Predicting Jail Population Model (PJP)

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INFORMATION TECHNOLOGY

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Sprinternship Timeline

Learning Power BI

Data Processing

Acquisition

Extraction

Cleaning

Modeling

Analysis

Project Goals

- ***Department Mission:*** Development of data-driven decision-making tools
- ***Challenge:*** Enhance the ability to prevent overcrowding in jails.
- ***Solution:*** Implementing forecasting feature into current tools.

Challenges

LEARNING POWER BI

FINDING ACCESSIBLE DATA

SECURITY LIMITATIONS

LEARNING PREDICTION ALGORITHMS & MODELS

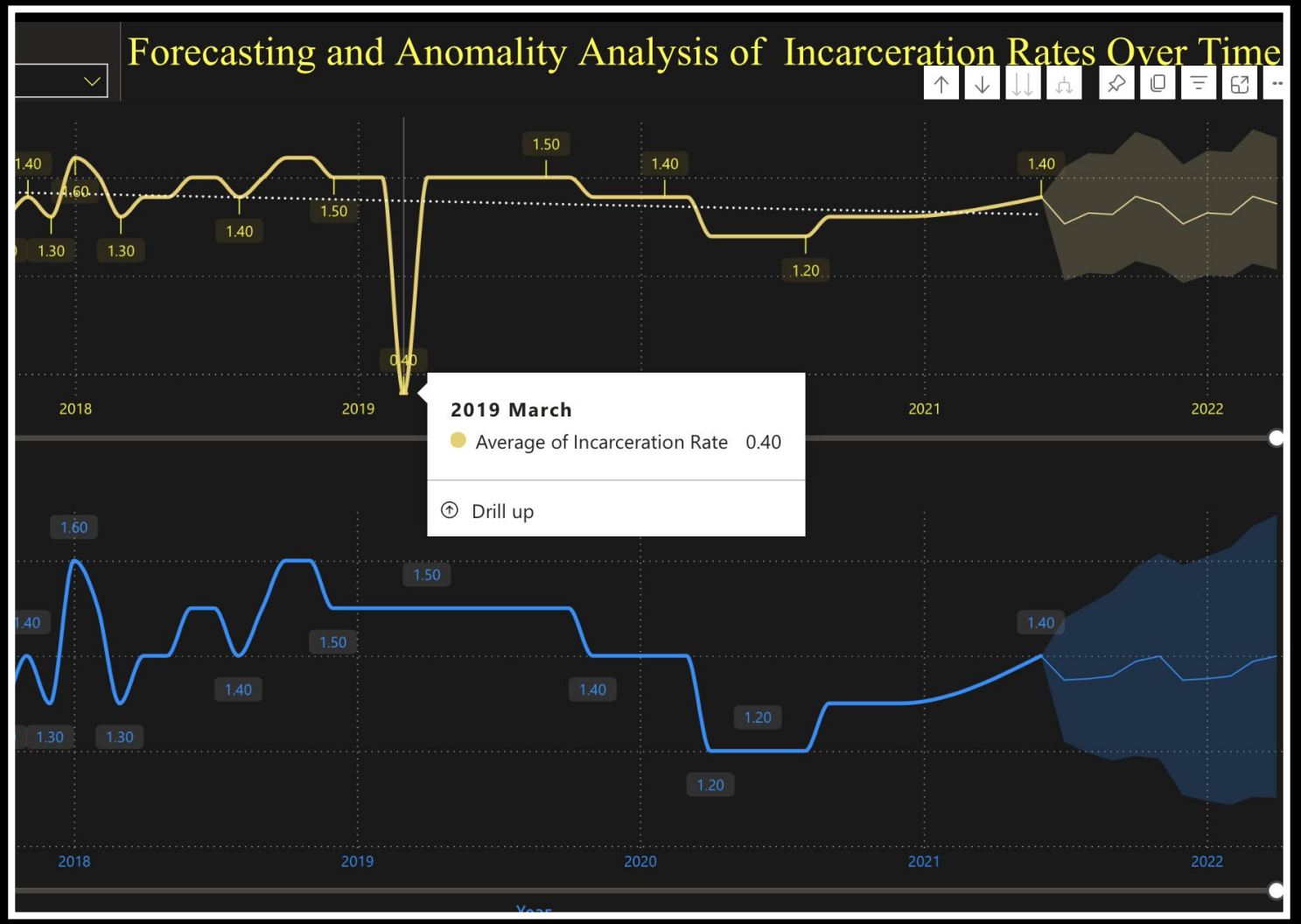
Technological Aspects

- **Python** *(Programming Language)*
- **Python Libraries**
  - **Matplotlib, Seaborn, Pandas**
- **Adobe Acrobat (** *Data Extraction***)**
- **Pip3** *(Package Management)*
- **PyCharm** *(IDE)*
- **Azure DevOps with Git** *(Source Control)*
- **Microsoft Excel** *(Data Organization)*
- **Power BI** *(Data Calculation & Visualization)*

View Report

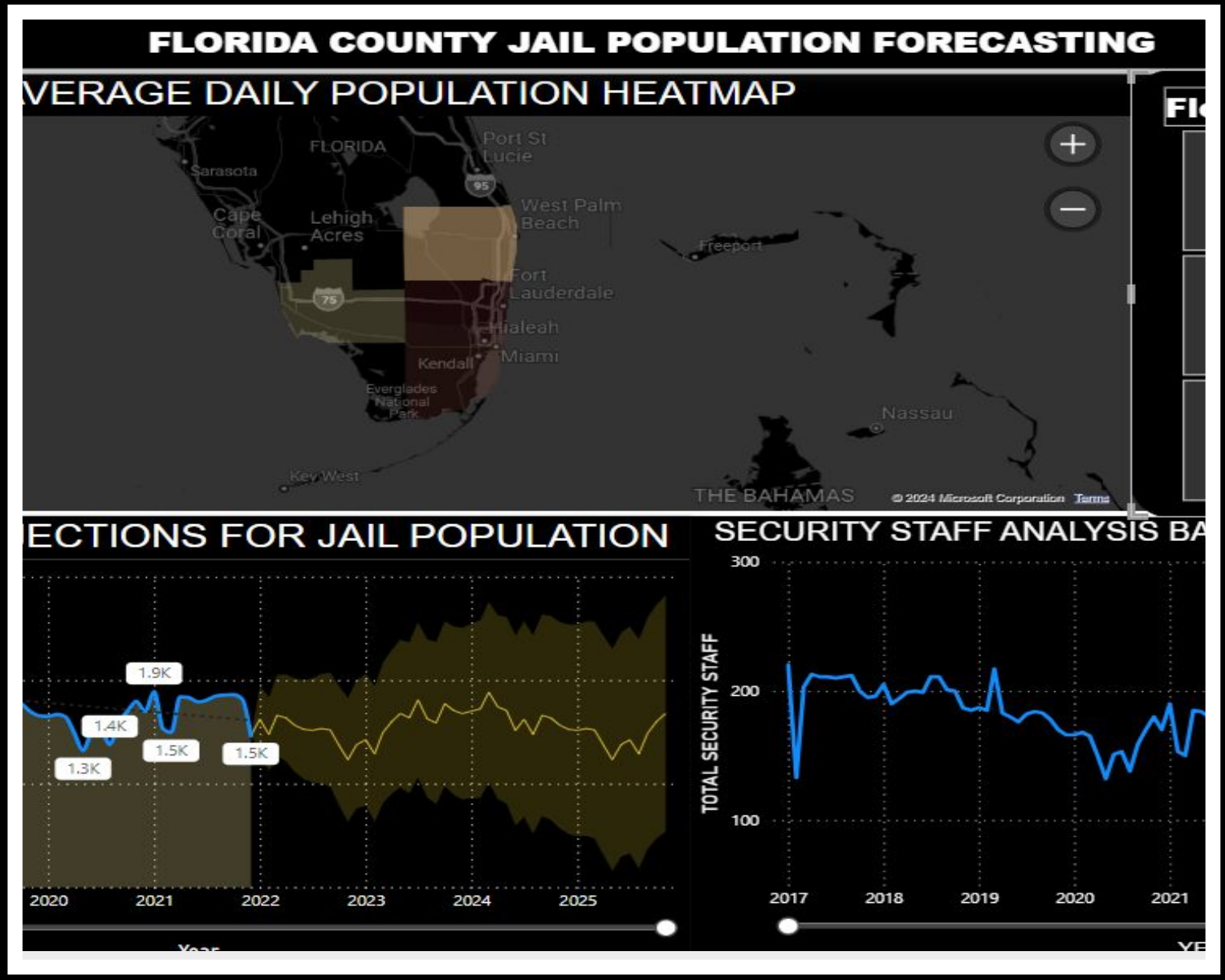
Time Series

- Time Series Analysis of Incarceration Rate.
- Anomaly Investigation and Mitigation.
- Forecasting Of Incarceration Rate



Heatmap for Jail Population

- Heatmap: Visualize Population Density
- Forecasting Daily Jail Population
- Forecasting security staff.



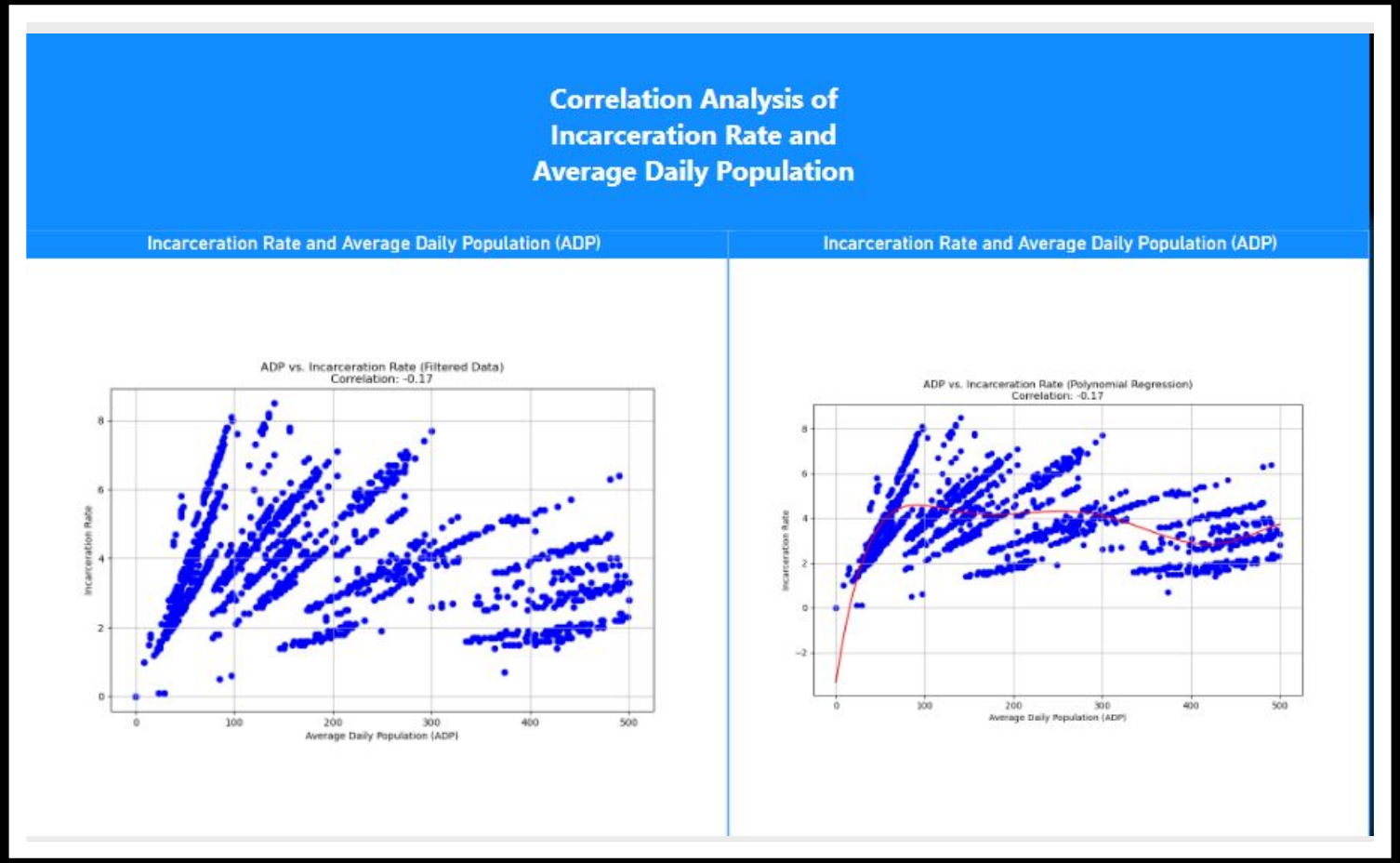
Correlation and Polynomial Regression

Python Script

- Correlation analysis
- Non-Linear Analysis using Polynomial Regression

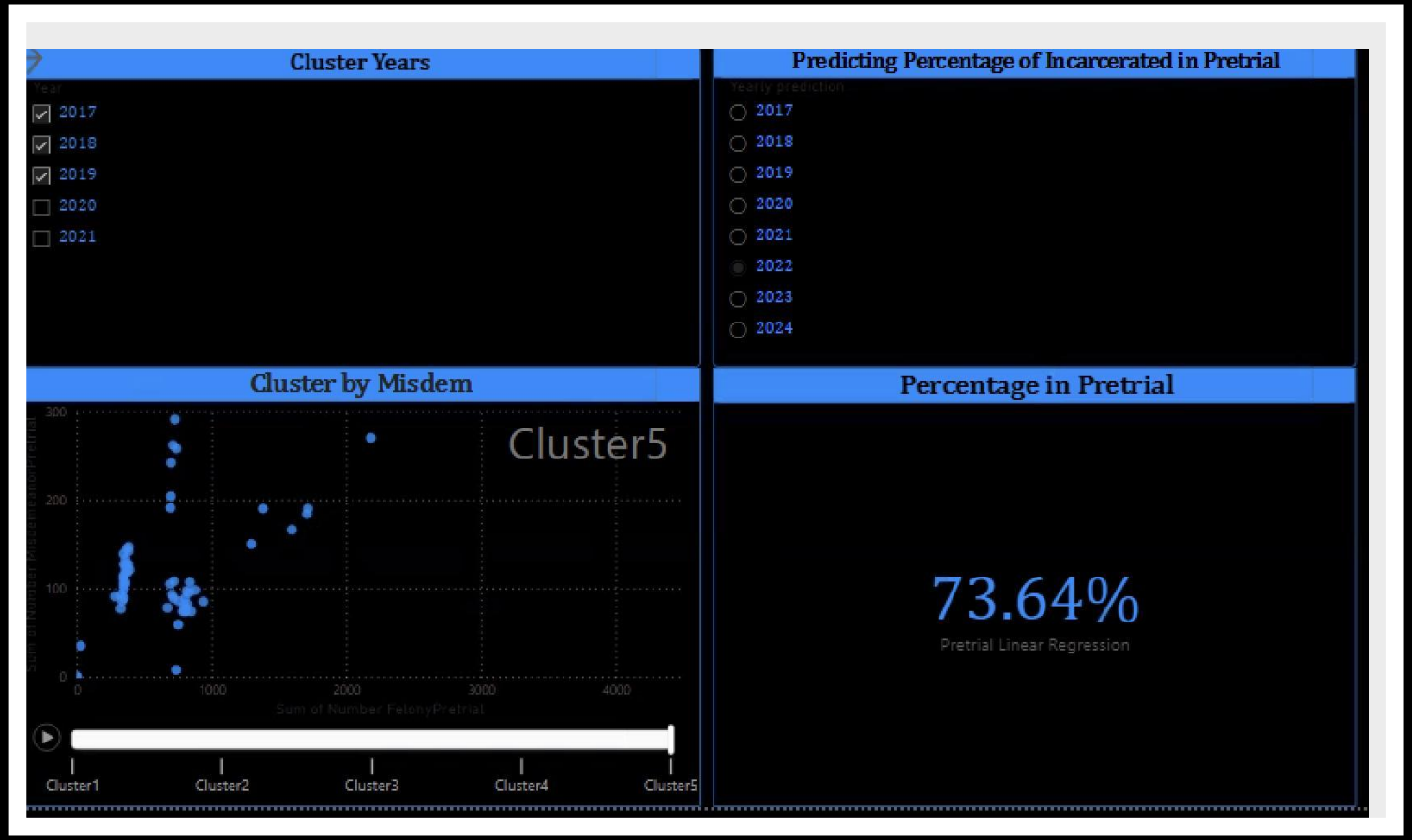
FINDINGS:

- Weak Correlation (-0.17)



Clustering and Linear Regression

- Clustering
- Misdemeanor vs. Felony
- Linear Regression Prediction



Correlation Heatmap

Goal: Identify disparities in sentencing practices.

Method: Heatmaps with Python

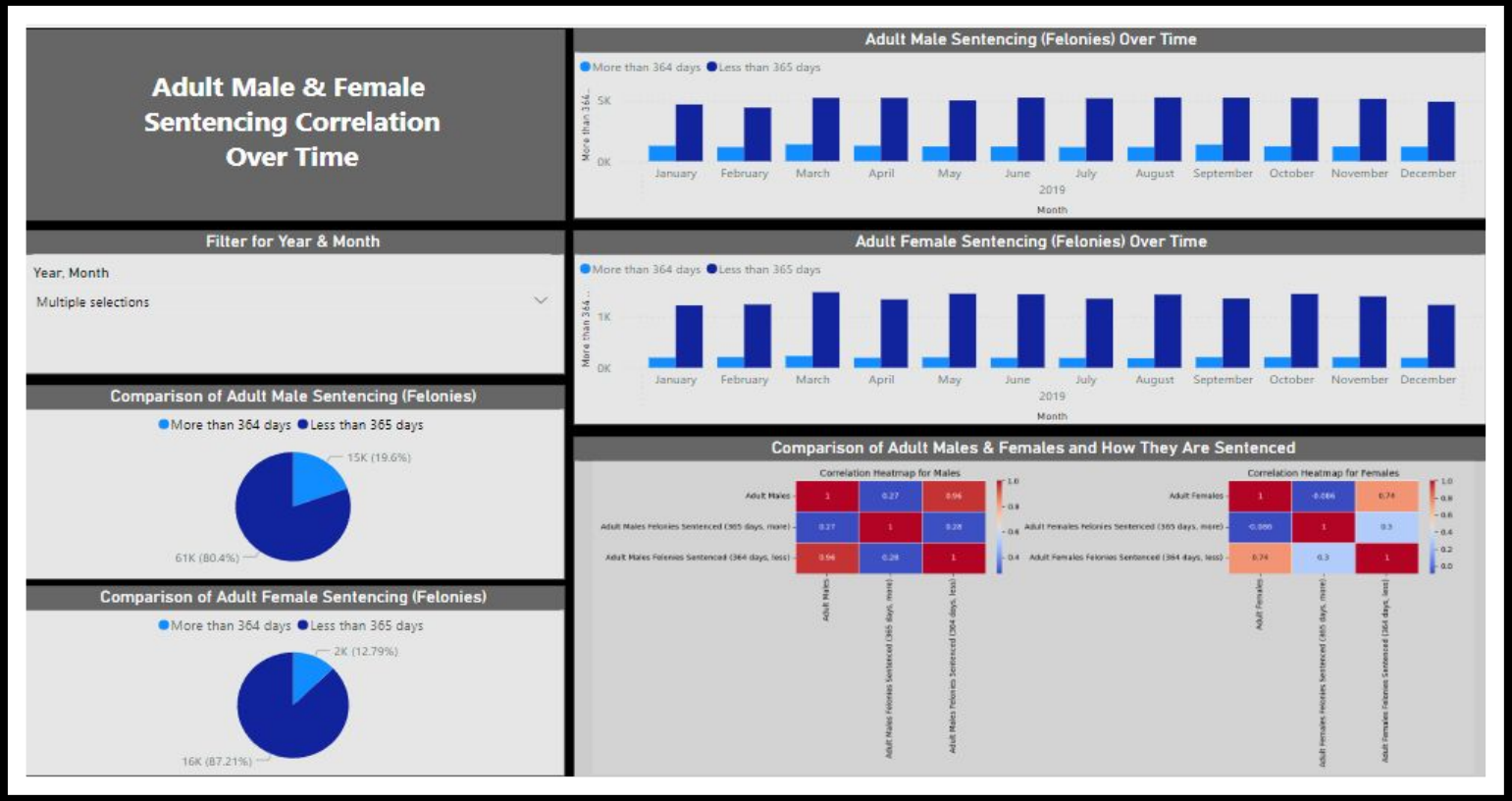
- Pandas (analysis)
- Matplotlib (plotting/text)
- Seaborn (heatmap).

Key Findings:

- **Males:** Negative correlation between long-term (365+ days) and short-term (<365 days) sentences.
- **Females:** Positive correlation between long-term and short-term sentences.

Implications:

- Different sentencing patterns for males and females.
- Need further investigation for fair sentencing.
- Potential reforms to address biases.



Learning Takeaways

FUNDAMENTALS OF POWER BI

SECURITY MEASURES CONCERNING DATA

LINEAR REGRESSION IMPLEMENTATION

PYTHON DEVELOPMENT

EXPLORING RELATIONSHIPS IN DATA THROUGH MODELING.