

Unpeaceful Assemble

Predicting Violence at Protests and Demonstrations

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P3 ML Project - 6.23.23

Stakeholders:

- Public Safety Officers
- Local Elected Officials
- City Managers



DATASET



**The Armed Conflict Location & Event
Data Project (ACLED)**

- collects real-time data on political violence and protest events globally.
- locations, dates, actors, fatalities, notes

Data Context



Initial Insight: 5% of US
Demonstrations become violent

**Started Collecting
US Data 2020**

**60,000 Demonstration/
Protest Datapoints**

**Comprehensive and
Constantly Updating**

Basic Model Features



CROWD SIZE

crowd size=a small group

crowd size=a handful

crowd size=dozens to 100

YEAR

2020-2023

US STATES

Features Engineered



GROUPS

Religious Groups
Students/Teachers
LGBTQ+
Hate Groups

MOTIVATIONS

Black Lives Matter
Abortion
Confederate Statues

CHARACTERISTICS

Armed
Presence of Counterprotesters

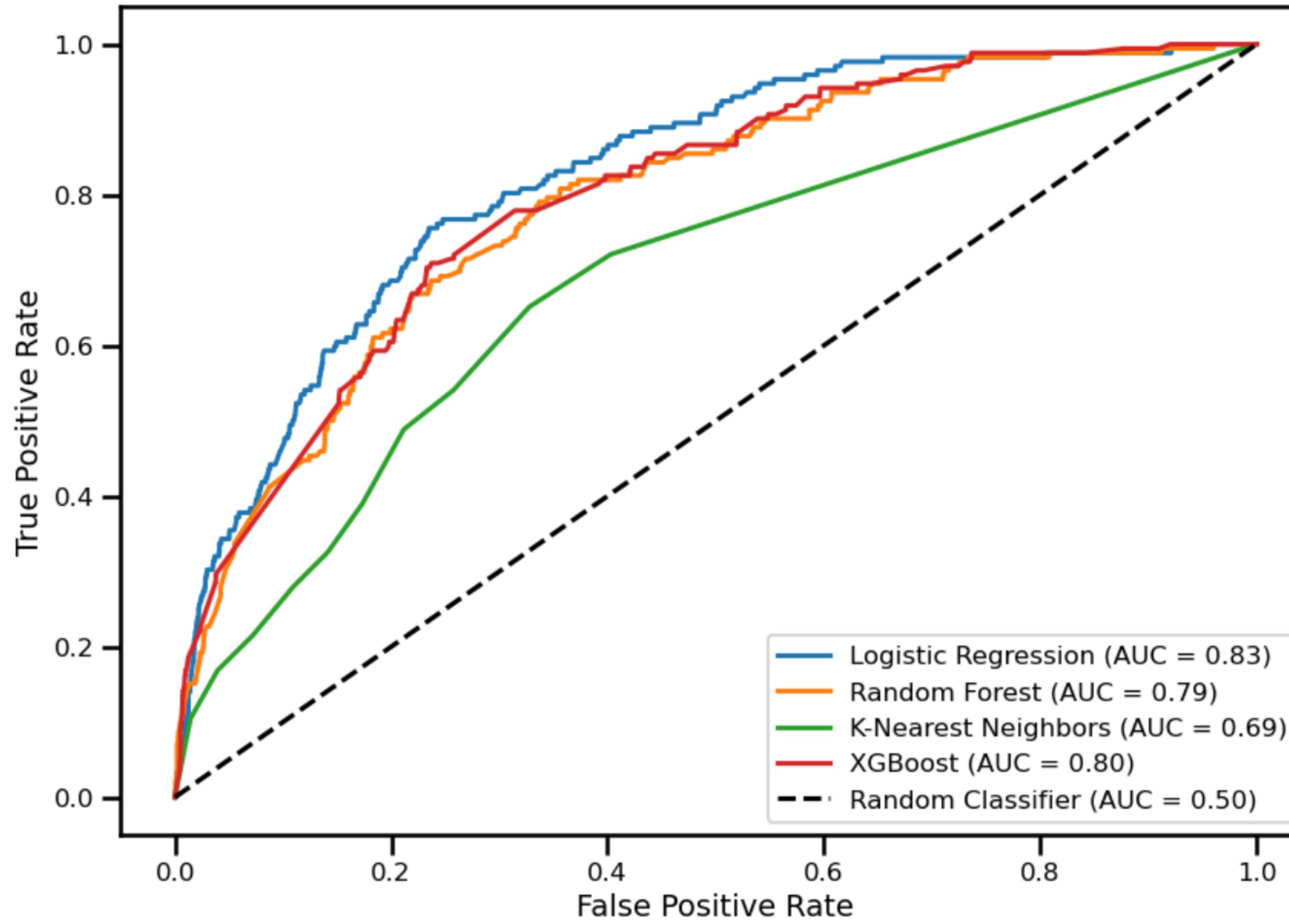
Classification Models Used:

- Logistic Regression
- KNearestNeighbors
- Random Forest
- XGBoost

Hyperparameters Tuned with Grid Search Cross-Validation

Best Model Performance

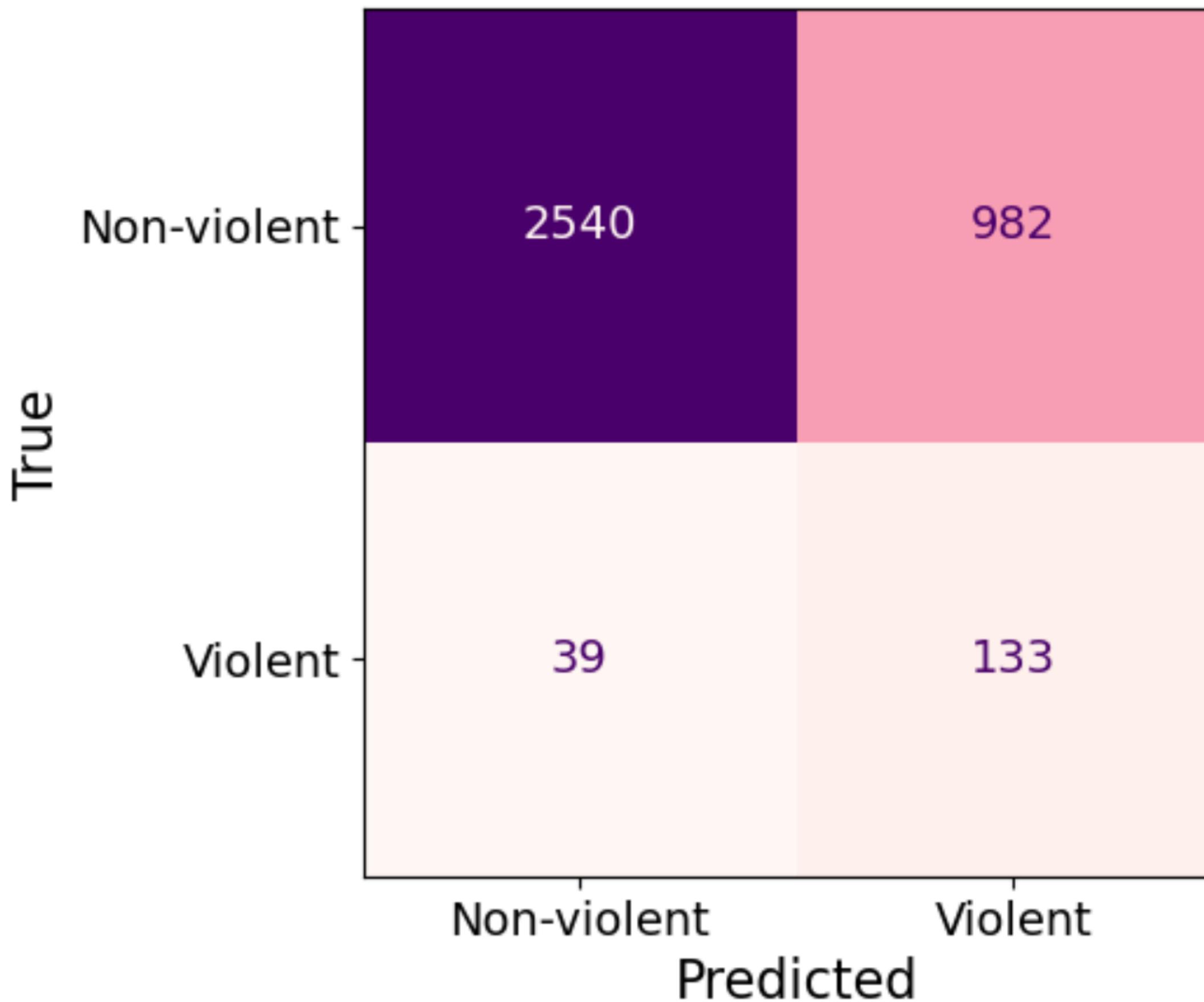
ROC Curves of Models



Logistic Regression
Wins The Day

Scored on Recall-
Priority to catch True
Positives and minimize
False Negative

Confusion Matrix



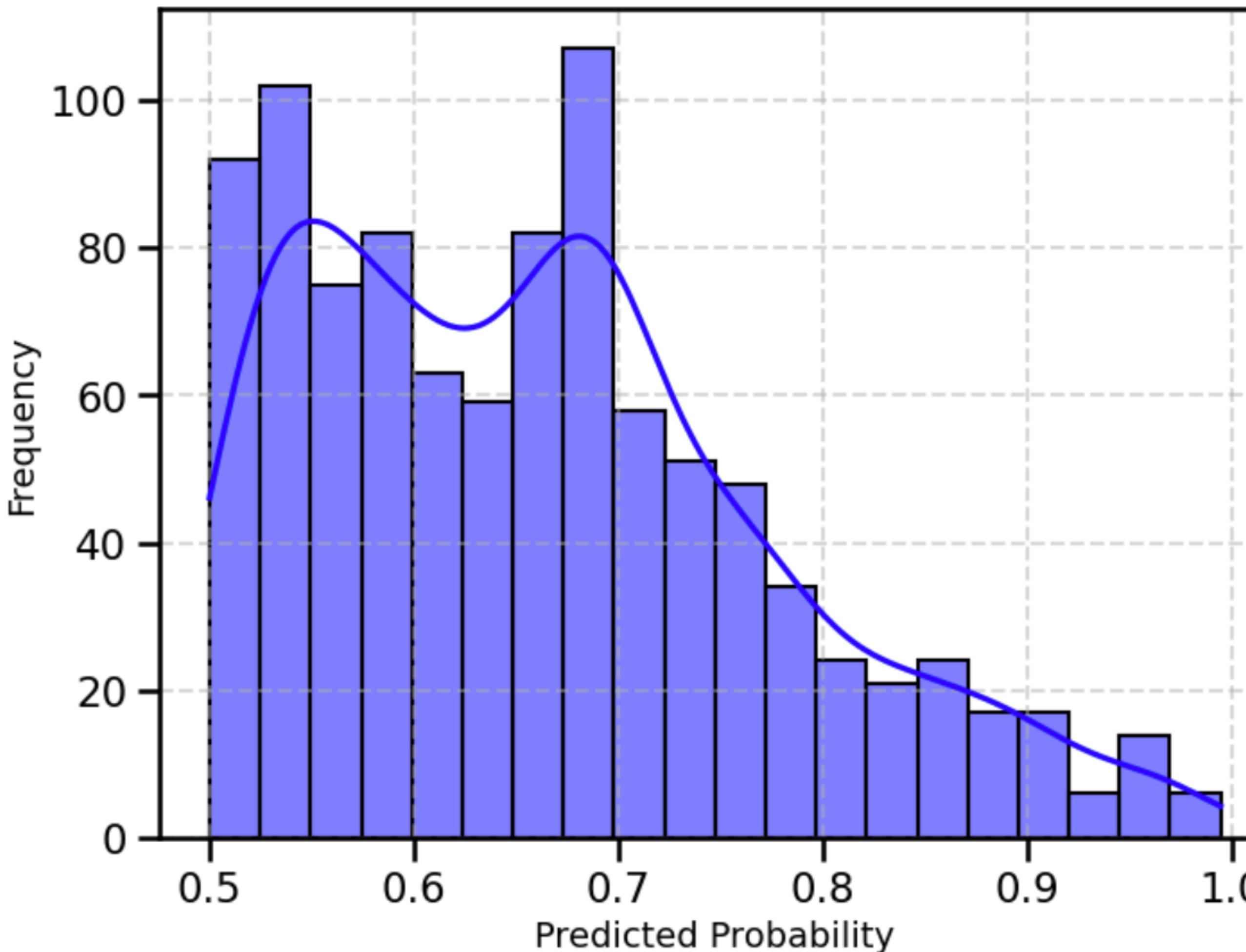
38% Nonviolent
classified as Violent

Correctly
characterizes ~75%
of True Positives

recall

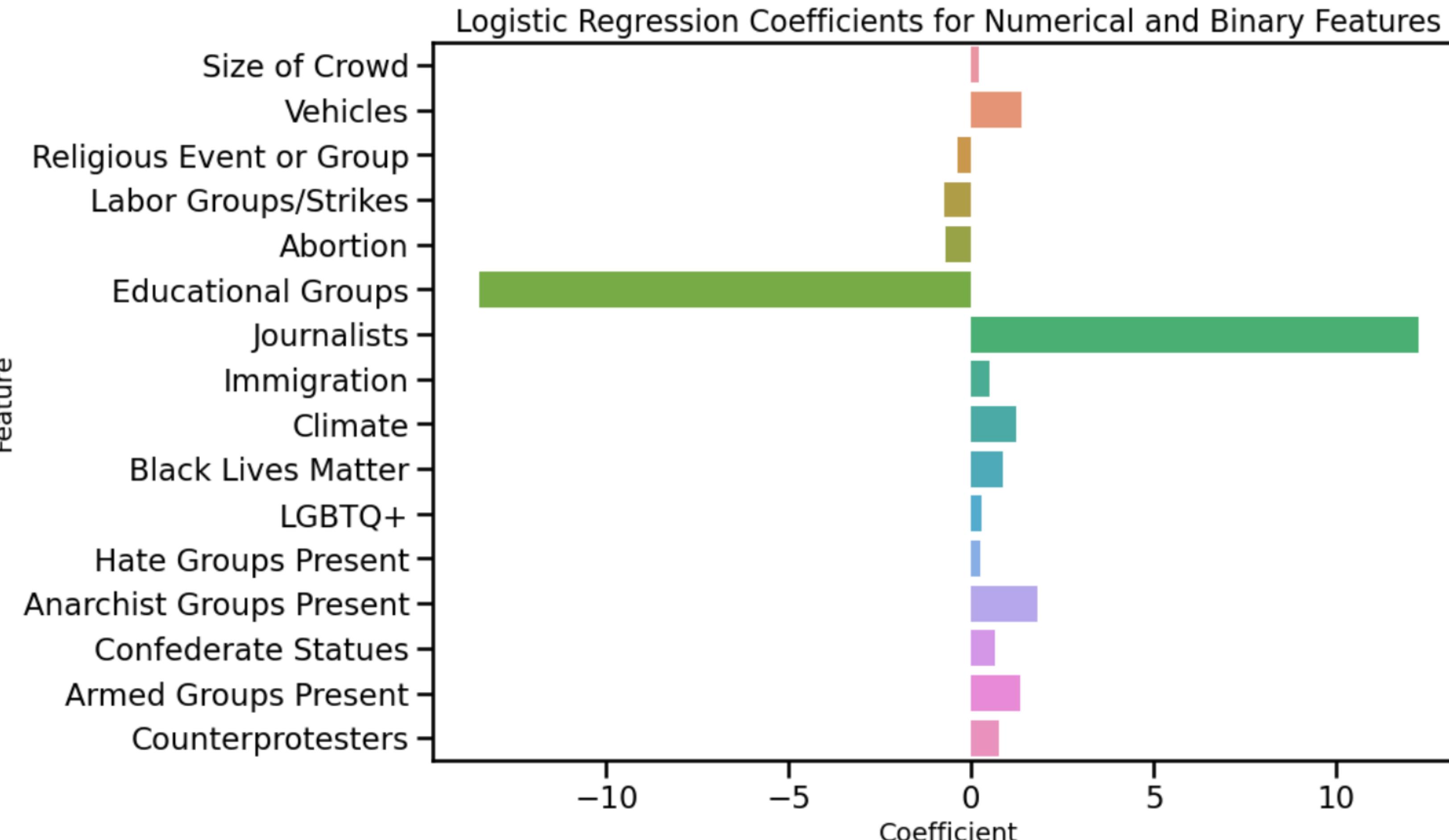
0	0.72
1	0.77

Distribution of Predicted Probabilities for False Positives

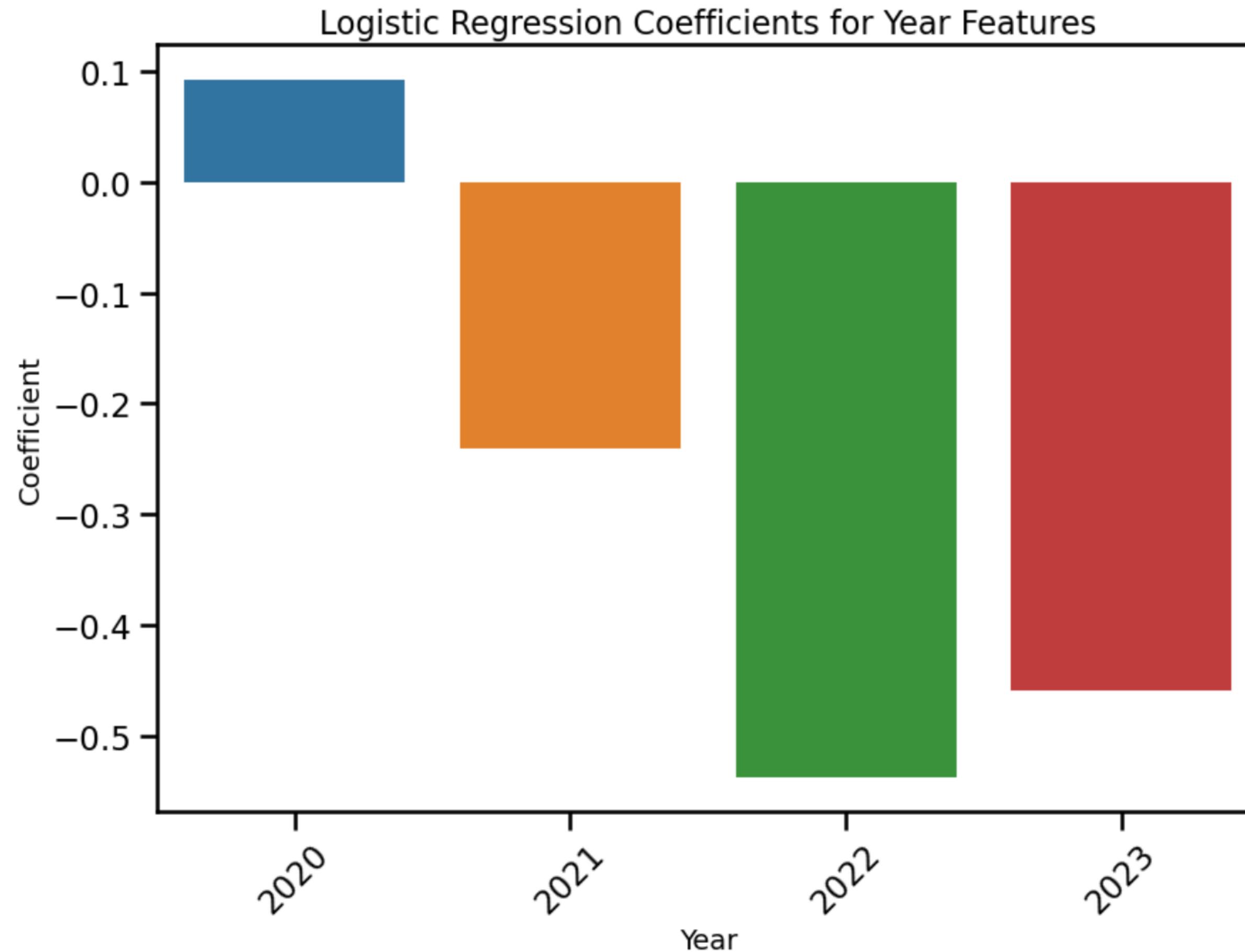


Most of the false positives are in the 50%-70% violence likelihood range

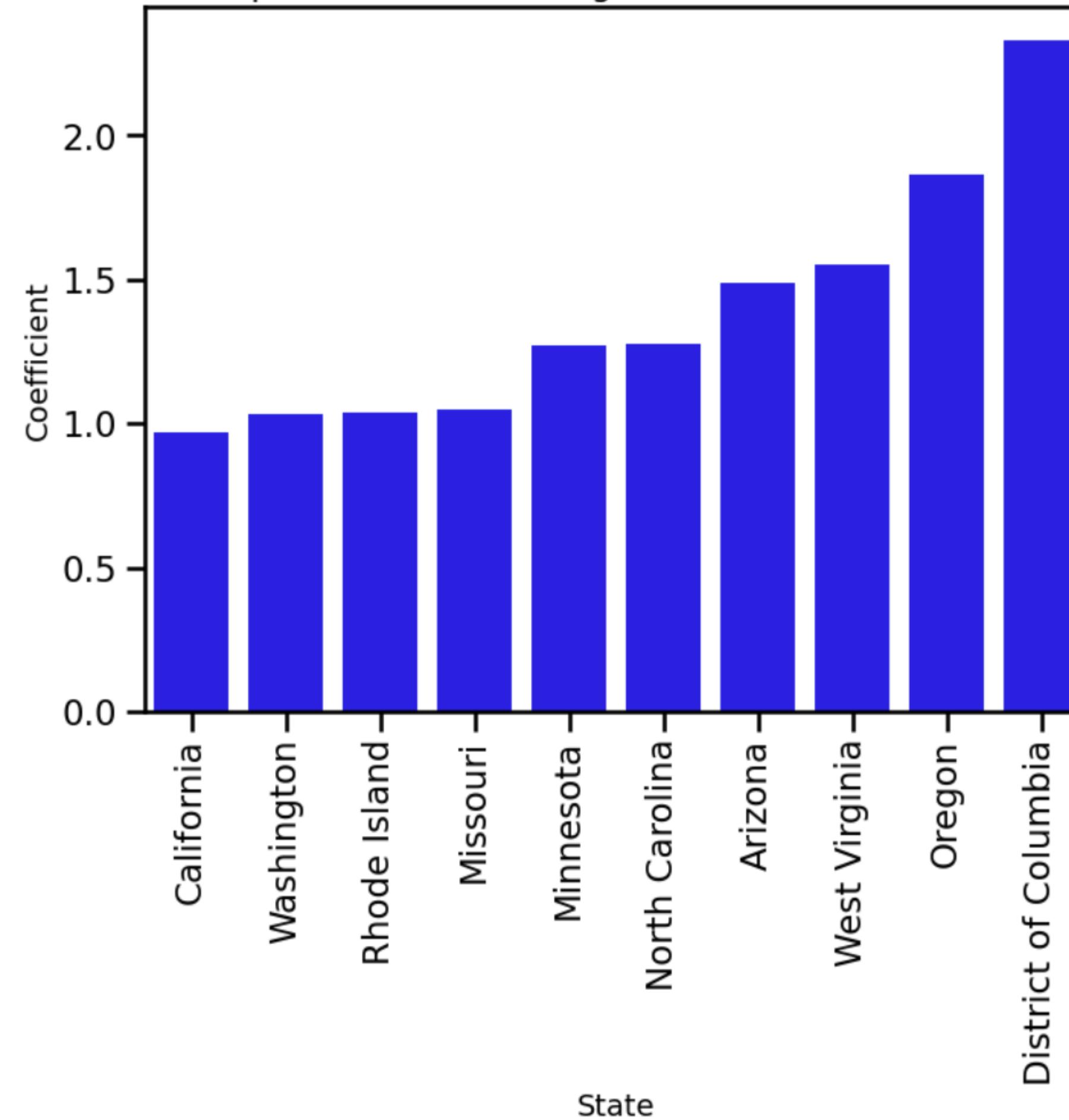
Feature Weights



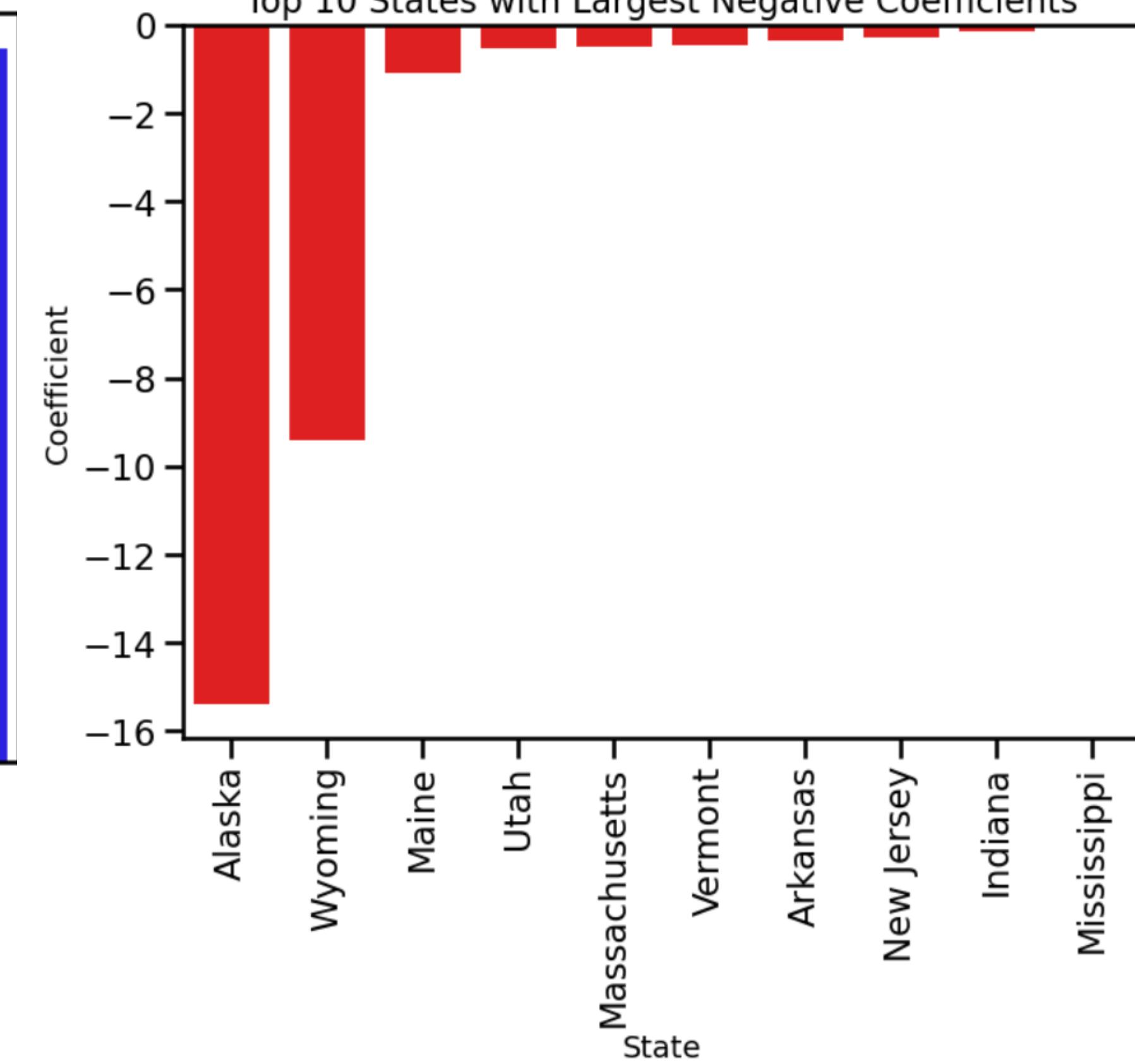
Feature Weights



Top 10 States with Largest Positive Coefficients



Top 10 States with Largest Negative Coefficients



Hypotheticals

NEW YORK

LGBT+

Hate Groups Present

2023

Crowd Size 200

NORTH CAROLINA

LGBT+

Hate Groups Present

2023

Crowd Size 200

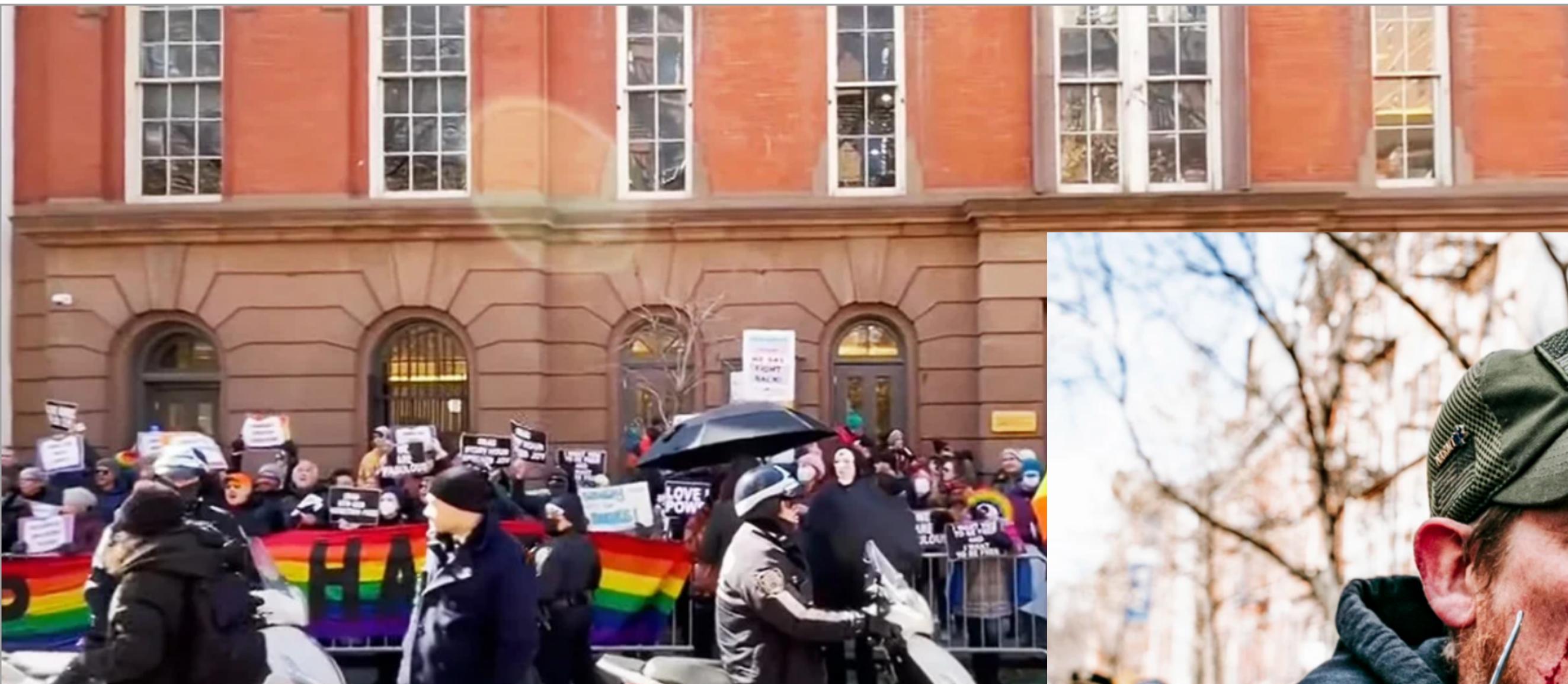
NEW YORK

67% Chance of
Violence

NORTH CAROLINA

73% Chance of
Violence

Proud Boys Retreat Bloodied From N.Y. AG's Drag Story Hour in Manhattan



Recommendations

- Careful how you treat journalists
- Keep People out of non-blockaded streets
- Pay attention to chatter (especially anti-fascists)



Thank You