UC San Diego

San Diego Police Calls for Service

From 2019 to 2023

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Background

1,500,000

This is the number of 911 calls received by San Diego Police Department (SDPD) in the year 2019. On average, SDPD fielded one call every 21 seconds.

During what times of day does the 911 service receive the majority of its calls?

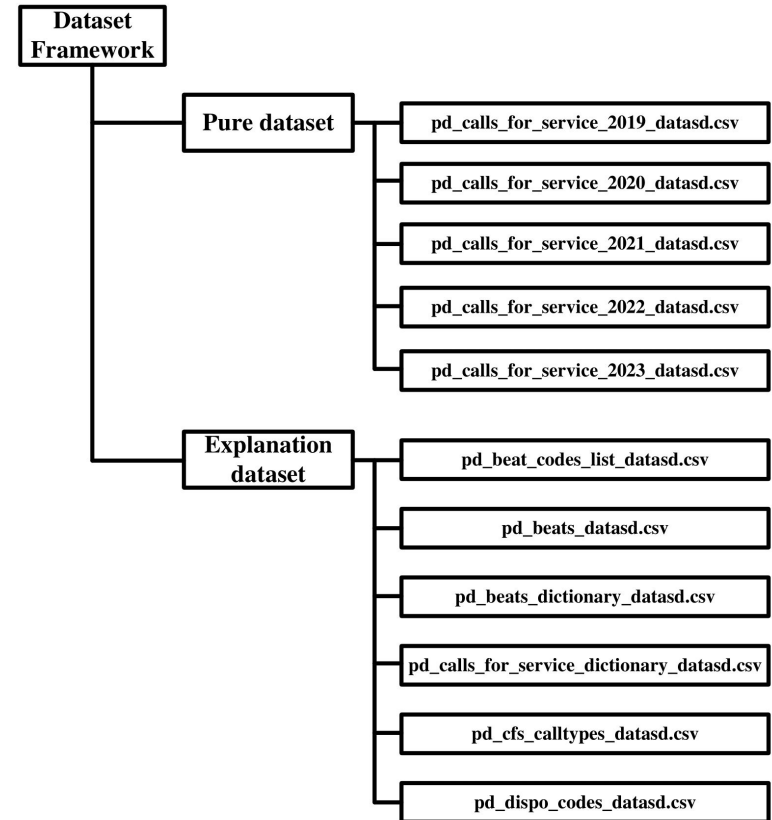What are the most common categories or types of calls received by the 911 service?

What percentage of the 911 calls is related to life-threatening emergencies?

Which geographic area generates the highest number of 911 calls?

Dataset and Methodology overview

Overview

- Police Calls for Service dataset from City of San Diego website
  - Calls from 2019 to 2023.
- The combined datasheet has **~2.7million** rows, henceforth cleaning is necessary.
- Data Cleaning and Preprocessing
  - handling missing values, outliers, and inconsistencies, converting date time to the appropriate date-time format, and standardizing address components
- Exploratory Data Analysis (EDA) and Visualization
  - Seaborn/Matplotlib for creating visualizations
  - distribution analysis, spatial analysis, category analysis

Dataset Framework

Pure dataset
- pd_calls_for_service_2019_datasd.csv
- pd_calls_for_service_2020_datasd.csv
- pd_calls_for_service_2021_datasd.csv
- pd_calls_for_service_2022_datasd.csv
- pd_calls_for_service_2023_datasd.csv

Explanation dataset
- pd_beat_codes_list_datasd.csv
- pd_beats_datasd.csv
- pd_beats_dictionary_datasd.csv
- pd_calls_for_service_dictionary_datasd.csv
- pd_cfs_calltypes_datasd.csv
- pd_dispo_codes_datasd.csv

Data Cleaning example

incident_num	date_time	day_of_week	address_num	address_dir_primary	address_road_primary	address_sfx_primary	address_dir_intersecting	address_road_intersecting	address_sfx_intersecting	call_type	disposition	beat	priority
E23010000001	2023/1/1 0:00	1	0		05TH	AVE		G		FD	CAN	523	2

_intersecting	call_type	disposition	beat	priority
NaN	AU1	DUP	441	1
NaN	415	K	321	2
NaN	FD	K	523	2
NaN	AU1	W	511	1
NaN	586	CAN	523	4

➡️

| call_type	classification	neighborhood	priority
ALL UNITS INFORMATION-PRI 1	DUPLICATE CALL, XREF'D	Mountain View	1
DISTURBING PEACE	NO REPORT REQUIRED	Grantville	2
FLAG DOWN/FIELD INITIATED	NO REPORT REQUIRED	Gaslamp	2
ALL UNITS INFORMATION-PRI 1	NO DISPATCH OR INCIDENT CANCLLED PRIOR TO DISP...	Barrio Logan	1
ILLEGAL PARKING	CANCEL	Gaslamp	4

Empty columns gone, opaque police jargons changed into human readable language (Ex: Beat -> Neighborhood)

Data Analysis and Visualization

Calls per Year

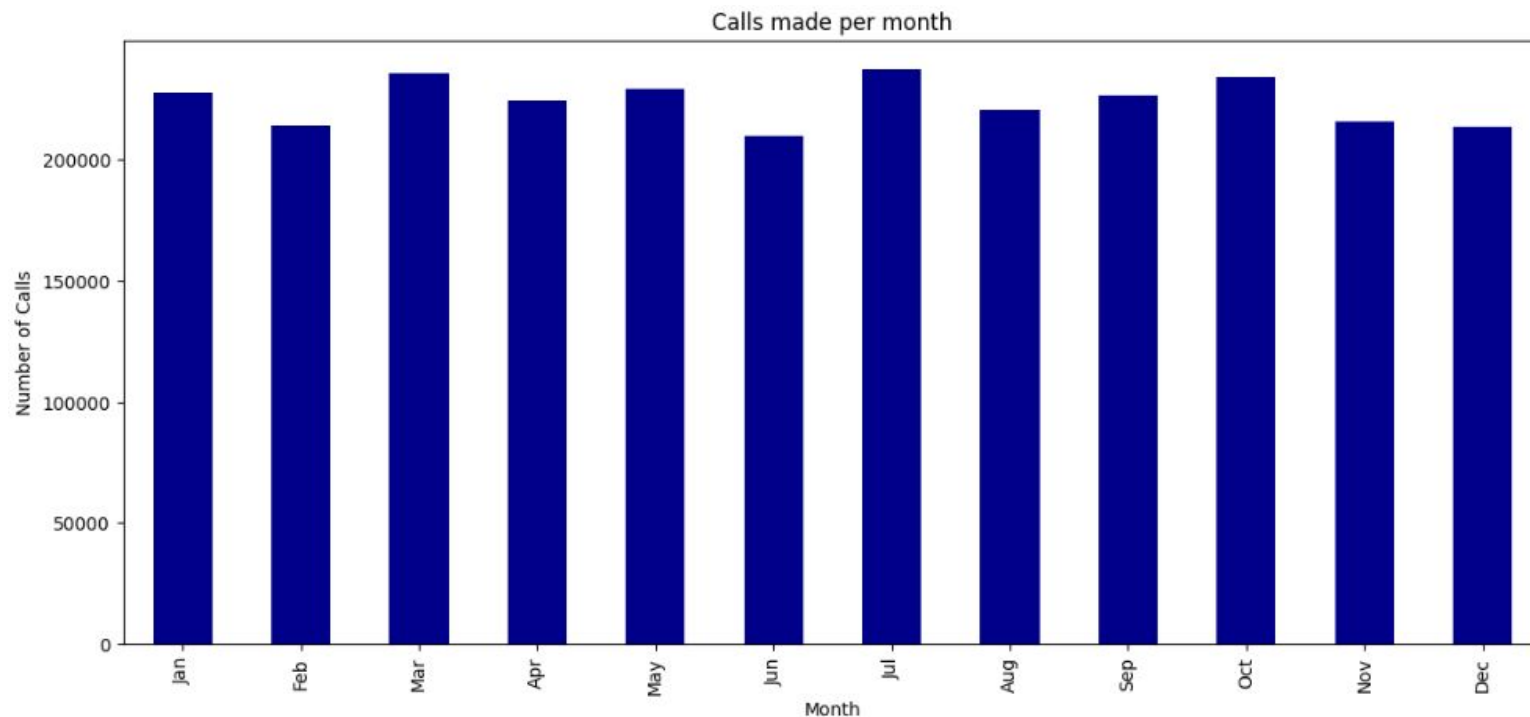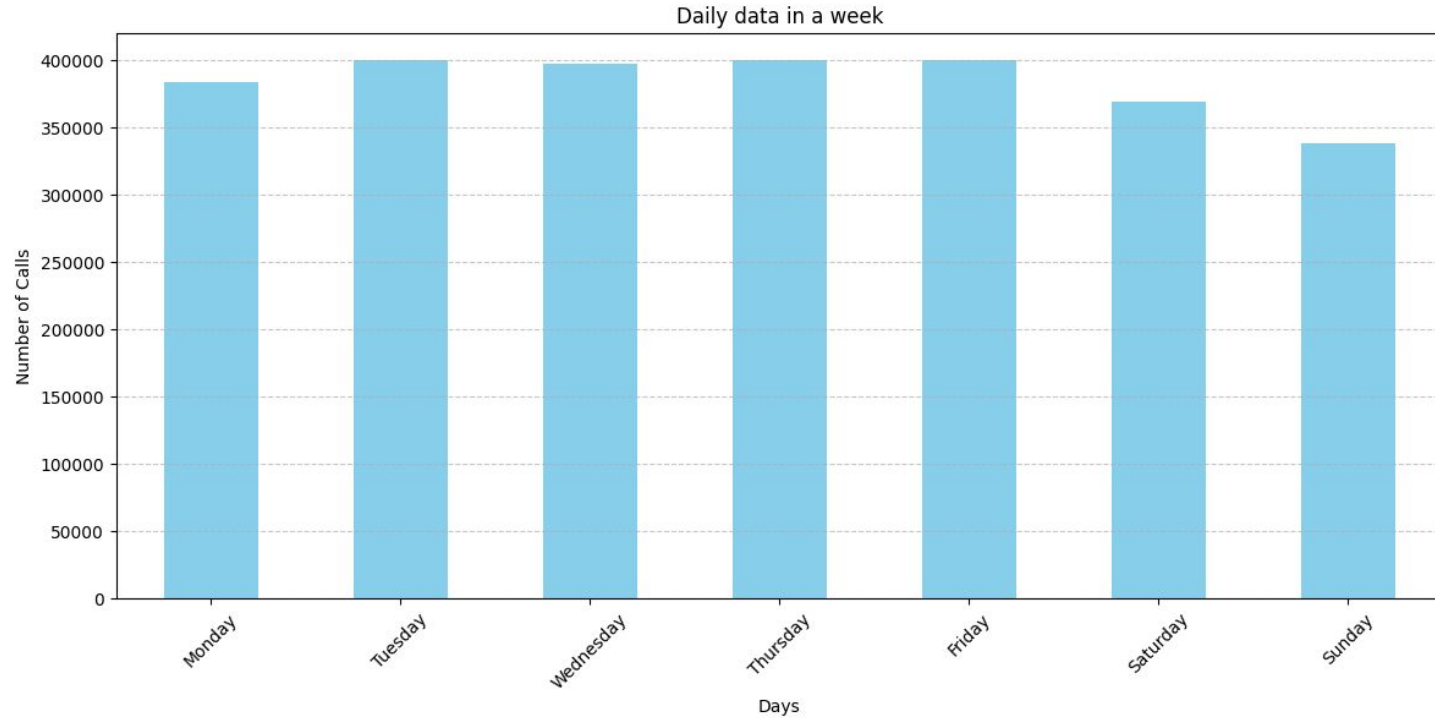Calls made per year
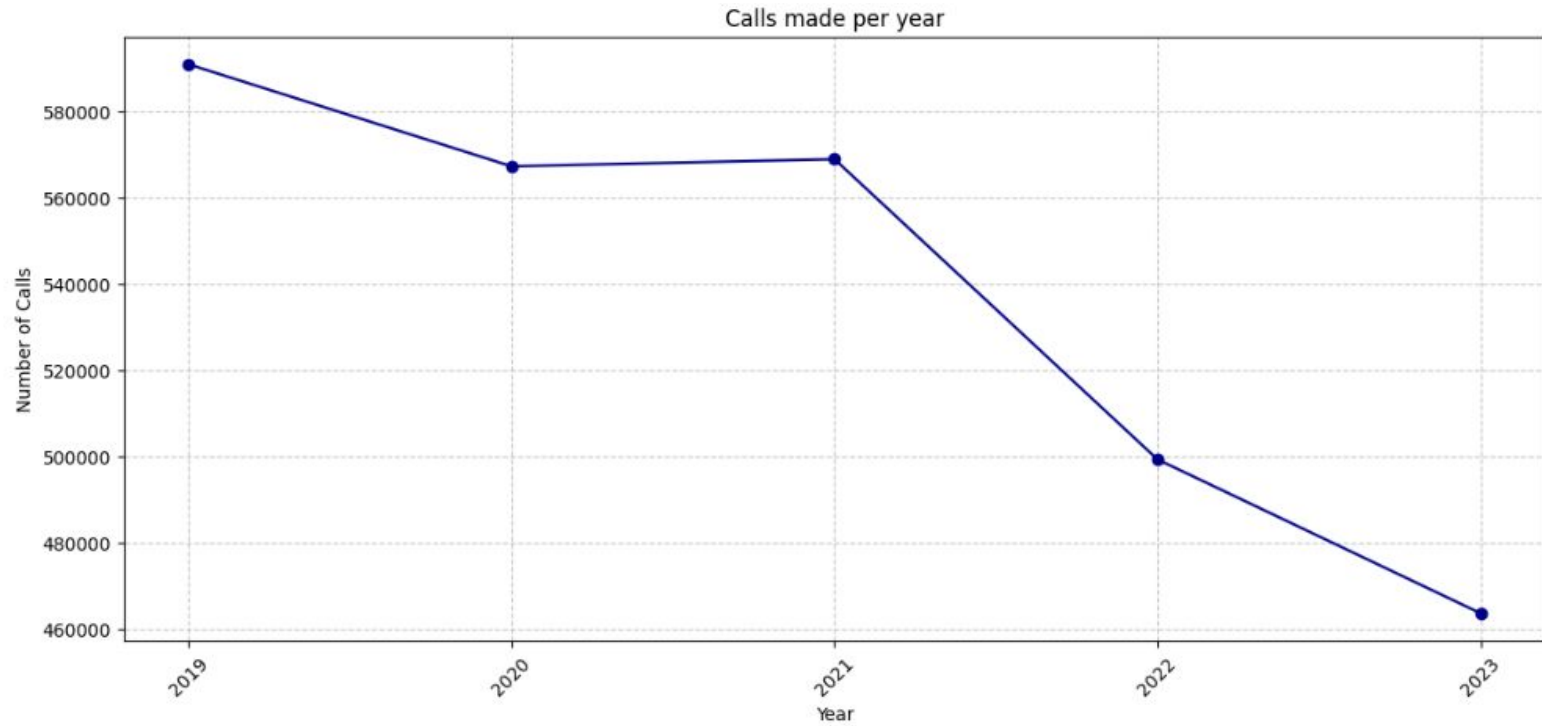
Connections

- San Diego Police Department facing staffing crisis (NBC 7 San Diego)

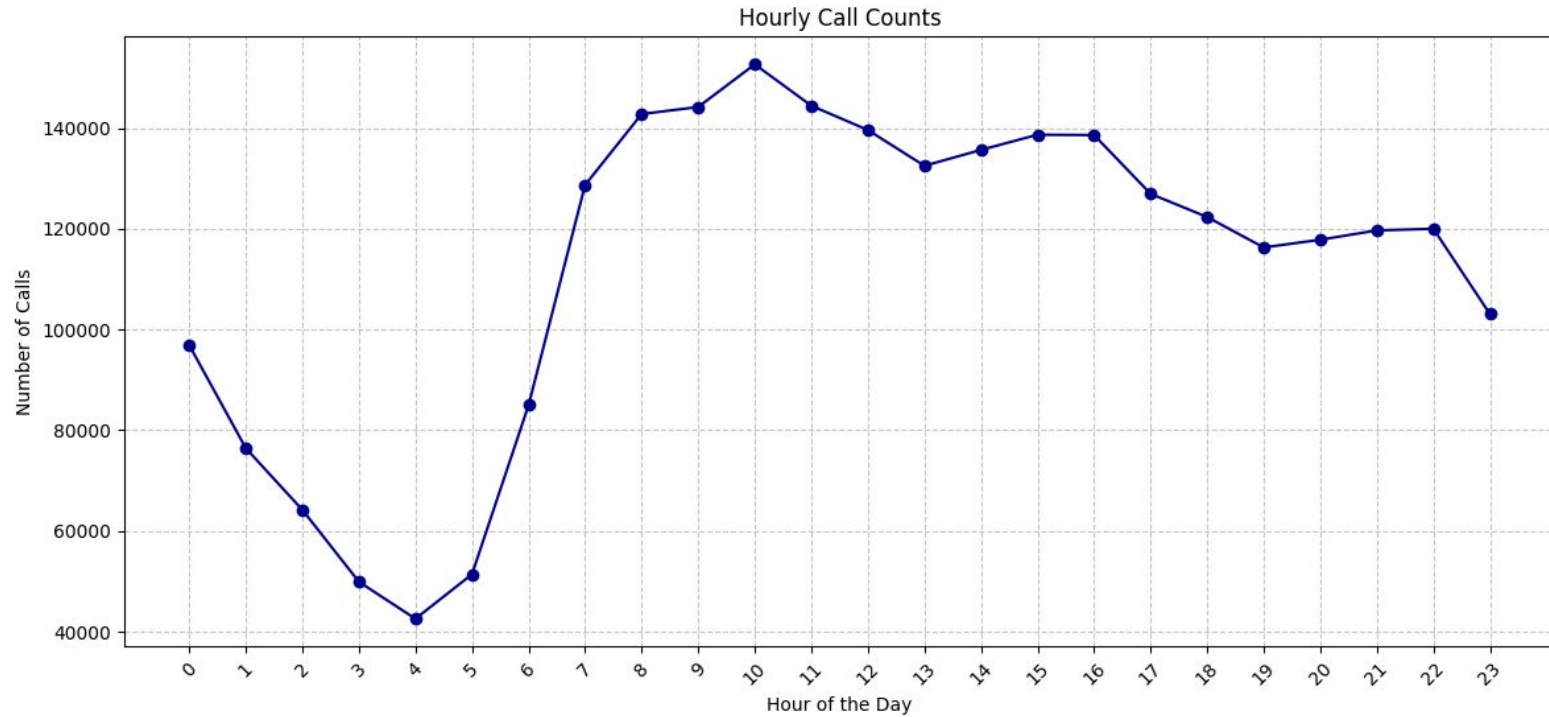- Distrust in Police

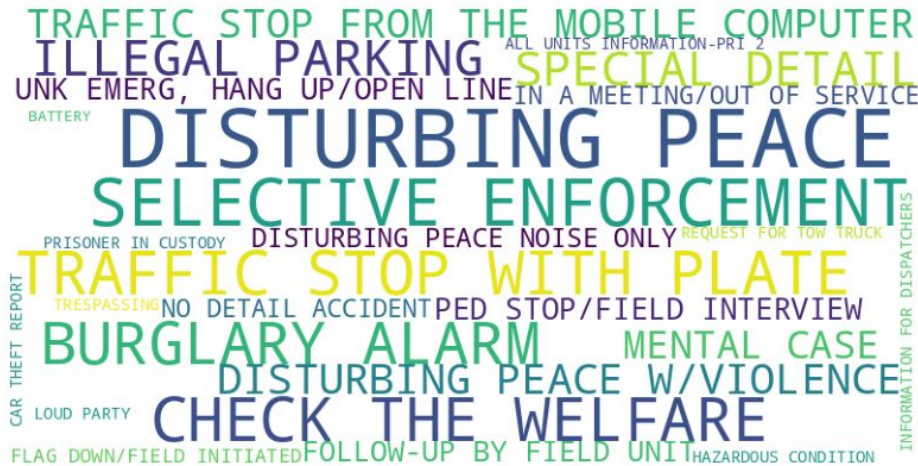- Calling Community-Based Alternatives
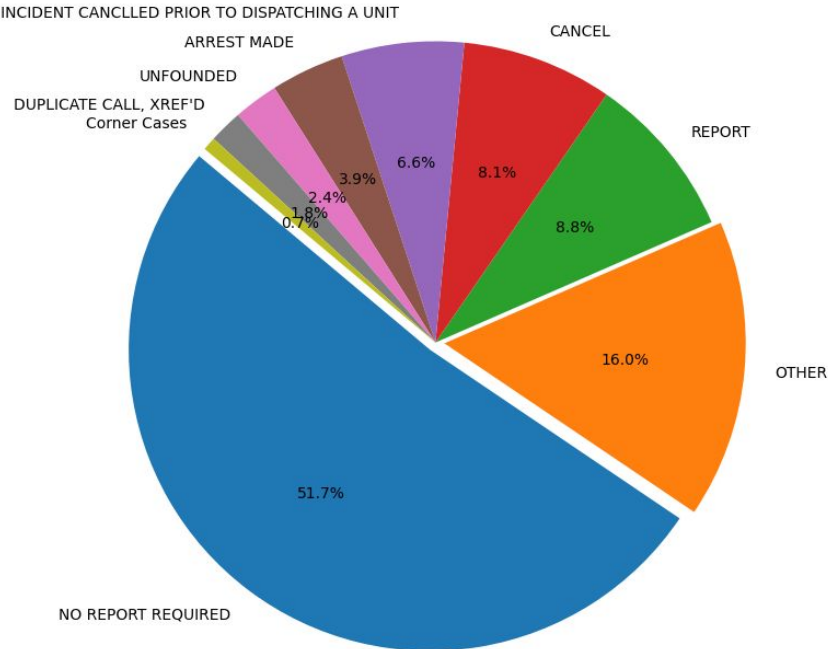
Calls per Month

Calls per day in week

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Daily data in a week

Calls per hour in a day

Hourly Call Counts

Call Type and categories

TRAFFIC STOP FROM THE MOBILE COMPUTER
ILLEGAL PARKING ALL UNITS INFORMATION-PRI 2 SPECIAL DETAIL
UNK EMERG, HANG UP/OPEN LINE IN A MEETING/OUT OF SERVICE
BATTERY
DISTURBING PEACE
SELECTIVE ENFORCEMENT
PRISONER IN CUSTODY DISTURBING PEACE NOISE ONLY REQUEST FOR TOW TRUCK
TRAFFIC STOP WITH PLATE
TRESPASSING NO DETAIL ACCIDENT PED STOP/FIELD INTERVIEW
BURGLARY ALARM MENTAL CASE
DISTURBING PEACE W/VIOLENCE
LOUD PARTY CHECK THE WELFARE
FLAG DOWN/FIELD INITIATED FOLLOW-UP BY FIELD UNIT HAZARDOUS CONDITION
CAR THEFT REPORT INFORMATION FOR DISPATCHERS

Disturbances

Law Enforcement Actions

Emergency Calls

Burglary and Theft Concerns

Non-Emergency Situations

Mental Health Concerns

Case Disposition

Proportion of each classification category

NO REPORT REQUIRED	1385288
OTHER	429195
REPORT	237040
CANCEL	216838
NO DISPATCH OR INCIDENT CANCLLED PRIOR TO DISPATCHING A UNIT	176132
ARREST MADE	105668
UNFOUNDED	64290
DUPLICATE CALL, XREF'D	48150
STOLEN VEHICLE OR RECOVERED VEHICLE	9295
DISPATCHED ALARM CALL CANCELLED BEFORE UNIT ONSCENE	5819
NO FURTHER ACTION, HIGH RISK (CRISIS RESPONSE TEAM)	3501
NO REPORT REQUIRED, BOARD AND SECURE	205
OTHER, HIGH RISK (CRISIS RESPONSE TEAM)	183
DUPLICATE CALL	105
REPORT TAKEN, BOARD AND SECURE	79
ARREST MADE, BOARD AND SECURE	39
REPORT, HIGH RISK (CRISIS RESPONSE TEAM)	31
ARREST MADE, HIGH RISK (CRISIS RESPONSE TEAM)	7

"RATIO" Principle

1. **R**esource **A**llocation to manage cost

2. **T**actics tailored to a specific type of crime

3. **I**nvestment in professional teams and equipment
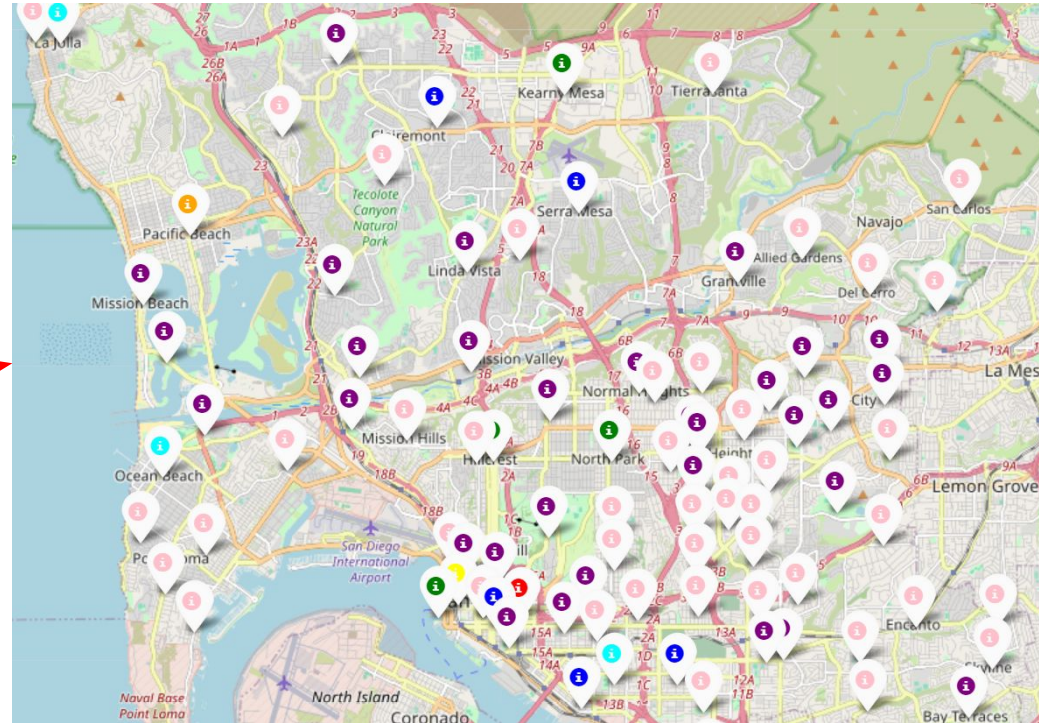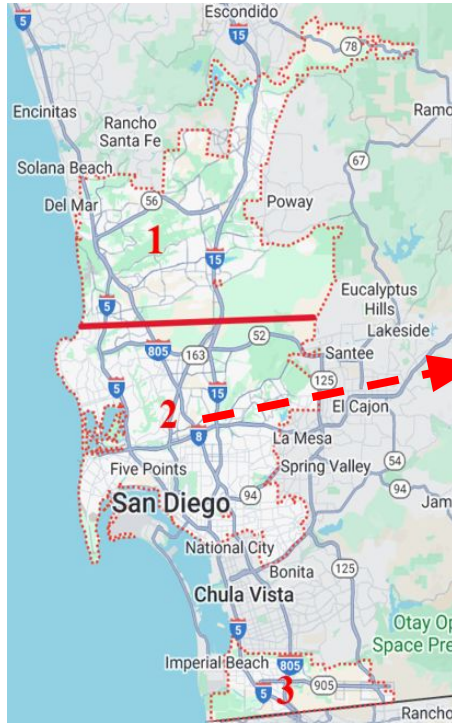
4. **O**ptimization towards streamlined process

Map visualization
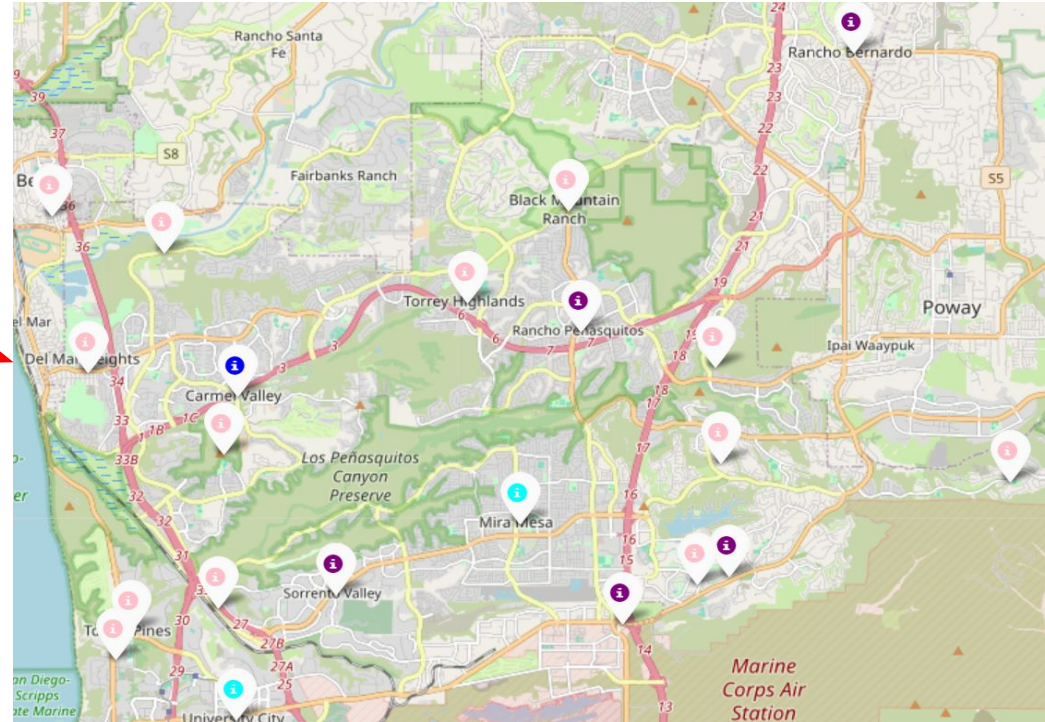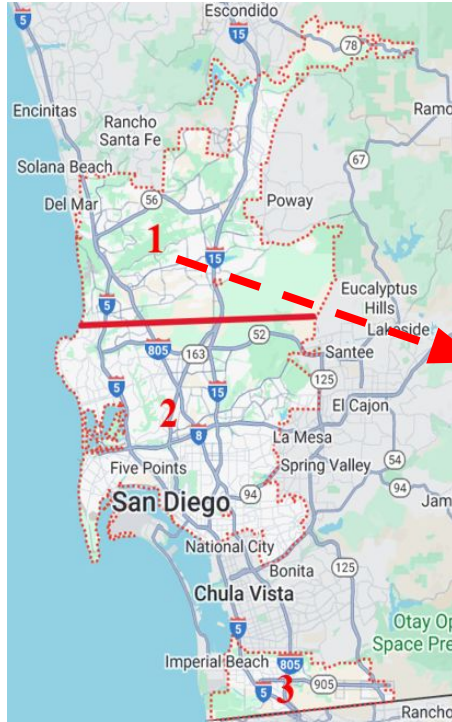
Notation:

- 0 - 15,000
- 15,001 - 30,000
- 30,001 - 45,000
- 45,001 - 60,000
- 60,001 - 75,000
- 75,001 - 90,000
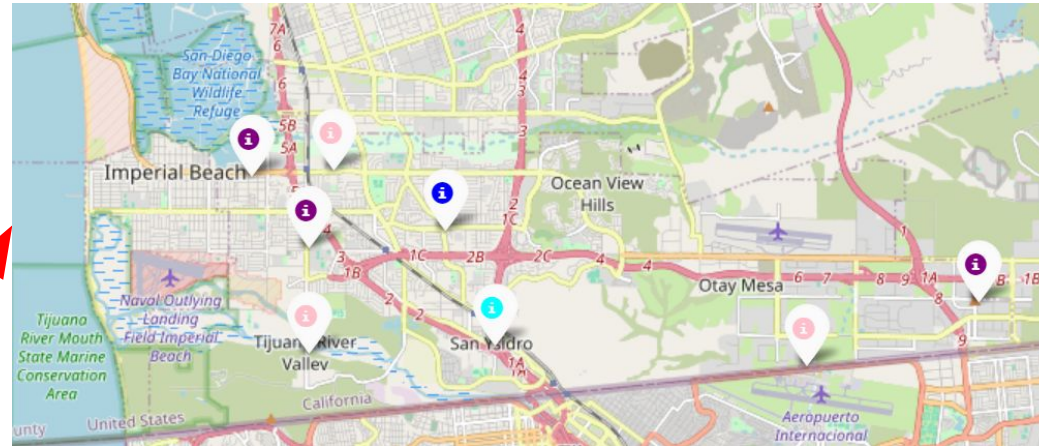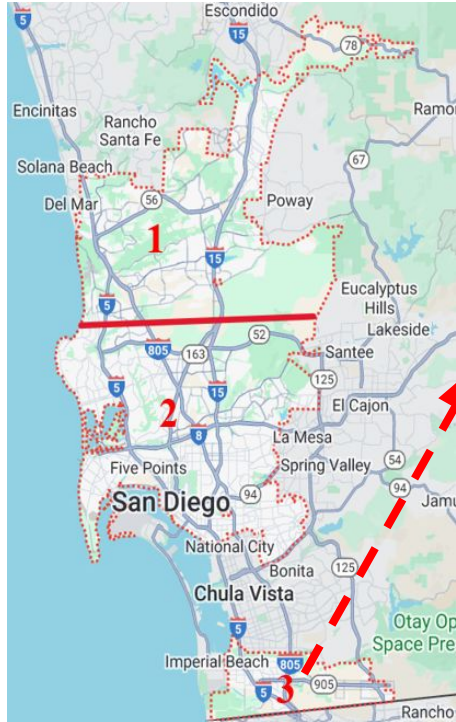- 105,001 - 120,000
- 135,001 - 150,000

Map visualization

Notation:

0 - 15,000	● (pink)
15,001 - 30,000	● (purple)
30,001 - 45,000	● (blue)
45,001 - 60,000	● (cyan)
60,001 - 75,000	● (green)
75,001 - 90,000	● (yellow)
105,001 - 120,000	● (orange)
135,001 - 150,000	● (red)

Map visualization

Notation:

- 0 – 15,000
- 15,001 – 30,000
- 30,001 – 45,000
- 45,001 – 60,000
- 60,001 – 75,000
- 75,001 – 90,000
- 105,001 – 120,000
- 135,001 – 150,000

Conclusions

What we got!

1 Identification of peak times and areas with high call volumes.

2 Distribution of call types and their dispositions and insights into potential correlations between call characteristics and geographic locations.

3 Recommendations for optimizing resource allocation based on hotspot areas.

4 Insights into the effectiveness of current policing strategies under different categories and potential suggestions for improved interventions to address specific types of incidents.

Thank you!