street names that vehicles start and end
- Latitude and Longitudes for start/ end locations
- Number of vehicles counted in each road

Example: San Diego Dataset

Before

	id	street_name	limits	northbound_count	southbound_count	eastbound_count	westbound_count	total_count	file_no	date_count
0	01AV018207	01 AV	A ST - ASH ST	18010	NaN	NaN	NaN	18010	0182-07	2007-03-13 00:00:00
1	01AV015210	01 AV	A ST - ASH ST	20060	NaN	NaN	NaN	20060	0152-10	2010-03-18 00:00:00
2	01AV018213	01 AV	A ST - ASH ST	19597	NaN	NaN	NaN	19597	0182-13	2013-03-12 00:00:00
3	01AV007721	01 AV	A ST - ASH ST	10640	NaN	NaN	NaN	10640	0077-21	2021-03-10 00:00:00
4	01AV088812	01 AV	ASH ST - BEECH ST	2298	NaN	NaN	NaN	2298	0888-12	2012-12-11 00:00:00

After

	start_loc	end_loc	lat_x	lon_x	lat_y	lon_y	count
0	CARMEL VALLEY RD	SWEETWATER TRAILS	32.951775	-117.194340	32.967200	-117.199821	1785
1	DR	N/O LA JOLLA VILLAGE DR	33.033823	-117.290030	NaN	NaN	58694
2	01 AV	02 AV	32.717633	-117.163817	32.721857	-117.162937	88234
3	01 AV	03 AV	32.717633	-117.163817	32.709392	-117.161934	113946
4	01 AV	04 AV	32.717633	-117.163817	32.741593	-117.161475	57874

Methodology

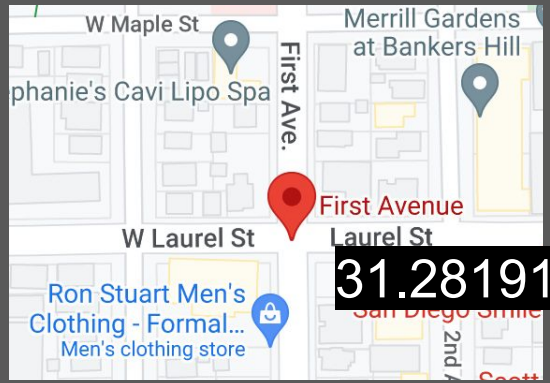
1. Preprocessed data and fixed the road names (Variations such as abbreviations, typos, etc.)

01 AV → 1st Avenue

L J SC S DR → La Jolla Scenic Drive South

2. Used geocoding to get the coordinates of the roads using street names

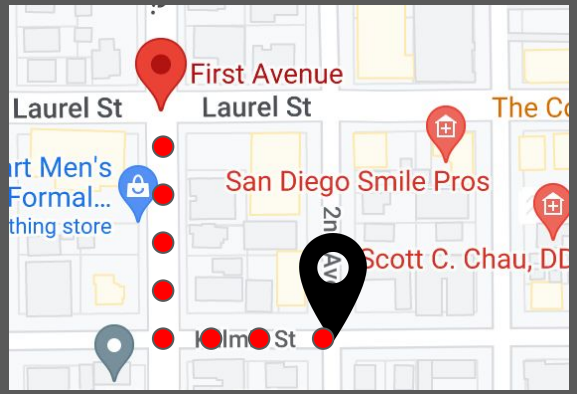
1st Avenue →



31.28191, -172.39182

Methodology

3. Implemented Routes and Directions from RapidAPI to generate a sequence of coordinates on roads between the start and end locations



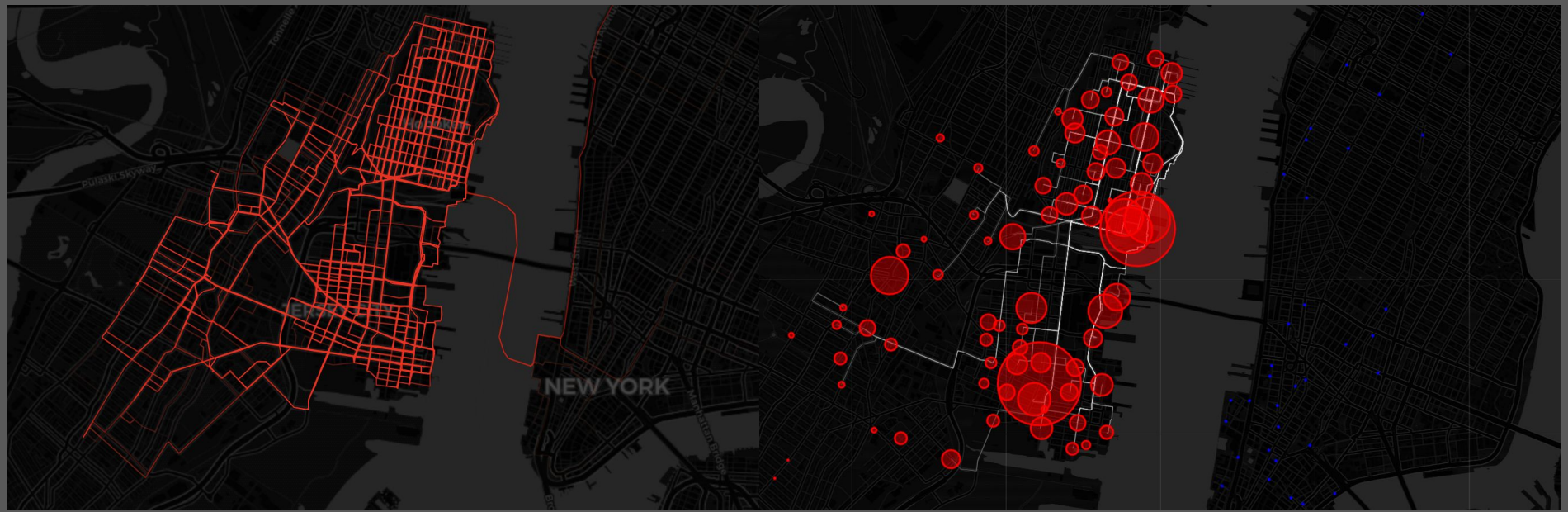
4. Plot the coordinates as lines onto a Folium plot.

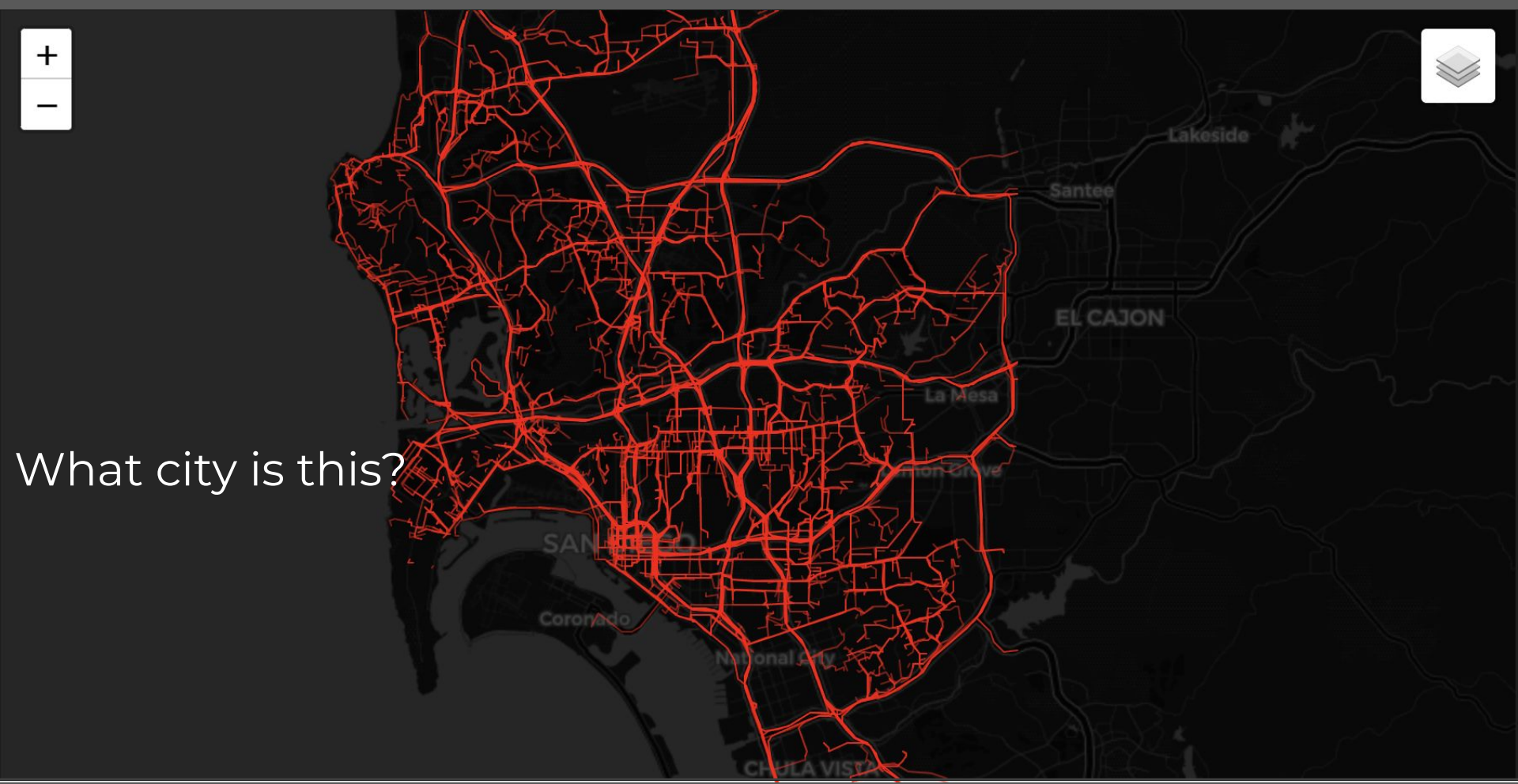
Scale the opacity proportionately to traffic volume

Citi bike dataset

	start_station_name	end_station_name	count	index_x	lat_x	lng_x	index_y	lat_y	lng_y
0	12 St & Sinatra Dr N	11 St & Washington St	31.0	12 St & Sinatra Dr N	40.750615	-74.024057	11 St & Washington St	40.749990	-74.027187
1	14 St Ferry - 14 St & Shipyard Ln	11 St & Washington St	46.0	14 St Ferry - 14 St & Shipyard Ln	40.752916	-74.024312	11 St & Washington St	40.749990	-74.027187
2	4 St & Grand St	11 St & Washington St	28.0	4 St & Grand St	40.742268	-74.035083	11 St & Washington St	40.749990	-74.027187
3	5 Corners Library	11 St & Washington St	1.0	5 Corners Library	40.734974	-74.059526	11 St & Washington St	40.749990	-74.027187
4	6 St & Grand St	11 St & Washington St	15.0	6 St & Grand St	40.744379	-74.034478	11 St & Washington St	40.749990	-74.027187
...	...	...	...	...	...	...	...	...	...
5223	Van Vorst Park	West St & Chambers St	1.0	Van Vorst Park	40.718479	-74.047733	West St & Chambers St	40.717548	-74.013221

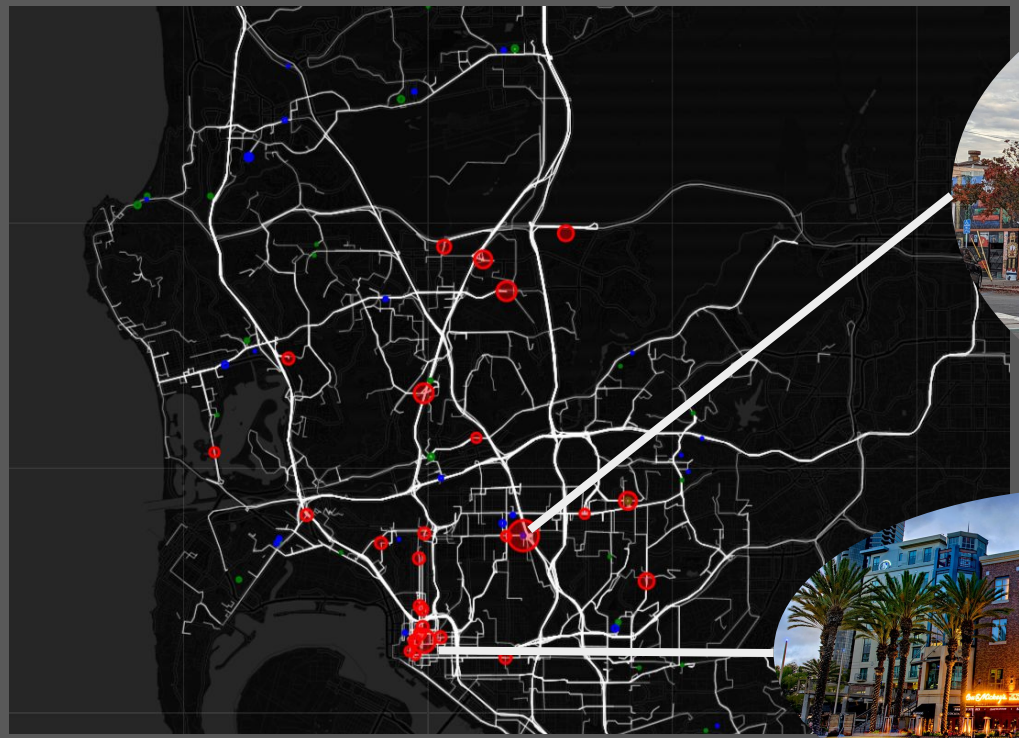
Data driven bike station placement





What city is this?

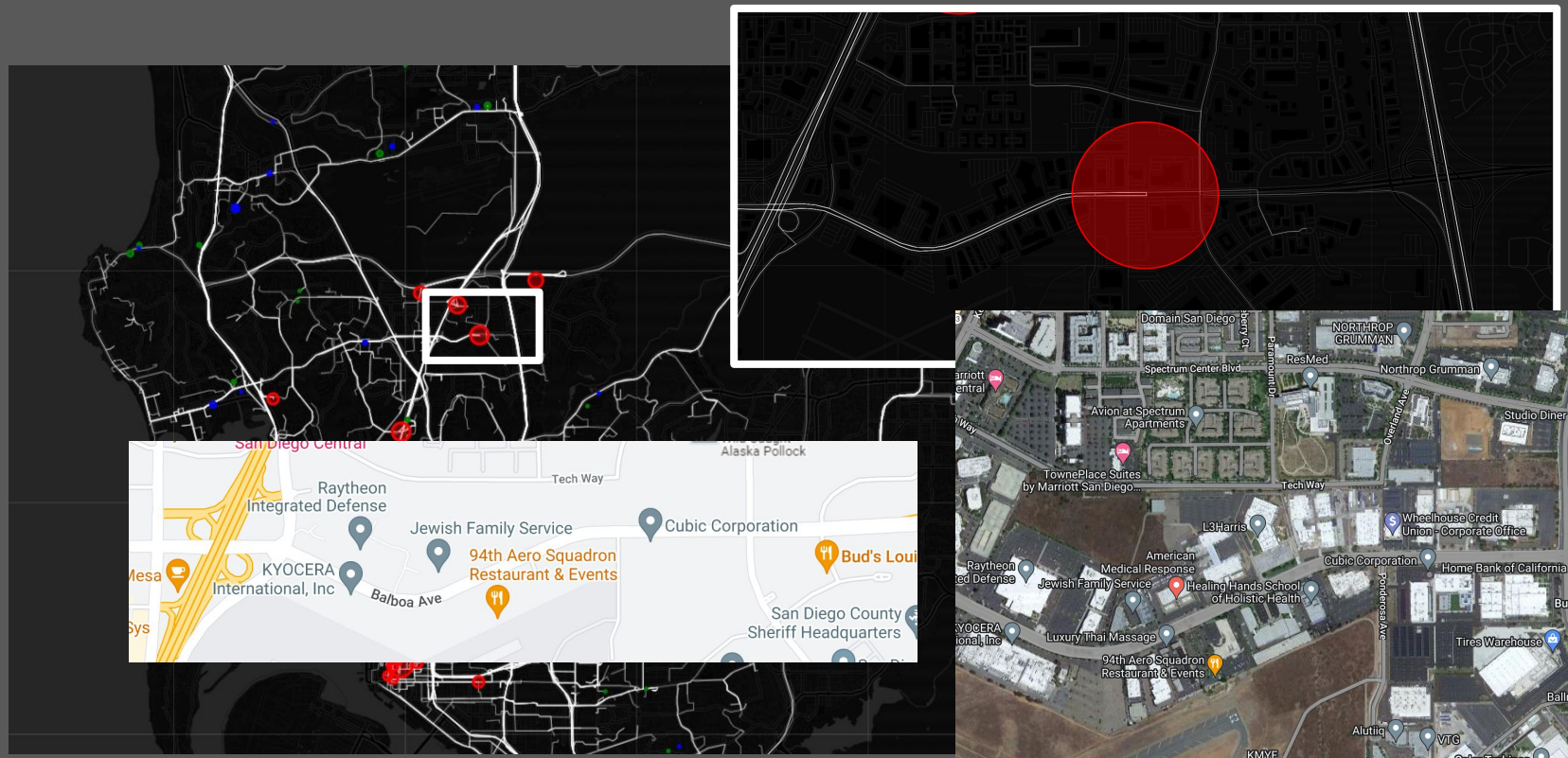
Data driven tourism?



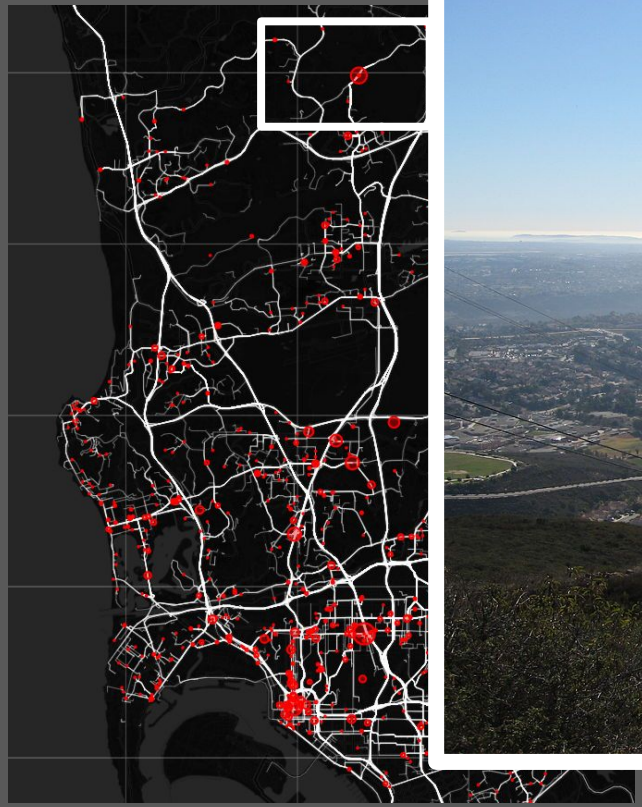
2. Northpark
   - Bars
   - Restaurants
   - Book stores

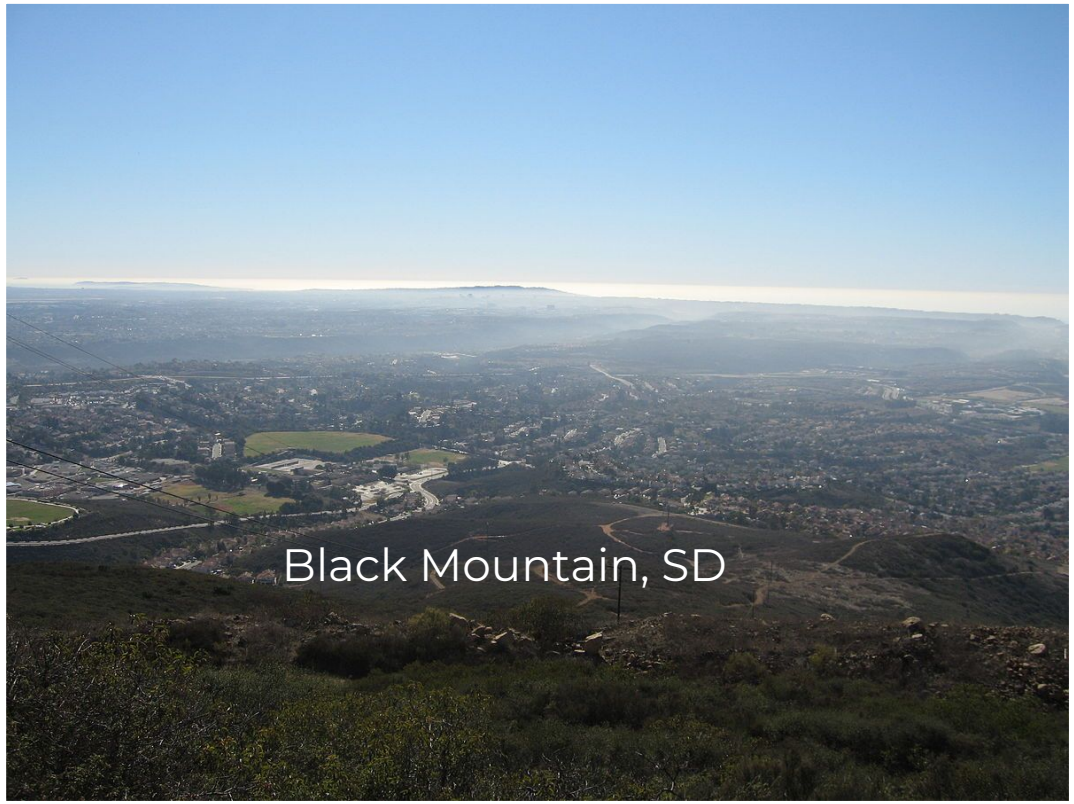
1. Downtown
   - Bars
   - Clubs
   - Events

Data driven road traffic



Data driven hiking





Black Mountain, SD

Thank you