**Crime Prediction & Analysis**

**Submitted for**

**Statistical Machine Learning CSET211**

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**Submitted to**

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# Abstract

The Crime Prediction and Analysis project aims to utilize machine learning techniques, particularly regression, to predict crime counts and analyze crime patterns. By leveraging historical data, the project provides insights into crime trends, severity classification, and gender-based crime distribution. This work demonstrates how data-driven approaches can assist law enforcement agencies and policymakers in making informed decisions to improve public safety. The results obtained through this project highlight the potential of statistical methods in addressing societal challenges effectively.

# Introduction

Crime is a significant issue affecting societies worldwide, necessitating innovative solutions to enhance public safety. The Crime Prediction and Analysis project explores data-driven techniques to analyze historical crime data and predict future trends. By applying regression models, the project seeks to identify patterns in crime occurrence and classify incidents based on severity. This approach aims to provide actionable insights for law enforcement agencies and policymakers. Additionally, the project emphasizes the importance of gender-based crime analysis to address disparities and ensure comprehensive solutions.

# Related Work

While crime prediction and analysis is an evolving field, several studies have contributed to its development. Machine learning techniques like regression, classification, and clustering have been applied to predict crime occurrences and classify incidents. Studies focusing on gender-based crime analysis have highlighted the disparities in victimization rates and the need for tailored interventions. Our project builds on these works by integrating regression for crime count prediction, severity classification, and gender-based distribution analysis into a comprehensive framework.

# Methodology

The methodology involves leveraging regression techniques to analyze and predict crime counts. The project utilized historical crime data, which was preprocessed for consistency and accuracy. Regression models were trained to identify patterns in crime trends, enabling predictions for future years. Additionally, the project implemented classification techniques to categorize crimes based on severity: Severe, Moderate, and Minor. Gender-based analysis was conducted to understand disparities in victimization rates. Visualizations were created to present insights in a comprehensible format, facilitating informed decision-making.

# Software Required

Software:  
- Python (with libraries such as NumPy, Pandas, Matplotlib, and scikit-learn)  
- Flask for web development  
- Visual Studio Code or Jupyter Notebook for development  
- Web browser for testing and deployment  
- Data visualization tools like Seaborn

# Experimental Results

The project demonstrated the effectiveness of regression models in predicting crime counts with high accuracy. Severity classification provided valuable insights into the distribution of crimes based on their intensity. Gender-based analysis highlighted significant trends, revealing disparities in victimization rates. Visualizations generated during the analysis phase facilitated better comprehension of complex data. Overall, the results underscored the potential of machine learning techniques in addressing real-world challenges.

# Conclusions

The Crime Prediction and Analysis project successfully applied machine learning techniques to predict crime counts, classify incidents based on severity, and analyze gender-based crime distribution. The findings underscore the importance of data-driven approaches in enhancing public safety and guiding policymaking. The project's success demonstrates the potential of regression and classification techniques in addressing societal challenges effectively.

# Future Scope

Future work on this project can focus on enhancing the predictive accuracy of regression models by incorporating additional features such as socioeconomic indicators and environmental factors. Advanced machine learning algorithms, including neural networks and ensemble methods, can be explored for crime classification. Additionally, the integration of real-time data streams can enable dynamic analysis and prediction, further enhancing the project's applicability.

# GitHub Link

The complete project, including the codebase, datasets, and documentation, is available on GitHub. Visit the following link to access the repository:  
<https://github.com/yahvichahar/crimedata>  
Website:  
https://aa1d2e05-8804-4805-8a97-14d18689762a-00-lfqf7skwojol.sisko.replit.dev/