Crime Rate Analysis Report

1. Introduction This report presents an analysis of crime trends based on a dataset of reported crimes. The primary objectives are to assess crime distribution, identify patterns, and predict high-crime periods using machine learning.

2. Data Assessment and Cleaning

- The dataset was loaded and explored for missing values.
- Several columns, including 'ID', 'Case Number', and other irrelevant fields, were dropped.
- Missing values were handled by removing incomplete records.
- 'Date' column was changed to a datetime-format, and Hour, Day of Week, Month were extracted.

3. Data Visualization

- Visualizations were used to identify crime trends over time.
- Crime occurrences were analyzed by hour, day of the week, and month to detect peak periods.
- Geographic crime distributions were examined using heatmaps.

4. Predictive Machine Learning Analysis

- A model was developed to predict crime hotspots for narcotics incidents based on temporal features.
- Another approach incorporated more features to improve prediction accuracy.
- A separate analysis was conducted to predict peak crime hours using historical data.

5. Findings and Insights

- Crime rates tend to be higher during specific hours and days.
- Certain locations exhibit consistent crime patterns, making them potential hotspots.
- Machine learning models provide reasonable predictions for high-crime periods, aiding in law enforcement resource allocation.

6. Conclusion The analysis reveals significant crime patterns, which can help authorities in strategic planning. Future work may involve integrating additional data sources for improved accuracy.

7. Recommendations

- Increase law enforcement presence during peak crime hours.
- Implement community awareness programs in high-crime areas.
- Utilize predictive modeling for proactive crime prevention measures.