

CLASSIFICATION OF NIGHTTIME ACCIDENTS BASED ON NIGHTLIFE SPOTS IN THE AREA

By Amir Iqbal

Accidents & Nightlife Spots

Is there a Relationship between Daytime & Nighttime Accidents?

Weekday Nighttime Accidents vs Weekend Night Accidents?

Impact of Nightlife spots on Nighttime Accidents?

What Businesses & City government can do to reduce Nighttime Accidents?

Data Sources

Accident Data from [Toronto open data source portal](#)

Postal Districts Geo Coordinates from [external data file](#)

Boroughs & Neighborhood Data from [WIKIPEDIA page](#)

Nightlife Spots data from
FOURSQUARE

Data Cleanup

Accidents Data

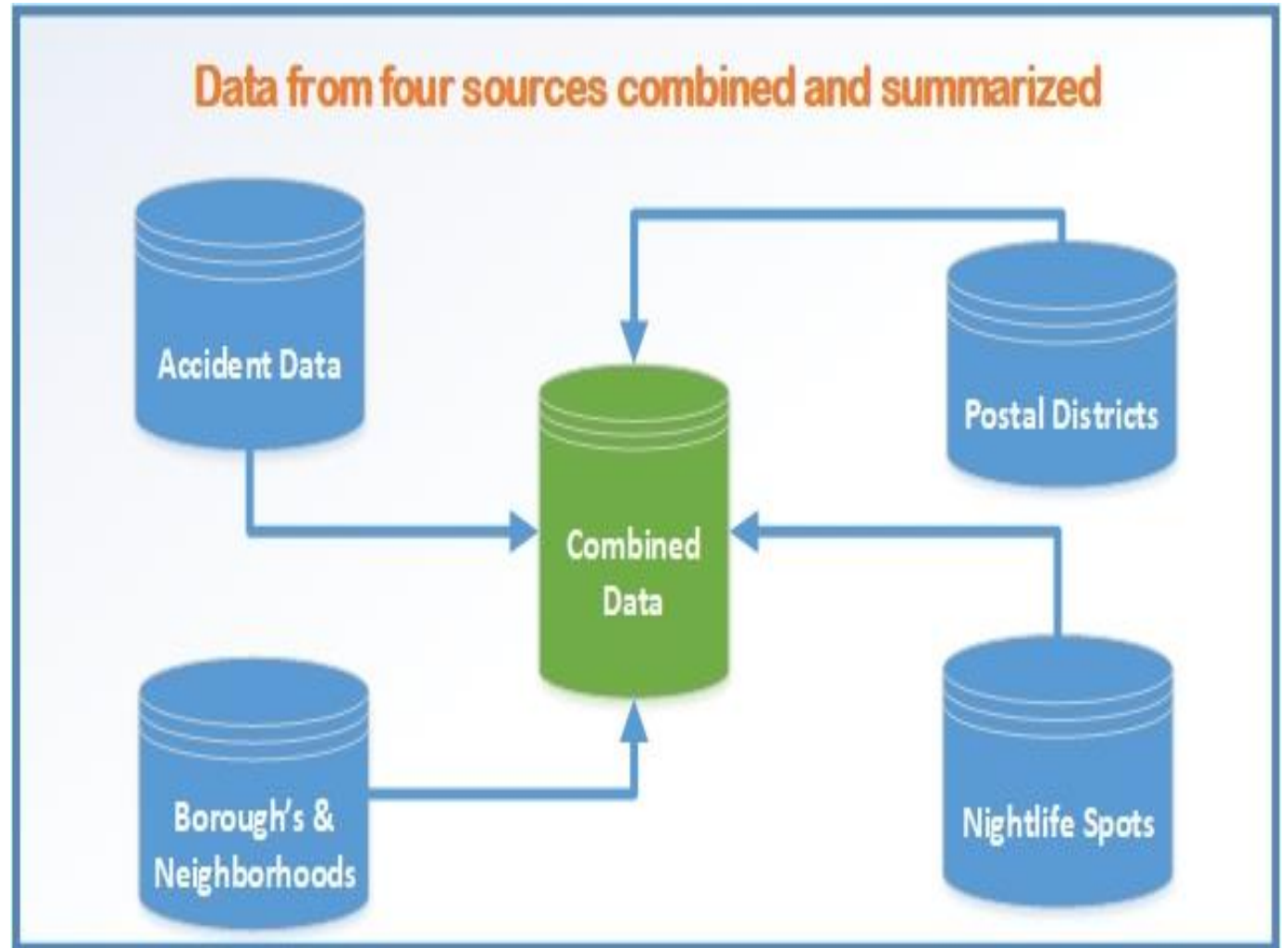
- Classify as Nighttime & Daytime Accidents
- Classify as Weekend or Weekday Accidents
- Remove records with missing data
- Derive Postal District for each accident

Boroughs & Neighborhood Data

- Retrieve data from [WIKIPEDIA page](#)
- Cleanup data & Generate Dataframe

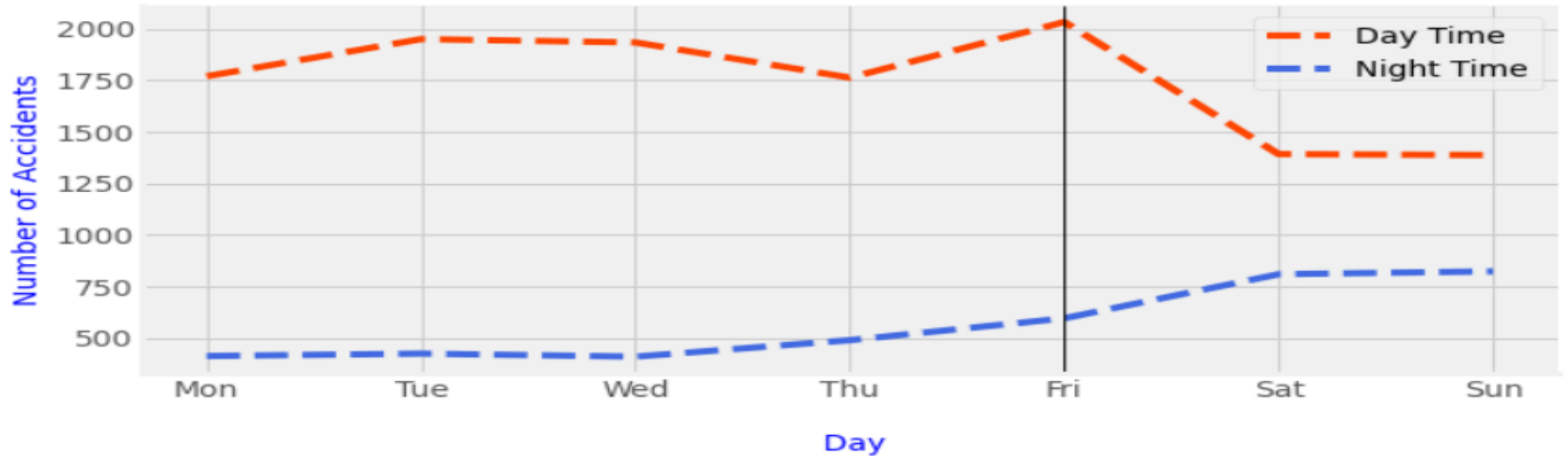
Combine Data

- Summarize Data for each of the four sources by postal district
- Generate one combined dataframe



Daytime vs Nighttime Accidents

Day time Accidents vs Night time Accidents



Nighttime Accidents

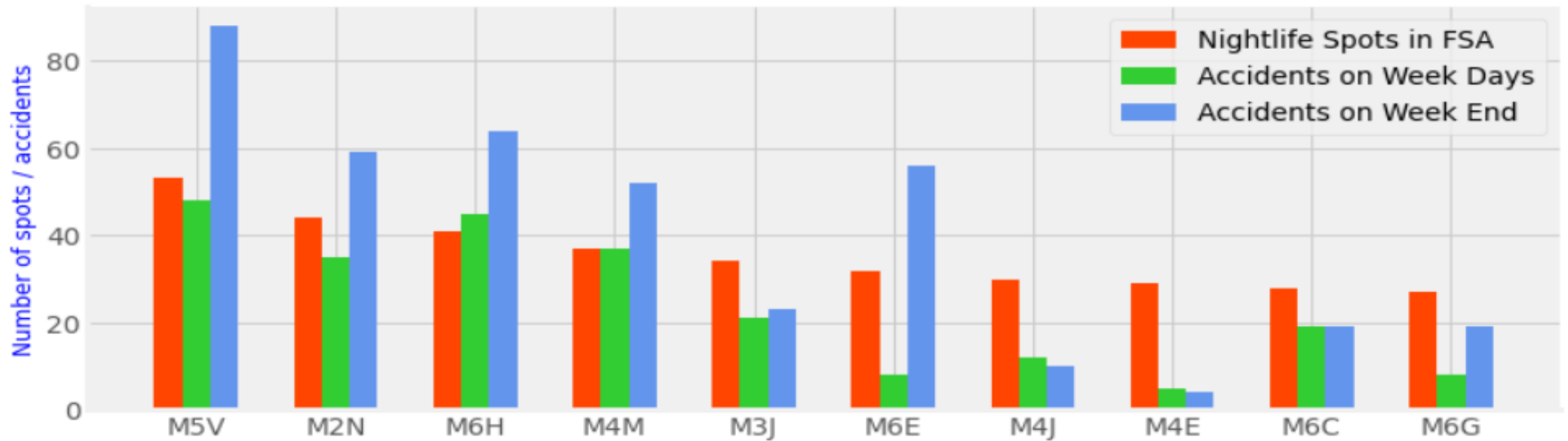
Daytime accidents significantly more than nighttime accidents

Higher number of Nighttime Accidents in postal districts where Nightlife Spots (bars, pub, nightclub, etc.) are higher.

Weekend Night Accidents vs Weekday Night Accidents

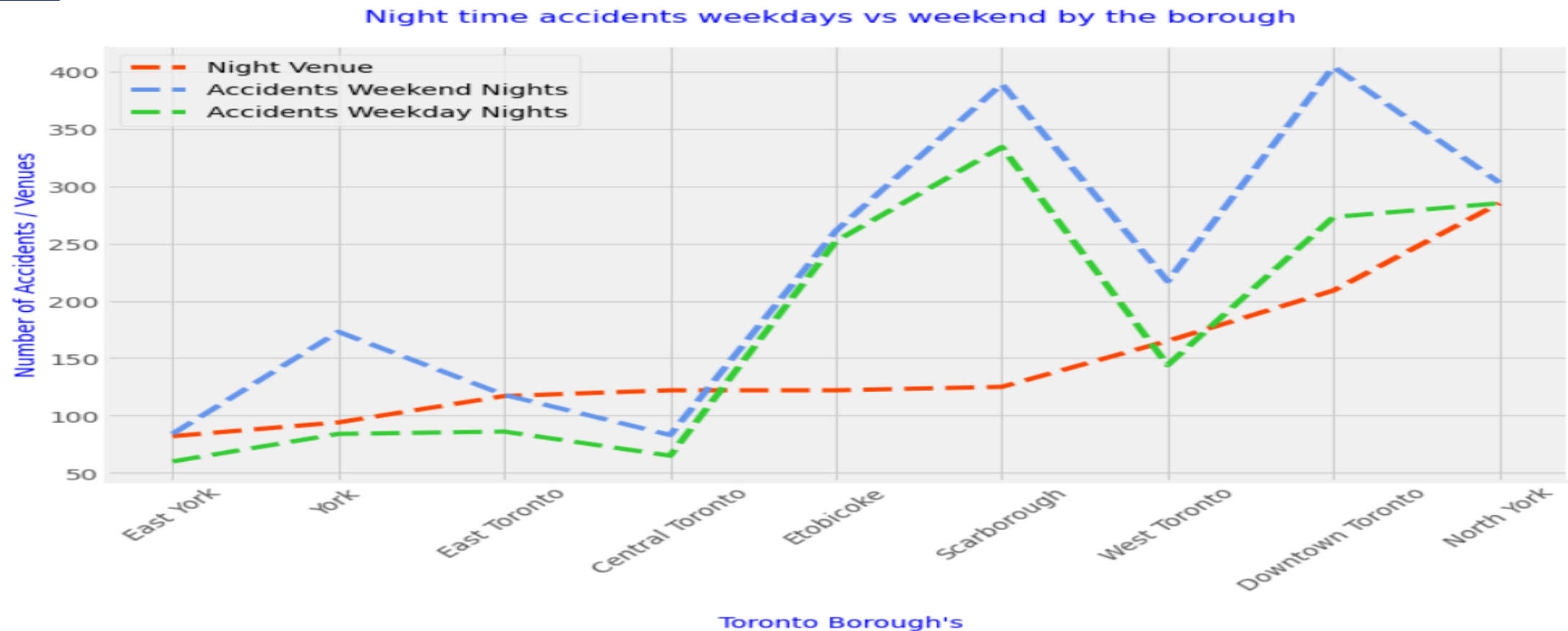
Accidents in Top 10 Postal Districts by Nightlife

Night time accidents in Top 10 Postal Districts by Nightlife spots



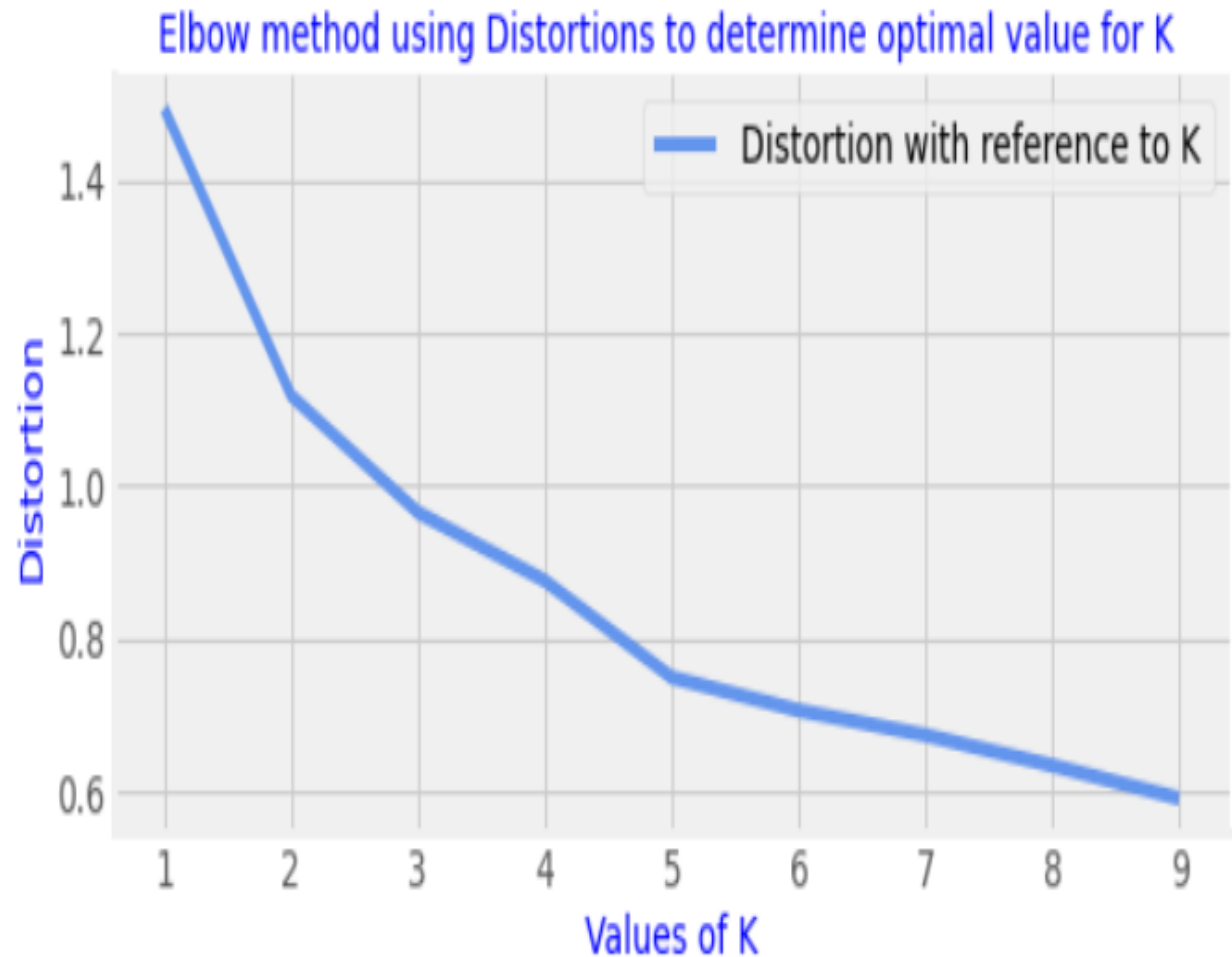
Top 10 Postal Districts based on nightlife spots

Nighttime Accidents by Each Borough

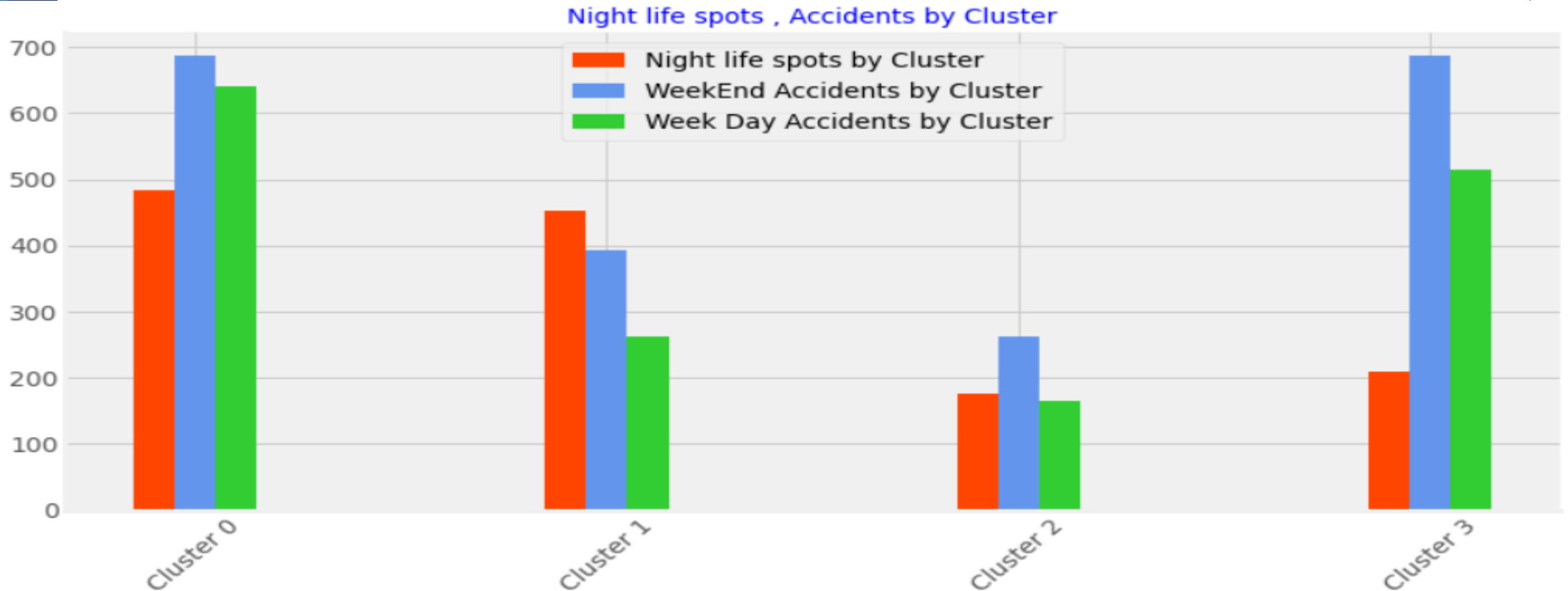


K Means Classification

- Optimal Value of K with Elbow Method



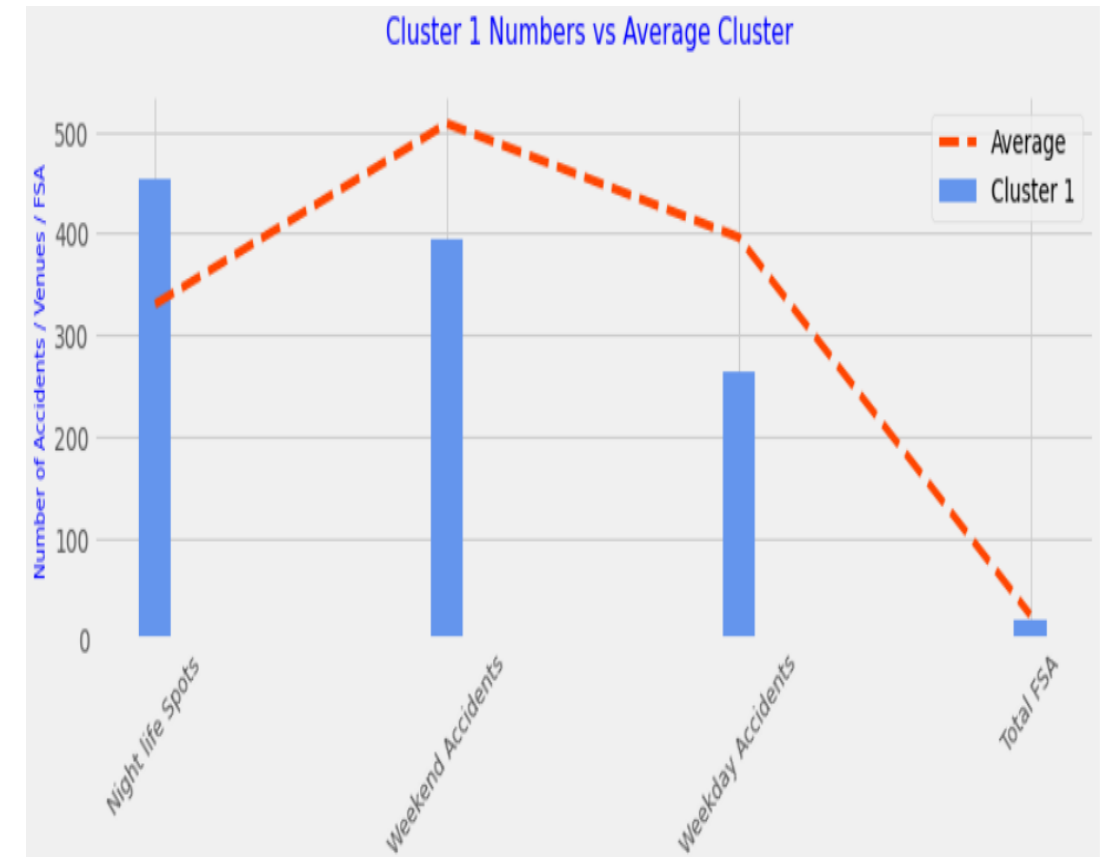
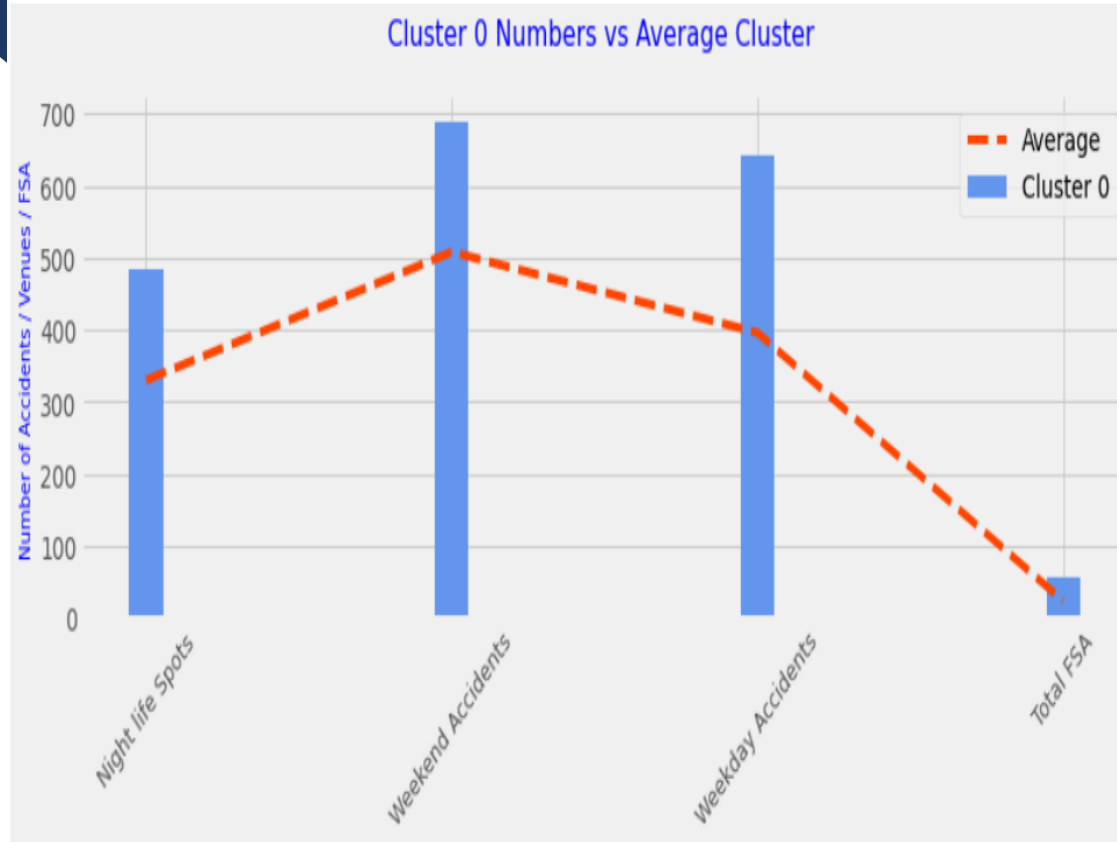
Classification Results



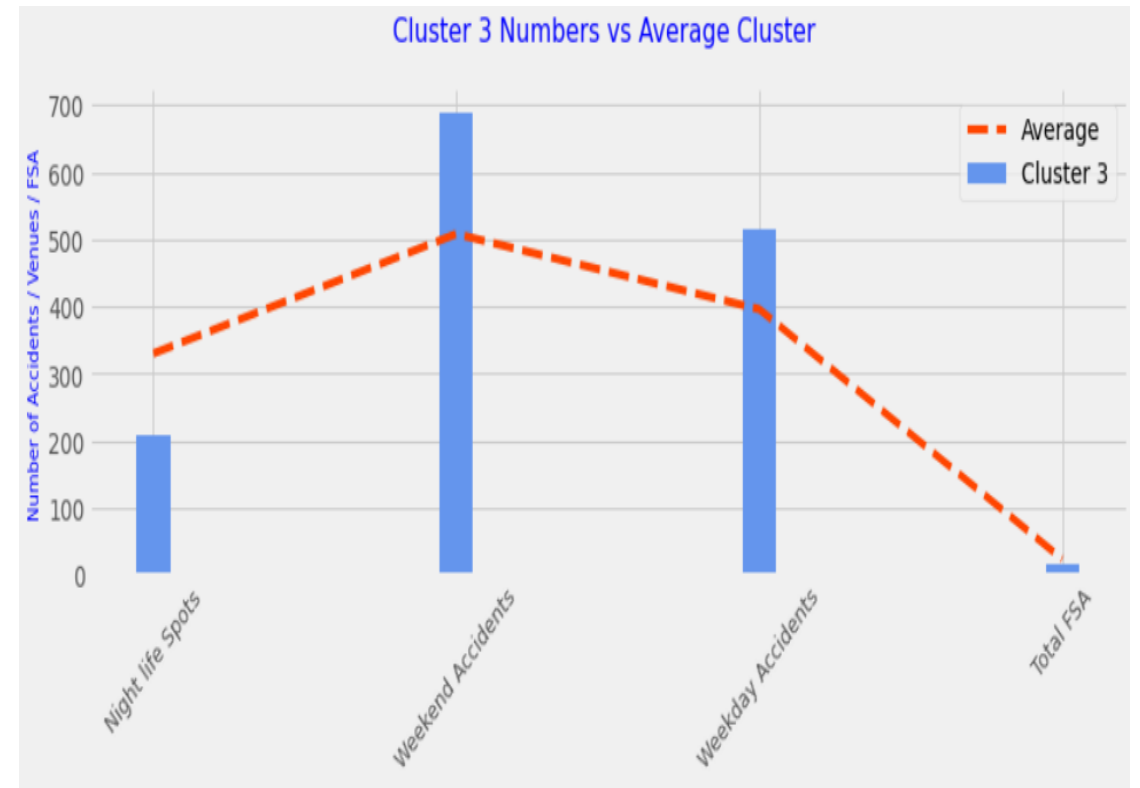
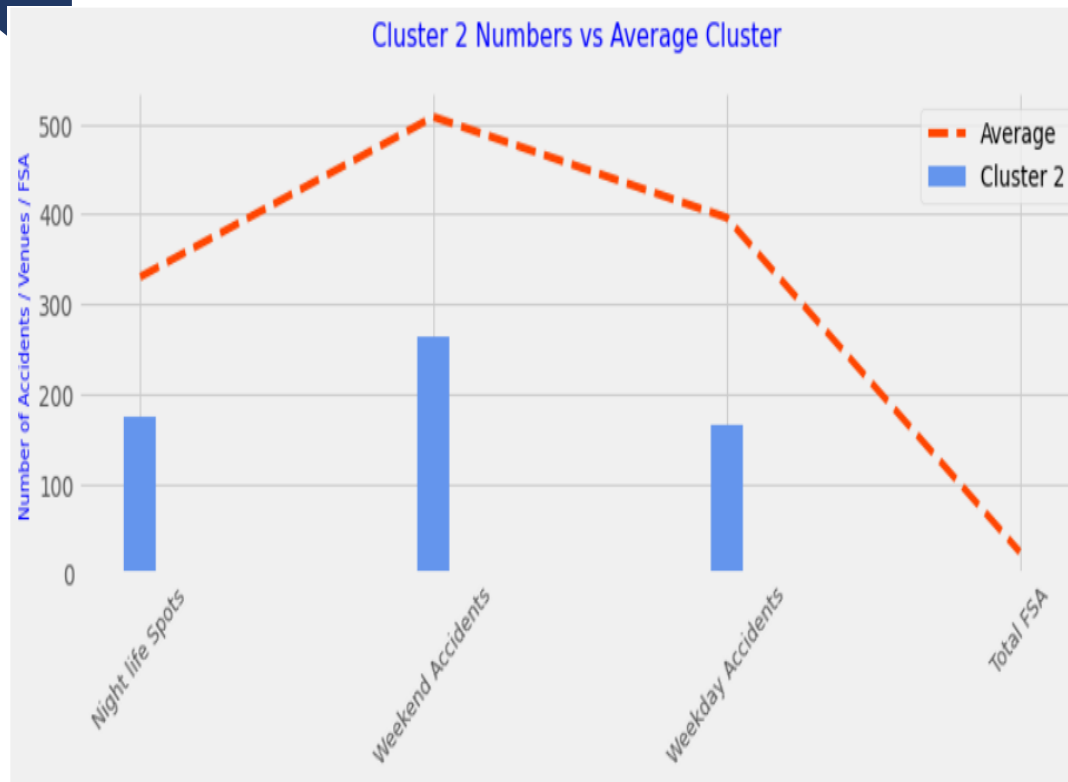


Postal District Classification on Map

Results for Cluster 0, 1



Results for Cluster 2, 3



Conclusion

Higher Nightlife Spots in the area increases the Nighttime Accidents

More Nighttime Accidents on the Weekend Nights compare to Weekday nights

Recommendations

- **In the areas with Higher Number of Accidents**
 - Businesses take additional steps for safety of their customers
 - Police increase nighttime patrol
 - City government run awareness campaign
 - Ride sharing / Cab services increase their presence