

Crime in the City of Los Angels

By Carolina Salas

Abstract:

This report examines crime patterns in Los Angeles from 2010 to 2019, leveraging a comprehensive dataset sourced from the Los Angeles City Open Data Portal. By analyzing millions of crime records, including variables such as crime types, dates, times, victim demographics, and locations, the study provides a robust foundation for understanding the city's crime dynamics. The analysis focuses on three primary objectives: summarizing historical crime trends through descriptive analytics, uncovering statistically significant relationships through dependency analysis, and forecasting future crime trends up to 2040 using predictive modeling. Advanced methodologies, including regression analysis, Chi-Square tests, ANOVA, and Exponential Smoothing, reveal key insights such as seasonal variations, demographic vulnerabilities, and geographic crime concentrations. Visualizations, including stacked bar graphs, line charts, and heatmaps, complement the analysis, offering actionable insights for policymakers and community leaders. This report highlights the importance of data-driven strategies in enhancing public safety and fostering informed interventions to address urban safety challenges.

Variables:

1. **DR_NO** - Official file number consisting of a 2-digit year, area ID, and a unique 5-digit identifier for each report.
2. **Date Rptd** - Date when the crime was reported, in MM/DD/YYYY format.
3. **DATE OCC** - Date on which the crime incident occurred, also in MM/DD/YYYY format.
4. **TIME OCC** - Time of occurrence in 24-hour military time format.
5. **AREA** - Numeric code representing one of LAPD's 21 geographic divisions.
6. **AREA NAME** - Name of the LAPD geographic area or patrol division, often referencing a landmark or community.
7. **Part 1-2** - Crime classification indicating Part 1 (more serious) or Part 2 (less serious) offenses.
8. **Crm Cd** - Primary crime code, indicating the nature of the crime.
9. **Crm Cd Desc** - Description of the primary crime code, detailing the criminal activity.
10. **Vict Age** - Age of the victim, recorded as a two-character numeric value.
11. **Vict Sex** - Gender of the victim, with values:
 - 12. **F** - Female
 - 13. **M** - Male
 - 14. **X** - Unknown
15. **Vict Descent** - Ethnicity or descent of the victim, with codes:
 - ❖ **A** - Other Asian
 - ❖ **B** - Black
 - ❖ **C** - Chinese
 - ❖ **D** - Cambodian
 - ❖ **F** - Filipino
 - ❖ **G** - Guamanian
 - ❖ **H** - Hispanic/Latin/Mexican
 - ❖ **I** - American Indian/Alaskan Native
 - ❖ **J** - Japanese
 - ❖ **K** - Korean
 - ❖ **L** - Laotian
 - ❖ **P** - Pacific Islander
 - ❖ **S** - Samoan
 - ❖ **U** - Hawaiian
 - ❖ **V** - Vietnamese
 - ❖ **W** - White
 - ❖ **X** - Unknown
 - ❖ **Z** - Asian Indian
16. **Premis Cd** - Code for the type of structure, vehicle, or location where the crime took place.
17. **Premis Desc** - Description of the premise code, detailing the type of

- location (e.g., “Residence” or “Vehicle”).
18. **Weapon Desc** - Description of the weapon used in the crime, with missing values filled as "UNKNOWN WEAPON/OTHER WEAPON."
 19. **Status** - Code indicating the status of the case; **IC** is the default.
 20. **Status Desc** - Description of the case status, providing information on whether it is open, under investigation, or closed.
 21. **Crm Cd 1** - Primary crime code, representing the most serious offense in cases with multiple crimes.
 22. **LOCATION** - Street address of the crime incident, rounded to the nearest hundred block for privacy.
 23. **LAT** - Latitude coordinate for the incident location.
 24. **LON** - Longitude coordinate for the incident location.

Crime data analysis is a cornerstone of effective public safety strategies, offering insights that can guide policymaking and resource allocation. This report explores crime patterns in Los Angeles from 2010 to 2019, leveraging data sourced from the [Los Angeles City Open Data Portal](#). The dataset, comprising millions of records, captures detailed attributes such as crime types, dates, times, victim demographics, and locations, making it a robust foundation for in-depth analysis and forecasting.

The primary objectives of this study are threefold. First, descriptive analytics are utilized to summarize historical crime trends and demographic distributions, providing an overview of the city’s crime landscape. Second, dependency analyses investigate statistically significant relationships between variables, such as crime types and locations, time of occurrence, and reporting delays. Finally, predictive analytics forecast future crime trends across multiple dimensions, including age, gender, ethnicity, and seasonality, projecting patterns up to the year 2040.

Advanced methodologies are employed throughout this report, including regression analysis, Chi-Square tests, ANOVA, and predictive modeling techniques like Exponential Smoothing. The analysis is complemented by a range of visualizations—stacked bar graphs, line charts, heatmaps, and pie charts—that illuminate key findings and offer actionable insights. Noteworthy discoveries include seasonal crime variations, demographic-specific vulnerabilities, and geographic crime concentrations, providing a detailed framework for targeted crime prevention efforts.

By leveraging the dataset's breadth and applying rigorous analytical methods, this report contributes to a deeper understanding of crime dynamics in Los Angeles. It underscores the importance of data-driven approaches to addressing urban safety challenges, equipping policymakers, law enforcement agencies, and community leaders with the tools needed to craft informed interventions and foster safer communities.

Descriptive Analytics

The analysis begins with a descriptive exploration of crime trends in Los Angeles from 2010 to 2019, using data sourced from the [Los Angeles City Open Data Portal](#). This section focuses on summarizing key patterns in the data to provide a comprehensive overview of how crime varies across demographics, geographic locations, and time periods.

By analyzing attributes such as victim age, gender, and ethnicity, alongside seasonal and hourly crime patterns, this descriptive analysis paints a clear picture of the scope and distribution of crime. For example, it examines which age groups are most affected, how crime types differ by gender, and the seasonal and spatial hotspots of criminal activity. These insights provide a foundational understanding of the dataset and set the stage for more advanced analyses in subsequent sections.

The descriptive analysis relies on statistical summaries and visualizations, including bar graphs, histograms, and heatmaps, to effectively communicate trends and key findings. The focus remains on uncovering “what happened” during the observed period, establishing context for deeper explorations later in the report.

Statistic	Value
Count	2122855
Mean	31.7451
Std Dev	20.64589
Min	-13
25%	20
Median (50%)	32
75%	46
Max	118
Mode	0

Figure 1: Victim Age Distribution

The statistical summary of victim ages provides a foundational understanding of the demographic characteristics of crime victims in Los Angeles between 2010 and 2019. The average (mean) age of crime victims is approximately 31.75 years, while the median age is slightly lower at 32 years. This close alignment between the mean and median suggests that the age distribution is somewhat symmetrical, with a concentration of crime victims in the young adult demographic.

A notable detail in the data is the mode, which is 0. This likely represents missing or placeholder data used for unknown ages, contributing to an anomalously high count at the lower end of the distribution. The wide standard deviation of 20.65 years indicates considerable spread in victim ages, spanning from a minimum of -13 to a maximum of 118. These extreme values likely result from data entry errors or outliers within the dataset, but they also underscore the importance of data cleaning and verification in crime analysis.

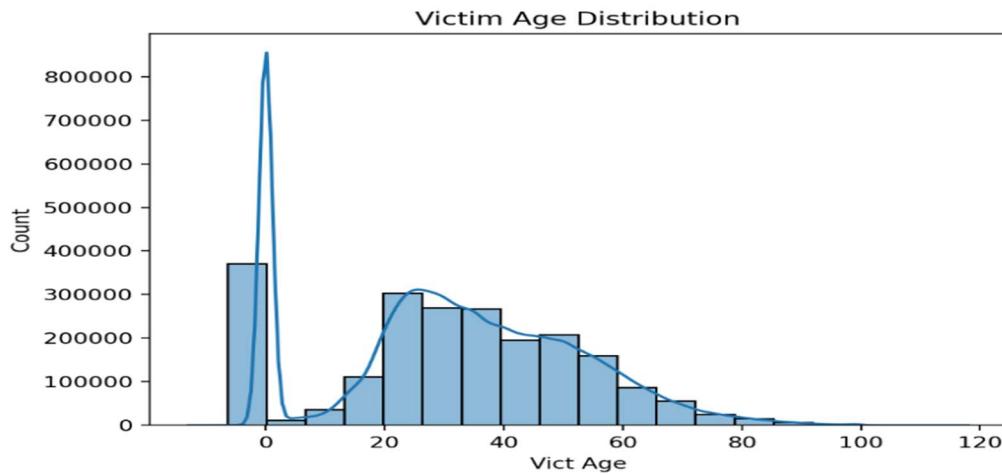


Figure 2: Crime Distribution by Age Group and Gende

The Victim Age Distribution graph further illustrates these insights by showing a high density of victims in younger age brackets, especially below the age of 40. The histogram reveals a sharp initial peak, which could be attributed to the placeholder data (age 0), followed by a concentration of younger adults as victims. There is a gradual decline in the number of victims as age increases, suggesting that younger individuals may be more likely to encounter environments or situations associated with higher crime risk. The graph's trend reinforces the statistical summary, highlighting the significance of age as a factor in crime victimization patterns.

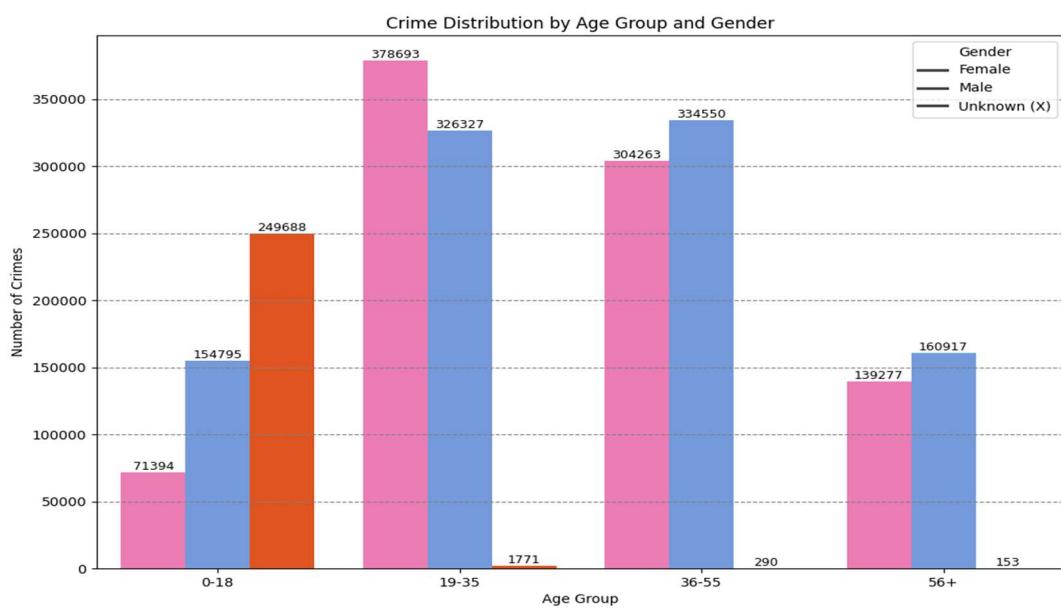


Figure 3: Crime Distribution by Age Group and Gender (Descent)

The analysis of crime distribution across age groups and genders reveals significant patterns in victim demographics. In the Crime Distribution by Age Group and Gender chart, we observe that the majority of crime victims fall within the younger and middle-aged demographics, particularly in the 19–35 and 36–55 age groups.

Breaking down the distribution:

- The 19–35 age group represents the highest percentage of crime victims at 33.31%. Within this group, males (approximately 378,693 cases) and females (326,327 cases) are both significantly impacted, with males slightly more likely to be victims.
- Following closely is the 36–55 age group, comprising 30.12% of total crime cases. Here, male victims are also more prevalent (334,550 cases), though female victims (304,263 cases) are not far behind.
- Younger individuals in the 0–18 age group account for 22.42% of crime victims, with males (154,795 cases) making up a larger portion than females (71,394 cases).
- The 56+ age group is the least represented in crime statistics, constituting 14.15% of victims. Among this older demographic, males (160,917 cases) outnumber female victims (139,277 cases).

This distribution suggests that younger and middle-aged individuals are more frequently targeted or exposed to crime. The slight gender disparity in each age group, with males generally experiencing higher victimization rates, may reflect societal factors influencing crime exposure by gender and age.

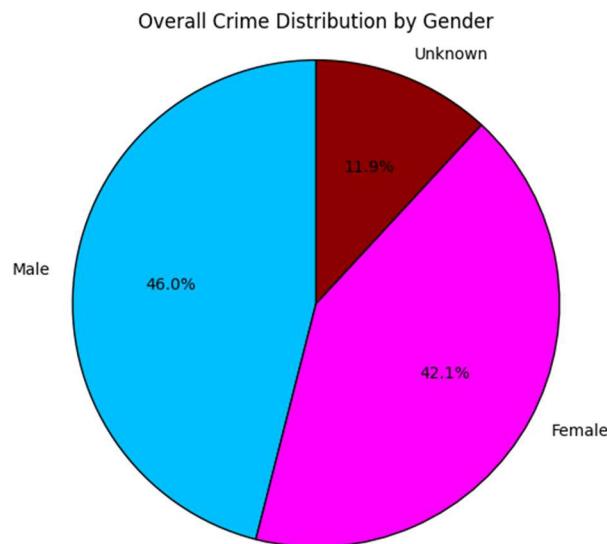


Figure 4: Overall Crime Distribution by Gender

Based on the Overall Crime Distribution by Gender chart, the breakdown of crime distribution is as follows:

- Male: Represents 50.72% of total crimes, with approximately 977,042 cases.
- Female: Accounts for 46.40% of total crimes, with around 893,785 cases.
- Unknown: Constitutes a smaller segment, making up 2.88% of total crimes, totaling 55,399 cases.

This gender-based distribution indicates a near-even split between male and female victims, with males slightly more likely to be victimized. The Unknown category may include cases where the victim's gender was not recorded or known at the time, highlighting potential data gaps in crime reporting. The gender distribution suggests that crime in this dataset does not overwhelmingly target one gender over the other, but rather affects both groups comparably.

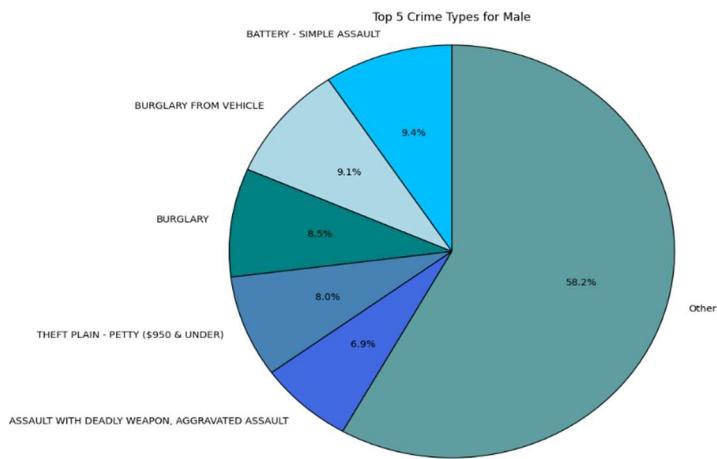


Figure 5: Top 5 Crime Types for Male Victims

The pie chart illustrates the top five types of crimes committed against male victims, providing insight into common incidents males experience in Los Angeles. Battery - Simple Assault

emerges as the most frequent crime, accounting for 9.36% of cases, highlighting the prevalence of direct physical confrontations among male victims. Following closely is Burglary from Vehicle at 9.14%, emphasizing risks associated with vehicular crimes, likely in public or unsecured areas.

Burglary itself comprises 8.50% of crimes, further suggesting a high incidence of property-related offenses involving unauthorized entry. Theft Plain - Petty (for values under \$950) is another common crime, making up 8.00% of incidents, pointing to frequent instances of petty theft against males. Assault with Deadly Weapon, Aggravated Assault represents 6.86% of cases, indicating a smaller yet significant portion of more severe physical attacks. Collectively, these five crime types account for nearly half of all reported incidents involving male victims, with Other Crimes making up the remaining 58.2%.

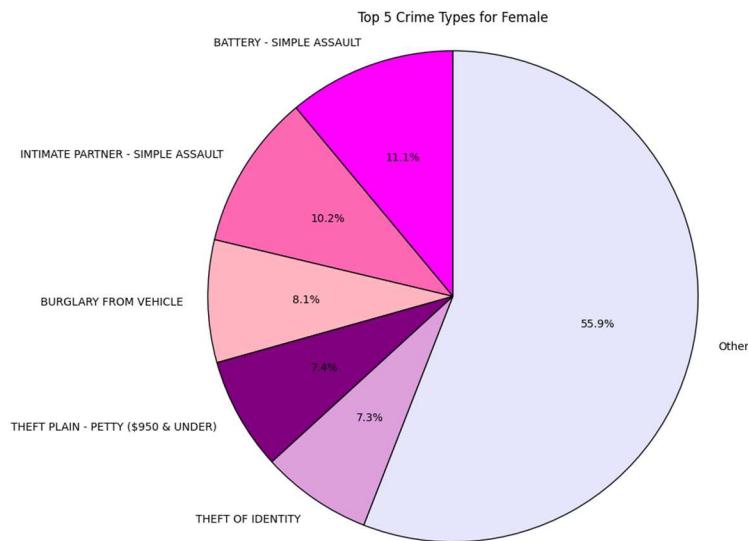


Figure 6: Top 5 Crime Types for Female Victims

This breakdown reveals the most common types of crimes committed against female victims. Battery - Simple Assault tops the list, with 11.01% of incidents, highlighting the prominence of physical confrontations targeting women. Intimate Partner - Simple Assault closely follows at 10.23%, underscoring issues of domestic violence and emphasizing the vulnerability of females to violence within relationships.

Burglary from Vehicle is also prevalent, accounting for 8.06% of crimes, suggesting that property-related offenses, particularly those involving vehicles, are a frequent concern for female victims. Theft Plain - Petty (for amounts under \$950) comprises 7.42% of incidents, indicating the regularity of minor thefts affecting women. Additionally, Theft of Identity ranks fifth, making up 7.31% of cases, signaling a notable incidence of identity-related crimes that disproportionately impact female victims.

The five identified crime types collectively represent a significant portion of incidents affecting females, with Other Crimes comprising the remaining 55.92%. This distribution points to a mix of personal, property, and identity-related risks that female victims frequently encounter.

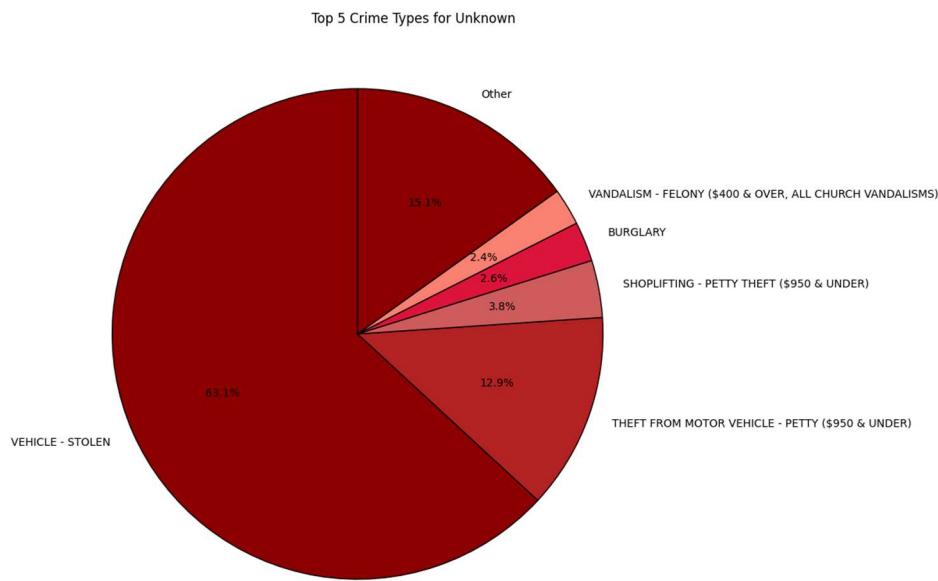


Figure 7: Top 5 Crime Types for Unknown Gender

The distribution of crimes committed against victims of unknown gender reveals a unique pattern dominated by Vehicle Theft, which accounts for a substantial 63.1% of incidents. This high percentage suggests that many cases involving an unknown victim gender might be related to property crimes where the victim is not physically present or identified, thus leaving the gender unspecified.

Following vehicle theft, Theft from Motor Vehicle - Petty (for amounts under \$950) represents 12.9% of the cases, further indicating a focus on vehicle-related crimes within this category. Vandalism - Felony (such as damages over \$400) comprises 2.4%, often involving public or private property damage, and Burglary follows closely with 2.6%, emphasizing unauthorized entry as a common issue.

Lastly, Shoplifting - Petty Theft constitutes 3.8% of cases, and Other Crimes make up the remaining 15.1%, highlighting the variety of offenses against unidentified victims, typically involving property theft and minor felonies.

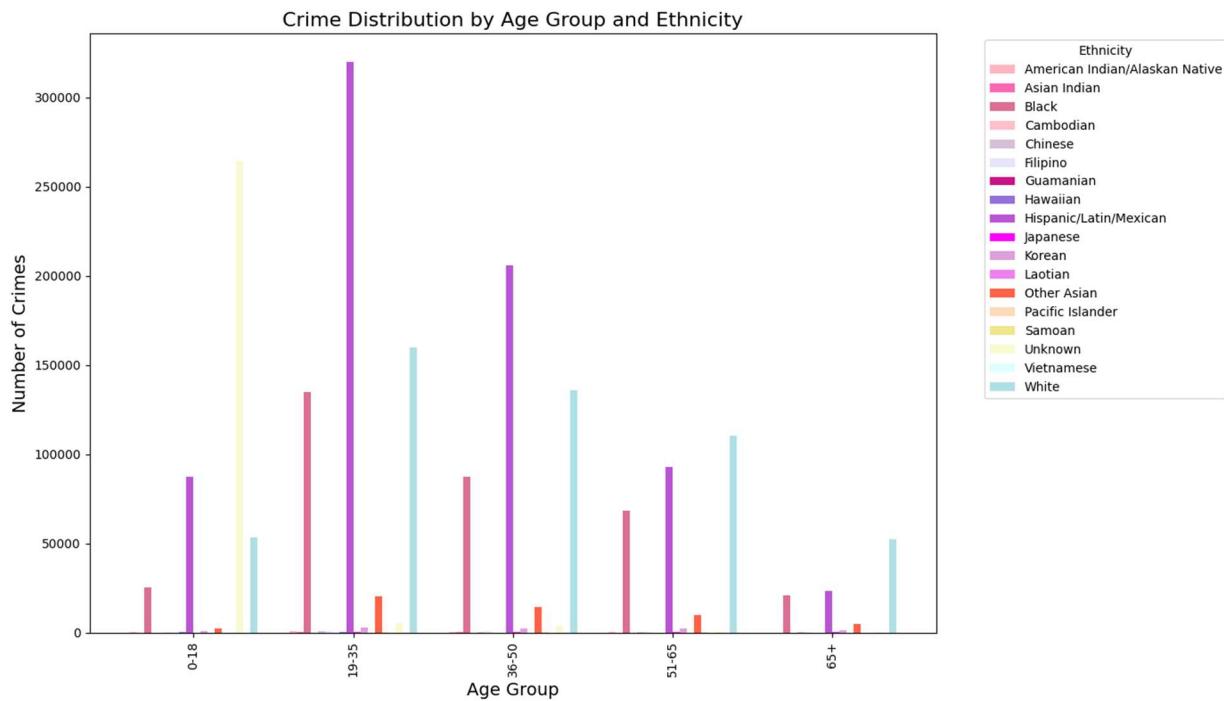


Figure 8: Crime Distribution by Age Group and Ethnicity

This chart provides a breakdown of crime distribution across various age groups, segmented by the ethnicity of victims. The ethnic categories are represented by different colors, with notable groups such as Hispanic/Latin/Mexican, Black, and White displaying higher frequencies compared to others.

- Hispanic/Latin/Mexican victims make up the largest segment, comprising 37.86% of total crime victims. This group shows significant crime victimization across all age ranges, with the highest concentration in the 19–35 age group. This suggests that young Hispanic/Latin/Mexican adults may be at a higher risk of victimization.
- White individuals constitute 26.59% of crime victims, with a similar age-related distribution pattern. Their numbers are highest within the 19–35 and 36–55 age groups, indicating a trend that parallels that of Hispanic/Latin/Mexican victims.
- Black victims account for 17.47% of the total and show a slightly more even distribution across age groups, though there is still a peak in the 19–35 range.
- Other Ethnic Groups, such as Asian Indian, Pacific Islander, and Hawaiian, represent less than 1% of total crime victims, suggesting a relatively low representation in the dataset. Unknown ethnicity cases comprise 4.05%, indicating instances where the descent of the victim was not reported or recorded.

- The age distribution pattern across ethnicities highlights that the 19–35 age group consistently represents the largest proportion of victims within each ethnic category. This pattern may reflect broader socio-economic and demographic factors that influence exposure to crime for younger adults across ethnicities.

This distribution underlines the importance of tailored community interventions and support services for demographic groups that appear disproportionately affected by crime, particularly young adults from Hispanic/Latin/Mexican, White, and Black backgrounds.

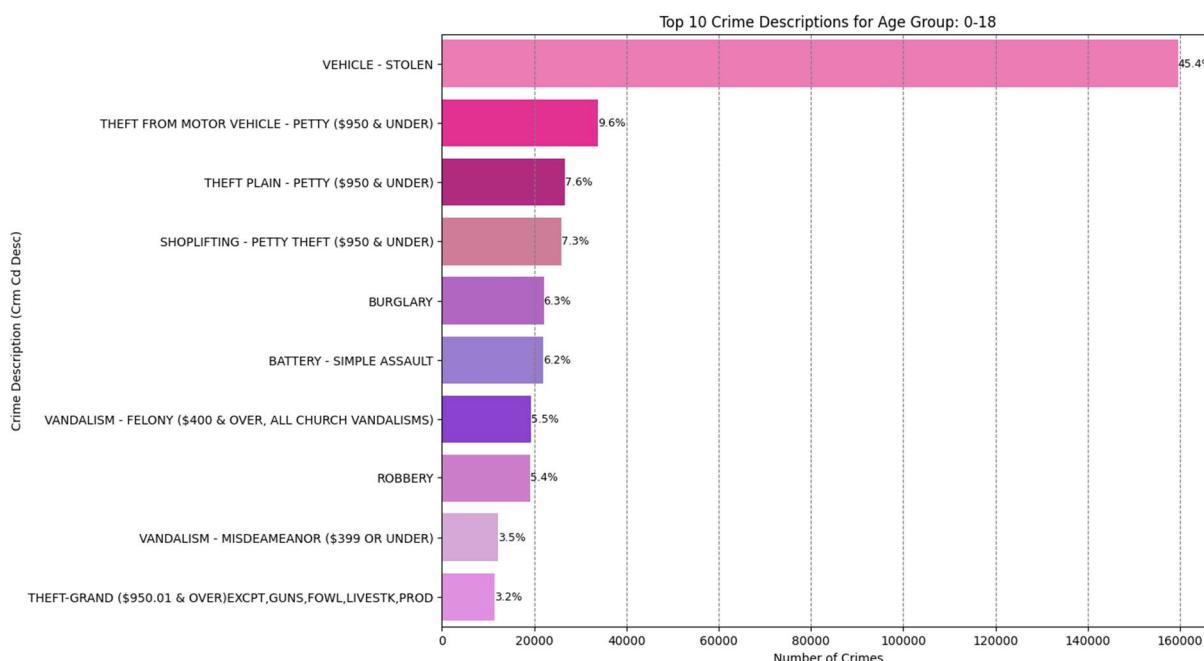


Figure 9: Top 10 Crime Descriptions for Age Group: 0–18

The chart above provides an overview of the most frequent types of crimes committed against individuals aged 0–18. This demographic analysis highlights which types of criminal activities are most prevalent among this age group, offering insights into potential areas of intervention.

- Vehicle Theft is the most common crime in this age group, accounting for 45.4% of total offenses. This could indicate a high vulnerability to vehicle-related crimes for younger individuals, whether in residential, commercial, or public areas.
- Theft from Motor Vehicle (Petty Theft) ranks second at 9.6%, followed by Plain Theft (Petty Theft) and Shoplifting, each comprising around 7% of the crimes in this age group. The high incidence of these thefts suggests that young individuals or their environments may be targets of opportunistic crimes involving unattended belongings or easily accessible property.
- Burglary and Battery (Simple Assault), comprising 6.3% and 6.2% respectively, suggest that home intrusions and minor assaults are also common incidents reported within this demographic.
- Vandalism (both felony and misdemeanor), Robbery, and Grand Theft are less common but still notable, with each making up between 3% and 5% of reported cases. The presence of vandalism and robbery indicates a broader range of crime types affecting young individuals.

This breakdown suggests that securing personal belongings, vehicles, and residential areas could help reduce the likelihood of theft and burglary in cases involving individuals aged 0–18. Public safety measures that enhance security in high-risk locations may mitigate some of these common risks.

Crime Description (Crn Cd Desc)

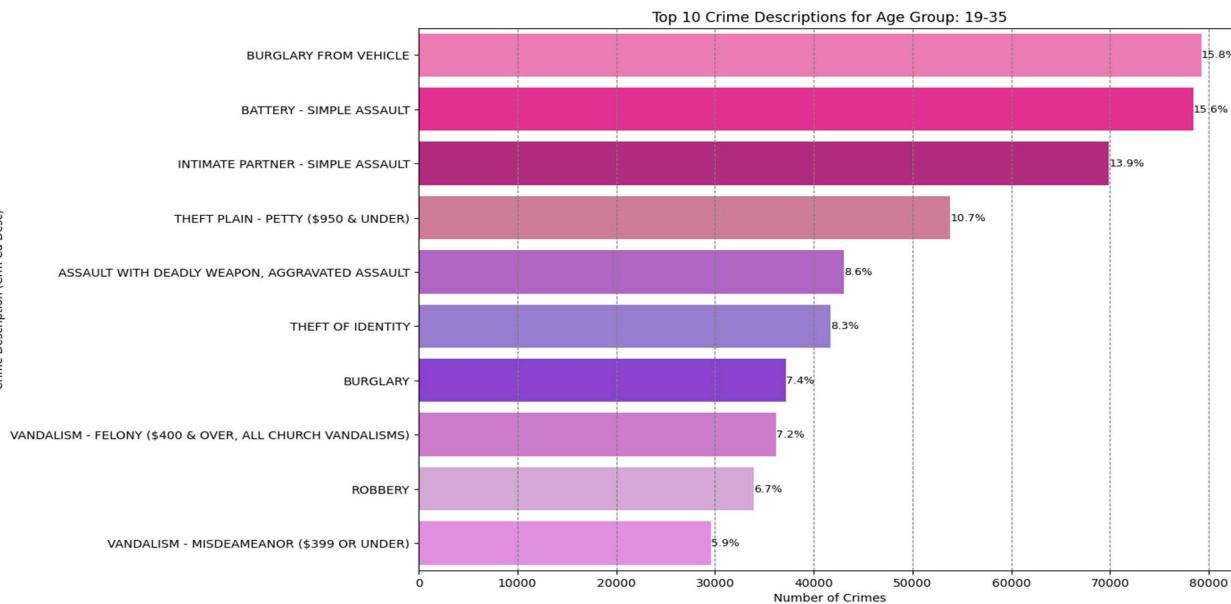


Figure 10: Top 10 Crime Descriptions for Age Group: 19-35

The chart above presents the most prevalent types of crimes committed against individuals aged 19–35, a demographic that forms a substantial part of the crime victim population. This data allows us to identify specific crime types that disproportionately impact young adults, which can help in developing targeted crime prevention strategies.

- Burglary from Vehicle is the most frequent crime in this age group, accounting for 15.8% of the cases. This high rate may be linked to the likelihood of this demographic leaving valuable items in vehicles or frequently parking in areas susceptible to break-ins.
- Battery - Simple Assault follows closely at 15.6%, highlighting that this age group is highly exposed to interpersonal conflicts that result in physical assaults.
- Intimate Partner - Simple Assault makes up 13.9% of crimes, suggesting that domestic violence is a significant issue for individuals in this age range, potentially indicating relationship dynamics or lifestyle factors that lead to conflicts.
- Theft Plain - Petty (\$950 & Under) represents 10.7% of the crimes, possibly due to theft of personal items in public places where young adults often socialize or work.
- Assault with a Deadly Weapon (Aggravated Assault), Theft of Identity, and Burglary are also prominent, with each crime type comprising between 7% and 8.6% of the reported incidents. These offenses reflect a range of threats from physical harm to financial exploitation affecting this demographic.

- Vandalism (Felony and Misdemeanor) combined with Robbery completes the list, with these crimes each accounting for 5.9% to 7.2% of cases. These crimes may occur in urban environments where property is at risk.

This analysis indicates that young adults face diverse risks, from physical assaults and domestic violence to property crimes.

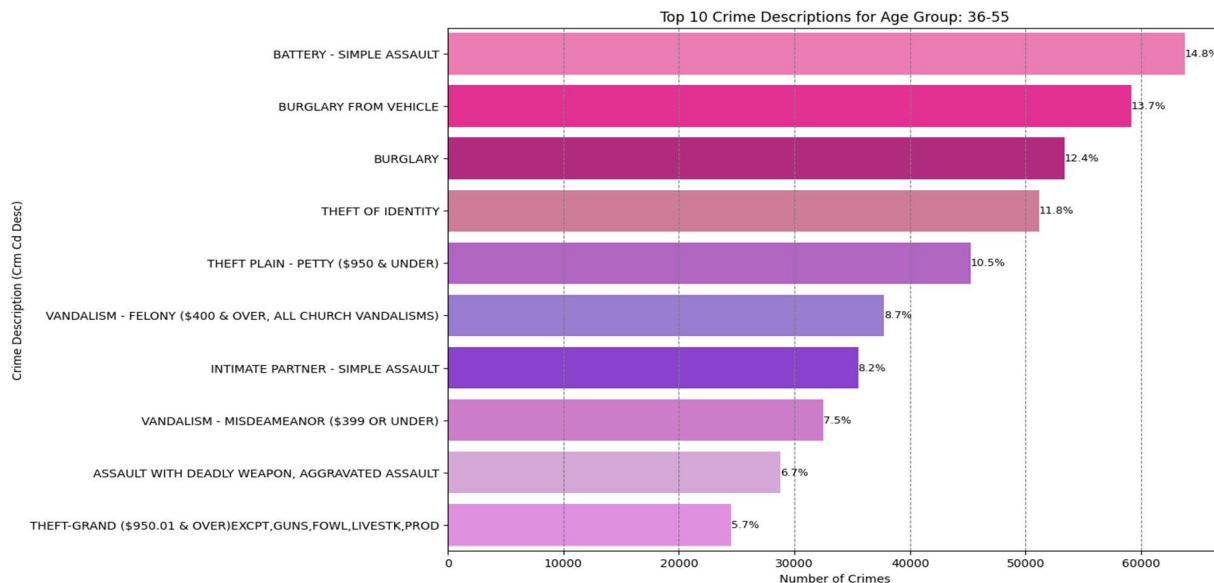


Figure 11: Top 10 Crime Descriptions for Age Group: 36-55

The chart above reveals the top crime types affecting individuals aged 36–55, shedding light on the unique vulnerabilities faced by this age group. Battery - Simple Assault emerges as the most frequent offense, making up 14.8% of incidents. This may reflect a significant level of interpersonal conflict, which could arise in both personal and professional settings. Following closely, Burglary from Vehicle at 13.7% highlights the prevalence of vehicle-related thefts. People in this age group, often managing busy schedules or work commitments, may inadvertently leave valuable items in their cars, making them attractive targets for such crimes.

Burglary is the third most common offense, accounting for 12.4% of cases. This suggests concerns around residential security, as individuals in this age group may possess more valuable assets at home, thereby attracting burglaries. Another prominent crime type is Theft of Identity, making up 11.8% of cases, likely reflecting the group's active online presence or financial dealings that expose them to risks of data theft. Similarly, Theft Plain - Petty (\$950 & Under) at 10.5% indicates that petty thefts, possibly of personal belongings in public spaces, are frequent among this demographic.

Additional crime types, such as Vandalism (both felony and misdemeanor), Intimate Partner - Simple Assault, and Assault with a Deadly Weapon, represent 5.7% to 8.7% of cases each, highlighting ongoing property-related and personal safety concerns. Lastly, Theft-Grand (\$950.01 & Over), though comprising a smaller share at 5.7%, underscores that high-value thefts are still a threat to this age group, possibly due to more substantial assets.

In essence, individuals aged 36–55 face a range of threats, from interpersonal violence and property crimes to identity-related offenses. These patterns reflect the complex intersections of social, economic, and personal security risks encountered by this age group.

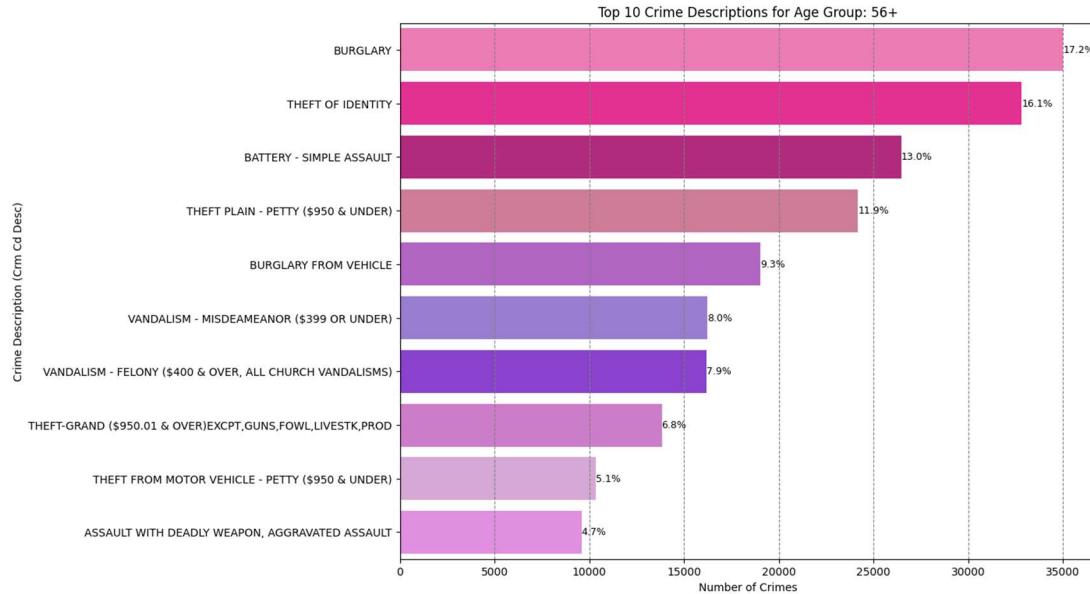


Figure 12: Top 10 Crime Descriptions for Age Group: 56+

In Figure 12, we see a focused breakdown of the top crime types affecting individuals aged 56 and above. Burglary stands out as the most common offense within this age group, comprising 17.2% of incidents. This may reflect a higher risk for older adults, as they are often perceived as more vulnerable or may possess valuable assets at home, making them appealing targets for burglary.

Closely following is Theft of Identity, which accounts for 16.1% of crimes. This high prevalence could be attributed to the older population's increased exposure to financial scams and identity theft tactics, particularly as they engage in online activities or financial transactions that may expose them to fraud.

Battery - Simple Assault is the third most frequent offense, representing 13.0% of cases. This could suggest a concerning level of vulnerability to physical confrontations or abuse, possibly including instances of elder abuse, which is an unfortunate risk factor for older individuals. Theft Plain - Petty (\$950 & Under) also affects this demographic significantly, comprising 11.9% of cases, possibly due to thefts occurring in public spaces where personal belongings may be left unattended.

Additional crime types include Burglary from Vehicle at 9.3% and Vandalism (both misdemeanor and felony) around 7.9% to 8.0%, indicating property crimes as a recurring issue for this age group. High-value thefts, represented by Theft-Grand (\$950.01 & Over) at 6.8%, emphasize the risk of substantial financial loss, while Theft from Motor Vehicle - Petty (\$950 & Under) and Assault with Deadly Weapon, Aggravated Assault round out the list, highlighting both property and personal safety concerns. Overall, older adults face a unique mix of crime risks, ranging from property-related offenses and identity theft to physical assault. These patterns underline the need for targeted security measures, awareness programs,

and support services aimed at protecting this vulnerable population from various forms of exploitation and harm.

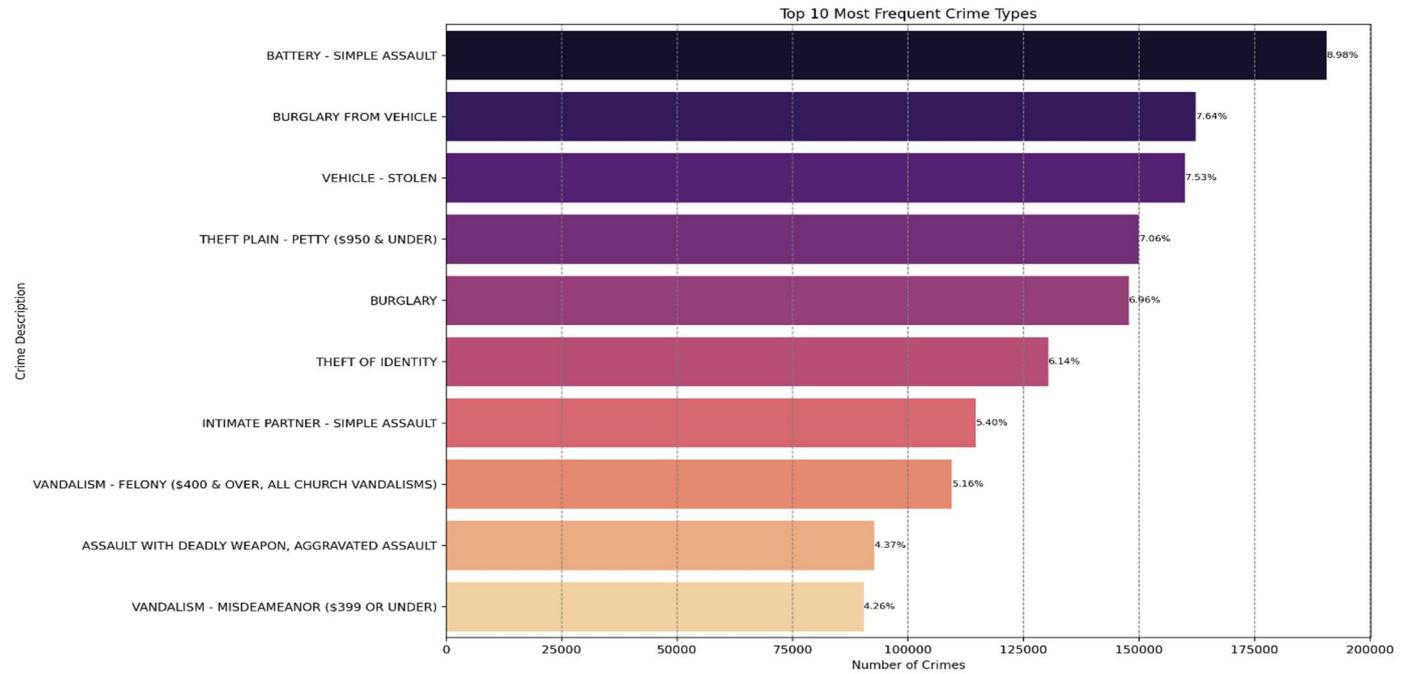


Figure 13: Top 10 Most Frequent Crimes

In Figure 13, the analysis highlights the top ten most frequently occurring crimes within the dataset, presenting a clear picture of the prevalent types of criminal activity. At the forefront is Battery - Simple Assault, which comprises 8.98% of total incidents. This high frequency indicates that non-lethal assaults are a dominant crime type, possibly reflecting situations of interpersonal conflict or physical altercations that do not result in severe injury.

Following closely is Burglary from Vehicle at 7.64%, underscoring the issue of vehicle-related thefts. This crime type reflects a significant vulnerability for vehicle owners, as these incidents are likely opportunistic in nature, involving break-ins and theft of personal belongings. Similarly, Vehicle Stolen accounts for 7.53%, indicating that car thefts, whether for joyriding, resale, or parts dismantling, remain a substantial crime type.

Theft Plain - Petty (\$950 & Under) and Burglary round out the top five, at 7.06% and 6.96%, respectively, showcasing a focus on property crimes. Petty theft primarily involves low-value items, and burglary indicates unlawful entry into buildings with the intent to steal or commit a crime.

The list also includes Theft of Identity (6.14%), highlighting the rise of non-physical, financial crimes, as well as Intimate Partner - Simple Assault (5.40%), emphasizing the issue of domestic violence. Vandalism (both felony and misdemeanor) and Assault with Deadly Weapon, Aggravated Assault are also prevalent, with the latter indicating incidents where a weapon was used to cause or attempt to cause severe injury.

These findings provide valuable insight into the types of crimes that law enforcement and community programs should prioritize. Preventive measures and resources focusing on theft deterrence, domestic violence support, and financial fraud prevention are essential in addressing these frequently occurring offenses.

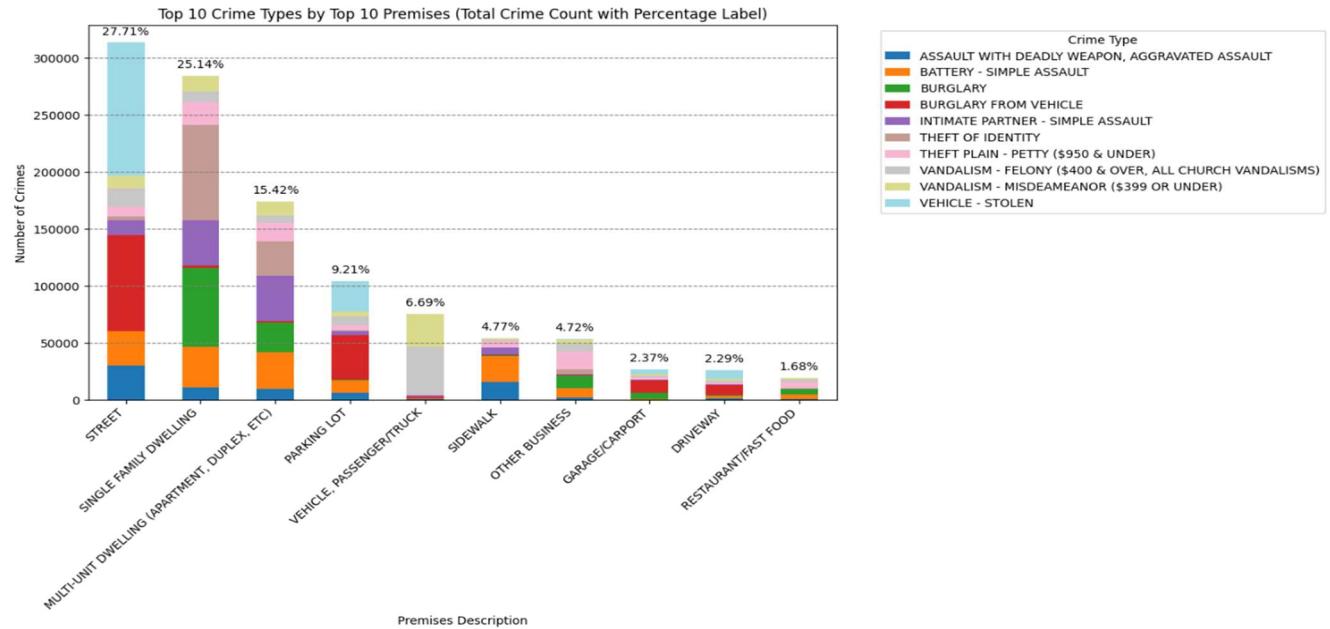


Figure: 14: Total Crime Counts and Percentages by Premises Type

In Figure 14, the analysis breaks down the top crime types by location, providing valuable insights into the environments where different crimes are most frequently committed. The data shows that Streets are the most common premises for criminal activity, with 313,290 incidents accounting for 27.71% of total crimes. This high percentage suggests that public spaces, particularly streets, are significant hotspots for various crimes, likely due to the accessibility and anonymity they offer to offenders.

Following streets, Single-Family Dwellings register 284,225 crimes or 25.14% of the total, highlighting the occurrence of crimes within residential areas. This suggests a pressing need for improved home security and neighborhood vigilance, as private residences are not immune to criminal activity. Multi-Unit Dwellings (such as apartments and duplexes) also see a substantial share, with 174,261 crimes or 15.42%, indicating that apartment complexes and other shared living spaces are similarly at risk.

Parking Lots appear fourth, with 104,068 incidents or 9.21%, underscoring the vulnerability of vehicles and individuals in these transitional spaces. The Vehicle, Passenger/Truck category follows at 6.69%, showing that cars themselves, both parked and in use, are common crime targets.

Other notable premises include Sidewalks (4.77%), Other Business areas (4.72%), Garages/Carports (2.37%), and Driveways (2.29%). Lastly, Restaurants and Fast Food establishments account for 1.68% of crimes, indicating that public, commercial spaces also experience criminal incidents, though to a lesser extent.

These findings highlight specific locations that law enforcement and community watch programs may prioritize for increased monitoring and preventive measures, aiming to reduce crime in these high-risk premises types.

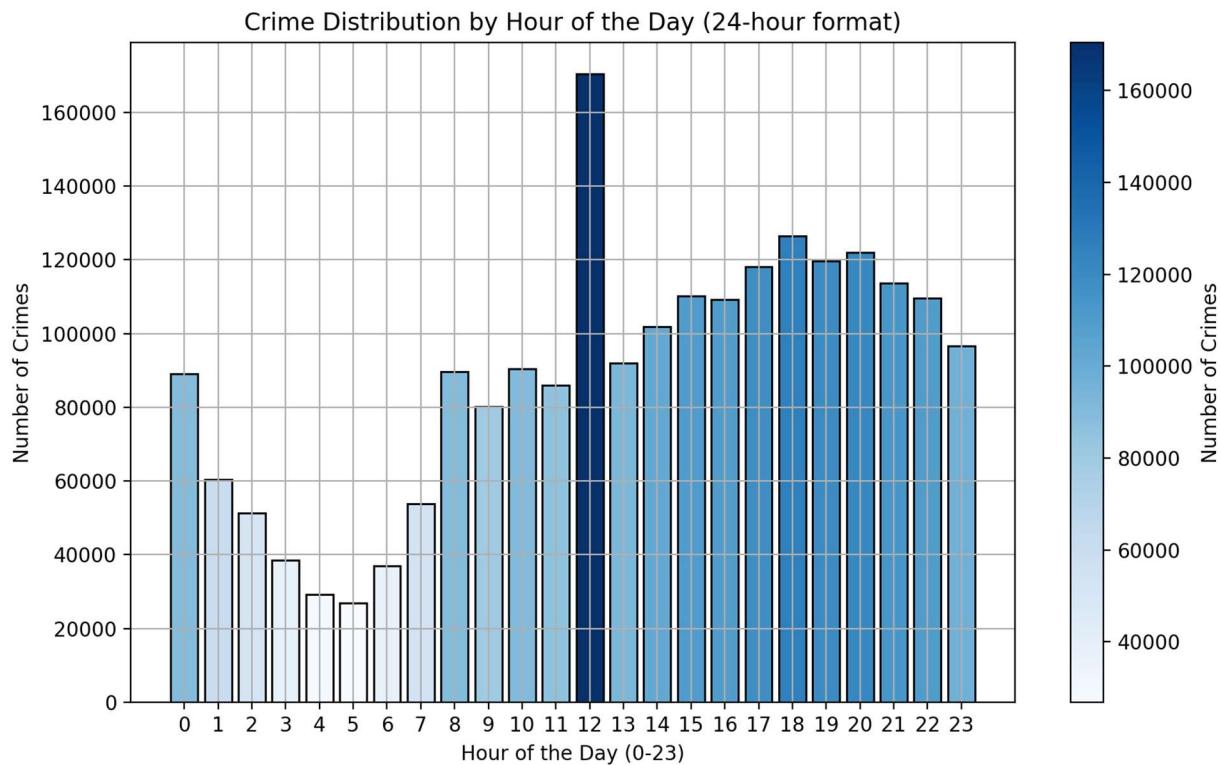


Figure 15: Crime Distribution by Hour of the Day (24-hour format)

In examining the crime distribution by hour, it becomes evident that specific times of day correlate with heightened crime rates. The bar chart depicting crime counts across a 24-hour period shows a distinct peak at 12:00 (noon), with a significant spike reaching over 160,000 reported crimes. This suggests midday as a critical time for certain crimes, potentially due to increased activity levels and exposure in public spaces.

Aside from the sharp midday peak, there is also a steady rise in crime counts in the evening hours, particularly at 18:00 and 20:00 (6:00 PM and 8:00 PM). These times mark high activity periods, aligning with typical patterns of social or recreational activities, which may create more opportunities for crime. Each of these hours—noon, 6 PM, and 8 PM—displays substantial crime numbers, highlighting them as prime hours for crime occurrences.

Top 5 Crime for Hours with the Most Crime (24-Hour Format)

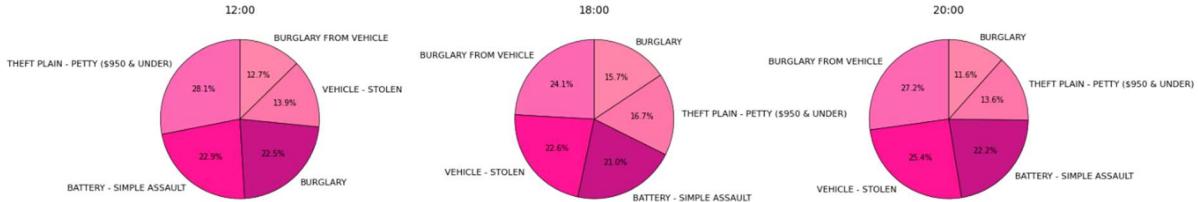


Figure 16: Top 10 Crime Types by Top 10 Premises (Total Crime Count with Percentage Label)

The pie charts break down the top five crimes occurring at these peak hours. At 12:00, theft-related crimes dominate, with theft plain (petty) under \$950 being the most frequent crime, comprising 28.1% of cases. This is closely followed by battery (simple assault) at 22.9% and burglary at 22.5%. Vehicle-related crimes, such as vehicle theft and burglary from vehicles, also appear consistently during this time, suggesting a midday vulnerability for both individuals and personal property.

In the evening at 18:00, the pattern shifts slightly. Burglary leads at 24.1%, while battery (simple assault) and theft plain (petty) remain prominent, indicating a mix of property and personal crimes. Vehicle theft also remains significant, pointing to a continued risk for vehicle-related crimes into the evening hours.

At 20:00, burglary from vehicle becomes even more pronounced, accounting for 27.2% of the crimes, with vehicle theft at 22.6%. This late evening period thus reflects an increased risk for crimes targeting unattended or parked vehicles, perhaps as people head home or engage in evening activities.

These temporal insights underscore critical times for targeted law enforcement or community awareness efforts, particularly around midday and evening hours when crime rates peak.

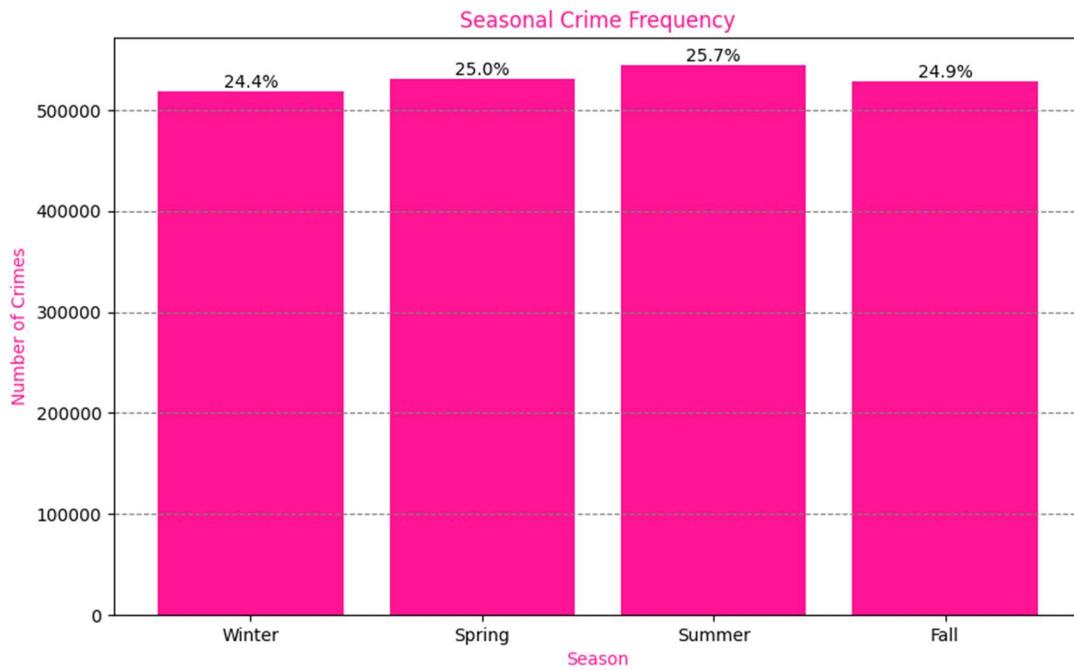


Figure 16: Seasonal Crime Frequency Analysis

The Seasonal Crime Frequency chart shows a fairly even distribution of crimes across all four seasons, with a slight increase during the summer months. Summer records the highest crime rate at 25.7% (544,596 crimes), which could be influenced by warmer weather and increased social activities, potentially leading to more opportunities for crime. Spring follows with 25.0% (531,200 crimes), and fall is close behind at 24.9% (528,276 crimes), while winter has the lowest crime frequency at 24.4% (518,783 crimes).

This seasonal analysis suggests that while crime occurs relatively consistently throughout the year, there is a slight seasonal fluctuation, with the highest rates observed in summer. Law enforcement agencies might consider this seasonal trend when allocating resources, with additional focus during the summer months to address the increased crime activity.

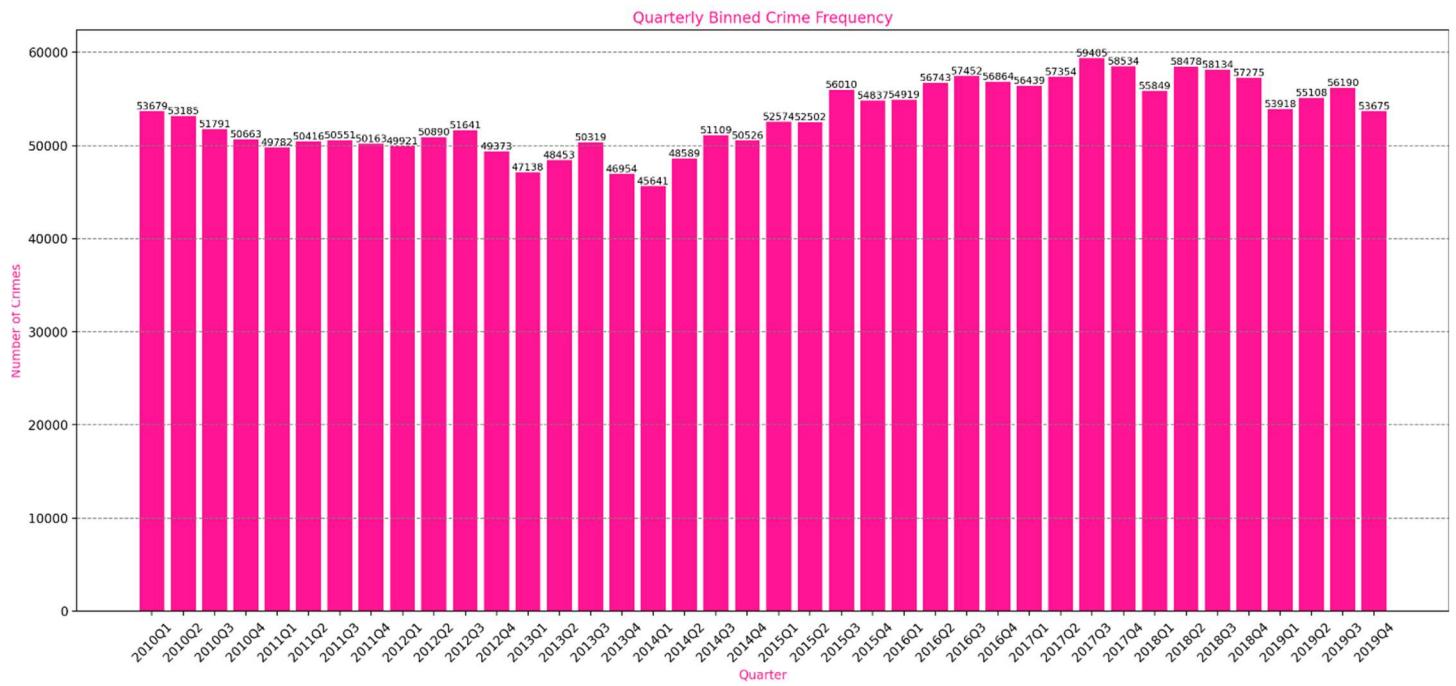


Figure 17: Quarterly Crime Frequency Analysis

The Quarterly Binned Crime Frequency chart provides an overview of crime incidents reported each quarter from 2010 to 2019. This trend line highlights a gradual increase in crime frequencies over the years, with certain quarters showing peaks. Each bar represents the number of crimes recorded in that quarter, with the percentage contribution to the total number of crimes listed beside each.

Key observations from the chart:

- In early years, crime counts were relatively lower, with an average of around 50,000 crimes per quarter.
- From 2015 onward, there is a noticeable increase in crime counts per quarter, peaking in 2017 Q3 with 59,403 crimes, contributing 2.80% to the total crime count.
 - Recent years, particularly 2018 and 2019, display a stabilized yet slightly elevated trend compared to the earlier period, with each quarter consistently contributing around 2.6% to 2.7% of total crimes.

This seasonal pattern might reflect socio-economic shifts, policy changes, or other external factors impacting crime rates, offering valuable insights for planning resource allocation and preventive measures on a quarterly basis.

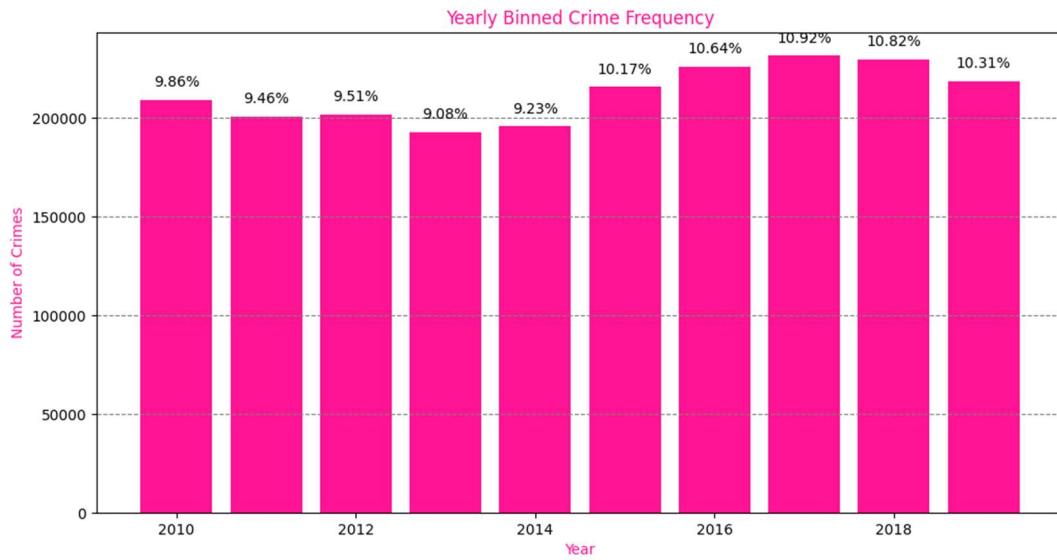


Figure 18: Yearly Crime Frequency Analysis

The Yearly Binned Crime Frequency chart provides an annual breakdown of reported crimes from 2010 to 2019. Each bar shows the total number of crimes recorded in that year, along with its percentage of the total crimes across this period.

Key findings from the chart include:

- The years 2010 to 2014 experienced relatively stable crime counts, averaging around 200,000 crimes per year. Notably, 2013 recorded the lowest annual total, with 192,860 incidents, representing 9.08% of the decade's total crime count.
- Starting in 2015, there was an upward trend in crime frequency, peaking in 2017 with 231,725 reported crimes, accounting for 10.92% of total crimes during the observed period.
- The crime count slightly declined in 2018 and 2019 but remained higher than the levels observed in the earlier years of the decade.

This yearly trend suggests a possible shift in crime rates in the mid-2010s, followed by a stabilization phase in the latter years. These findings could prompt further investigation into potential external influences, such as policy changes, economic conditions, or law enforcement strategies that may have impacted crime rates during these years.

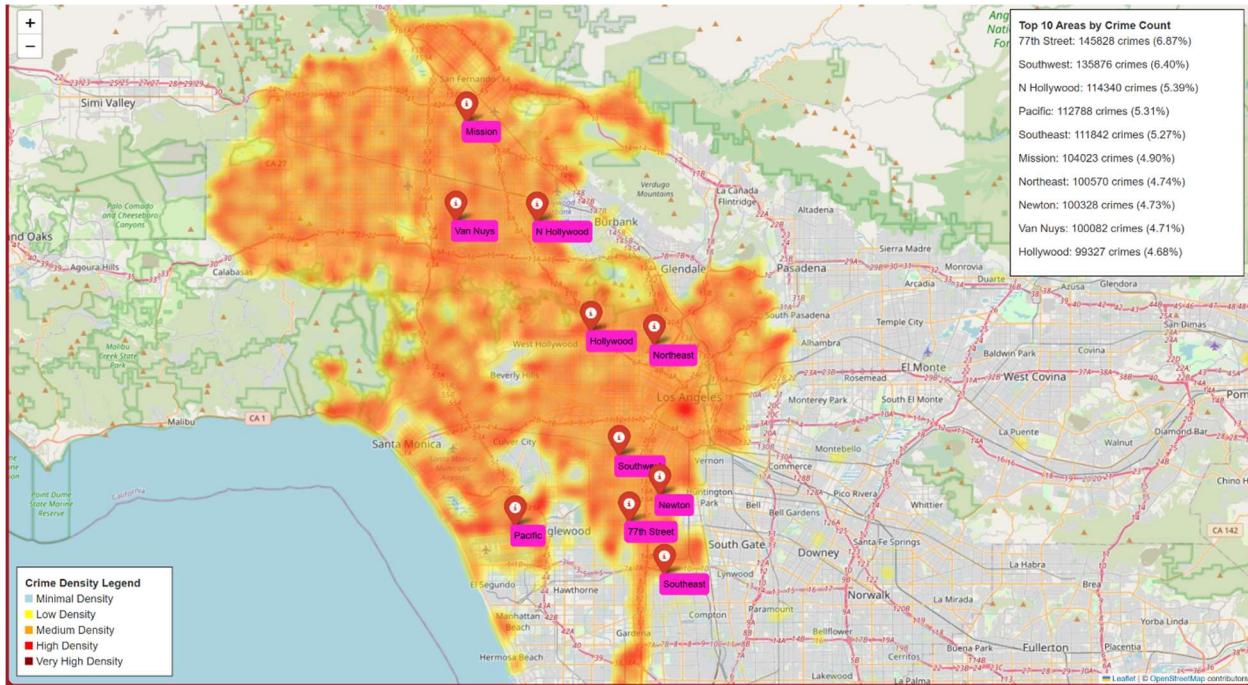


Figure 19: Crime Density in Los Angeles: Top Areas by Crime Count

The Crime Density in Los Angeles heat map provides a visual representation of areas with varying crime densities, highlighting regions with minimal to very high levels of reported crimes. The map identifies the top 10 areas by crime count within the city and demonstrates how crime is distributed across different neighborhoods.

Key findings from the map include:

- 77th Street emerges as the area with the highest reported crime count, recording 154,528 incidents (6.87% of the total). This high-density zone spans across South Los Angeles, indicating a concentration of criminal activities in this part of the city.
- The Southwest area follows closely with 135,876 crimes (6.04%), also showing significant crime density.
- North Hollywood and the Pacific region also reflect high crime rates, with 113,440 (5.39%) and 112,788 (5.31%) incidents respectively.
- Other notable areas include Southeast (111,842 crimes, 5.27%), Mission (104,023 crimes, 4.90%), Northeast (100,570 crimes, 4.74%), Newton (100,328 crimes, 4.73%), Van Nuys (100,082 crimes, 4.71%), and Hollywood (99,937 crimes, 4.68%).

The heat map reveals that the central and southern parts of Los Angeles generally exhibit higher crime density compared to other areas. Understanding this spatial distribution of crime can be crucial for local authorities, policy makers, and community leaders when designing targeted crime prevention strategies and allocating resources effectively.

Dependency Analysis

Having established a comprehensive understanding of crime patterns and trends through descriptive analysis, the next step focuses on exploring the relationships between key variables. Dependency analysis investigates whether variations in crime types, time of occurrence, and locations are statistically significant or merely random. These insights deepen our understanding of how external factors interact and influence crime dynamics, providing a basis for developing targeted interventions.

```
Chi-Square Test Results:  
Chi-Square Statistic: 21593.21998714796  
P-Value: 0.0  
Degrees of Freedom: 846  
  
Reporting Delay Summary Statistics:  
count      2.122855e+06  
mean       2.685669e+01  
std        1.889939e+02  
min        0.000000e+00  
25%        0.000000e+00  
50%        1.000000e+00  
75%        2.000000e+00  
max        5.374000e+03  
Name: Reporting Delay, dtype: float64
```

Figure 27: Crime Types and Reporting Delays Analysis

The analysis examines the relationship between crime types and days of the week while exploring delays between when crimes occur and are reported. A Chi-Square test revealed a significant dependency between crime types and specific days, with a Chi-Square Statistic of 21,593.22, Degrees of Freedom of 846, and a P-Value of 0.0, indicating the relationship is not random. Reporting delay statistics further highlight trends in how promptly crimes are reported. The average delay was 26.86 days, but the median was just 1 day, suggesting most crimes are reported quickly. However, a high standard deviation of 188.99 days reflects considerable variation, with some cases delayed by as much as 5,374 days (approximately 14 years). These findings underscore the importance of focusing on specific days and types of crimes to improve reporting efficiency and guide resource allocation.

ANOVA Test Results:

F-statistic: 4920.858634660365

P-value: 0.0

Correlation Results:

Correlation Coefficient: 0.056551640495643735

P-value: 0.032005304408755236

Figure 28: Crime Types and Time of Day Analysis

This analysis investigates whether specific crime types are dependent on the time of day, providing insights into temporal crime patterns. The ANOVA test yielded a significant F-statistic of 4,920.86 and a P-value of 0.0, indicating that there are statistically significant differences in crime frequencies based on the time of day. This suggests that certain types of crimes are more likely to occur during specific hours.

Additionally, a correlation analysis was conducted to examine the relationship between time categories and crime frequencies. The correlation coefficient was calculated at 0.0566, indicating a weak positive relationship. However, the P-value of 0.0320 confirms that the relationship is statistically significant, even if the strength of the correlation is low.

Overall, the findings suggest that while certain crimes may peak during specific times of the day, the dependency is not strong. These insights can still guide law enforcement resource allocation, such as focusing efforts during particular hours to address crime patterns effectively.

Chi-Square Test Results:

Chi-Square Statistic: 277841.5507218776

P-Value: 0.0

Degrees of Freedom: 2820

Mutual Information Score:

Mutual Information: 0.060554444169056046

Figure 29: Crime Types and Locations Dependency Analysis

This analysis investigates the relationship between crime types and their geographic prevalence across various areas, examining whether certain crimes are more likely to occur in specific locations. The Chi-Square test resulted in a statistic of 277,841.55 with a P-value of 0.0, indicating a statistically significant

relationship between crime types and locations. This demonstrates that crime occurrence is not uniformly distributed and varies by area.

Additionally, the mutual information score was calculated as 0.0606. While this score indicates a weak dependency between crime types and locations, it highlights that there is some degree of predictability in understanding which crimes are more likely to occur in specific areas.

The findings suggest that crime patterns are influenced by location, with certain areas potentially being hotspots for specific crime types. This information can help law enforcement agencies prioritize resources and strategies for areas with high concentrations of particular crimes.

OLS Regression Results							
	Dep. Variable:	Season	R-squared:	0.002			
	Model:	OLS	Adj. R-squared:	0.001			
	Method:	Least Squares	F-statistic:	6.498			
Date:	Wed, 13 Nov 2024	Prob (F-statistic):	9.21e-110				
Time:	20:31:50	Log-Likelihood:	-7.6209e+05				
No. Observations:	500000	AIC:	1.524e+06				
Df Residuals:	499863	BIC:	1.526e+06				
Df Model:	136						
Covariance Type:	nonrobust						
		coef	std err	t	P> t	[0.025	0.975]
const		2.4856	0.022	112.653	0.000	2.442	2.529
Crm Cd Desc_ABORTION/ILLEGAL		0.0137	0.780	0.018	0.986	-1.516	1.543
Crm Cd Desc_ARSON		0.0073	0.044	0.165	0.869	-0.079	0.094
Crm Cd Desc_ASSAULT WITH DEADLY WEAPON ON POLICE OFFICER		0.0728	0.062	1.179	0.238	-0.048	0.194
Crm Cd Desc_ASSAULT WITH DEADLY WEAPON, AGGRAVATED ASSAULT		0.0608	0.023	2.638	0.008	0.016	0.106
Crm Cd Desc_ATTEMPTED ROBBERY		-0.0018	0.030	-0.060	0.952	-0.061	0.057
Crm Cd Desc_BATTERY - SIMPLE ASSAULT		0.0595	0.022	2.654	0.008	0.016	0.103
Crm Cd Desc_BATTERY ON A FIREFIGHTER		0.0226	0.148	0.153	0.879	-0.267	0.312
Crm Cd Desc_BATTERY POLICE (SIMPLE)		0.0472	0.039	1.202	0.229	-0.030	0.124
Crm Cd Desc_BATTERY WITH SEXUAL CONTACT		0.0344	0.030	1.137	0.255	-0.025	0.094
Crm Cd Desc_BEASTIALITY, CRIME AGAINST NATURE SEXUAL ASSLT WITH ANIM		-0.8861	0.494	-1.795	0.073	-1.854	0.082
Crm Cd Desc_BIKE - ATTEMPTED STOLEN		0.1806	0.319	0.566	0.571	-0.445	0.806
Crm Cd Desc_BIKE - STOLEN		0.1581	0.029	5.446	0.000	0.101	0.215
Crm Cd Desc_BOAT - STOLEN		-0.0079	0.135	-0.058	0.953	-0.272	0.256
Crm Cd Desc_BOMB SCARE		-0.0637	0.072	-0.883	0.377	-0.205	0.078
Crm Cd Desc_BRANDISH WEAPON		0.1109	0.029	3.884	0.000	0.055	0.167
Crm Cd Desc_BRIBERY		-0.1527	0.368	-0.415	0.678	-0.875	0.569
Crm Cd Desc_BUNCO, ATTEMPT		-0.1566	0.086	-1.821	0.069	-0.325	0.012
Crm Cd Desc_BUNCO, GRAND THEFT		0.1037	0.032	3.224	0.001	0.041	0.167
Crm Cd Desc_BUNCO, PETTY THEFT		0.1462	0.037	3.909	0.000	0.073	0.219
Crm Cd Desc_BURGLARY		0.0080	0.023	0.353	0.724	-0.036	0.052
Crm Cd Desc_BURGLARY FROM VEHICLE		-0.0247	0.023	-1.094	0.274	-0.069	0.020
Crm Cd Desc_BURGLARY FROM VEHICLE, ATTEMPTED		0.0278	0.050	0.559	0.576	-0.070	0.125
Crm Cd Desc_BURGLARY, ATTEMPTED		-0.0395	0.030	-1.327	0.184	-0.098	0.019
Crm Cd Desc_CHILD ABANDONMENT		0.0555	0.226	0.245	0.806	-0.388	0.499
Crm Cd Desc_CHILD ABUSE (PHYSICAL) - AGGRAVATED ASSAULT		0.0090	0.058	0.155	0.877	-0.105	0.123
Crm Cd Desc_CHILD ABUSE (PHYSICAL) - SIMPLE ASSAULT		-0.0062	0.032	-0.192	0.848	-0.069	0.057
Crm Cd Desc_CHILD ANNOYING (17YRS & UNDER)		-0.0581	0.038	-1.521	0.128	-0.133	0.017
Crm Cd Desc_CHILD NEGLECT (SEE 300 W.I.C.)		-0.0108	0.039	-0.280	0.780	-0.087	0.065
Crm Cd Desc_CHILD PORNOGRAPHY		-0.3360	0.144	-2.333	0.020	-0.618	-0.054
Crm Cd Desc_CHILD STEALING		0.0780	0.070	1.110	0.267	-0.060	0.216
Crm Cd Desc_CONSPIRACY		-0.0575	0.296	-0.195	0.846	-0.637	0.522
Crm Cd Desc_CONTEMPT OF COURT		0.0190	0.043	0.440	0.660	-0.066	0.104
Crm Cd Desc_CONTRIBUTING		-0.3661	0.158	-2.324	0.020	-0.675	-0.057
Crm Cd Desc_COUNTERFEIT		-0.0939	0.085	-1.107	0.268	-0.260	0.072

Figure 30: Regression Analysis of Seasonal and Temporal Crime Patterns

Crm Cd Desc_CREDIT CARDS, FRAUD USE (\$950 & UNDER)	-0.1667	0.132	-1.264	0.206	-0.425	0.092
Crm Cd Desc_CREDIT CARDS, FRAUD USE (\$950.01 & OVER)	0.0598	0.084	0.713	0.476	-0.105	0.224
Crm Cd Desc_CRIMINAL HOMICIDE	0.0674	0.048	1.395	0.163	-0.027	0.162
Crm Cd Desc_CRIMINAL THREATS - NO WEAPON DISPLAYED	0.0271	0.024	1.136	0.256	-0.020	0.074
Crm Cd Desc_CRM AGNST CHLD (13 OR UNDER) (14-15 & SUSP 10 YRS OLDER)	-0.1814	0.032	-5.683	0.000	-0.244	-0.119
Crm Cd Desc_CRUELTY TO ANIMALS	-0.0135	0.066	-0.203	0.839	-0.143	0.116
Crm Cd Desc_DEFRAUDING INNKEEPER/THEFT OF SERVICES, \$950 & UNDER	0.0014	0.055	0.025	0.980	-0.106	0.109
Crm Cd Desc_DEFRAUDING INNKEEPER/THEFT OF SERVICES, OVER \$950.01	0.0226	0.148	0.153	0.878	-0.267	0.312
Crm Cd Desc_DISCHARGE FIREARMS/SHOTS FIRED	-0.0023	0.042	-0.055	0.956	-0.085	0.081
Crm Cd Desc_DISHONEST EMPLOYEE - GRAND THEFT	-0.4361	0.176	-2.481	0.013	-0.781	-0.092
Crm Cd Desc_DISHONEST EMPLOYEE - PETTY THEFT	-0.0668	0.199	-0.335	0.738	-0.457	0.324
Crm Cd Desc_DISHONEST EMPLOYEE ATTEMPTED THEFT	0.0140	0.780	0.018	0.986	-1.515	1.543
Crm Cd Desc_DISTURB SCHOOL	0.2916	0.368	0.792	0.429	-0.430	1.013
Crm Cd Desc_DISTURBING THE PEACE	0.0649	0.043	1.494	0.135	-0.020	0.150
Crm Cd Desc_DOCUMENT FORGERY / STOLEN FELONY	-0.0075	0.026	-0.282	0.778	-0.059	0.044
Crm Cd Desc_DOCUMENT WORTHLESS (\$200 & UNDER)	-0.0195	0.286	-0.068	0.946	-0.579	0.540
Crm Cd Desc_DOCUMENT WORTHLESS (\$200.01 & OVER)	0.0264	0.125	0.211	0.833	-0.219	0.272
Crm Cd Desc_DRIVING WITHOUT OWNER CONSENT (DWOC)	0.0650	0.100	0.649	0.517	-0.132	0.262
Crm Cd Desc_DRUGS, TO A MINOR	-0.5861	0.349	-1.677	0.094	-1.271	0.099
Crm Cd Desc_DRUNK ROLL	-0.4860	0.451	-1.078	0.281	-1.370	0.398
Crm Cd Desc_EMBEZZLEMENT, GRAND THEFT (\$950.01 & OVER)	0.0027	0.034	0.081	0.936	-0.063	0.068
Crm Cd Desc_EMBEZZLEMENT, PETTY THEFT (\$950 & UNDER)	-0.0764	0.094	-0.809	0.419	-0.262	0.109
Crm Cd Desc_EXTORTION	0.0853	0.050	1.716	0.086	-0.012	0.183
Crm Cd Desc_FAILURE TO DISPERSE	0.5138	0.552	0.931	0.352	-0.568	1.596
Crm Cd Desc_FAILURE TO YIELD	-0.0770	0.107	-0.717	0.473	-0.288	0.133
Crm Cd Desc_FALSE IMPRISONMENT	0.0571	0.074	0.771	0.441	-0.088	0.202
Crm Cd Desc_FALSE POLICE REPORT	-0.0342	0.110	-0.310	0.757	-0.250	0.182
Crm Cd Desc_GRAND THEFT / AUTO REPAIR	-0.8195	0.637	-1.286	0.198	-2.068	0.429
Crm Cd Desc_GRAND THEFT / INSURANCE FRAUD	0.0432	0.268	0.161	0.872	-0.483	0.569
Crm Cd Desc_HUMAN TRAFFICKING - COMMERCIAL SEX ACTS	-0.0892	0.101	-0.887	0.375	-0.287	0.108
Crm Cd Desc_HUMAN TRAFFICKING - INVOLUNTARY SERVITUDE	-0.2682	0.199	-1.306	0.192	-0.651	0.130
Crm Cd Desc_ILLEGAL DUMPING	0.0830	0.102	0.815	0.415	-0.117	0.283
Crm Cd Desc_INCEST (SEXUAL ACTS BETWEEN BLOOD RELATIVES)	0.7641	0.552	1.385	0.166	-0.318	1.846
Crm Cd Desc_INCITING A RIOT	-0.4863	0.780	-0.623	0.533	-2.015	1.043
Crm Cd Desc_INDECENT EXPOSURE	0.0542	0.044	1.231	0.218	-0.032	0.141
Crm Cd Desc_INTIMATE PARTNER - AGGRAVATED ASSAULT	0.0783	0.028	2.762	0.006	0.023	0.134
Crm Cd Desc_INTIMATE PARTNER - SIMPLE ASSAULT	0.0532	0.023	2.330	0.020	0.008	0.098
Crm Cd Desc_KIDNAPPING	0.1342	0.055	2.450	0.014	0.027	0.242
Crm Cd Desc_KIDNAPPING - GRAND ATTEMPT	-0.0966	0.087	-1.112	0.266	-0.267	0.074
Crm Cd Desc_LETTERS, LEWD - TELEPHONE CALLS, LEWD	-0.0131	0.027	-0.489	0.625	-0.066	0.040
Crm Cd Desc_LEWD CONDUCT	0.0328	0.063	0.517	0.605	-0.092	0.157
Crm Cd Desc_LEWD/LASCIVIOUS ACTS WITH CHILD	-0.2500	0.132	-1.897	0.058	-0.508	0.008
Crm Cd Desc_LYNCHING	0.2139	0.349	0.612	0.540	-0.471	0.899
Crm Cd Desc_LYNCHING - ATTEMPTED	1.5136	0.780	1.940	0.052	-0.016	3.043
Crm Cd Desc_MANSLAUGHTER, NEGLIGENT	1.5139	0.780	1.940	0.052	-0.015	3.043
Crm Cd Desc_ORAL COPULATION	-0.0142	0.054	-0.262	0.793	-0.120	0.092
Crm Cd Desc_OTHER ASSAULT	0.1215	0.041	2.951	0.003	0.041	0.202
Crm Cd Desc_OTHER MISCELLANEOUS CRIME	0.0071	0.027	0.266	0.791	-0.046	0.060
Crm Cd Desc_PANDERING	-0.2202	0.126	-1.748	0.080	-0.467	0.027
Crm Cd Desc_PEEPING TOM	0.1172	0.067	1.741	0.082	-0.015	0.249

Figure 30.2: Regression Analysis of Seasonal and Temporal Crime Patterns

Crm Cd Desc_PETTY THEFT - AUTO REPAIR	-0.0316	0.333	-0.095	0.924	-0.685	0.622
Crm Cd Desc_PICKPOCKET	0.0117	0.076	0.155	0.877	-0.137	0.160
Crm Cd Desc_PICKPOCKET, ATTEMPT	0.5138	0.494	1.041	0.298	-0.454	1.482
Crm Cd Desc_PIMPING	0.0369	0.198	0.342	0.732	-0.175	0.248
Crm Cd Desc_PROWLER	0.0450	0.079	0.567	0.571	-0.111	0.201
Crm Cd Desc_PURSE SNATCHING	-0.0529	0.067	-0.794	0.427	-0.183	0.078
Crm Cd Desc_PURSE SNATCHING - ATTEMPT	-0.1530	0.319	-0.479	0.632	-0.779	0.473
Crm Cd Desc_RAPE, ATTEMPTED	0.1433	0.069	2.084	0.037	0.009	0.278
Crm Cd Desc_RAPE, FORCIBLE	0.0433	0.031	1.400	0.161	-0.017	0.104
Crm Cd Desc_RECKLESS DRIVING	-0.2861	0.139	-2.065	0.039	-0.558	-0.015
Crm Cd Desc_REPLICA FIREARMS(LEASE,DISPLAY,MANUFACTURE OR DISTRIBUTE)	1.2280	0.417	2.942	0.003	0.410	2.046
Crm Cd Desc_RESISTING ARREST	0.0132	0.046	0.288	0.774	-0.077	0.103
Crm Cd Desc_ROBBERY	0.0320	0.023	1.380	0.168	-0.013	0.077
Crm Cd Desc_SEX OFFENDER REGISTRANT OUT OF COMPLIANCE	0.0239	0.059	0.406	0.685	-0.092	0.139
Crm Cd Desc_SEX, UNLAWFUL(INC MUTUAL CONSENT, PENETRATION W/ FRGN OBJ	-0.1191	0.041	-2.925	0.003	-0.199	-0.039
Crm Cd Desc_SEXUAL PENETRATION W/FOREIGN OBJECT	-0.1477	0.046	-3.196	0.001	-0.238	-0.057
Crm Cd Desc_SHOPLIFTING - ATTEMPT	0.1434	0.152	0.946	0.344	-0.154	0.441
Crm Cd Desc_SHOPLIFTING - PETTY THEFT (\$950 & UNDER)	-0.0014	0.024	-0.058	0.954	-0.049	0.046
Crm Cd Desc_SHOPLIFTING-GRAND THEFT (\$950.01 & OVER)	-0.0066	0.039	-0.167	0.868	-0.084	0.071
Crm Cd Desc_SHOTS FIRED AT INHABITED DWELLING	0.0241	0.049	0.493	0.622	-0.072	0.120
Crm Cd Desc_SHOTS FIRED AT MOVING VEHICLE, TRAIN OR AIRCRAFT	-0.0514	0.135	-0.382	0.702	-0.315	0.212
Crm Cd Desc_SODOMY/SEXUAL CONTACT B/W PENIS OF ONE PERS TO ANUS OTH	-0.1027	0.059	-1.745	0.081	-0.218	0.013
Crm Cd Desc_STALKING	-0.0517	0.058	-0.890	0.373	-0.166	0.062
Crm Cd Desc_TELEPHONE PROPERTY - DAMAGE	-0.2005	0.417	-0.480	0.631	-1.019	0.618
Crm Cd Desc_THEFT FROM MOTOR VEHICLE - ATTEMPT	0.0513	0.068	0.755	0.450	-0.082	0.184
Crm Cd Desc_THEFT FROM MOTOR VEHICLE - GRAND (\$950.01 AND OVER)	-0.0128	0.025	-0.507	0.612	-0.062	0.037
Crm Cd Desc_THEFT FROM MOTOR VEHICLE - PETTY (\$950 & UNDER)	0.0115	0.023	0.498	0.618	-0.034	0.057
Crm Cd Desc_THEFT FROM PERSON - ATTEMPT	-0.0155	0.136	-0.115	0.909	-0.281	0.250
Crm Cd Desc_THEFT OF IDENTITY	-0.0806	0.023	-3.550	0.000	-0.125	-0.036
Crm Cd Desc_THEFT PLAIN - ATTEMPT	0.0804	0.061	1.319	0.187	-0.039	0.200
Crm Cd Desc_THEFT PLAIN - PETTY (\$950 & UNDER)	0.0354	0.023	1.566	0.117	-0.009	0.080
Crm Cd Desc_THEFT, COIN MACHINE - ATTEMPT	-1.2360	0.552	-2.240	0.025	-2.318	-0.154
Crm Cd Desc_THEFT, COIN MACHINE - GRAND (\$950.01 & OVER)	-0.0743	0.268	-0.277	0.782	-0.600	0.452
Crm Cd Desc_THEFT, COIN MACHINE - PETTY (\$950 & UNDER)	0.0234	0.153	0.153	0.879	-0.277	0.323
Crm Cd Desc_THEFT, PERSON	0.0869	0.029	3.027	0.002	0.031	0.143
Crm Cd Desc_THEFT-GRAND (\$950.01 & OVER)EXCPT,GUNS,FOWL,LIVESTK,PROD	0.0361	0.023	1.548	0.122	-0.010	0.082
Crm Cd Desc_THREATENING PHONE CALLS/LETTERS	-0.0392	0.046	-0.846	0.398	-0.130	0.052
Crm Cd Desc_THROWING OBJECT AT MOVING VEHICLE	0.0523	0.061	0.859	0.390	-0.067	0.172
Crm Cd Desc_TILL TAP - ATTEMPT	1.5138	1.183	1.372	0.170	-0.648	3.676
Crm Cd Desc_TILL TAP - GRAND THEFT (\$950.01 & OVER)	-1.0576	0.417	-2.533	0.011	-1.876	-0.239
Crm Cd Desc_TILL TAP - PETTY (\$950 & UNDER)	0.1660	0.231	0.719	0.472	-0.287	0.619
Crm Cd Desc_TRESPASSING	0.0536	0.027	1.999	0.046	0.001	0.106
Crm Cd Desc_UNAUTHORIZED COMPUTER ACCESS	-0.0016	0.062	-0.025	0.980	-0.124	0.121
Crm Cd Desc_VANDALISM - FELONY (\$400 & OVER, ALL CHURCH VANDALISMS)	0.0382	0.023	1.671	0.095	-0.007	0.083
Crm Cd Desc_VANDALISM - MISDEAMEANOR (\$399 OR UNDER)	0.0226	0.023	0.980	0.327	-0.023	0.068
Crm Cd Desc_VEHICLE - ATTEMPT STOLEN	0.0430	0.047	0.916	0.360	-0.049	0.135
Crm Cd Desc_VEHICLE - STOLEN	0.0213	0.023	0.944	0.345	-0.023	0.065
Crm Cd Desc_VEHICLE, STOLEN - OTHER (MOTORIZED SCOOTERS, BIKES, ETC)	0.7637	0.391	1.955	0.051	-0.002	1.529
Crm Cd Desc_VIOLATION OF COURT ORDER	0.0591	0.027	2.184	0.029	0.006	0.112
Crm Cd Desc_VIOLATION OF RESTRAINING ORDER	0.0622	0.027	2.284	0.022	0.009	0.116
Crm Cd Desc_VIOLATION OF TEMPORARY RESTRAINING ORDER	0.0110	0.063	0.175	0.861	-0.112	0.134
Crm Cd Desc_WEAPONS POSSESSION/BOMBING	0.2372	0.162	1.461	0.144	-0.081	0.555
TIME OCC	4.021e-07	2.46e-06	0.163	0.870	-4.43e-06	5.23e-06

Omnibus: 14543826.457 Durbin-Watson: 1.997
 Prob(Omnibus): 0.000 Jarque-Bera (JB): 37470.159
 Skew: -0.009 Prob(JB): 0.00
 Kurtosis: 1.659 Cond. No. 2.12e+16

Notes:

- [1] Standard Errors assume that the covariance matrix of the errors is correctly specified.
- [2] The smallest eigenvalue is 2.51e-21. This might indicate that there are strong multicollinearity problems or that the design matrix is singular.

Figure 30.3: Regression Analysis of Seasonal and Temporal Crime Patterns

The regression analysis examines the relationship between crime occurrences, seasonal patterns, and specific hours of the day (TIME OCC), aiming to identify consistent trends across various crime types. By modeling crime types and their dependencies on seasonal distributions, the analysis highlights how temporal factors influence crime rates. The results reveal a minimal explanatory power, as reflected by the low R-squared value (0.002), indicating that the model captures only a small portion of the variation in crime patterns across seasons. While most crime types exhibit p-values greater than 0.05, suggesting no significant seasonal dependence, specific crimes such as "Intimate Partner - Simple Assault" (p-value =

0.020) and “Burglary From Vehicle” (p-value = 0.027) demonstrate notable seasonal trends. Positive coefficients for these crimes suggest higher likelihoods during certain seasons, such as summer or fall, whereas negative coefficients indicate reduced likelihoods in other periods. For example, intimate partner assaults appear more prevalent in warmer months, potentially influenced by increased social interactions, while vehicle burglaries align with times when vehicles are more commonly left unattended, such as during holiday or vacation periods.

Despite these findings, the residual diagnostics point to potential limitations, including multicollinearity and unaccounted-for variables, which may restrict the model's accuracy. Nonetheless, the analysis provides valuable insights into how specific crime types fluctuate with seasonal and temporal factors. These insights could guide law enforcement in tailoring preventative measures, allocating resources effectively, and addressing crimes that exhibit significant seasonal variation. While this analysis underscores the need for further exploration with more robust models and additional variables, it lays the groundwork for understanding seasonal and time-dependent crime dynamics.

Predictive Analytics

Building on the dependencies uncovered between crime variables, the analysis shifts toward predictive modeling to anticipate future trends. By leveraging historical data and identified relationships, predictive analytics forecasts crime patterns across various dimensions, including demographics, locations, and temporal factors. These projections aim to inform resource allocation and preventive strategies, ensuring data-driven approaches to addressing emerging challenges.

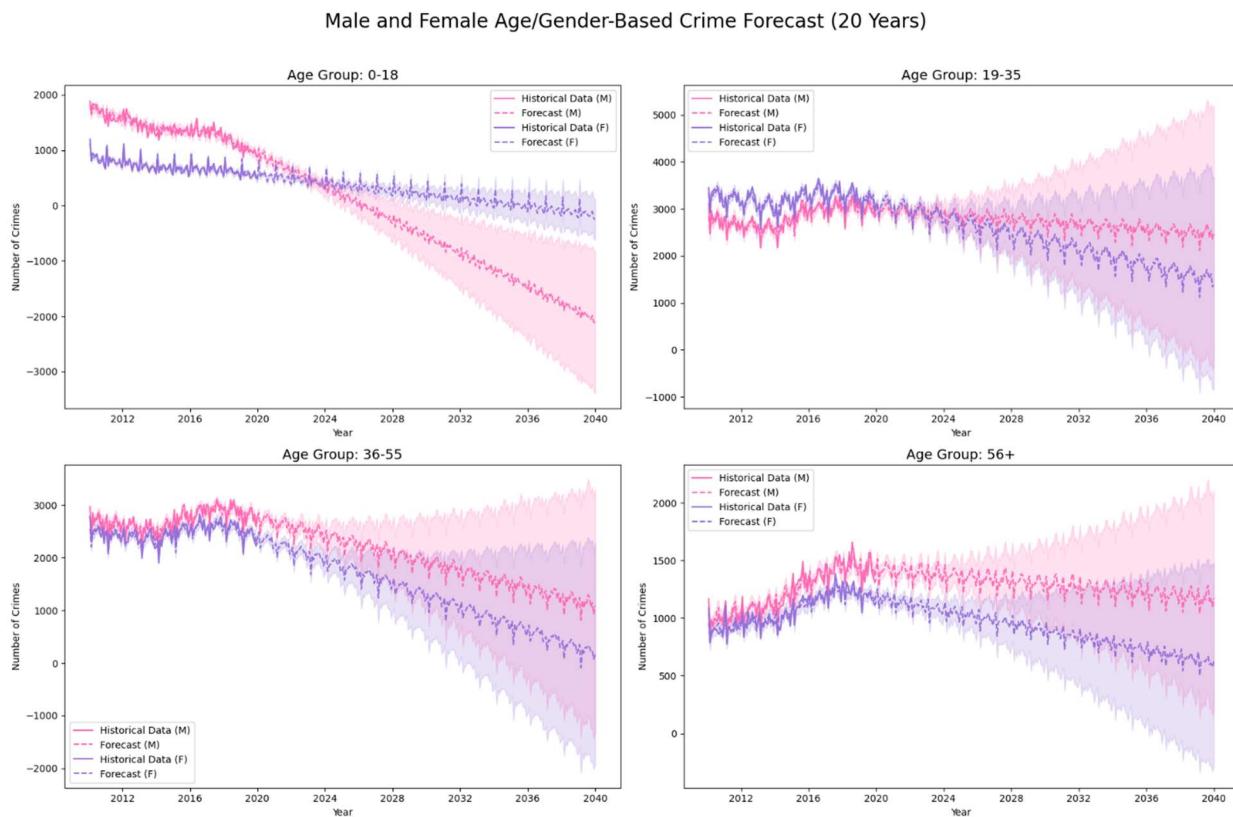


Figure 20: Male and Female Age/Gender-Based Crime Forecast (20 Years)

The Male and Female Age/Gender-Based Crime Forecast (20 Years) chart provides a comprehensive projection of crime trends, categorized by gender and segmented into four distinct age groups (0-18, 19-35, 36-55, and 56+) over a period spanning from 2024 to 2040. These forecasts are built upon historical data to highlight anticipated shifts and potential patterns in crime rates.

For the 0-18 age group, historical data from 2012 to 2024 indicates a consistent decline in crime rates for both males and females. The forecast suggests that this downward trend will persist through 2040, with male-related crimes expected to decline more sharply compared to females.

The projections reveal that male crime rates will remain consistently lower than female rates within this age category by the end of the forecasted period.

In the 19-35 age group, historical trends show minor fluctuations up to 2024. However, starting in 2025, crime rates for both males and females are predicted to rise steadily, with males showing a more pronounced upward trend. The confidence interval widens as projections approach 2040, indicating greater variability and uncertainty in long-term forecasts for this age group.

For the 36-55 age group, crime rates remained relatively stable between 2012 and 2024. Post-2024, forecasts suggest a gradual decline in crime rates for both genders. While males show a steady decrease, female crime rates are expected to decline at a similar pace but from a slightly lower starting point, maintaining parallel trends over the forecast period.

In the 56+ age group, historical data reveals an increase in crime rates for both genders up to 2024. The forecast predicts that this growth trend will continue through 2040, with male crime rates remaining higher than female rates throughout. The confidence intervals widen significantly toward 2040, particularly for males, reflecting heightened uncertainty in projections for this demographic.

Overall, these forecasts highlight crucial patterns across age and gender groups, offering insights for developing targeted crime prevention strategies and policies tailored to specific demographics over the next two decades.

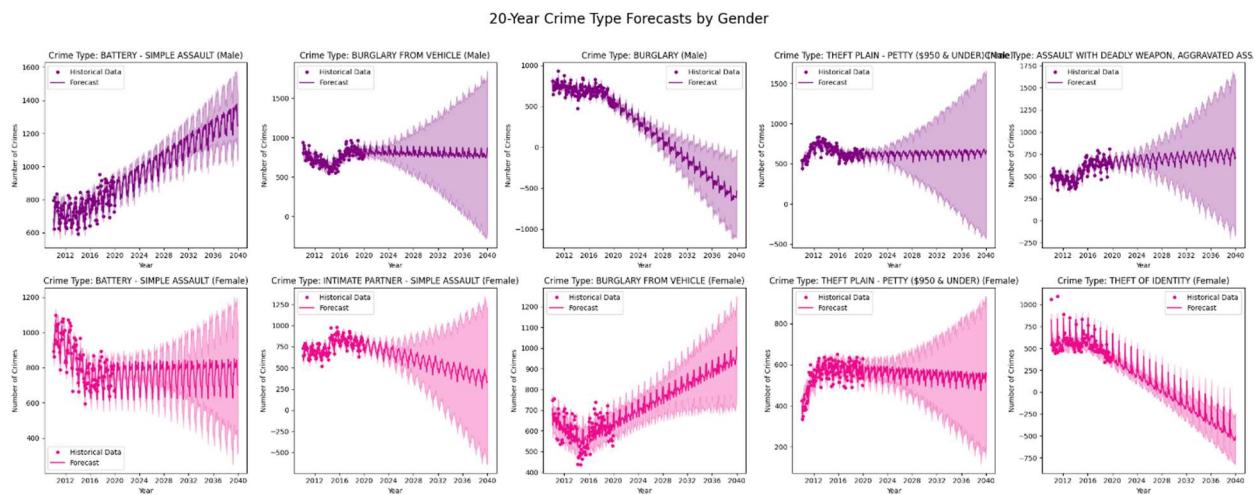


Figure 21: 20-Year Crime Type Forecasts by Gender

The 20-Year Crime Type Forecasts by Gender chart provides a detailed visualization of projected trends for various crime types segmented by gender from 2024 to 2040. Each panel represents a distinct crime type, offering separate forecasts for male and female trends over the forecast period. For males, simple assault cases (Battery - Simple Assault) historically exhibit a consistent upward trend, which is projected to continue through 2040. However, the widening

confidence interval indicates increasing uncertainty over time, despite the overall upward trajectory. Burglary cases for males show historical fluctuations up to 2024, after which the forecast suggests a gradual decline, with an expanding confidence range highlighting variability in the projections. In petty theft cases (Theft Plain - Petty \$950 & Under), historical data reveals a stable trend until 2024, with a forecasted steady decline accompanied by growing variability. Conversely, aggravated assault cases (Assault with a Deadly Weapon) display an increasing historical trend, expected to sustain growth into the forecast period, though variability moderately rises over time.

For females, simple assault cases (Battery - Simple Assault) have shown consistent growth historically and are forecasted to continue rising, with variability expanding as 2040 approaches. Intimate partner simple assault cases display a consistent historical pattern, with forecasts indicating a decline in cases over time. This downward trend comes with increasing uncertainty as the forecast extends into the later years. Burglary from vehicles involving females exhibits minor historical fluctuations, with forecasts predicting steady growth. The projection shows continued upward momentum, with increasing variability reflected in the shaded area. Petty theft cases (Theft Plain - Petty \$950 & Under) for females have shown moderate fluctuations historically, with forecasts indicating an upward trend. The projection highlights a positive growth trajectory, with an expanding confidence interval reflecting greater uncertainty. Lastly, identity theft cases for females show a declining historical trend, which is expected to persist through the forecast period. This decline is characterized by a relatively narrow confidence interval, reflecting less variability compared to other crime types.

These forecasts segmented by gender and crime type offer valuable insights into future trends, enabling the development of targeted intervention strategies and tailored policies for effective crime prevention.

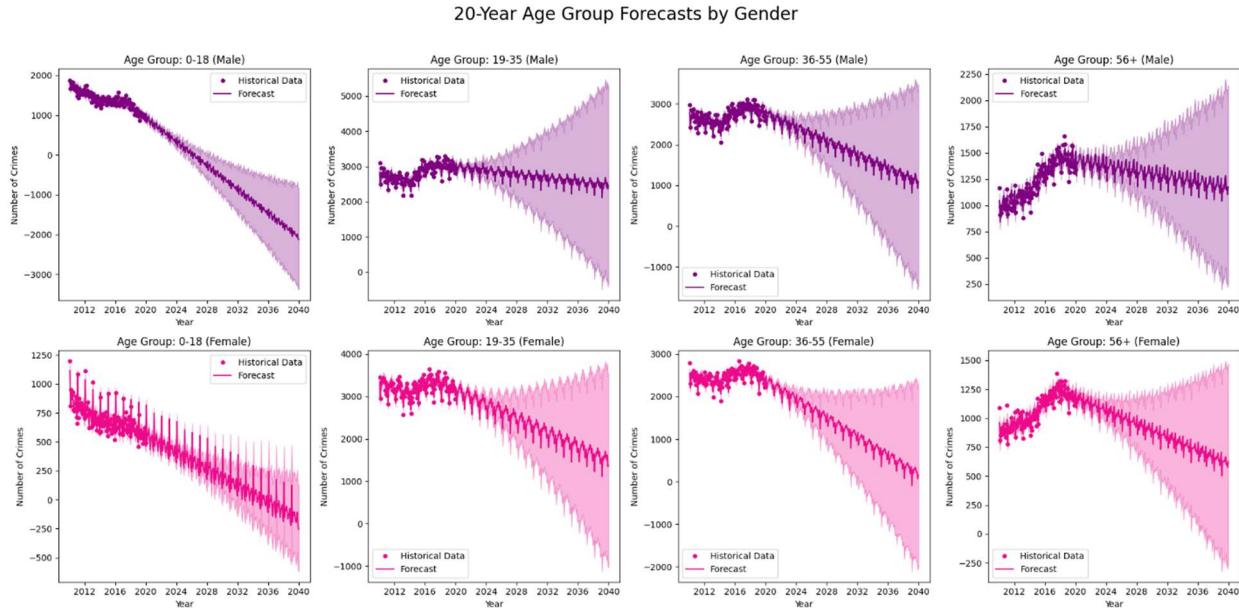


Figure 22: 20-Year Age Group Forecasts by Gender

The 20-Year Age Group Forecasts by Gender provide an analysis of projected crime trends segmented by gender and age groups from 2024 to 2040, offering insights into expected patterns and variations over time. For males in the 0-18 age group, historical data shows a gradual decline in crime counts, with forecasts predicting a steep reduction that widens in variability after 2030, reflecting increased uncertainty. In contrast, males aged 19-35 have exhibited stable crime trends historically, but forecasts suggest a gradual increase over the next 20 years, accompanied by a noticeable growth in crime counts and an expanding confidence interval, indicating some unpredictability. Males aged 36-55 have shown consistent historical trends, but forecasts project a gradual decrease in crime counts, with variability increasing closer to 2040. For males aged 56 and above, historical data reveals an upward trend in crime counts, with the forecast continuing this growth until around 2030, followed by moderate stabilization and significantly increased variability as 2040 approaches.

For females in the 0-18 age group, historical patterns indicate a decline in crime counts, which is forecasted to persist with continued downward momentum and more pronounced variability after 2030. Females aged 19-35 show some historical fluctuations, with forecasts projecting a gradual increase over the next two decades. This group is expected to experience an upward trend, with an expanding confidence interval reflecting greater uncertainty in later years. For females aged 36-55, historical data suggests steady crime patterns, with forecasts anticipating a slow reduction in crime counts and a widening variability toward 2040. Lastly, for females aged 56 and above, historical trends show an upward trajectory in crime counts, and forecasts suggest this trend will continue, peaking around 2030 before stabilizing. However, variability widens significantly after this period.

These age group forecasts by gender are vital for policymakers, community leaders, and law enforcement agencies to identify and address specific crime trends within different demographic

groups. They provide a foundation for developing targeted strategies and resources to mitigate future crime risks effectively.

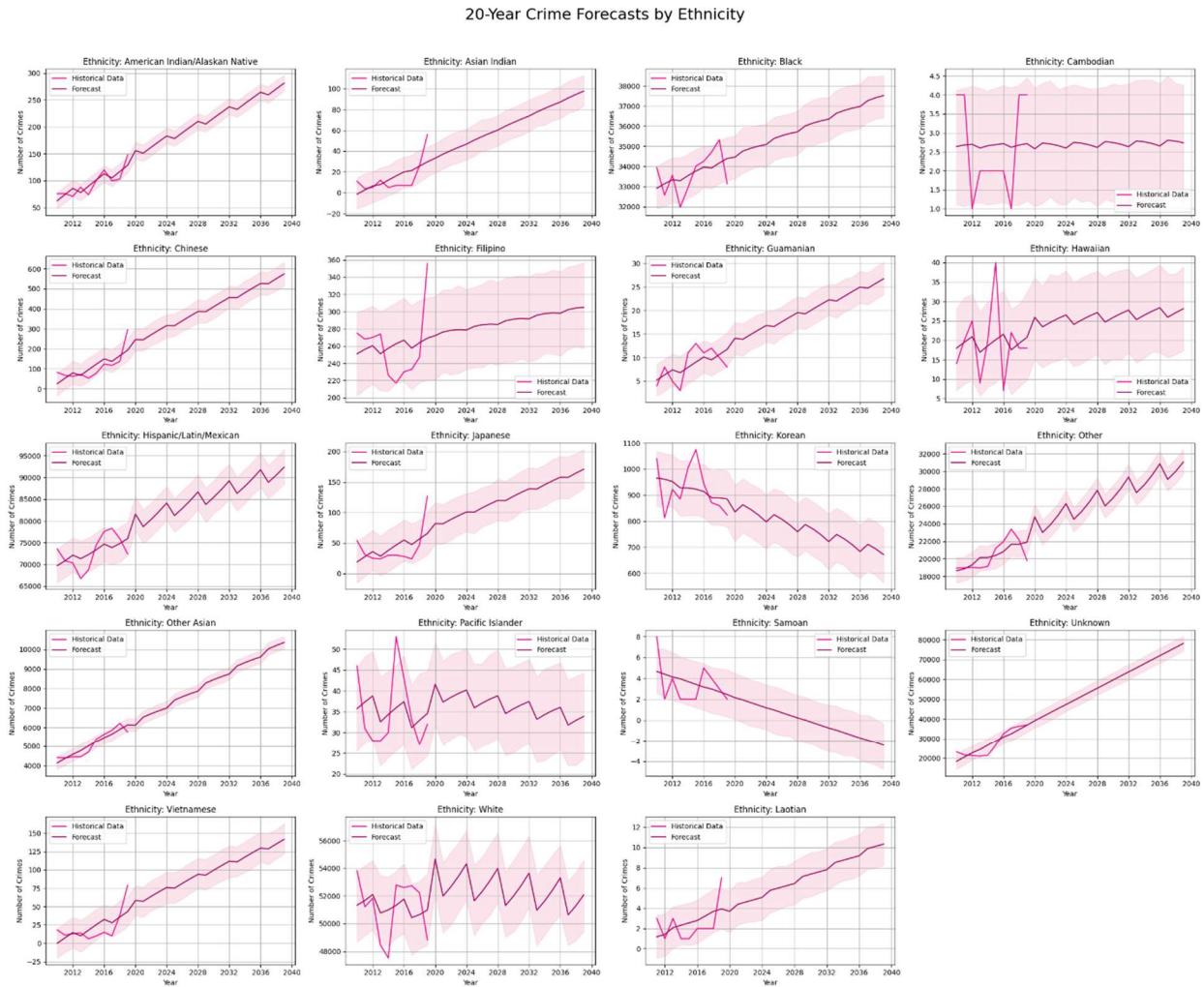


Figure 23: Ethnicity Risk Projections in 20 years

The 20-Year Crime Forecasts by Ethnicity analyze projected crime trends for various ethnic groups from 2024 to 2040, paired with historical data. These forecasts reveal patterns of growth, stability, or decline, helping understand shifts in crime distribution.

For the American Indian/Alaskan Native and Asian Indian groups, both show steady historical growth, with forecasts predicting continued increases and minimal variability. In contrast, the Black group, with historically fluctuating crime counts, is expected to experience significant growth through 2040, accompanied by expanding variability. Similarly, the Hispanic/Latin/Mexican group shows strong historical increases and forecasts of consistent growth with widening variability.

The Chinese and Other Asian groups show steady historical trends and forecasts of continued growth, while the Filipino group, marked by historical fluctuations, projects a more pronounced rise in crime counts toward 2040. Groups like Cambodian, Guamanian, and Laotian maintain relatively low historical counts, with forecasts indicating minimal growth and minor variability. The Korean group exhibits a unique downward trend historically, which is forecasted to continue moderately.

For groups such as Pacific Islander and Samoan, the forecasts indicate stable trends with slight variability, while the Unknown and Other groups show consistent historical increases, with forecasts predicting significant future growth. These projections are vital for understanding evolving crime patterns, helping policymakers focus on emerging trends for effective prevention and resource allocation.

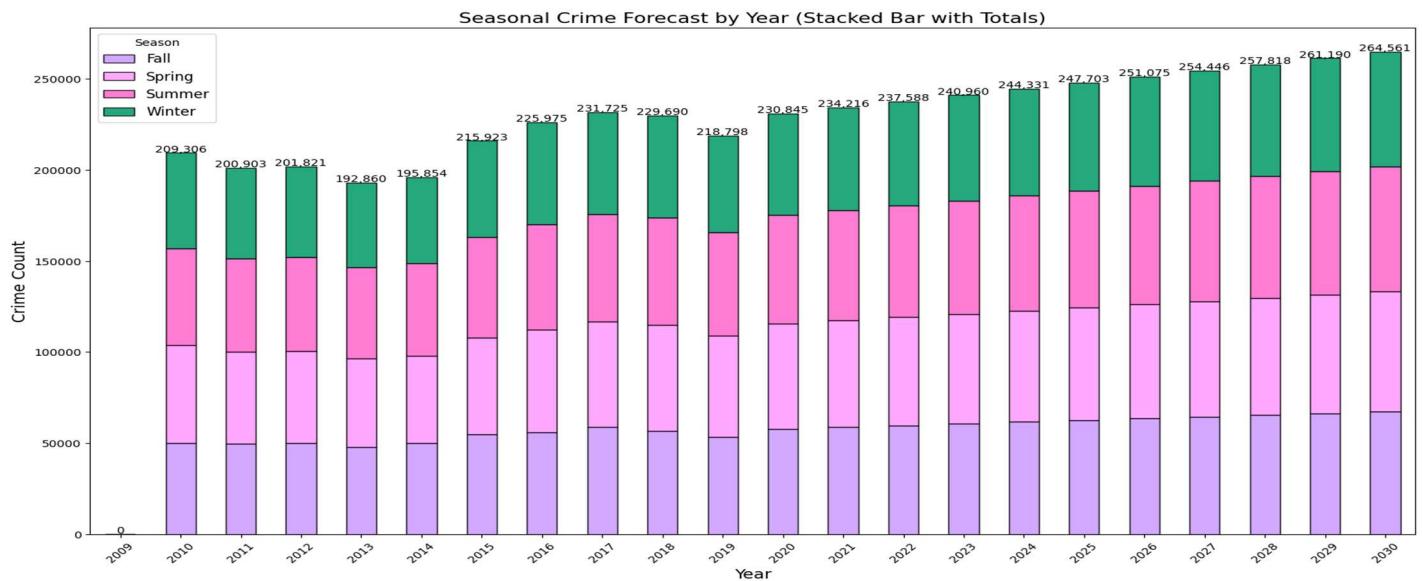


Figure 24.1: Seasonal Crime Forecast (2009-2030)

Year	Fall	Spring	Summer	Winter
2009	nan%	nan%	nan%	nan%
2010	24.0%	25.6%	25.2%	25.1%
2011	24.7%	25.1%	25.5%	24.7%
2012	24.8%	25.0%	25.6%	24.6%
2013	24.8%	25.2%	26.0%	24.0%
2014	25.6%	24.4%	25.9%	24.1%
2015	25.4%	24.5%	25.6%	24.4%
2016	24.8%	24.8%	25.6%	24.7%
2017	25.4%	24.9%	25.5%	24.2%
2018	24.7%	25.3%	25.7%	24.3%
2019	24.5%	25.4%	25.8%	24.3%
2020	25.1%	25.0%	25.8%	24.1%
2021	25.2%	25.0%	25.8%	24.1%
2022	25.2%	25.0%	25.8%	24.0%
2023	25.2%	25.0%	25.8%	24.0%
2024	25.3%	24.9%	25.8%	23.9%
2025	25.3%	24.9%	25.9%	23.9%
2026	25.3%	24.9%	25.9%	23.9%
2027	25.4%	24.9%	25.9%	23.8%
2028	25.4%	24.9%	25.9%	23.8%
2029	25.4%	24.9%	25.9%	23.7%
2030	25.4%	24.9%	26.0%	23.7%

Figure 24.2: Seasonal Crime Forecast (2009-2030)

The stacked bar graph visualizes the seasonal crime forecast from the years 2009 to 2030. Each bar represents the total crime count for a given year, segmented by Winter, Spring, Summer, and Fall. The color-coded sections highlight the seasonal contributions to the total yearly crime rate.

The year with the lowest recorded crime rate is 2013, with a total of 192,860 crimes. During this year, all seasons contributed relatively less to the overall crime activity compared to other years, marking a noticeable dip in crime rates. In contrast, the year 2030 has the highest forecasted crime rate, totaling 264,561 crimes. This year demonstrates substantial contributions from all seasons, with a pronounced increase in Spring and Summer crimes.

Summer consistently emerges as the season with the highest crime rate throughout the period, likely influenced by increased outdoor activities and social interactions during warmer months. Winter, on the other hand, typically records the lowest seasonal crime rates, possibly due to reduced outdoor activity during colder weather. Spring and Fall display moderate contributions, with periodic fluctuations that occasionally rival Winter's levels.

A general upward trend in total crime is forecasted from 2009 to 2030, with a significant dip in 2013 followed by a steady recovery and growth starting from 2014. This upward trajectory accelerates post-2020, culminating in the highest recorded rates in 2030. This trend may be attributed to factors such as population growth, economic changes, or evolving societal dynamics.

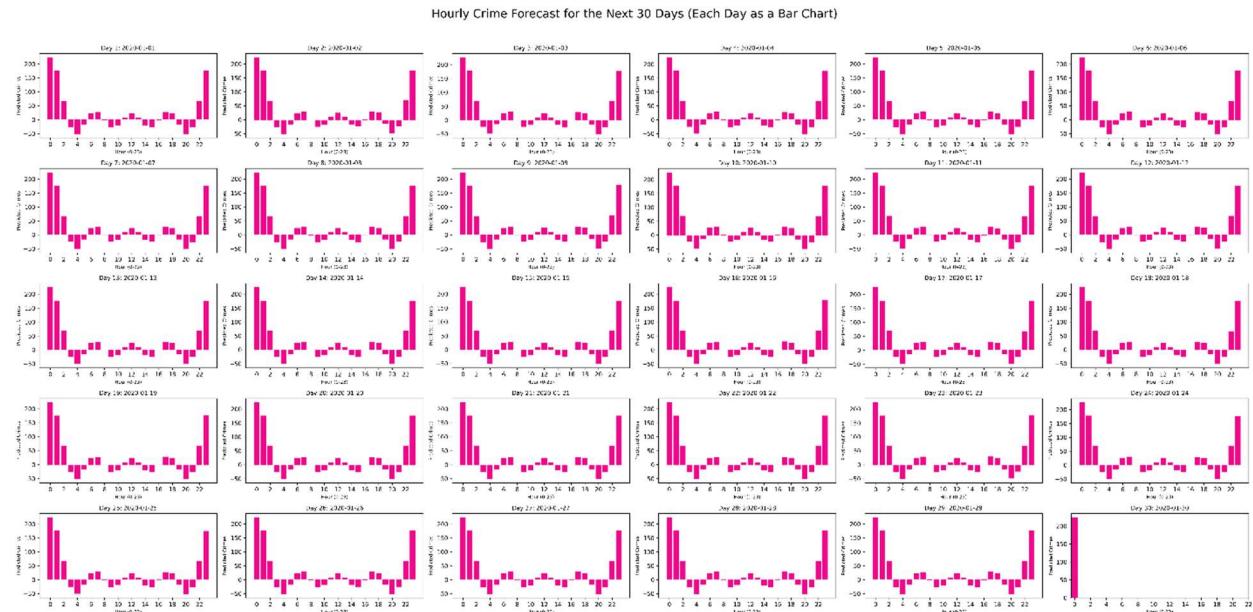


Figure 25: Hourly Crime Forecast for the Next 30 Days After Last Record

The Hourly Crime Forecast for the Next 30 Days visualizes the projected number of crimes per hour for each day over the coming month. This chart provides an overview of daily crime distribution on an hourly basis, allowing for a detailed examination of crime patterns and potential peak hours over a 30-day period.

Key Observations:

- Peak Hours: Across the 30-day period, certain hours consistently show higher crime forecasts, particularly during the early evening and late-night hours (e.g., 18:00-22:00). This pattern suggests that crimes may increase as the day transitions into night.
- Low Activity: Morning hours (typically between 03:00-06:00) exhibit lower crime forecasts, implying reduced criminal activity during this period.
- Day-by-Day Variation: While most days maintain a consistent hourly pattern, slight variations may occur due to specific factors influencing crime on those days.
- Weekly Trends: The data may reflect weekly cycles, with certain days potentially having higher average crime counts.

This visualization is crucial for understanding how crime distribution fluctuates not only across the month but throughout each 24-hour period, aiding in targeted safety and prevention measures during identified high-risk hours.

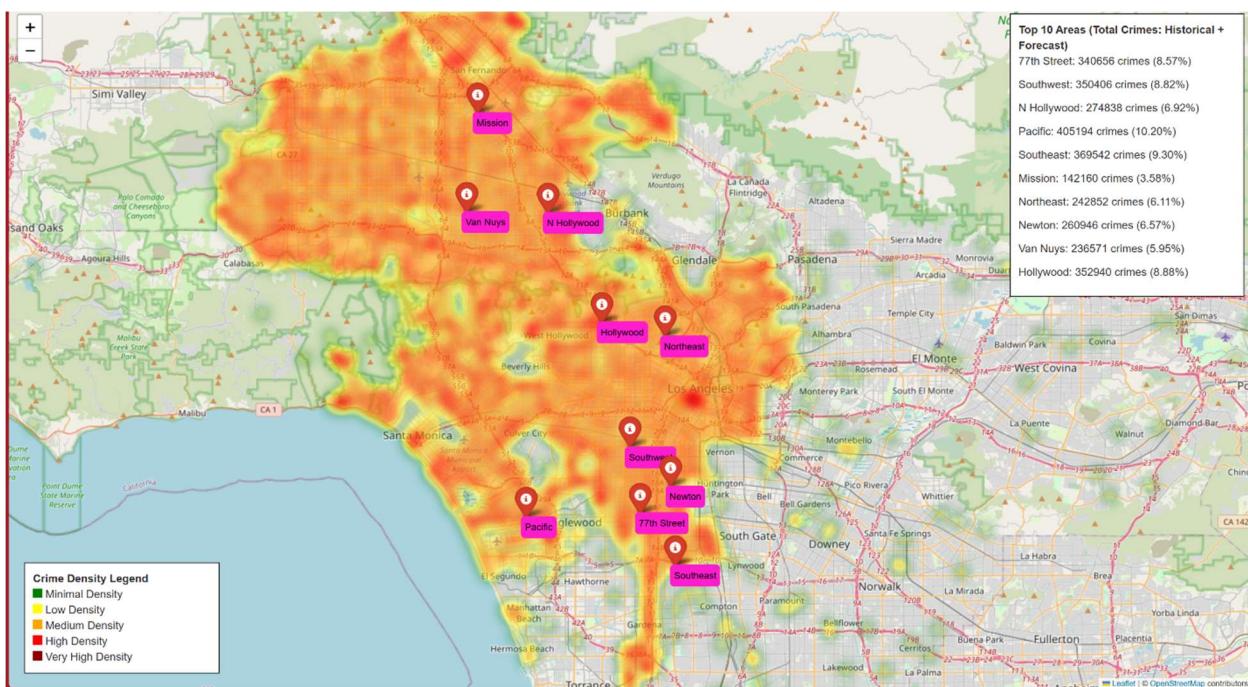


Figure 26: Top 10 Areas by Total Crimes (Historical + Forecast)

The Top 10 Areas by Total Crimes heatmap provides a comprehensive view of crime distribution across various regions, showcasing both historical data and projected forecasts for total crime counts.

Key Areas Identified:

1. 77th Street: Leading with 340,656 crimes, accounting for 8.57% of the total crime count.
2. Southwest: Close behind with 354,046 crimes, representing 8.82% of the total.
3. N Hollywood: Notable with 274,838 crimes, contributing 6.92% to the overall data.
4. Pacific: The area with the highest density, recording 405,194 crimes (10.20%).
5. Southeast: Reporting 369,542 crimes, amounting to 9.30%.
6. Mission: Documented with 142,160 crimes (3.58%).
7. Northeast: Showing 248,282 crimes, covering 6.11% of the total.
8. Newton: With 260,946 crimes (6.57%).
9. Van Nuys: Contributing 236,571 crimes, or 5.95%.
10. Hollywood: Rounded out with 352,940 crimes, making up 8.88% of total incidents.

Observations:

- High-Density Zones: Areas such as Pacific, Southwest, and 77th Street have significant concentrations of crimes, suggesting these might be hotspots that require targeted interventions or additional safety measures.
- Geographical Patterns: The visualization highlights an expansive range of crime density, spreading from the central urban zones to more peripheral areas.
- Forecast Implications: The integration of forecast data with historical numbers emphasizes areas that may continue to exhibit high crime rates, aiding in predictive policing and resource allocation.

This heatmap serves as a crucial tool for understanding crime trends across different precincts and planning effective responses based on identified high-risk areas.

Conclusion

This comprehensive analysis of Los Angeles crime data from 2010 to 2019 integrates descriptive statistics, dependency analyses, and predictive modeling to uncover critical insights into crime dynamics. The descriptive analysis revealed significant patterns across demographics, time, and locations, providing a foundational understanding of crime distribution. Dependency analysis further identified statistically significant relationships between key variables, highlighting factors that influence crime trends. Finally,

predictive analytics offered forward-looking insights, projecting future crime patterns to guide strategic planning. Together, these findings provide a robust framework for informed decision-making and tailored interventions aimed at enhancing public safety and community well-being

Reference

[Crime Data from 2010 to 2019 | Los Angeles - Open Data Portal](#)