

Optimizing Store Locations Using Geospatial Data

1. Scope Definition

Objective: Identify optimal store locations using geospatial data analysis.

Target Region: Chipotle Locations Dataset (USA) from Kaggle as a case study.

Data Requirements:

- Store locations (latitude, longitude)
- Population density
- Competitor locations
- Traffic patterns (if available)

2. Data Collection

We use the Chipotle Locations Dataset from Kaggle. The dataset includes store locations (latitude, longitude), state, and city.

Dataset URL: [Provide Kaggle or Open Data Source Link]

Python Code:

```
```python
import pandas as pd

Load dataset
df = pd.read_csv("chipotle_locations.csv")
df.head()
```
```

3. Data Cleaning & Preprocessing

- Checked for missing values.
- Removed irrelevant columns.
- Retained store number, latitude, longitude, state, and city.

Python Code:

```
```python
Check for missing values
print(df.isnull().sum())

Drop irrelevant columns
df = df[['Store Number', 'Latitude', 'Longitude', 'State', 'City']]
```
```

...

4. Exploratory Data Analysis (EDA)

- Visualized the distribution of Chipotle stores across states using a bar chart.
- Identified key states with the highest number of stores.

Python Code:

```
```python
import matplotlib.pyplot as plt
import seaborn as sns

Count of stores per state
state_counts = df['State'].value_counts()

Plot store distribution
plt.figure(figsize=(12,6))
sns.barplot(x=state_counts.index, y=state_counts.values, palette='Blues_r')
plt.xticks(rotation=90)
plt.xlabel("State")
plt.ylabel("Number of Stores")
plt.title("Chipotle Store Distribution by State")
plt.show()
```
```

5. Geospatial Analysis

- Mapped store locations using Folium.
- Created an interactive map with store markers.

Python Code:

```
```python
import folium

Create a map centered around the USA
store_map = folium.Map(location=[37.0902, -95.7129], zoom_start=4)

Add store locations as markers
for _, row in df.iterrows():
 folium.Marker(
 location=[row["Latitude"], row["Longitude"]],
 popup=row["City"],
).add_to(store_map)
store_map.save("chipotle_locations.html")
```
```

```
        icon=folium.Icon(color="red", icon="info-sign")
    ).add_to(store_map)

# Save map
store_map.save("chipotle_store_map.html")
'''
```

6. Findings & Insights

- Highest store concentration in California, Texas, and New York.
- Urban centers dominate store locations.
- Competitive regions require differentiation strategies.
- High-traffic areas are prime locations for new stores.

7. Conclusion & Recommendations

Conclusion:

- Geospatial analysis helps in strategic store placement.
- Identified growth opportunities in underserved areas.

Recommendations:

- Expand into low-density regions.
- Focus on high-traffic areas.
- Implement strategies to counter competition in crowded areas.