L.A. Vehicle Thefts Analysis

Matheus Grover

Table of Contents

Why This Matters to YOU

- Vehicle theft impacts thousands of LA residents every year
- Knowing the high-risk times and locations can help communities stay more aware and protected
- Identifying demographic patterns helps highlight which groups are disproportionately affected
- This analysis uses Los Angeles Police Department (LAPD) vehicle theft data to provide evidence-based insights
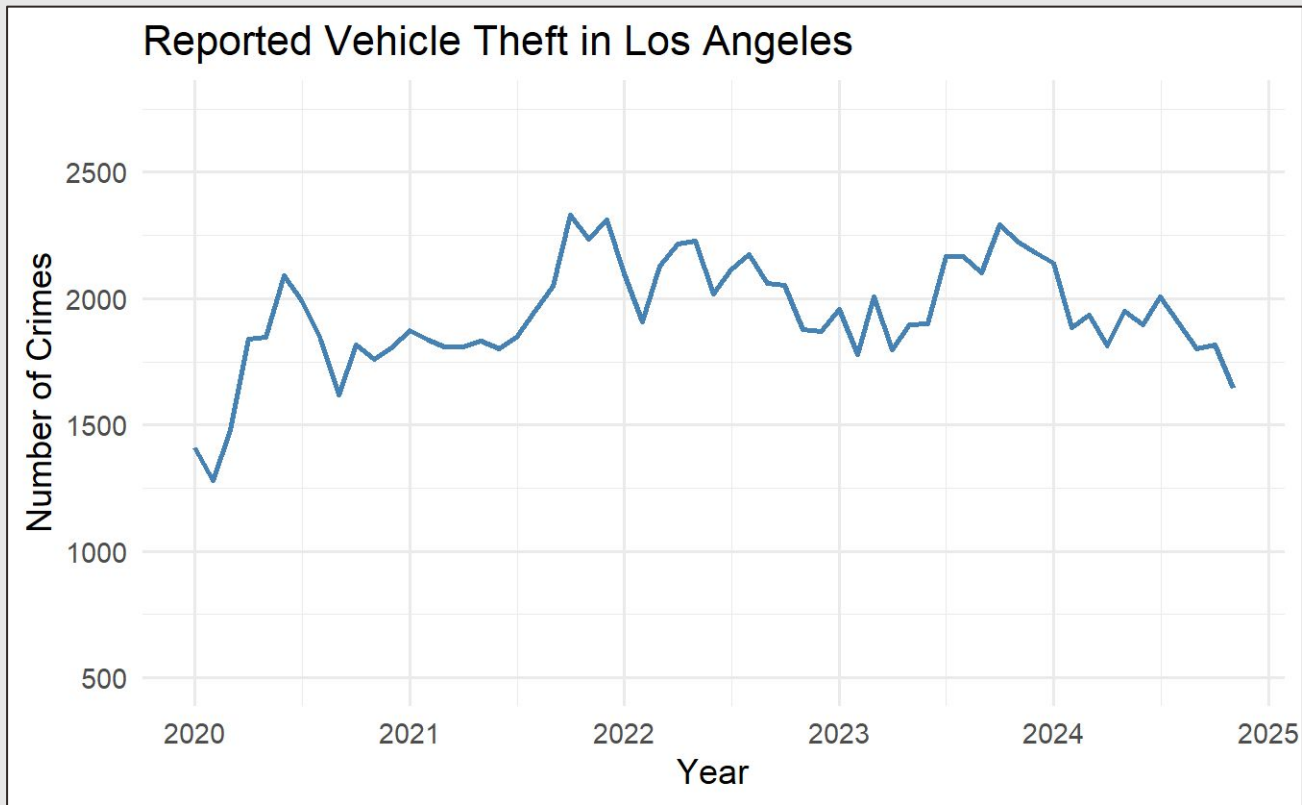
Research Question

What patterns characterize vehicle thefts in Los Angeles, and how do timing, location, and victim demographics shape these incidents?
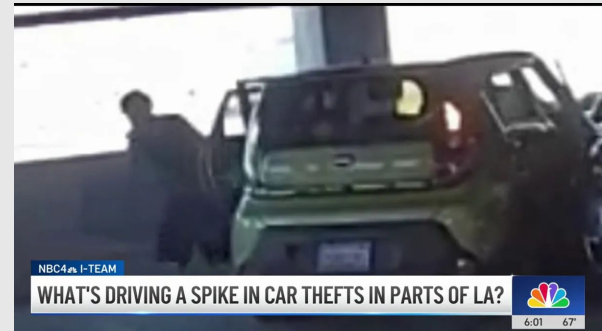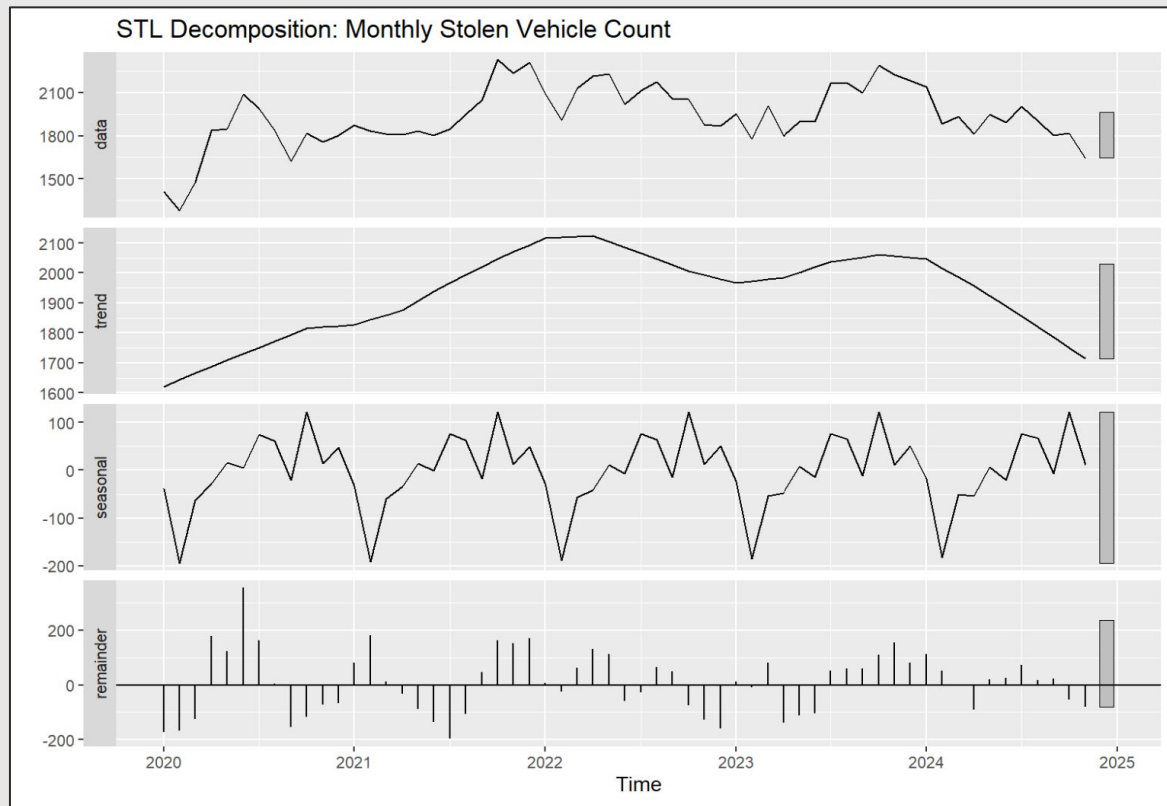
Exploratory Data Analysis

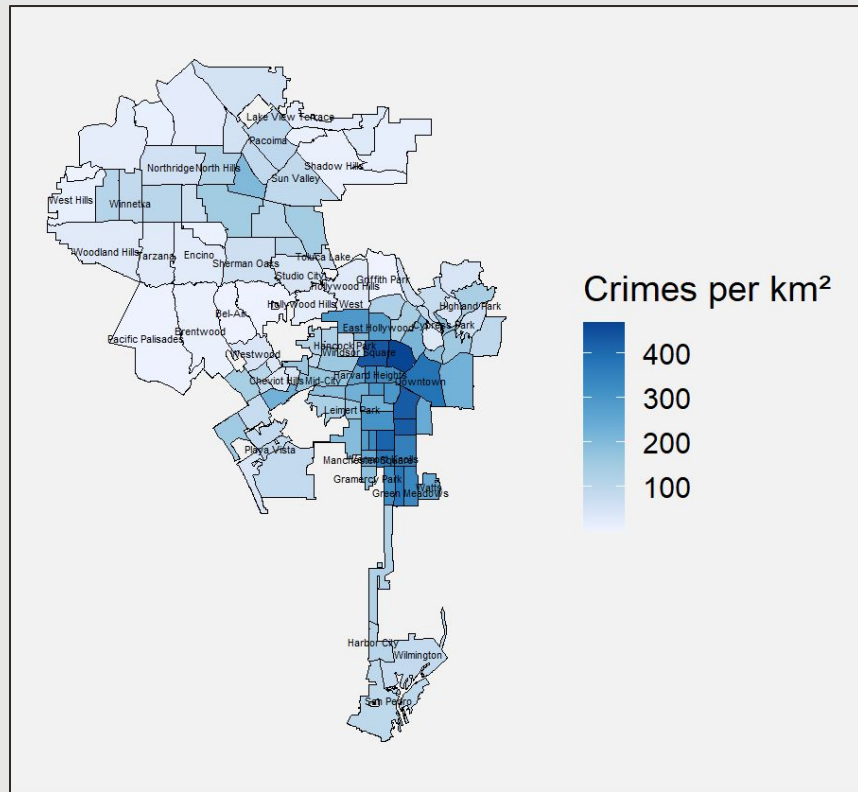# Trends Over Time

Reported Vehicle Theft in Los Angeles

Seasonal Decomposition
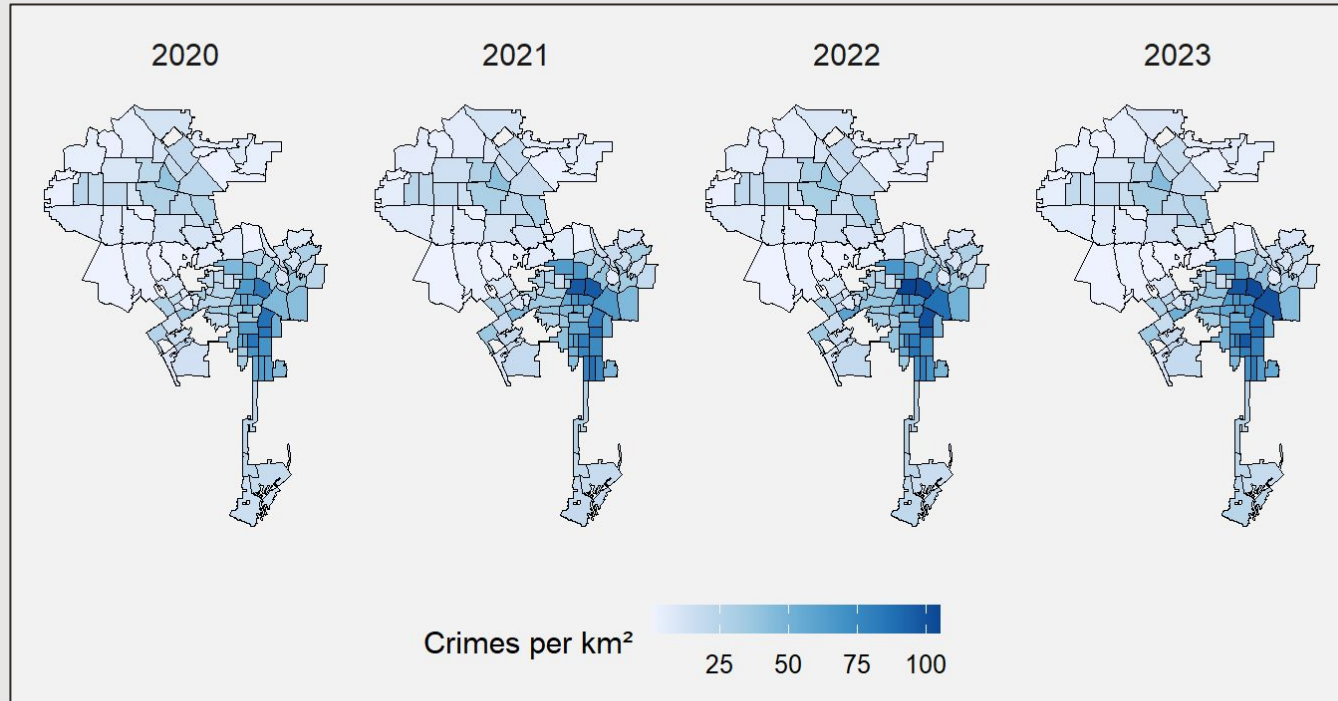

STL Decomposition: Monthly Stolen Vehicle Count

Reported Vehicle Theft Map

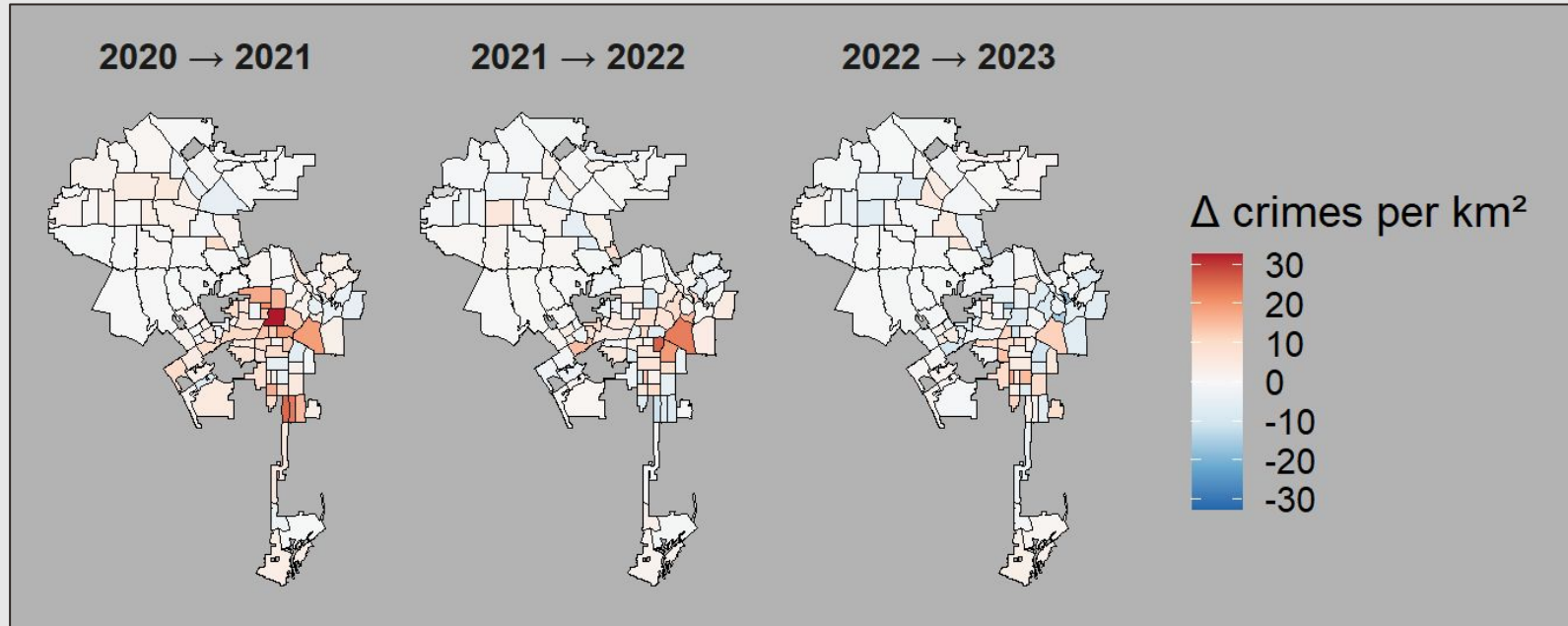# Geographic Patterns on Crime Density

Change in Reported Vehicle Theft

Do Vehicle Thefts Vary by Day of the Week?

Vehicle Theft by Day of Week
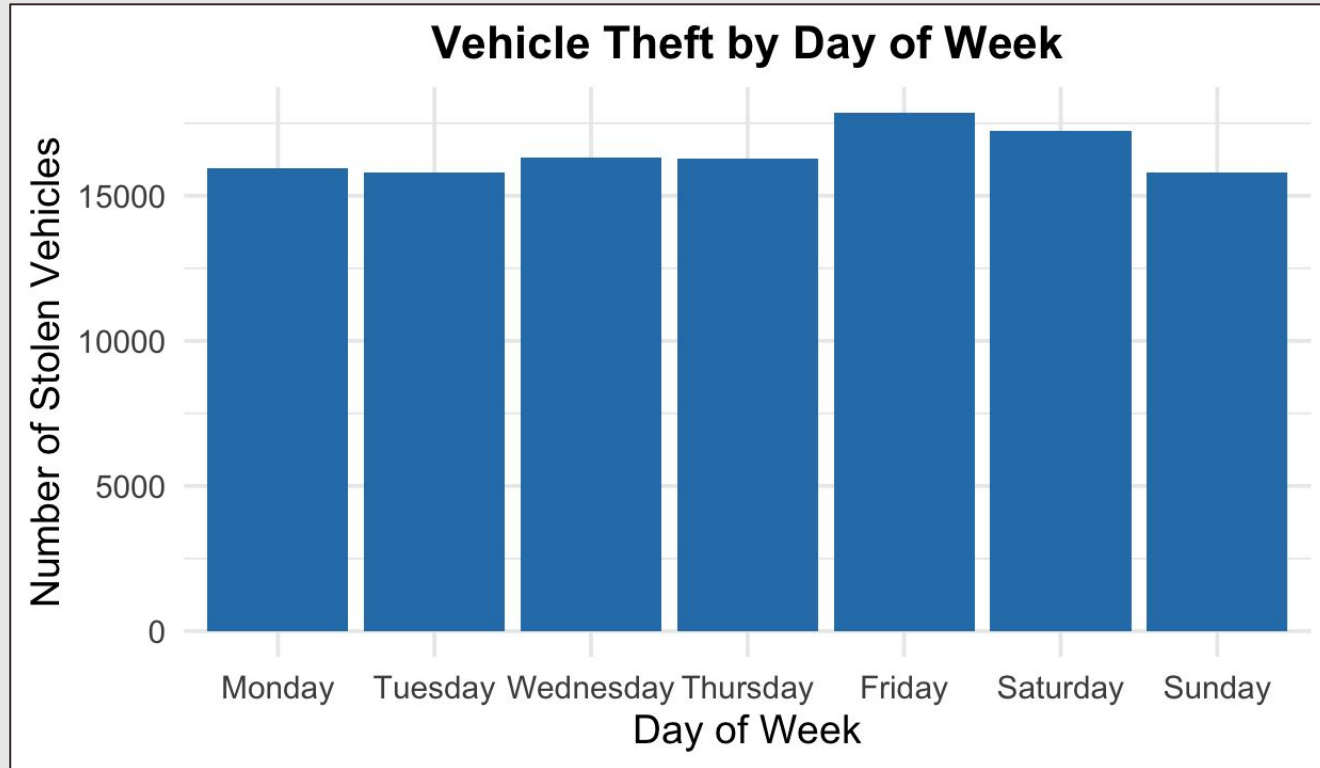
When Do Vehicle Thefts Occur?

Time that Vehicle Theft Occurred
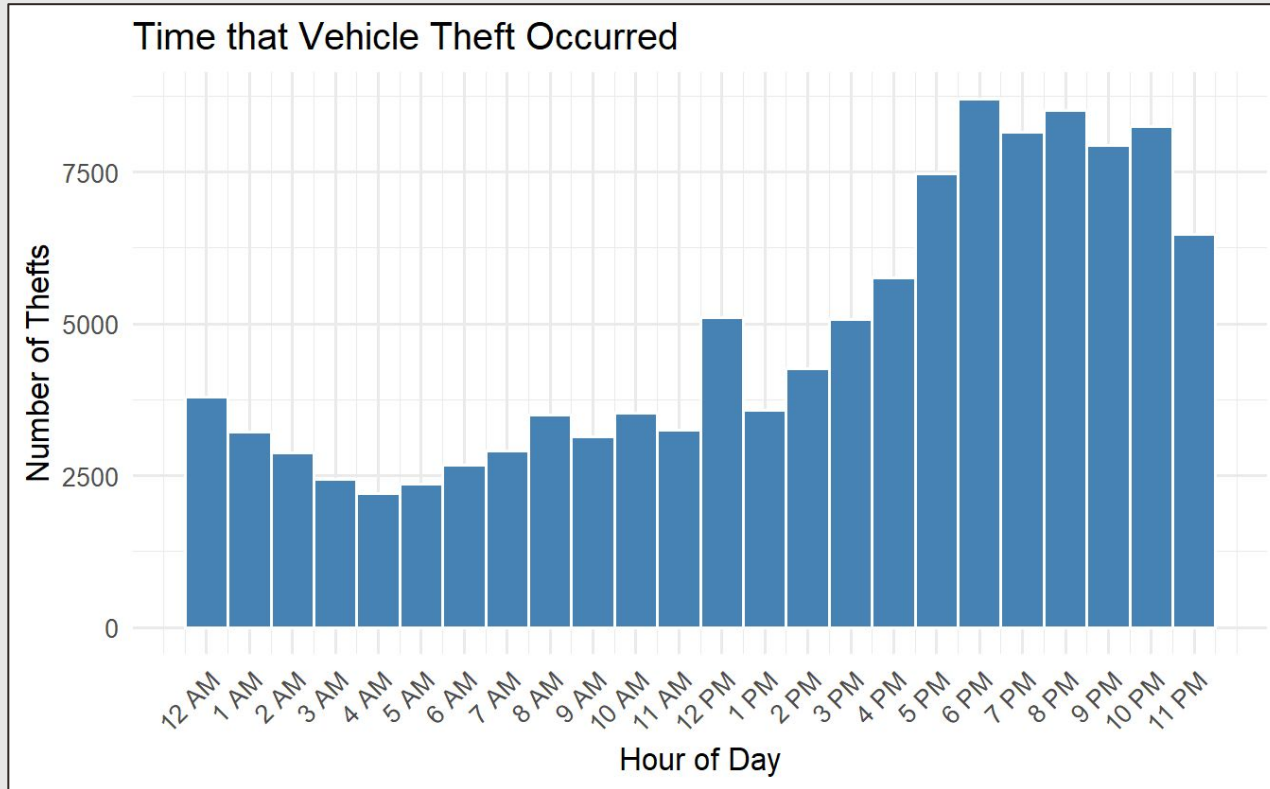
Victim Demographics: Age
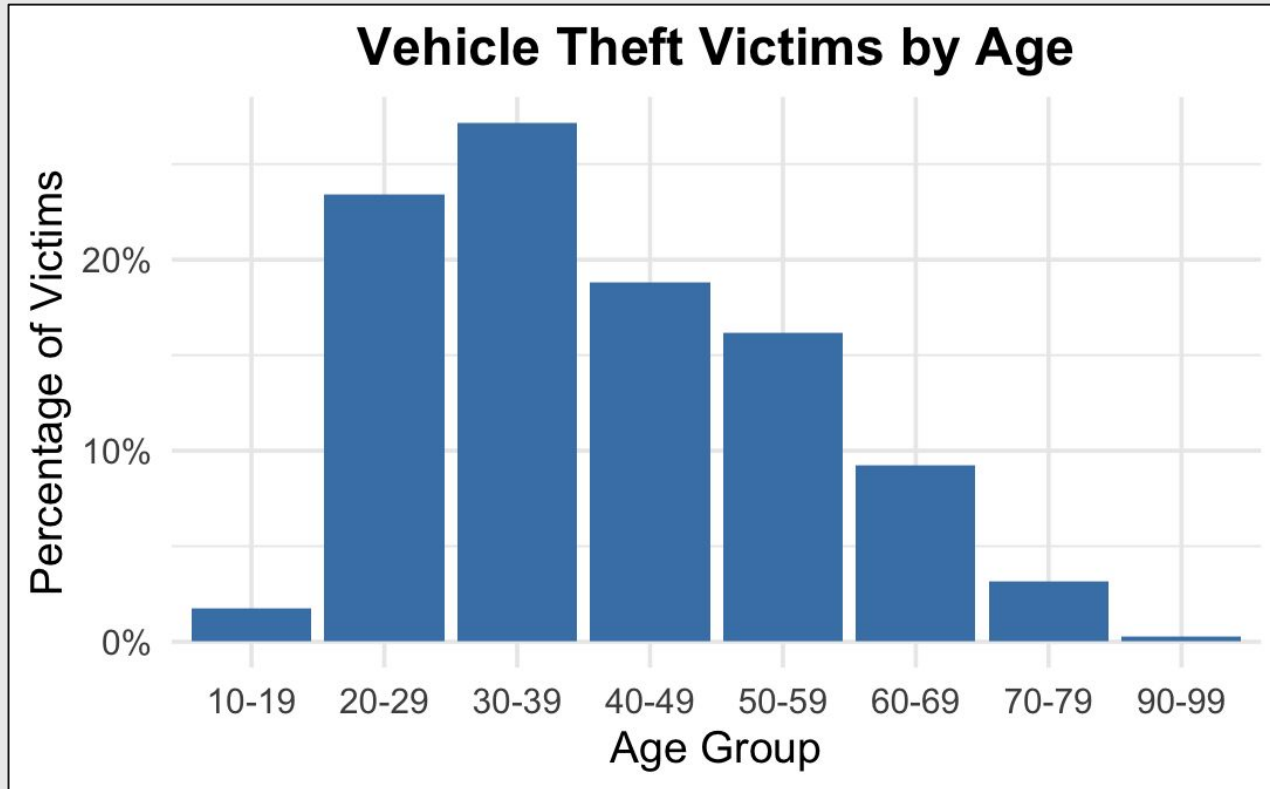
Victim Demographics: Gender

Victim Demographics: Race

Modeling

Residuals from ARIMA

ARIMA Forecast
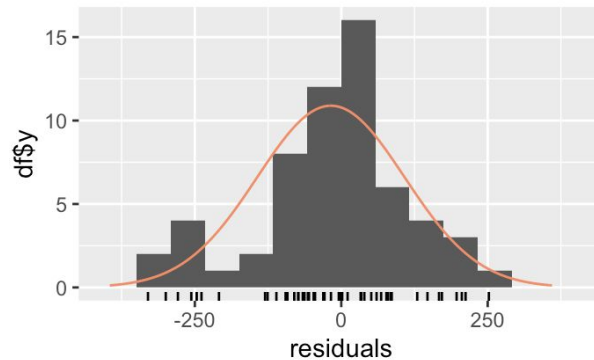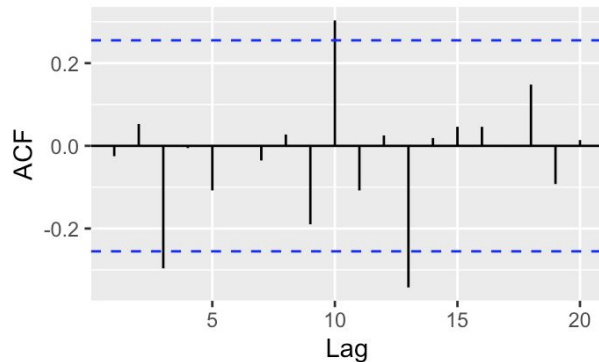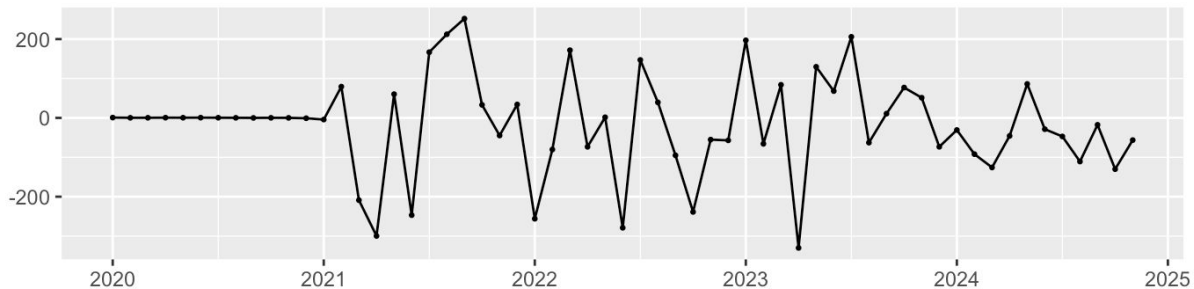
ARIMA Forecast: Reported Vehicle Theft
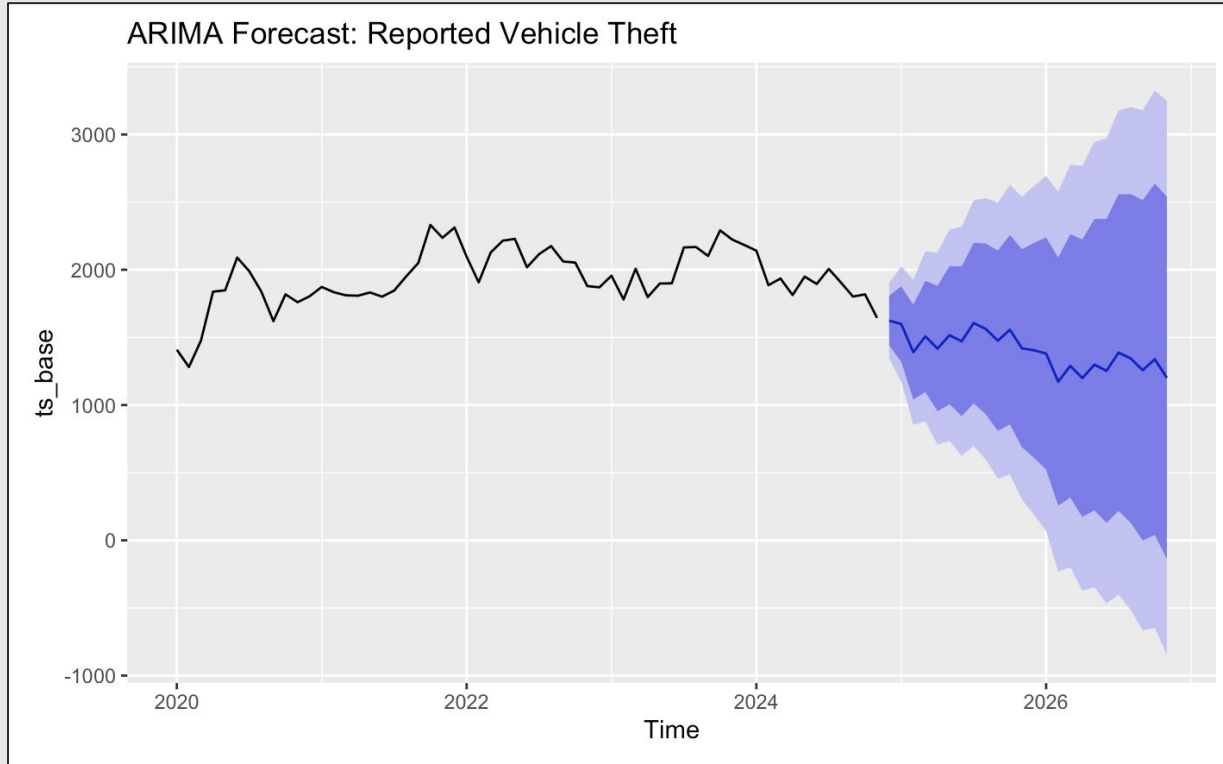
If you had to guess, what matters the most for vehicle theft in LA:

Who the Victim is? ❌
Time of day? ❌
Location? ✅

Regressions Trees for Data Scientists

-Why Regression Trees?

-The final outcome is the **misleading**, so few vehicle thefts out of all crime in LA

-Original prediction is **no**
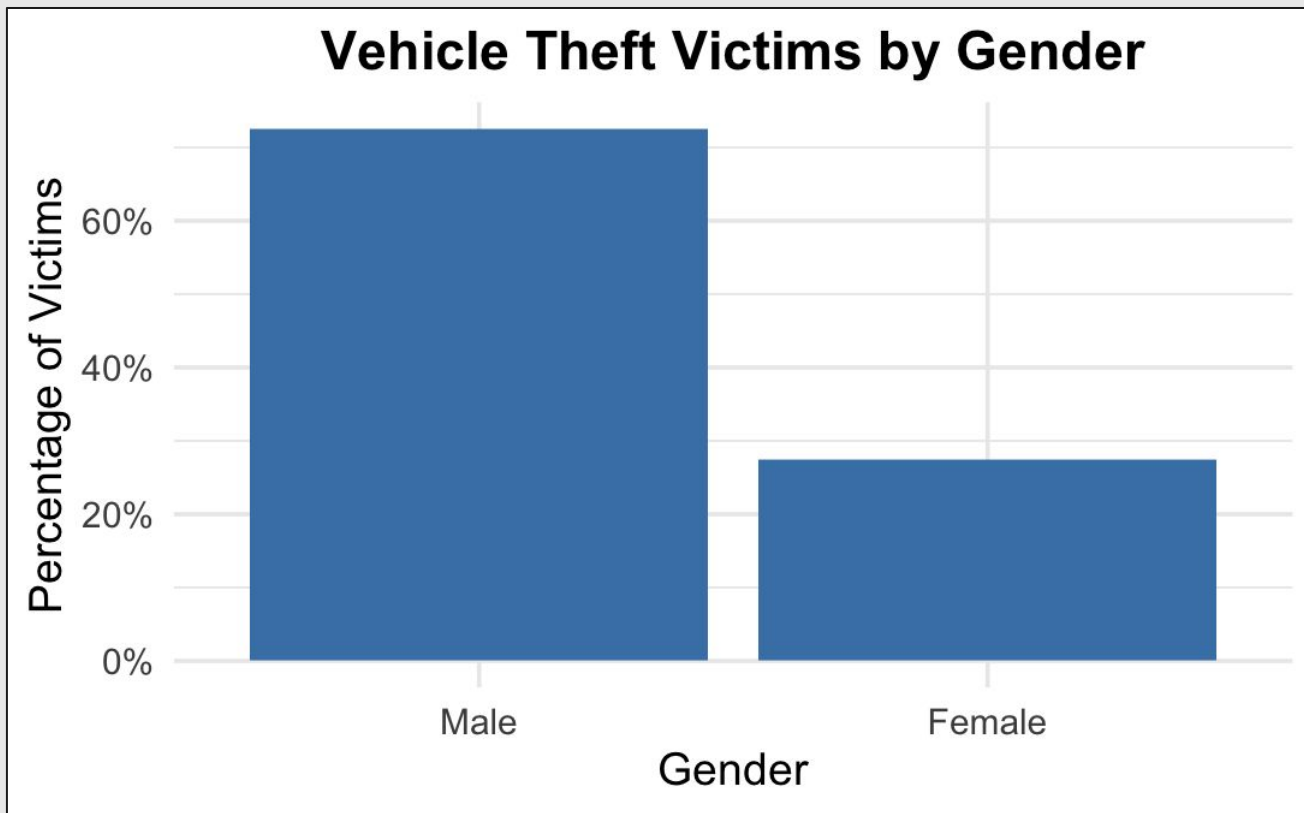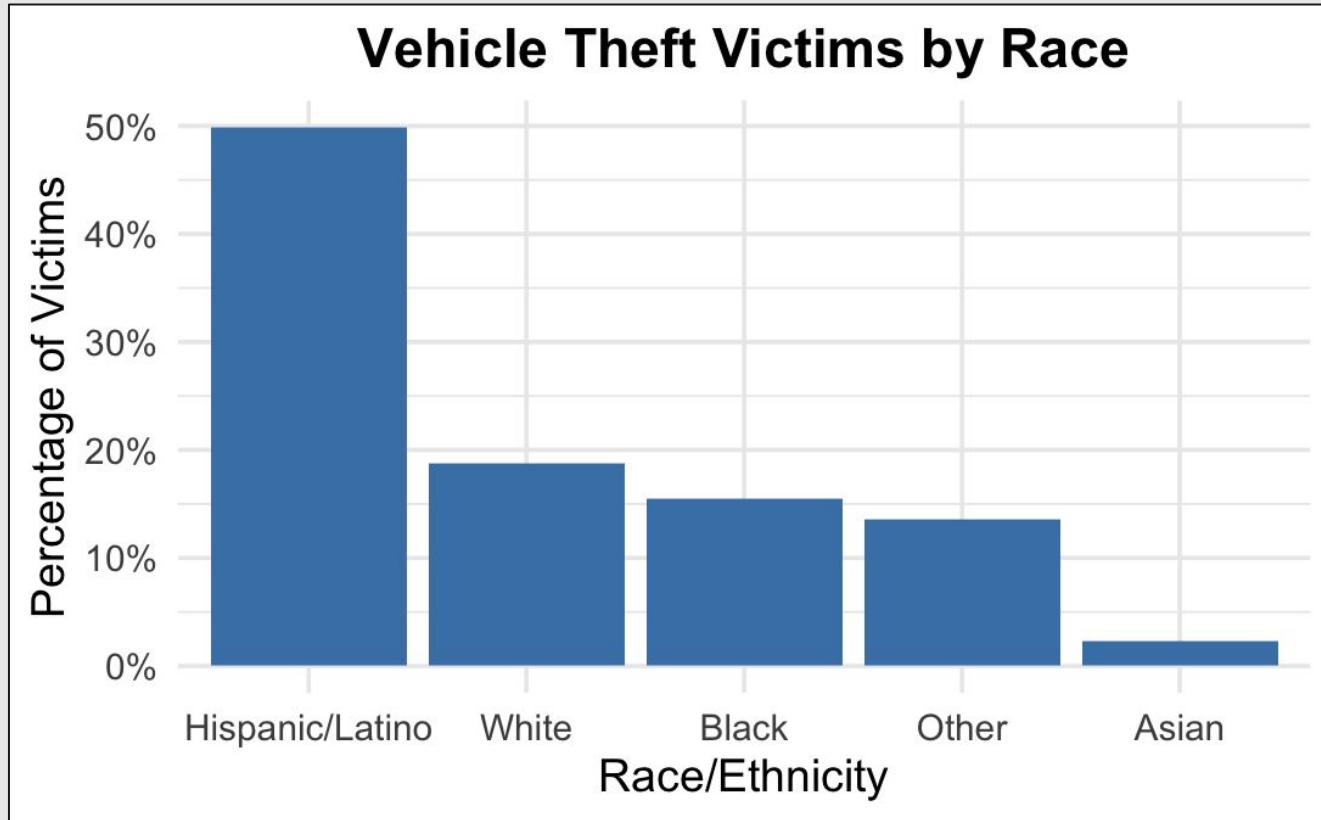
-When weighting the **yes** answer, **Location dominates**

Solution? -> Drop **location** because we know it's important

Reminder:
-these are predictive from the model and by no means a indication a crime will happen to you

Vehicle Theft vs Other Crimes

No
1.00 .00
100%

*344 vehicle thefts out of roughly 725,000 when filtered for rows with values for sex, age, race, and time occurred

Vehicle Theft (Simple Decision Tree)

No
.50 .50
100%

yes — age_grp = 35-44 — no

Yes
.44 .56
89%

hour >= 3

No
.51 .49
68%

Yes
.17 .83
20%

descent_grp = Hispanic,Other/Unknown

sex = F,X

No
.51 .49
68%

No
1.00 .00
16%

Yes
.37 .63
53%

No
1.00 .00
2%

Yes
.09 .91
18%
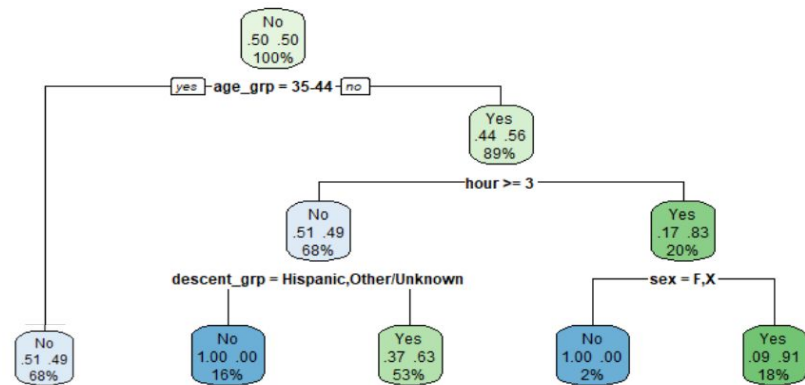
Is this graph easy to understand?
🔍

Kinda....if you've never seen one it's not intuitive and could be cleaned up

Is the crime vehicle theft?

Yes → **Is the Victim between ages 35 and 44?**

No → Out of all the reported crime in the dataset, 344 are vehicle thefts and 725,000+ are not.

No → If the victim **not** between 35–44, the model predicts vehicle theft 56% of the time.

Yes → If the victim **is** 35–44, the model predicts vehicle theft 49% of the time.

The time is between 12am and 3am?

No → If the victim is **not** between 35–44, and the time is outside of 12-3 am the model predicts vehicle theft 49% of the time.

Yes → If the victim is **not** between 35–44, and the time is between 12-3 am the model predicts vehicle theft 83% of the time.

Does the victim identify as Hispanic or "Other"/Unknown?

Yes → 0% predicted to be a victim of vehicle theft.

No → 63% predicted to be a victim of vehicle theft.

Does the victim identify as Female or Other?

Yes → 0% predicted to be a victim of vehicle theft.

No → 91% predicted to be a victim of vehicle theft.

Economic Impact

- Vehicle theft imposes substantial financial burdens on residents (cost of repairs, replacements and lost personal property).

- Insurance premiums rise in high-theft neighborhoods, increasing ongoing expenses for the entire communities.

- The city faces significant public costs related to police response, investigations and administrative processing.

- Businesses in affected areas experience reduced customer activity and higher security expenses

- These economic pressures disproportionately impact lower-income neighborhoods, reinforcing existing financial inequalities.

Social Implications

- High theft rates reduce residents' sense of safety and contribute to increased stress and anxiety.

- Certain demographic groups appear more frequently as victims, indicating that the impact is not evenly distributed across the population.

- Frequent theft incidents can create a perception that local authorities are unable to ensure safety which may discourage residents from reporting crimes.

Recommendations

- **Increase Surveillance in Hot Zones:** City planners should add cameras, improved street lighting, and automatic license-plate readers in the high-risk areas

- **Subsidize Anti-Theft Technology:** Provide low-income neighborhoods with discounted GPS trackers, steering-wheel locks, or immobilizers to reduce theft impact.

- **Community Partnership Programs:** Work with neighborhood councils to promote reporting, awareness workshops, and increase crime-prevention communication.

- **Data-Driven Policy Evaluation:** Continuously monitor theft and evaluate whether interventions (patrols, tech adoption, campaigns) reduce incidents over time.

DON'T EVEN THINK ABOUT STEALING

Policies

- **Increased LAPD Targeted Patrols:** The city expanded hotspot-based policing in areas with historically high vehicle-theft rates.

- **Catalytic Converter Theft Task Forces:** Los Angeles implemented specialized task forces and partnered with CHP to crack down on organized theft rings responsible for repeat offenses.

- **VIN-Etching & Anti-Theft Programs:** Policymakers funded free VIN-etching events and distributed steering-wheel locks to residents in high-risk neighborhoods.

- **Public Awareness Initiatives:** The city launched public campaigns encouraging residents to secure their vehicles, install tracking devices, and report suspicious activity.

Conclusion

- **Vehicle theft in LA is persistent and unevenly distributed**. Certain areas consistently have the highest theft density

- **When and where matters more than who.** Thefts cluster in specific hotspots and peak during evening hours, while the day and victim demographics are not as important

- **Models highlight risk, not certainty.** Our models indicate that theft levels will remain high and that location is the primary predictor. Keep in mind we can only evaluate where risk is higher on average, not predict where a theft will or will not occur

- **Big picture:** Targeted hotspot policing, anti-theft technology, and community partnerships are key to reducing vehicle theft and its economic and social costs.