**I INTRODUCTION**

**a. Background:**

Man is thought to have evolved from ancient behaviors in the way they think and do things with the need to leave comfortable and luxurious lives. The man's behavior has advanced in both negative and positive ways. With the need to live comfortably and without adequate resources to produce basic needs, there is a great push towards the negative behavior of humans leading to criminal offenses for various reasons. Crime is defined as any offense that violates the law of state and any behavior rejected by the society. Historically, crime rates were relatively low. However, over time, there has been a sharp and concerning rise in criminal activity. This upward trend can be attributed to a multitude of factors and underlying social issues (Thotakura, 2011, p. 196-198). This study examines crime patterns in 2024, analyzing neighborhood variations, seasonal trends, and correlations between crime types, time of day, and homicide rates.

b. **Research Question:**

1. How does the frequency of crime vary across different neighborhoods in DC during 2024?
2. What time of year in 2024 saw the highest and lowest crime rates in DC?
3. What are the most common types of crime reported in DC throughout 2024?
4. Is there a significant correlation between the time of day and the type of crime reported?
5. Which neighborhoods in DC have the highest rates of homicide?

**c. Objectives:**

* To analyze crime trends and patterns in Washington D.C. during 2024.

**II. DATA DESCRIPTION**

**a. Data Source:**

The crime data analyzed in this study was obtained from Open Data DC, a publicly available dataset managed by the Enterprise Data team in the Office of the Chief Technology Officer (OCTO). This dataset titled "Crime Incidents in 2024," contains 29,292 observations and provides comprehensive information on crime incidents reported in Washington D.C. during 2024 (Open Data DC, 2024).

**b. Data Structure:**

The dataset used in this study consists of 29,292 observations, each representing a crime incident reported in Washington D.C. during 2024. The data is structured into several variables, some of the variables included are:

1. X - The x-coordinate of the crime incident location.
2. Y - The y-coordinate of the crime incident location.
3. CCN - The Crime Code Number.
4. REPORT\_DAT - The date the crime incident was reported.
5. SHIFT - The shift during which the crime incident occurred.
6. METHOD - The method used to commit the crime.
7. OFFENSE - The type of offense committed.
8. NEIGHBORHOOD\_CLUSTER - The neighborhood cluster where the crime incident occurred.
9. LATITUDE - The latitude of the crime incident location.
10. LONGITUDE - The longitude of the crime incident location.

**III. METHODOLOGY**

**a. Data Cleaning:**

**b. Data Transformation:**

**c. Statistical Analysis:**

**d. R Packages:**

* Ggplot
* Readr
* dplyr
* forecast
* sp
* caret

**IV. RESULTS**

**a. Summary Statistics: *Provide summary statistics (e.g., means, medians, standard deviations).***

**b. Visualizations: *Include relevant visualizations (e.g., plots, charts, graphs).***

**c. Model Output: *Present the output of any statistical models (e.g., regression coefficients, p-values).***

**V. DISCUSSION**

**a. Interpretation: *Interpret the results in the context of the research question.***

**b. Implications: Discuss the implications of the findings.**

**c. Limitations: *Acknowledge any limitations of the study****.*

**VI. CONCLUSION**

**a. Summary**

This study analyzed crime patterns in Washington, D.C., in 2024, focusing on crime distribution across neighborhoods, prevalent crime types, time-based patterns, and correlations. The findings reveal that crime is unevenly distributed across neighborhoods, with some areas experiencing significantly higher crime rates. The theft was the most frequently reported crime, while homicide and assault were more common during the midnight shift. The time-based pattern indicated that September recorded the highest number of incidents, while March had the lowest. A statistical analysis confirmed a significant correlation between crime type and time of day, reinforcing the importance of time-sensitive law enforcement strategies.

**b. Future Directions**

Future research could expand on these findings by incorporating socioeconomic variables such as unemployment rates, education levels, and income disparities to understand crime patterns more deeply. Additionally, machine learning models and linear regression analysis for predictive crime modeling could help forecast potential crime hotspots and uncover the influence of continuous predictors like time, population density, or resource allocation. Longitudinal studies analyzing crime trends over multiple years would provide valuable insights into the effectiveness of policy changes and law enforcement interventions.

**VII. REFERENCES**

* Thotakura, Dr. (2011). Crime: A Conceptual Understanding. Indian Journal of Applied Research. 4. 196-198. 10.15373/2249555X/MAR2014/58.
* Lu, R., Willits, D., Stohr, M. K., Makin, D., Snyder, J., Lovrich, N., ... & Hemmens, C. (2021). The cannabis effect on crime: Time-series analysis of crime in Colorado and Washington State. *Justice Quarterly*, *38*(4), 565-595.

**Viii. APPENDICES**