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Terry-Traffic-Stops-project-

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Decoding Arrest Decisions in Terry Traffic Stops

Overview:

Key Features:

The Terry Traffic Stops project aims to unravel the complex dynamics behind police decisions during traffic stops, with a specific focus on whether an arrest occurs. Building upon the legal precedent set by *Terry v. Ohio*, which introduced the concept of "reasonable suspicion," this project develops a machine learning model to predict the likelihood of arrest following a stop.

##Business Understanding, Goals and Objectives:

Problem Statement: Terry Stops, based on the legal concept of "reasonable suspicion," allow police officers to temporarily detain individuals for investigation. However, the decision to escalate a stop to an arrest is influenced by various factors, often unclear or inconsistent. This project aims to address these complexities through the following approaches:

- **Machine Learning Model**: Develop a predictive model to estimate the probability of arrest after a traffic stop.
- **Understanding Police Behavior**: Identify patterns and critical factors influencing police decisions during stops.
- **Policy Implications**: Inform policy decisions related to policing practices.
- **Fairness and Transparency**: Promote fairness and transparency in law enforcement interactions.

Data Understanding:

Exploration of the dataset, understanding its structure, and identifying key features relevant to churn prediction, including customer demographics, account information, transaction patterns, and historical churn data. Certainly! Let's rephrase that for clarity and conciseness:

##Data Cleaning:

Data cleaning involves essential steps such as handling missing values, encoding categorical variables, and removing irrelevant columns. By performing these tasks, we ensure that the dataset is well-prepared for accurate model training.

##Exploratory Data Analysis (EDA)

The Terry Traffic Stops project delves into the intricate dynamics of police decisions during traffic stops. Our EDA focuses on understanding key patterns and factors that influence arrest decisions following Terry Stops. Here's a concise summary:

1. **Data Exploration**:

- We analyze a rich dataset containing details such as stop context, demographics, and circumstances.
- Investigate distributions, central tendencies, and outliers for relevant variables.

2. **Factors Influencing Arrests**:

- Identify critical features affecting arrest outcomes.
- Explore correlations between variables (e.g., demographics, time, location).

3. **Demographic Insights**:

- Evaluate the role of race, gender, and other demographic factors in arrest decisions.
- Ensure fairness and transparency in policing practices.

4. **Resource Allocation Implications**:

- Understand arrest patterns to optimize resource allocation.
- Inform training and policy development for law enforcement agencies.

Model Building:

In our Terry Traffic Stops project, we explore two essential models:

Logistic Regression and **Decision Trees**.

1. **Logistic Regression**:

- Logistic Regression is a powerful tool for binary classification.
- It estimates the probability of an event (e.g., arrest) based on input features.
- We'll use it to predict whether a traffic stop results in an arrest, considering various factors.

2. **Decision Trees**:

- Decision Trees are intuitive and interpretable models.
- They split data based on feature thresholds to create decision rules.
- We'll explore decision tree models to understand the key factors influencing arrest decisions during stops.

##Model Evaluation Assessment:

Evaluating the performance of model performance using metrics such as accuracy, precision, recall, F1 score, and ROC AUC score ensures the selection of the most effective model. These metrics provide a comprehensive understanding of the model's predictive power.

##Recommendations:

Further research could explore the impact of additional variables not included in the current dataset.

Advanced modeling techniques could be employed to improve prediction accuracy beyond the current 80% threshold.

A deeper analysis into the potential biases related to gender and race could provide more nuanced understanding and inform training programs for officers.

##Contributors:

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