US Gun Control

Mayank Mishra, Zixiao Wang, Evan Swett

Description

- The primary goal of this project is to identify and understand the relationship between gun control laws in the united states and violent gun incidents
- Specifically this project seeks to examine the efficacy of relevant gun control laws by examining the number of violent gun incidents, injuries and deaths comparatively with the stringency on gun laws in the state at the time of the incidents.
- Examine the relationship between gun violence and mental health funding in the United States
- Predict violent gun incident rates based on laws in state.

Prior Work

- Gun control has been a widely debated topic since 1791, when the Constitutional Convention ratified the Second Amendment to specify that it did not guarantee one's individual right to own a gun.
- However, with today's high-capacity magazines and automatic firing capabilities, the issue of gun control has never been more prevalent.
- In 2004, Lisa Hepburn and David Hemenway conducted case-control studies, ecological time-series and cross-sectional studies that proved, where there are guns, there are more homicides.
- There have been many other factors tested including mental health issues, income, gender, and many more.

Datasets

- Gun Control Law Data (key = [State, Year])
    - https://www.statefirearmlaws.org/resources
    - State Firearm Laws is a research project conducted by the Boston University School of Public Health in which laws surrounding the sale, distribution and manufacture of firearms is tabulated and aggregated in the above dataset.
- Gun Violence Incidents in the US (key = [State, Date])
    - https://www.kaggle.com/datasets/jameslko/gun-violence-data
    - The data is sourced from GunArchive.org which is a government funded non-profit working to manage and maintain a repository of violent gun incidents in the United States.
- State population by year (key = [State, Year])
    - https://www.census.gov/data/datasets/time-series/demo/popest/2010s-state-total.html
    - US Census Estimates of population by state and year.
- The datasets are stored locally and on github. The merging script is also on github such that every feature that will be investigated will be cleaned and merged the same way.
- Merge the three datasets by state and year

Proposed Work (Part 1)

- Data Cleaning/PreProcessing
    - Drop NAs (features with significant NA values)
    - Drop repeated incidents (tricky because difficult to identify unique incidents)
    - One-Hot Encode Categorical features in violent incident dataset
    - Clean nested features within single columns of violent incident dataset.

- Data Integration
    - The first step in investigating each feature is merging the datasets by their respective keys
    - Adding new features by year and state and population such that we have a metric for understanding the progression of gun violence per capita by state.

Proposed Work (Part 2)

- Feature Analysis
    - Examine the pearson correlation between the existence of certain gun control laws and violent gun incidents per capita
    - Examine the magnitude of gun violence incidents (injuries and/or deaths) by gun control laws
- Combine significant features into a model for predictive analysis of gun violence in the United States by law.
    - Multiple Linear Regression
    - RNN

Tools

- Jupyter Notebooks
    - All cleaning, integration, analysis and result visualization will be done using Jupyter Notebooks
- Google Drive
    - All documentation will be saved within a shared folder
- Zoom
    - Weekly and ad hoc meetings will be conducted via zoom

Evaluation

- There are a couple of metrics by which the success of this project will be evaluated
- First is through identifying a mathematically rigorous relationship between gun violence and gun laws
- Second is through visualizing these relationships
- Finally through creating a model that can recognize the key factors that are correlated with gun violence.