

Abstract geometric lines in the top left corner, consisting of several overlapping, irregular polygons and lines in a light beige color.

YOUTH CRIME IN THE UNITED STATES

DSB-826 Group Project

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AGENDA

PROBLEM STATEMENT

MODELING

Crime Rates Predictor™ DEMONSTRATION

CONCLUSION & NEXT STEPS

AUDIENCE

Kids First, a US NGO, and the US Department of Justice and associated policymakers, educational institutions, and public safety organizations

GOAL

Conduct an analysis using socioeconomic, educational attainment, and state demographic data to determine which factors had an impact on youth crime

DATA

Collected from various governmental sources (including Bureau of Justice Statistics, St. Louis FED, Centers for Disease Control and Prevention, U.S. Census Bureau)

RESULT

Kids First will be able to provide evidence-based recommendations to the US DOJ in order to reduce crime in young adults

PROBLEM STATEMENT



DATA

CRIME

Young adult (ages 16 to 24) crime rates per 100,000 by category by State from 2016 to 2022, Bureau of Justice Statistics

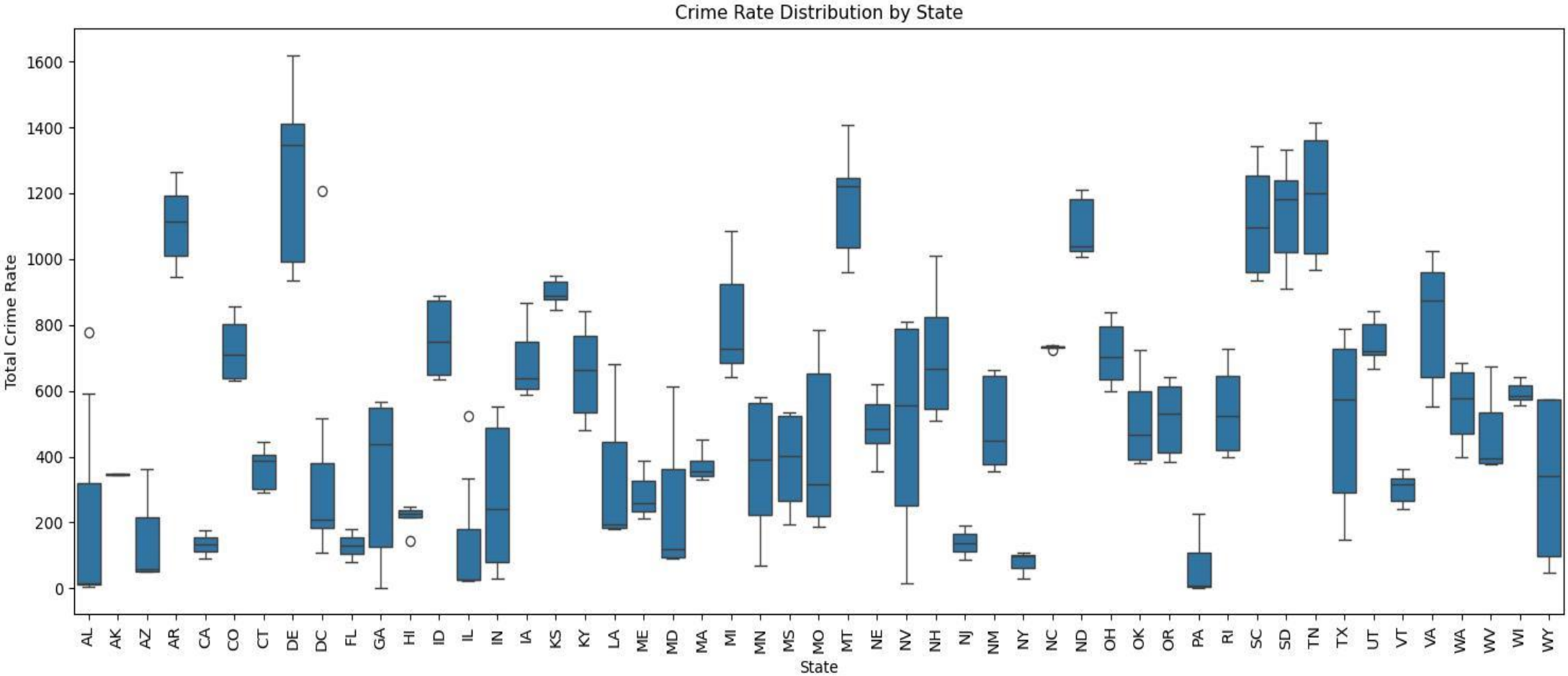
STATE DEMOGRAPHICS

Population, income, poverty rate, unemployment rate, labor force participation rate, high school and Bachelor's grad rates, St. Louis FED

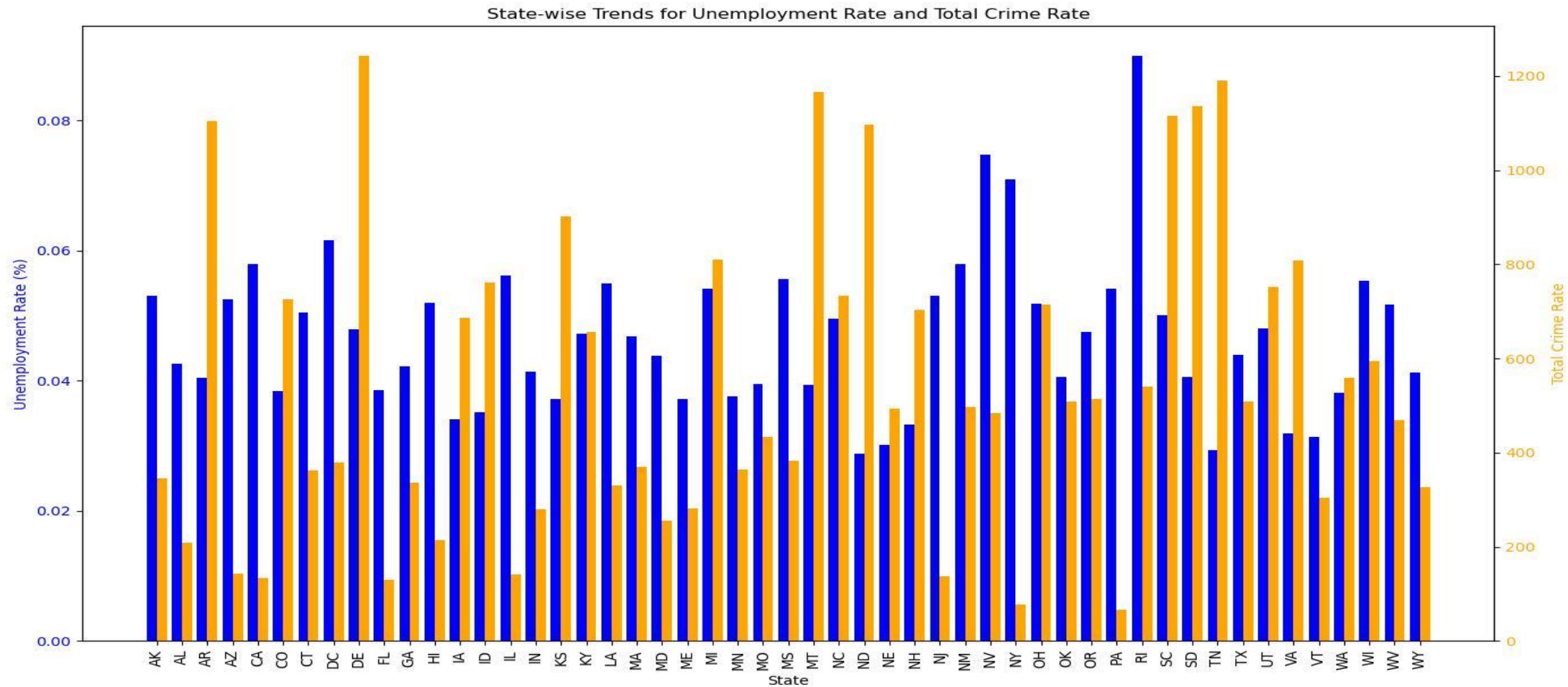
YOUTH STATISTICS

Suicide rate, overdose death rate, youth not in school, youth living in poverty, youth in living foster care, CDC and US Census Bureau

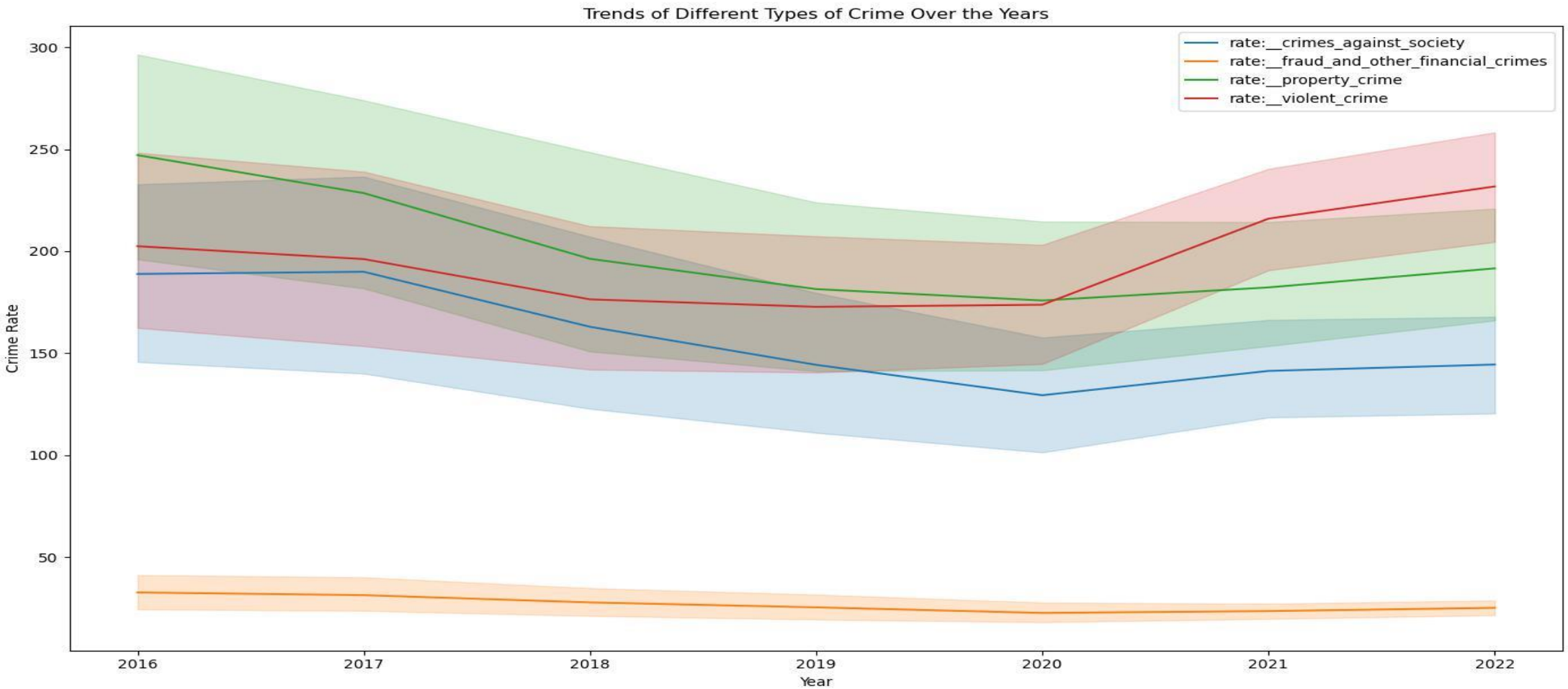
YOUTH CRIME BY STATE



YOUTH CRIME AND UNEMPLOYMENT BY STATE



YOUTH CRIME BY TYPE AND YEAR



MODELING

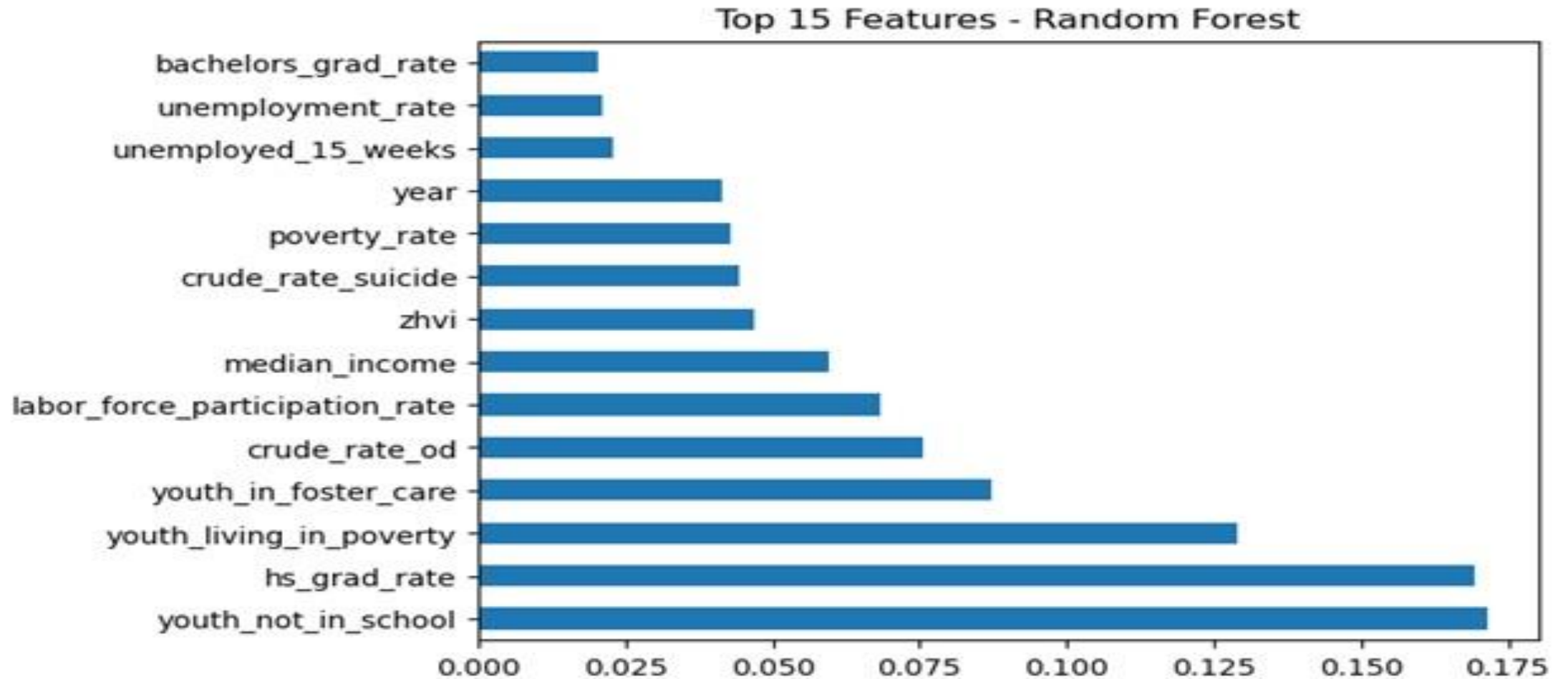
Linear & Ridge Regression

Decision Tree & Random Forest

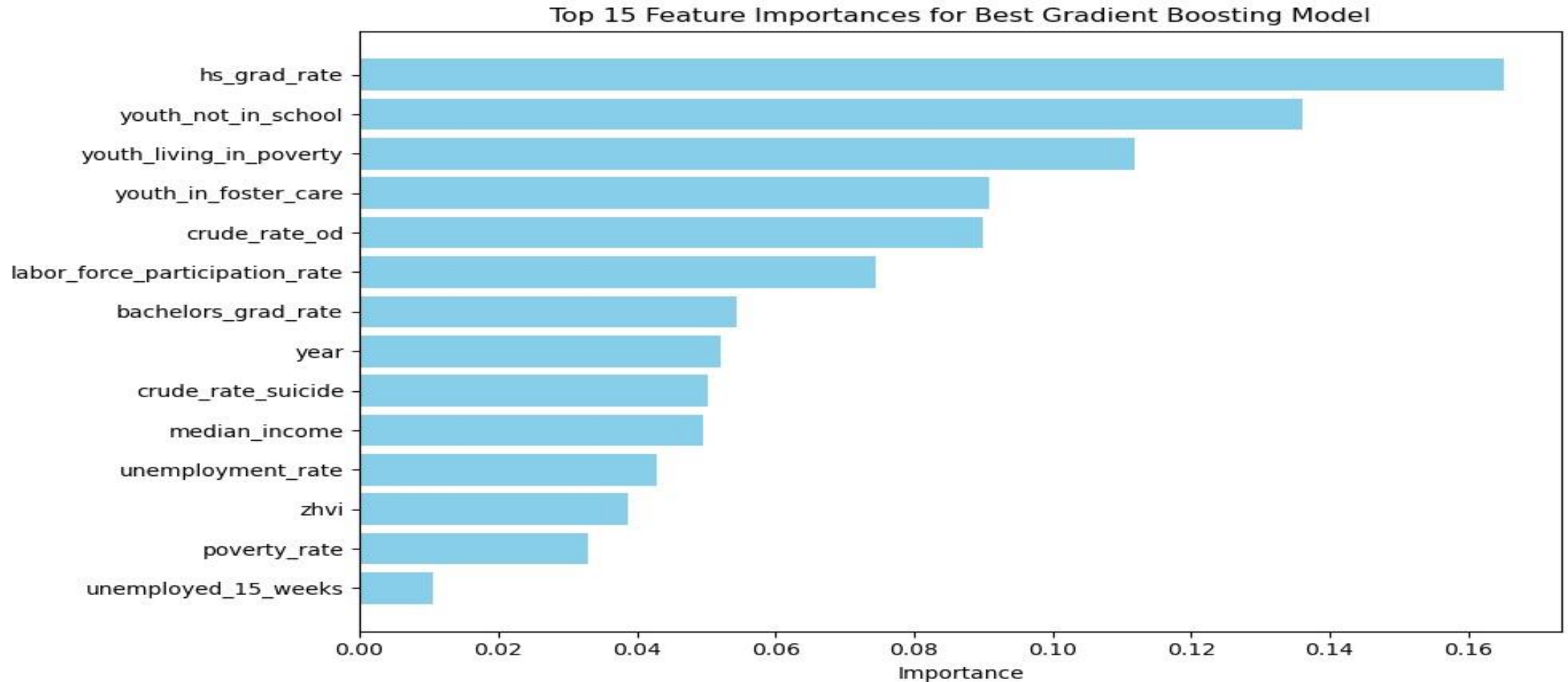
Gradient Descent & XGBoost

SVM & Stacking

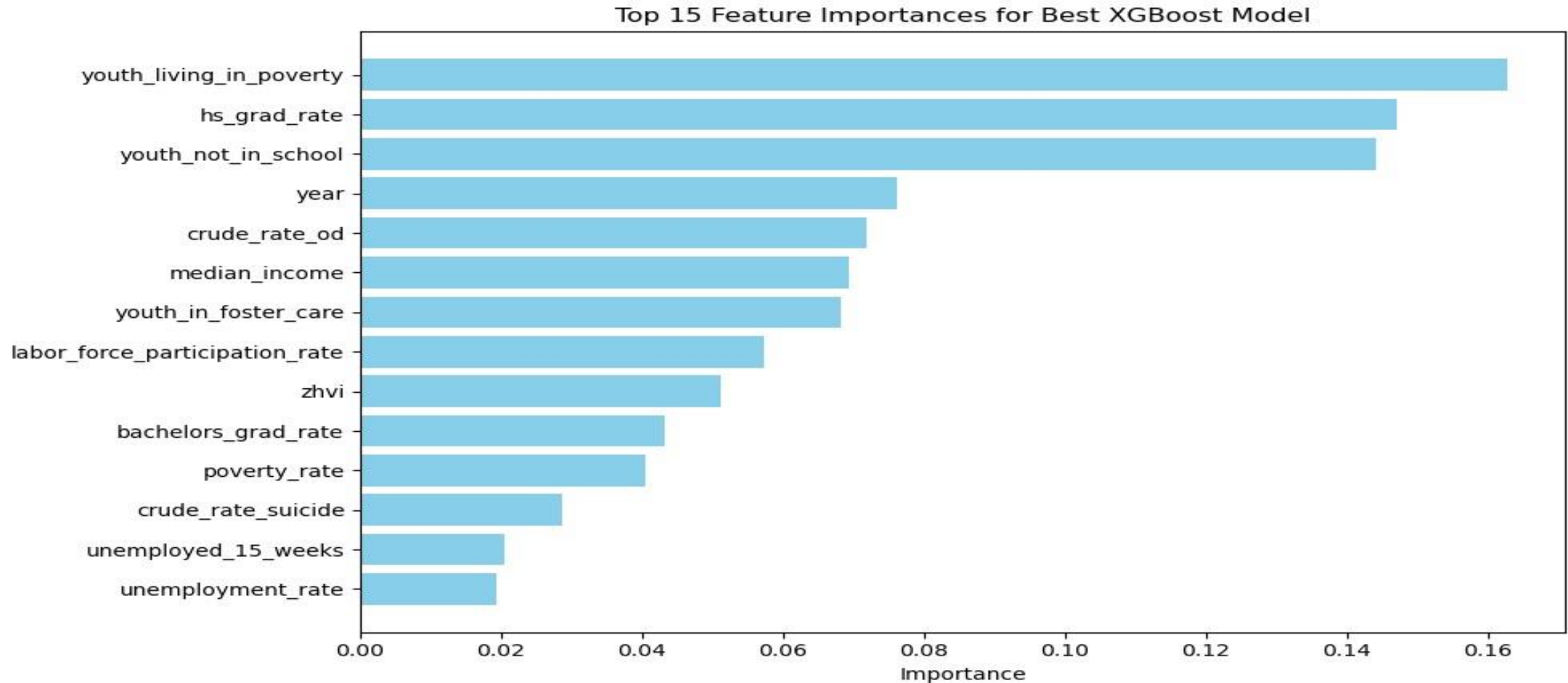
RANDOM FOREST FEATURE IMPORTANCE



GRADIENT BOOSTING FEATURE IMPORTANCE



XGBOOST FEATURE IMPORTANCE



GRID SEARCH XG BOOST MODEL PERFORMANCE



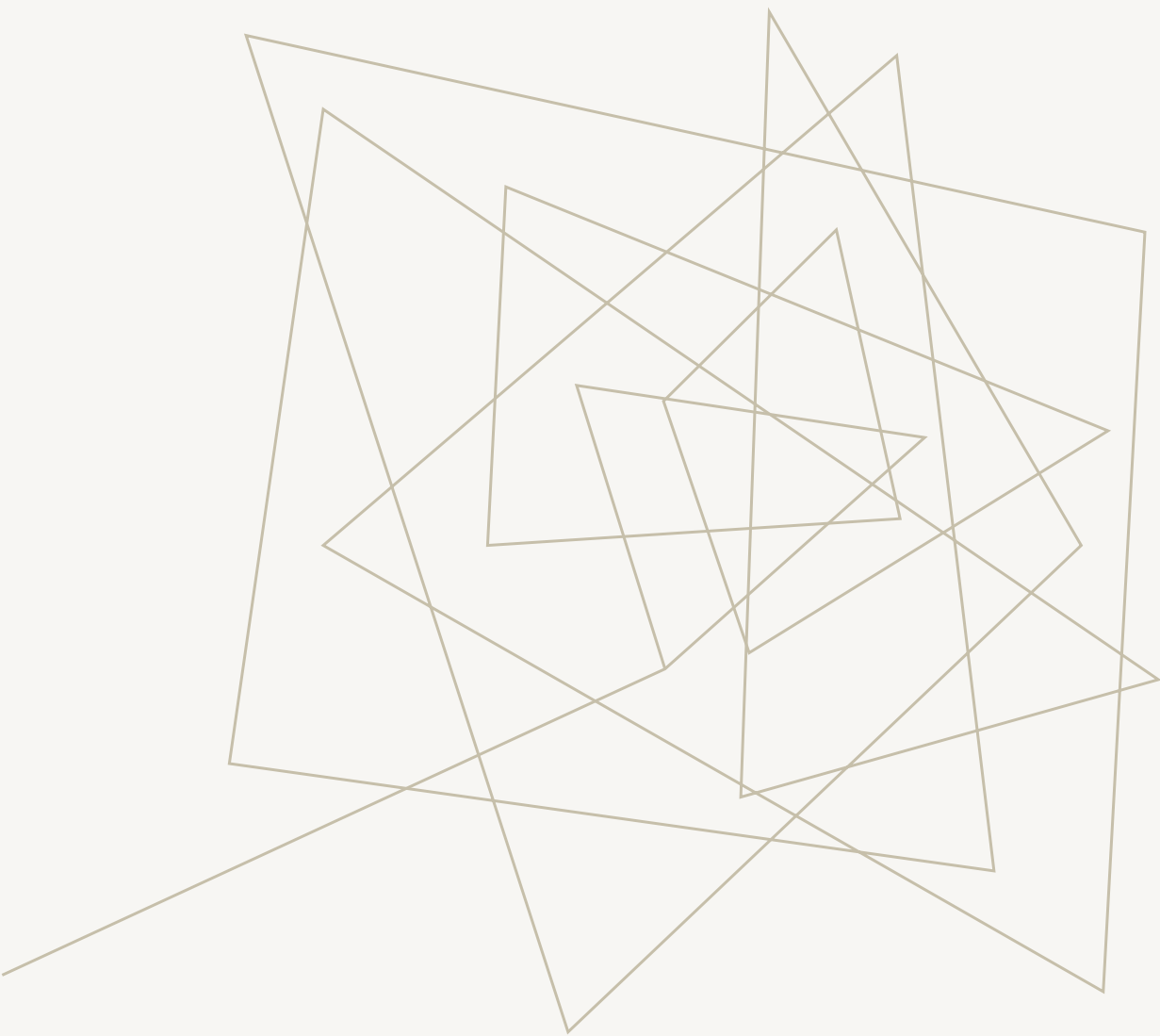
R²



MEAN SQUARED ERROR



MEAN ABSOLUTE ERROR



CRIME RATES
PREDICTOR™
DEMONSTRATION

×

User Input

Median Income

60000

− +

Poverty Rate (%)

0.15

− +

Unemployment Rate (%)

0.05

− +

Unemployed 15 Weeks or Longer

1000

− +

Labor Force Participation Rate (%)

0.65

− +

High School Graduation Rate (%)

0.85

− +

Bachelors Graduation Rate (%)

0.30

− +

Zillow Home Value Index (ZHVI)

250000

− +

Crude Rate of Suicide

10

− +

Crude Rate of Overdose

15

− +

Youth Not in School

10000

− +

Youth in Foster Care

500

− +

Youth Living in Poverty

20000

− +

Crime Rate Predictor

Data Dictionary

	Feature	Description
0	year	The year of the data record
1	median_income	Median income of the population
2	poverty_rate	Percentage of the population living in poverty
3	unemployment_rate	Unemployment rate in the state
4	unemployed_15_weeks	Number of people unemployed for 15 weeks or longer
5	labor_force_participation_rate	Labor force participation rate (%)
6	hs_grad_rate	High school graduation rate (%)
7	bachelors_grad_rate	Bachelors degree graduation rate (%)
8	zhvi	Zillow Home Value Index (ZHVI)
9	crude_rate_suicide	Crude rate of suicide per 100,000 population

Dataset Overview

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	state	year	total_pop	white_pop	black_pop	hispanic_pop	asian_pop	native_pop	islander_pop
0	AL	2,022	4,916,000	0.645	0.252	0.048	0.014	0.002	
1	AL	2,021	4,900,800	0.644	0.255	0.047	0.013	0.004	
2	AL	2,020	4,833,950	0.649	0.26	0.0455	0.0135	0.004	
3	AL	2,019	4,767,100	0.654	0.265	0.044	0.014	0.004	
4	AL	2,018	4,752,600	0.656	0.265	0.043	0.013	0.01	
5	AL	2,017	4,741,400	0.658	0.266	0.041	0.013	0.01	
6	AL	2,016	4,730,100	0.66	0.265	0.041	0.012	0.01	
7	AK	2,022	698,600	0.577	0.028	0.073	0.061	0.128	0.
8	AK	2,021	698,700	0.579	0.026	0.067	0.07	0.138	0.
9	AZ	2,022	7,189,700	0.518	0.043	0.325	0.035	0.033	0.

Prediction

Predicted Log Total Crime Rate: 5.79

Predicted Total Crime Count: 623581

Two thin orange lines intersect on the left side of the slide. One line is horizontal, and the other is diagonal, crossing it.

CONCLUSION

- **Youth Living in Poverty, High School Graduation Rate, and Youth Not In School** were the top factors influencing young adult crime rates
- **Invest in programs** that focus on poverty and school participation and graduation
- **Unavailable and/or biased crime data** (reliant on agency participation)
- **Examine additional features** that may impact crime in young adults (e.g. mental health program spending, diversion programming availability, city and county-level demographics)
- **Add time series by state functionality** to Crime Rates Predictor™ app

A series of thin, light brown lines forming an abstract geometric pattern in the top left corner of the slide. The lines intersect to create various triangular and polygonal shapes.

THANK YOU

Questions?