Hello Mr. Sikora,

We are emailing you regarding our AOS research project about using machine learning to determine the relationships between gun legislature and rates of gun violence. My name is Aryan Deorah and my partner’s name is Chris Goodhart, at we are juniors at AOS. AOS stands for the Loudoun County Academy of Science, a magnet high school for science, math, and research. One of the most crucial aspects of this project is obtaining accurate and complete sets of data. As such, we would greatly appreciate access to reliable sources of data. We would also be interested in working with professional researchers in the field and receiving expert advice.

Our current plan is to compile data from various government and non-profit sources on rates of gun violence and the controls that we will use (age, income, unemployment, etc). These controls will be used to adjust the rates of gun violence as if each state had the same value for the control. We have access to an extensive database listing the existing gun regulations in each state from 1991-2018. This database has been put together and utilized by past researchers. The framework which we have in mind is to start by analyzing small groups of laws with only a few select states. As our project progresses and we acquire more and more data from reliable sources,, we will include more states in our analysis and test different laws.

First, we’ll use Weka to explore the data and search for preliminary patterns. Then we’ll create several different regression models and test each architecture for least error. The goal of these models will be to take in law analysis for a given state as inputs and give predicted rates of gun violence as outputs. Once we identify the model that most successfully predicts the rates of gun violence, we will actually apply it to determine which set of laws will yield the lowest rates of gun violence.

As a second part to this project, we plan to construct a stringency algorithm. This algorithm will assign a stringency score to each category and subcategory of laws in each state based on the “strictness” of these laws. Each stringency algorithm will take law characteristics as inputs, but there will be a slightly different algorithm for each category or subcategory. The algorithm will effectively be tailored to its specific category. The output will be a single numerical value that represents the strictness of the laws in that category for a given state.

So far we have utilized the gun law database combined with a WISQARS data set on rates of gun deaths to perform exploratory data analysis through Weka. We are hoping that you would be willing to help us continue our project and provide insight to help guide us.

Please contact us with questions, comments, or concerns at [chrisgoodhart817@gmail.com](mailto:chrisgoodhart817@gmail.com) and [aryan.deorah@gmail.com](mailto:aryan.deorah@gmail.com).