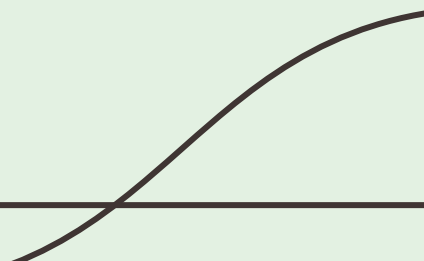


Patterns of Firearm-Related Crimes in the United States

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Disclaimer

Please note that the content and results cover a sensitive topic area for many as they relate to gun violence in the United States and schools in particular.

The data and analysis presented in this project are based on publicly available sources and do not represent the views of any individual or organization. The project is for informational purposes only and should not be construed as a comprehensive or definitive analysis of gun-related violence and deaths in the United States. The data and analysis may be subject to limitations and biases inherent in the sources and methods used, and should be interpreted with caution. The project is not intended to promote any particular policy or agenda related to gun control or gun rights, and the conclusions and recommendations presented should not be taken as an endorsement or condemnation of any such policy or agenda. The project is intended to contribute to the public discourse on gun-related violence and deaths in the United States and to promote further research and discussion on the topic.

Motivation

- US has the highest rate of civilian gun ownership in the world.
- Guns are one of the leading causes of death among American children and teens.



of school shooters planned
the attack in advance.

Question 1

Introduction

What state-level firearm-restrictive laws have the highest effect on preventing homicide?

Gun Law Dataset

Amount of firearms
legislation across
states

CDC Dataset

Number of
firearm-related
death across states

Models Used

Ridge

Linear

Lasso

For Linear Regression

Training R-squared: 0.9570227076052755

Testing R-squared: 0.9353640332573007

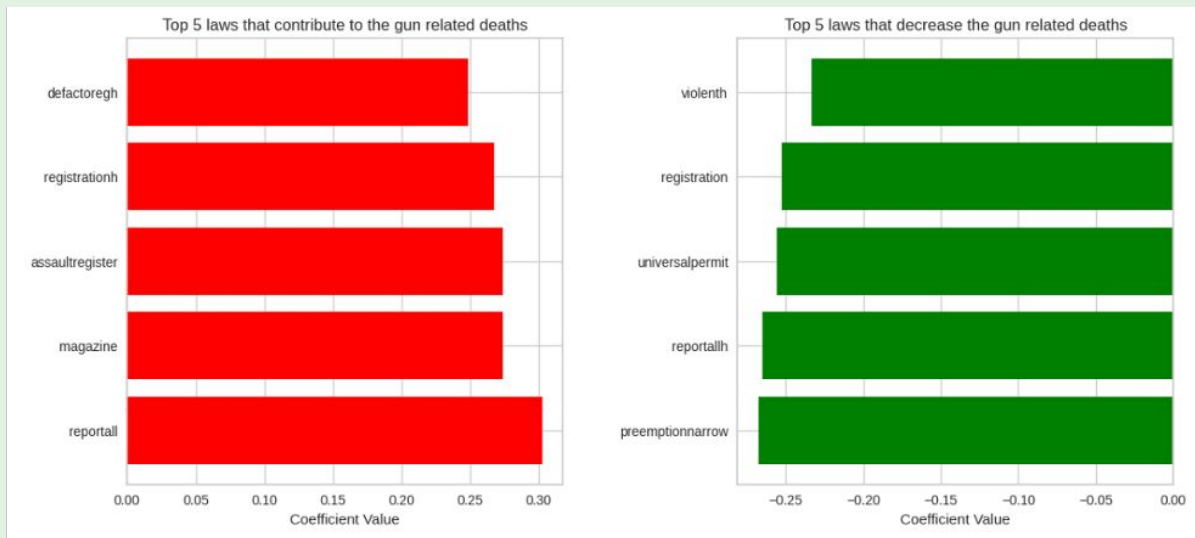
MSE train: 0.001995591707188507

MSE test: 0.003229367552749634

ElasticNet - new model

Conclusion and Discussion

We noticed that the more restrictive state level guns law are, the lesser gun related death we observe. We can use this correlation to identify and frame better laws for gun control.



- Defactoregh - Hand guns registered
- Assaultregisterh - Gandfathered weapons registered
- Violenth - Handgun possession is banned for people with violent misdemeanor
- universalpermit - background checks and permit requirement

The image features a light green background with two horizontal dark green lines. The top line starts with a curve on the left, and the bottom line ends with a curve on the right.

Question 2

Introduction

Based on the severity of the attack, can we predict which type of gun is most likely to be used in a school shooting?

School Shooting Incidence Dataset

Information about
school shootings

School Shooting Weapon Dataset

Weapon
information on
school shooting

Classification Models

KNN

AdaBoost

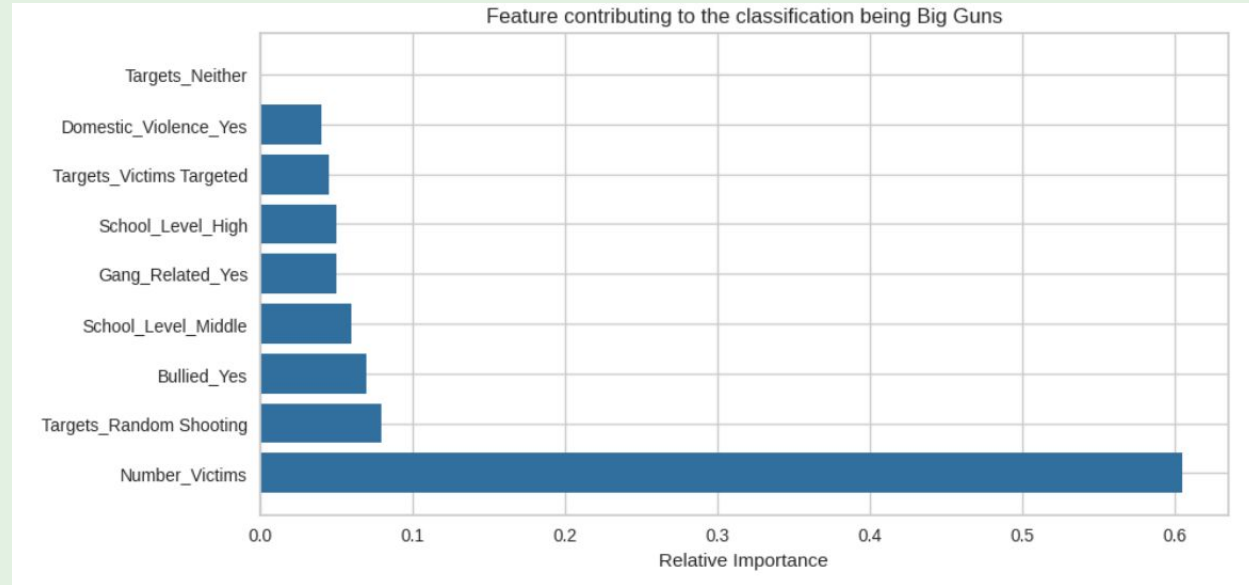
Logistic Regression

Decision Tree

AdaBoost classification report:				
	precision	recall	f1-score	support
0	0.90	0.99	0.94	502
1	0.71	0.15	0.25	65
accuracy			0.90	567
macro avg	0.81	0.57	0.60	567
weighted avg	0.88	0.90	0.86	567

Conclusion and Discussion

- Number of victims is the most important factor for classifying a weapon as “Big Gun”
- Usefulness for policymakers in developing strategies to prevent school shootings





Question 3

Introduction

Can we predict gun dealer types based on violations, inspection letter content, and license recommendation?

ATF Inspection Reports Dataset

Firearm distributor
violations across the
US

Classification Models

KNN

AdaBoost

Logistic Regression

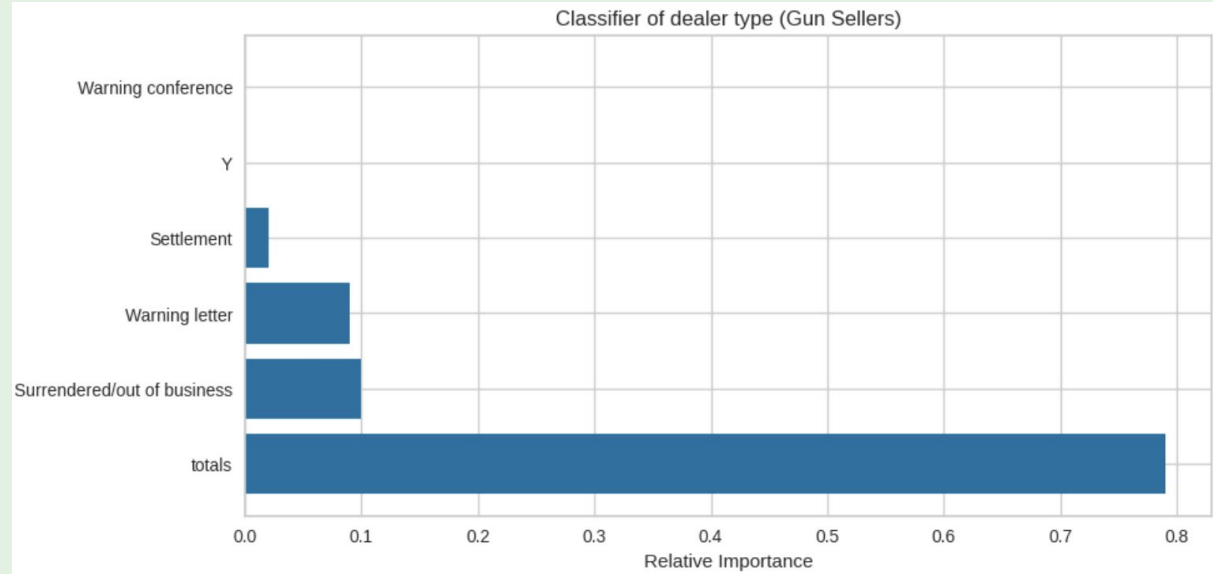
Decision Tree

AdaBoost classification report:

	precision	recall	f1-score	support
Dealer	0.75	1.00	0.85	355
Manufacturer	0.67	0.02	0.03	123
accuracy			0.74	478
macro avg	0.71	0.51	0.44	478
weighted avg	0.73	0.74	0.64	478

Conclusion and Discussion

- Total violations is the most important factor in classifying the distributor type: Manufacturer
- Suggests manufacturers committing most violations - target for policy action



Future Work

- Expanding the scope of analysis to include other variables or factors that may impact gun violence or firearm laws
- Investigate the effectiveness of specific policy interventions
- Conduct analyses on local levels
- Ongoing evaluation and monitoring of firearm laws and their impact on gun violence

References

- <https://www.statefirearmlaws.org/resources>
- <https://projects.thetrace.org/inspections/methodology/>
- <https://github.com/washingtonpost/data-school-shootings>
- <https://wisqars.cdc.gov/data/explore-data/explore/selected-years>
- <https://www.sandyhookpromise.org/blog/gun-violence/facts-about-gun-violence-and-school-shootings/>