Correlations Between Demographics, Voter ID Laws, and Voter Turnout in the United States

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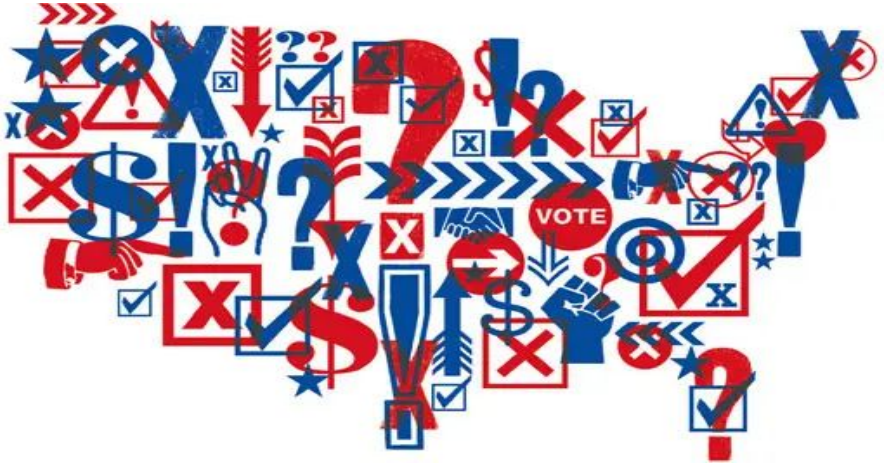
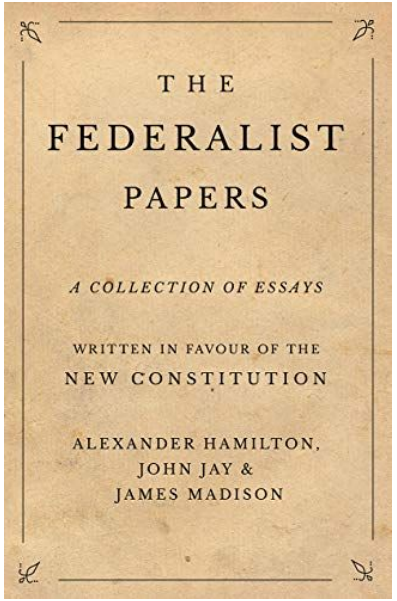
Outline

- Voting in Democracies
  - Voter turnout
  - Demographics
  - Voter ID laws
- Focus of Study
- Data Analysis
  - Clustering at the county level
  - Clustering at the state level
  - Predicting turnout rates
- Conclusions



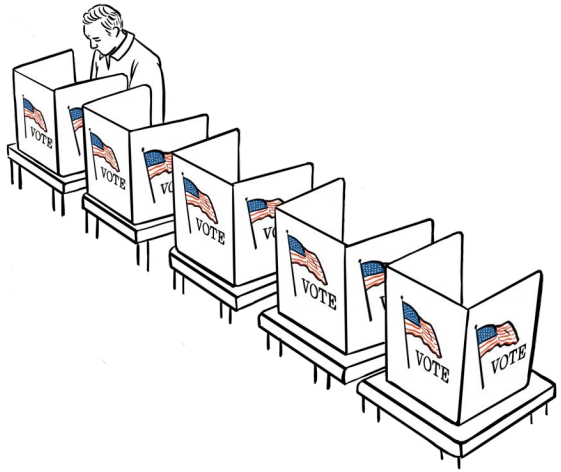
Role of Voting in Democracies

- What does it mean to vote in a democracy?
- Electing representatives in politics
- The Federalist Papers
  - Democracy and Representative Republic for the U.S.
- Declaration of Independence
  - Consent of Governed Men through Voting
- Morris Fiorina
  - Power of Citizens over Their Representatives



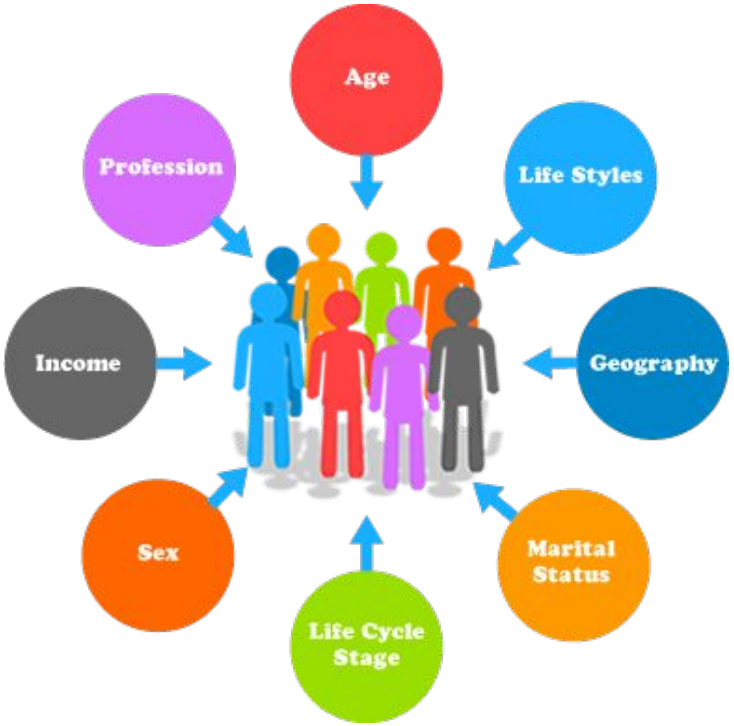
Measuring Participation: Voter Turnout

- What is Voter Turnout?
  - Percentage of the Eligible Voters, who Voted
- Campbell, et al 1981 in the American Voter; Expressing Citizens' Opinion in Politics
- Significant Indicator of a Healthy Democracy
- Factors that Correlate with Voter Turnout
  - Demographics
  - Voter ID Requirements



Role of Demographics

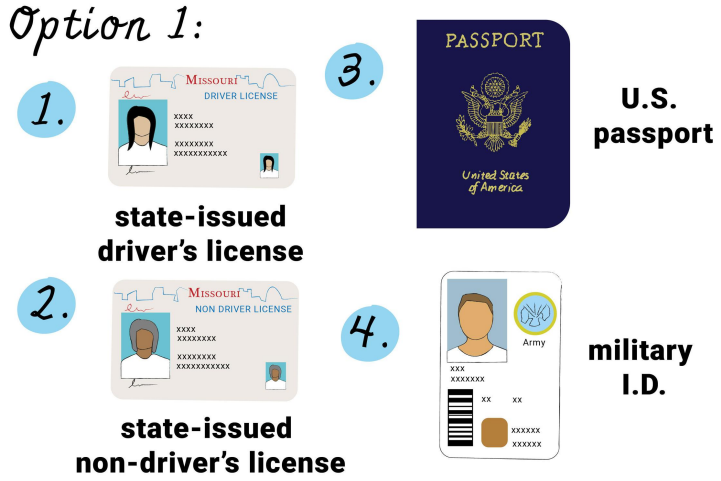
- Demographics plays a significant role in the outcome of elections
- Its ability to influence elections depends on:
  - relative size of the group of people
  - Voter turnout from that group



Demographic trends affecting turnout and voting outcomes

- Older generations' growing voting power
- A shrinking white America

Voter ID Laws



Voter ID Laws in the United States are laws that require a person to provide some form of official identification before they are permitted to register to vote, receive a ballot for an election, or to actually vote in elections in the United States.

Why are they required?

- Voter fraud
- Democracy
- One-vote-per-person system

On the last two days of the campaign, Donald Trump said on Tuesday, "I did six speeches, and then I heard that my opponent — does anybody remember my opponent?" | Getty

Trump tells Wisconsin: Victory was a surprise

By **NOLAN D. MCCASKILL** | 12/13/2016 10:29 PM EST

Donald J. Trump ✓
@realDonaldTrump

The election is absolutely being rigged by the dishonest and distorted media pushing Crooked Hillary - but also at many polling places - SAD

1:01 PM · Oct 16, 2016 · Twitter for Android

Donald J. Trump ✓
@realDonaldTrump

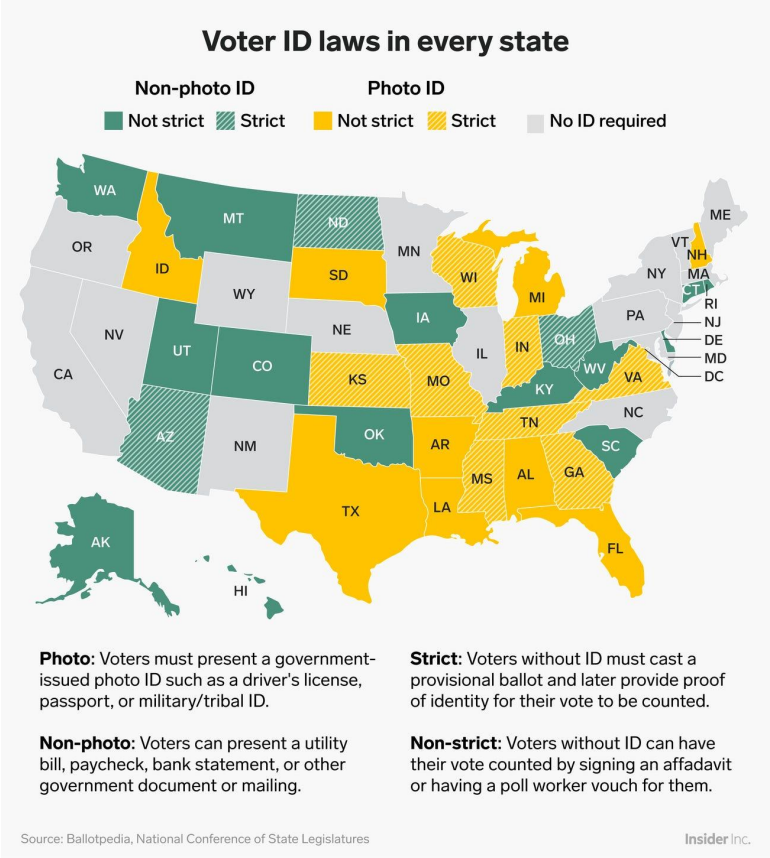
Of course there is large scale voter fraud happening on and before election day. Why do Republican leaders deny what is going on? So naive!

8:33 AM · Oct 17, 2016 · Twitter for Android

Types of Voter ID Requirements

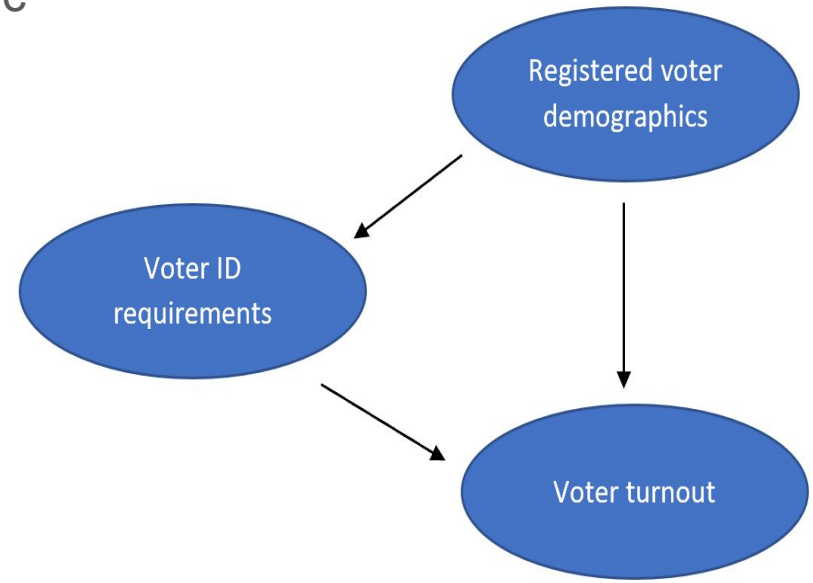
Photo ID required (strict)
Photo ID required (non-strict)
Non-photo ID required(strict)
Non-photo ID requested (non-strict)
No ID required to vote at ballot box

Source: NCSL (National Conference of State Legislatures)

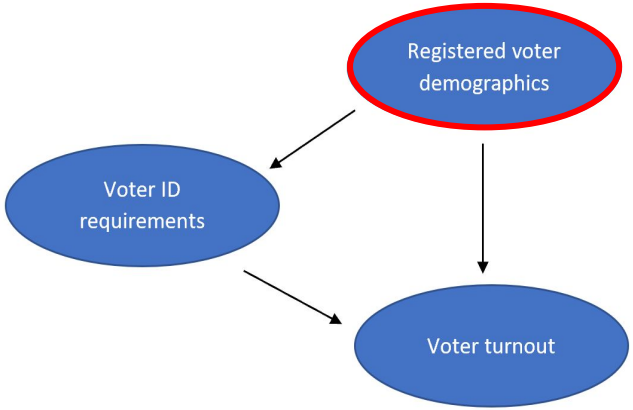


Focus of Study

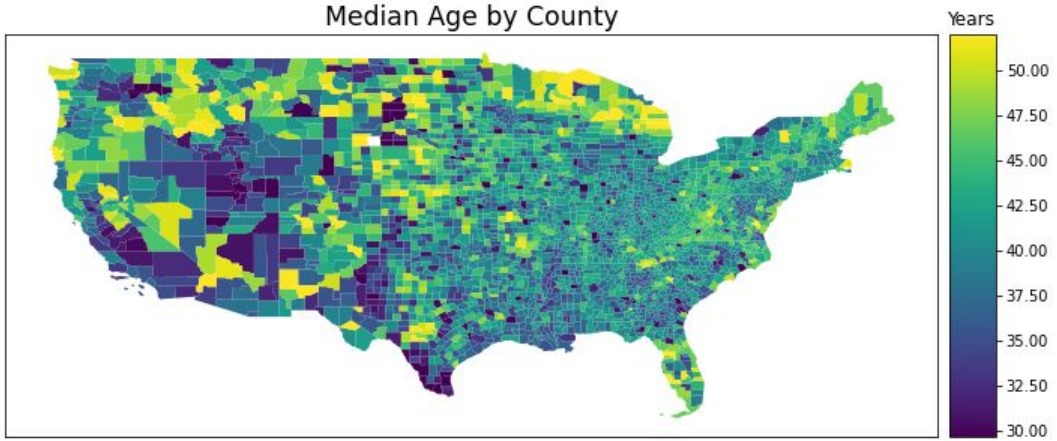
- How do demographics and socioeconomic characteristics relate to state Voter ID laws?
- How do demographics relate to voter turnout?
- How do Voter ID laws affect turnout?
- The 2016 Presidential Election



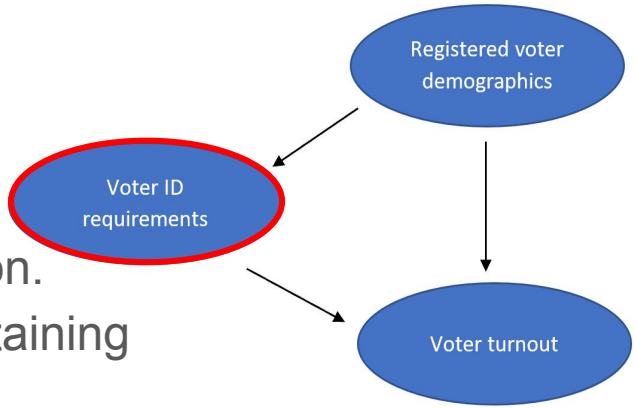
Data Sources - Demographics



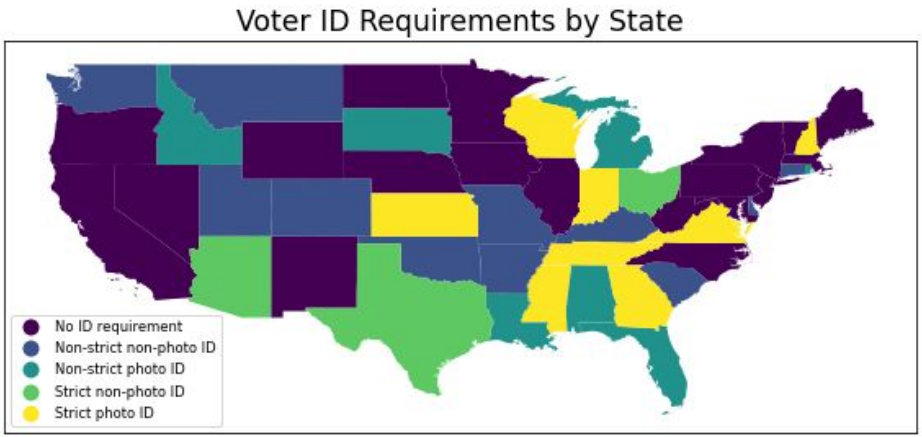
- Compiled by the American Community Survey, organized by https://datafordemocracy.org/
- County level demographic data
  - Median Household Income
  - Unemployment
  - Education Level
  - Age
  - Ethnicity

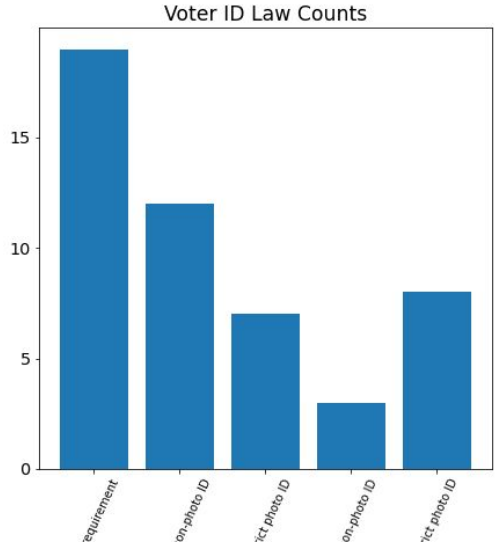


Data Sources - Voter ID Laws



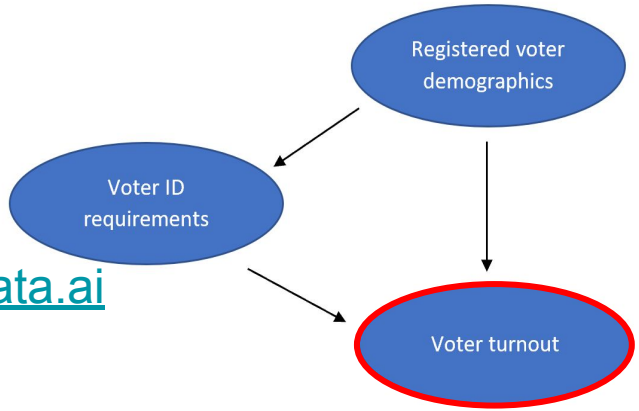
- State voter ID laws are publicly available information.
- Data for Democracy has an organized dataset containing this information.



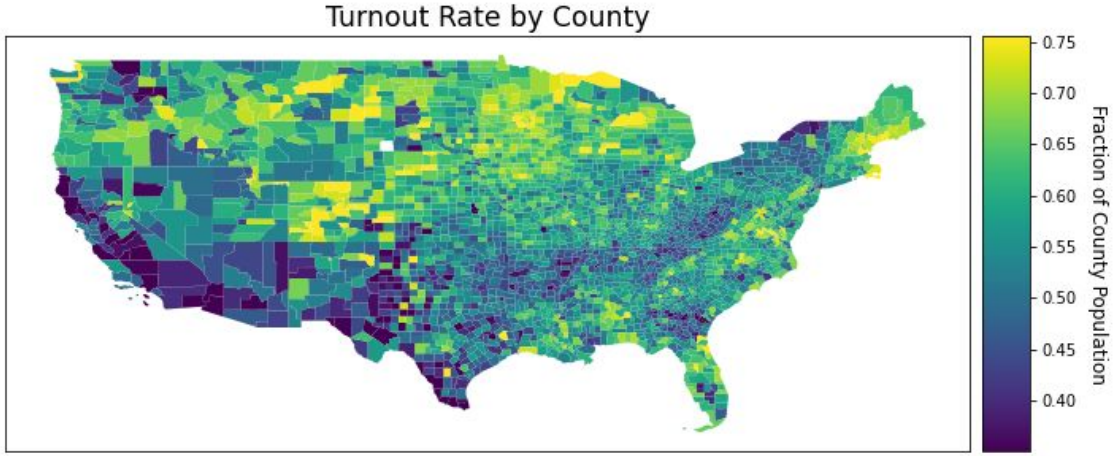


- More states have relaxed laws than strict ones.

Data Sources - Election Results



- Compiled by the TownHall.com, organized by emdata.ai
- County level election results can be combined with population data to determine voter turnout.
    - Assume that demographic data and election data are compatible



Data Analysis

Clustering by Demographics at the County level

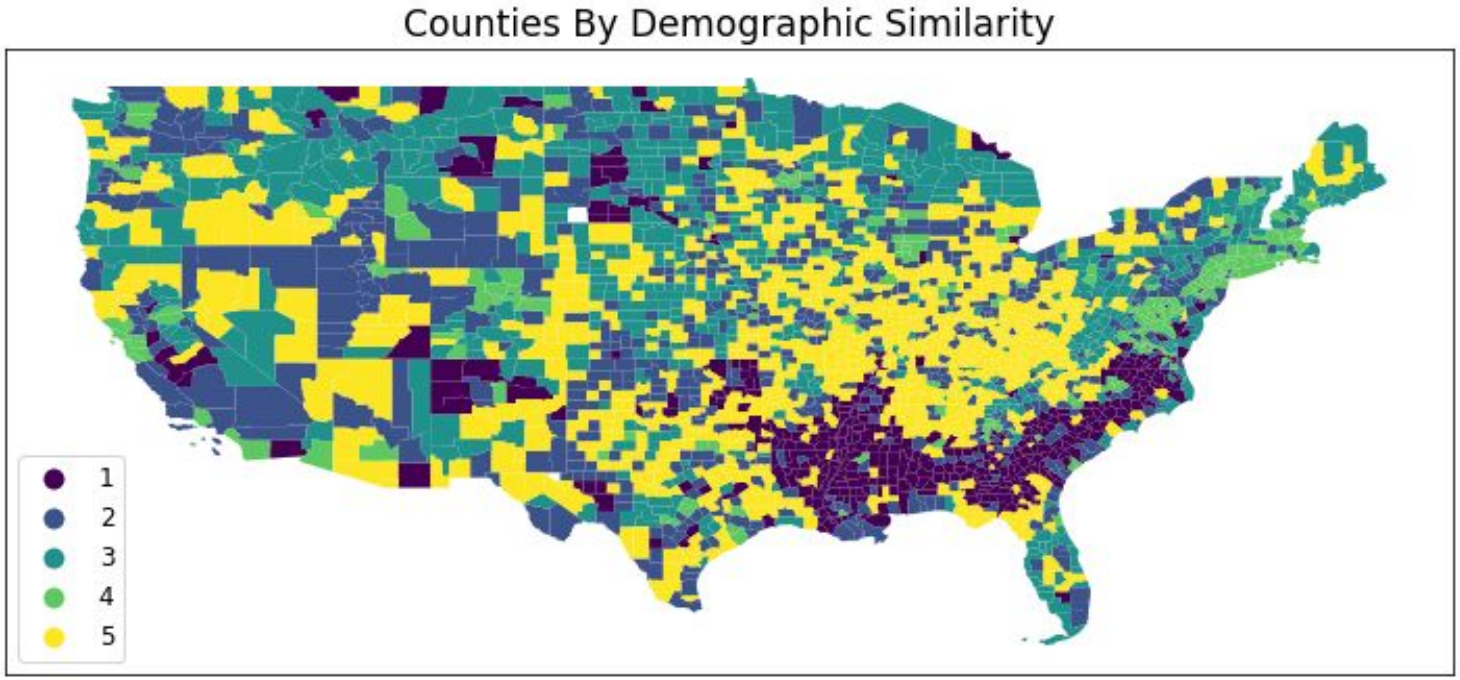
Question

Were counties more likely to have turnout rates related to their demographic makeup or their voter ID restrictions?

Method

Create two separate clusterings (K-Means & ID law) and examine how they relate to each other as well as to voter turnout.

Clustering by Demographics at the County Level



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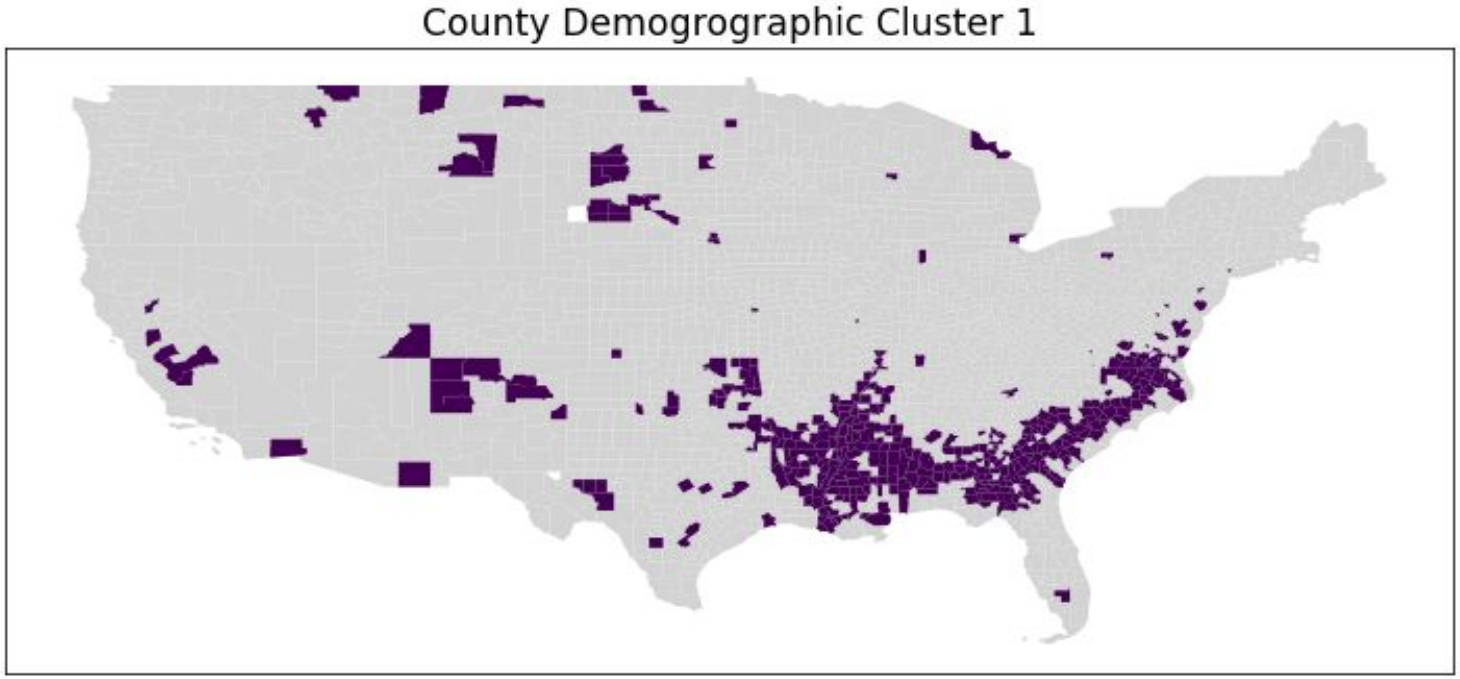

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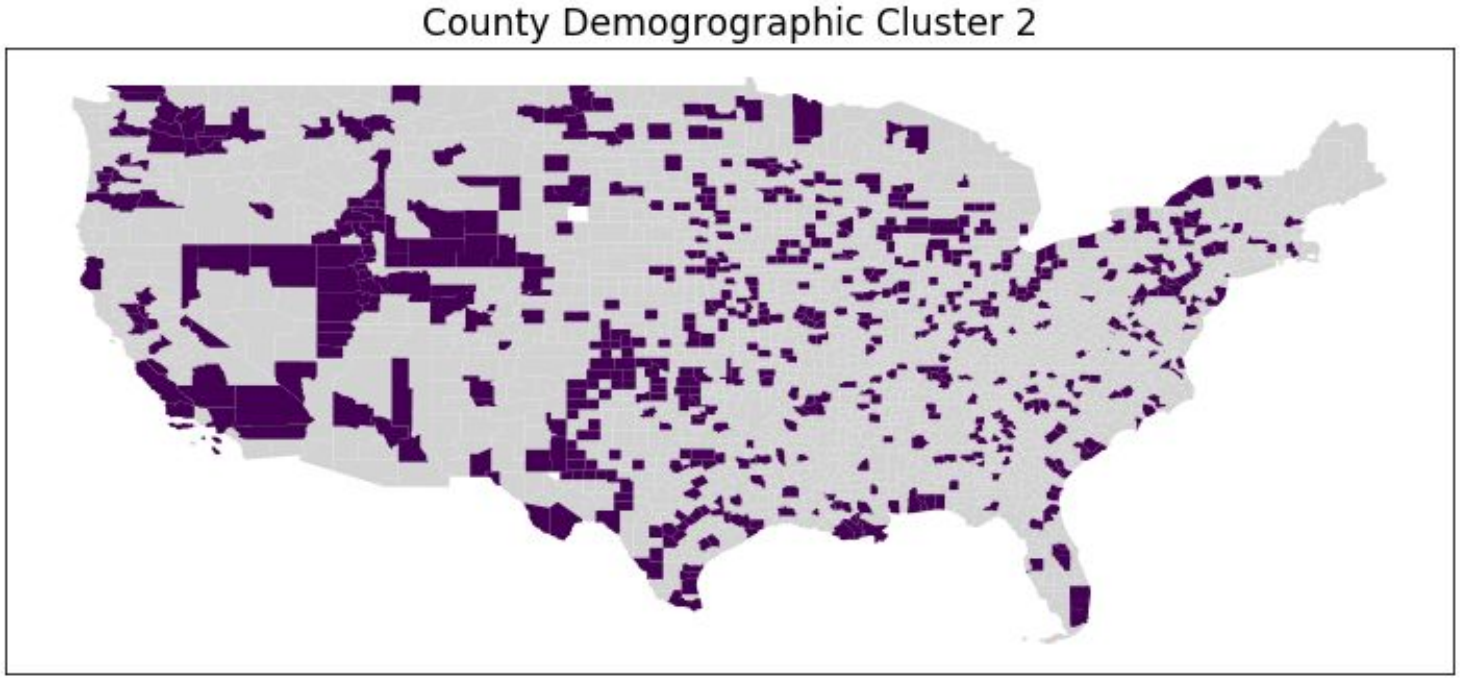

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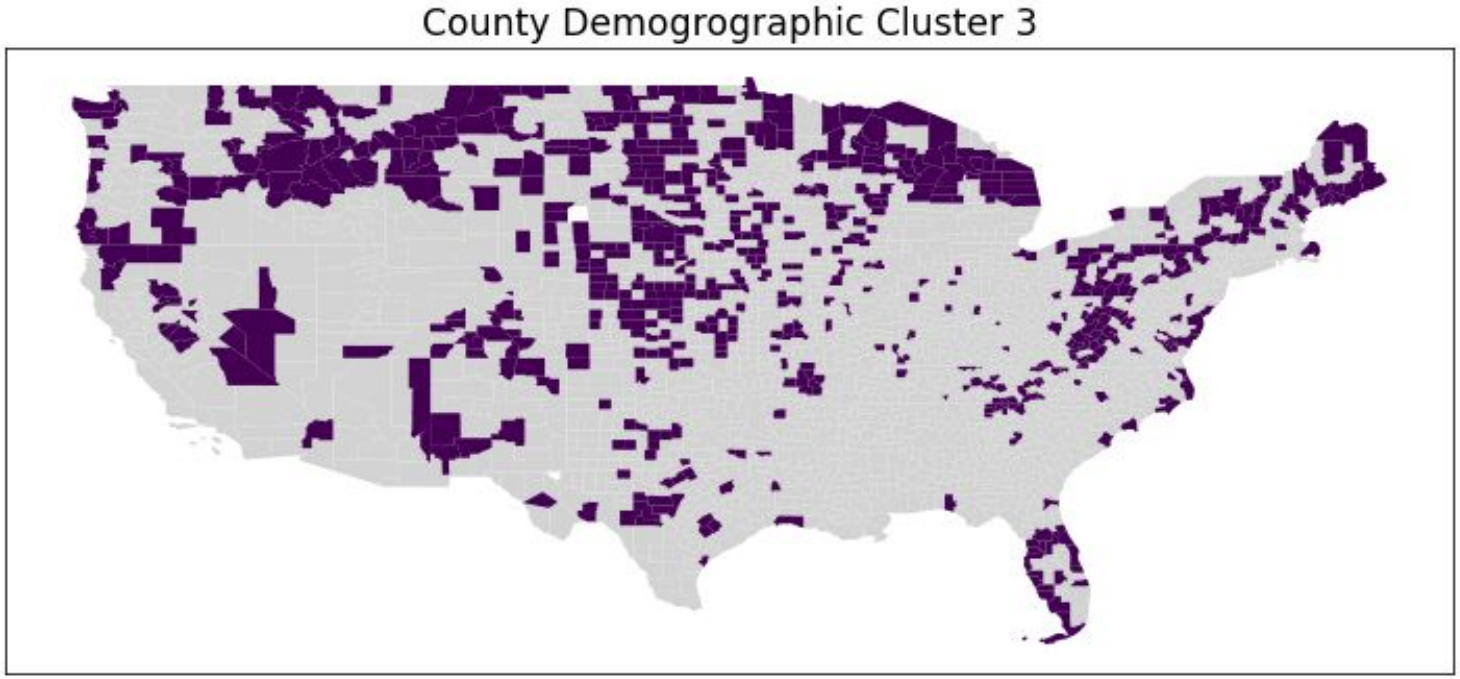

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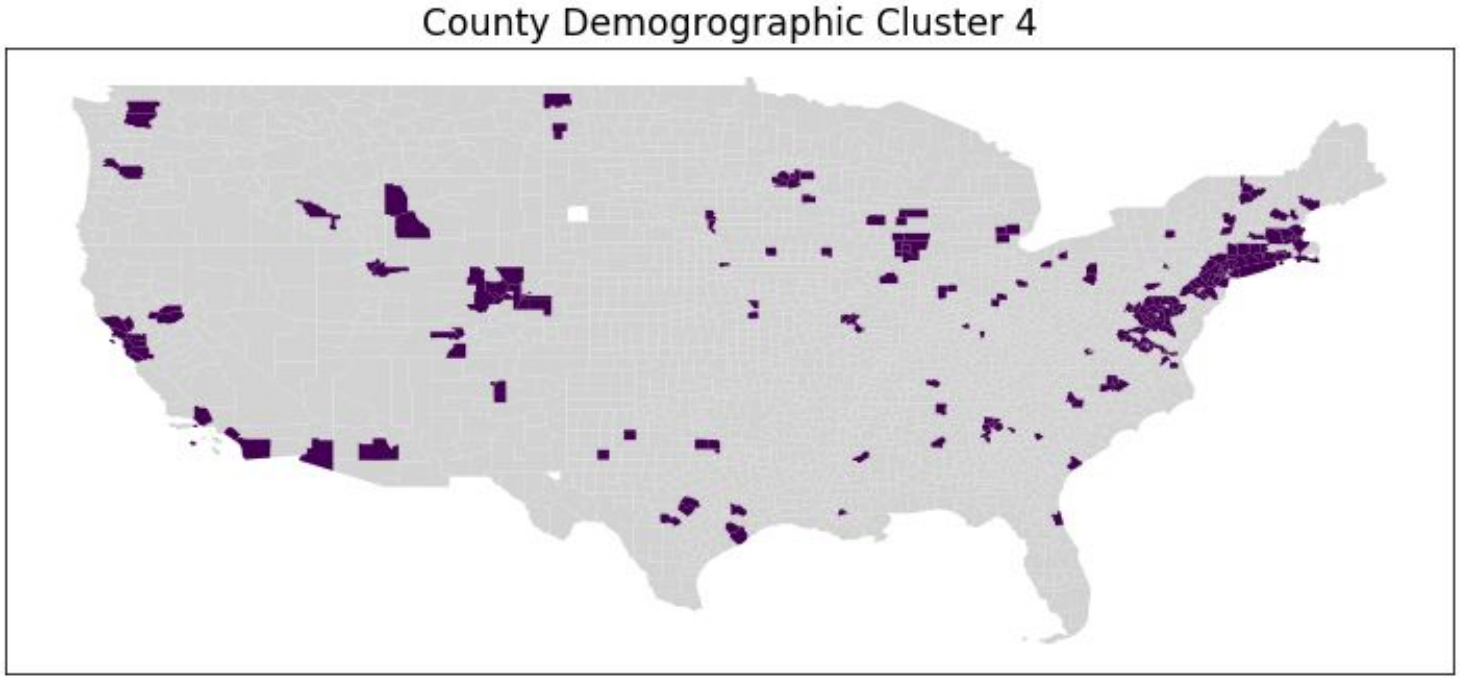

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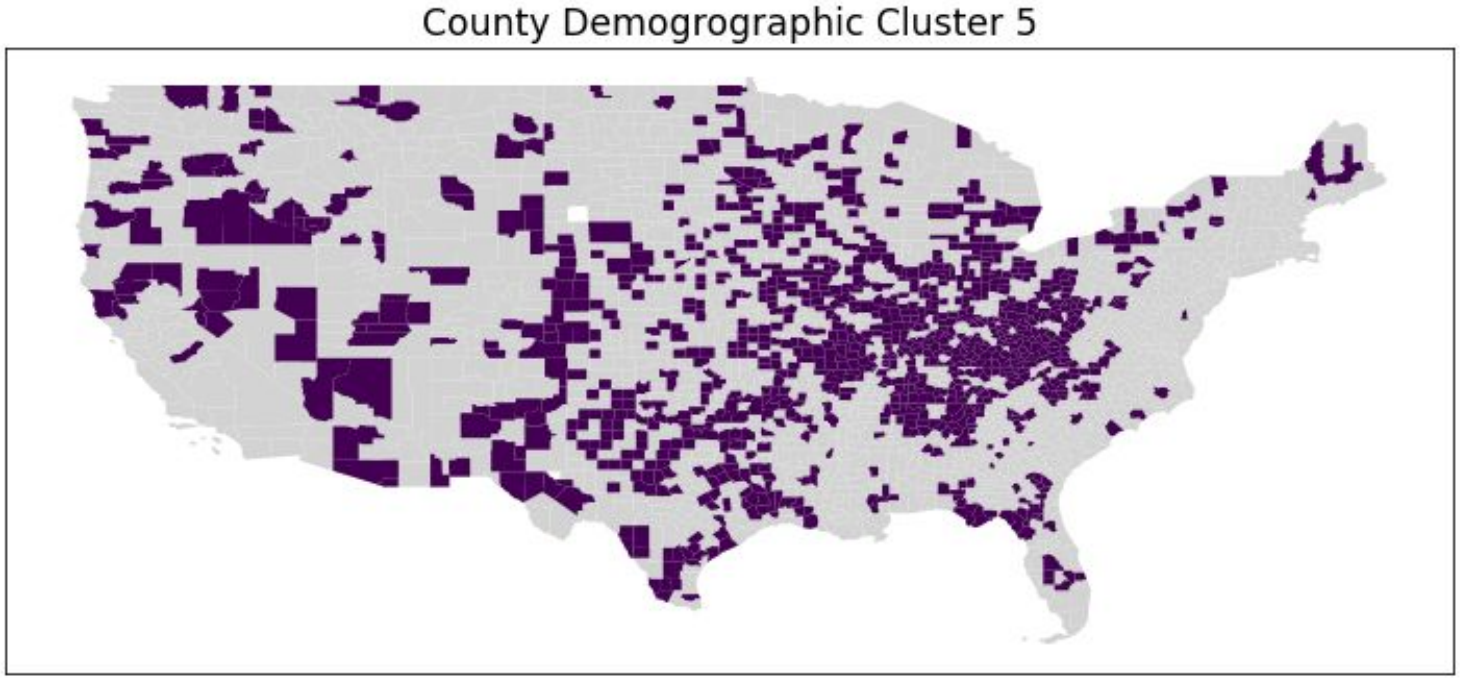

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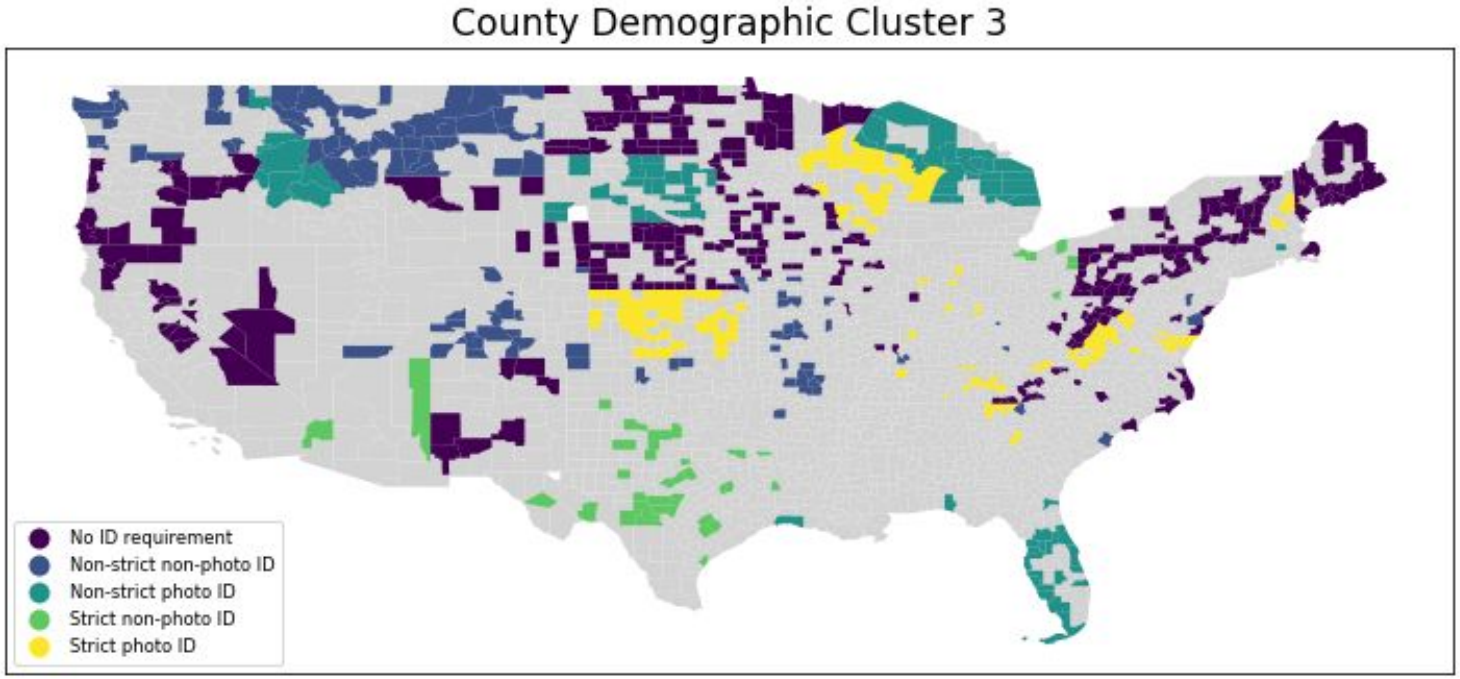
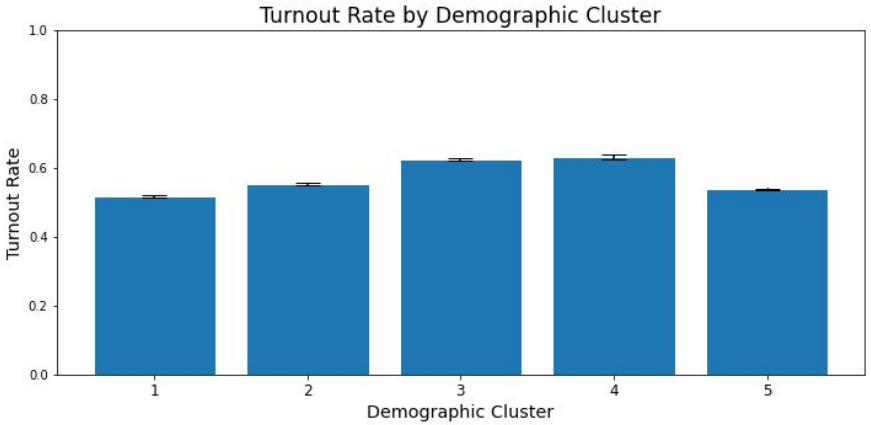


Compare Clusters

- All demographic clusters contained a county from each Voter ID category
  - Likely due to Voter ID laws being a statewide feature, while demographics are not homogenous across entire states
- The two clusterings were not very similar
  - Fowlkes-Mallows score of 0.244 (scale from 0 to 1)
- Counties were better partitioned by their demographic makeup than by their Voter ID category
  - Inertia (on the turnout rate) was 15% lower for the demographic clusters

Compare Clusters

- Demographic clusters had different voter turnout rates with a 95% confidence level



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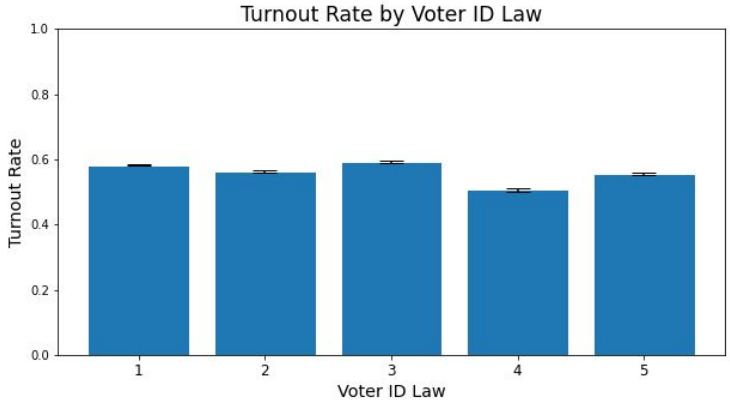


Clustering by Demographics at the State Level

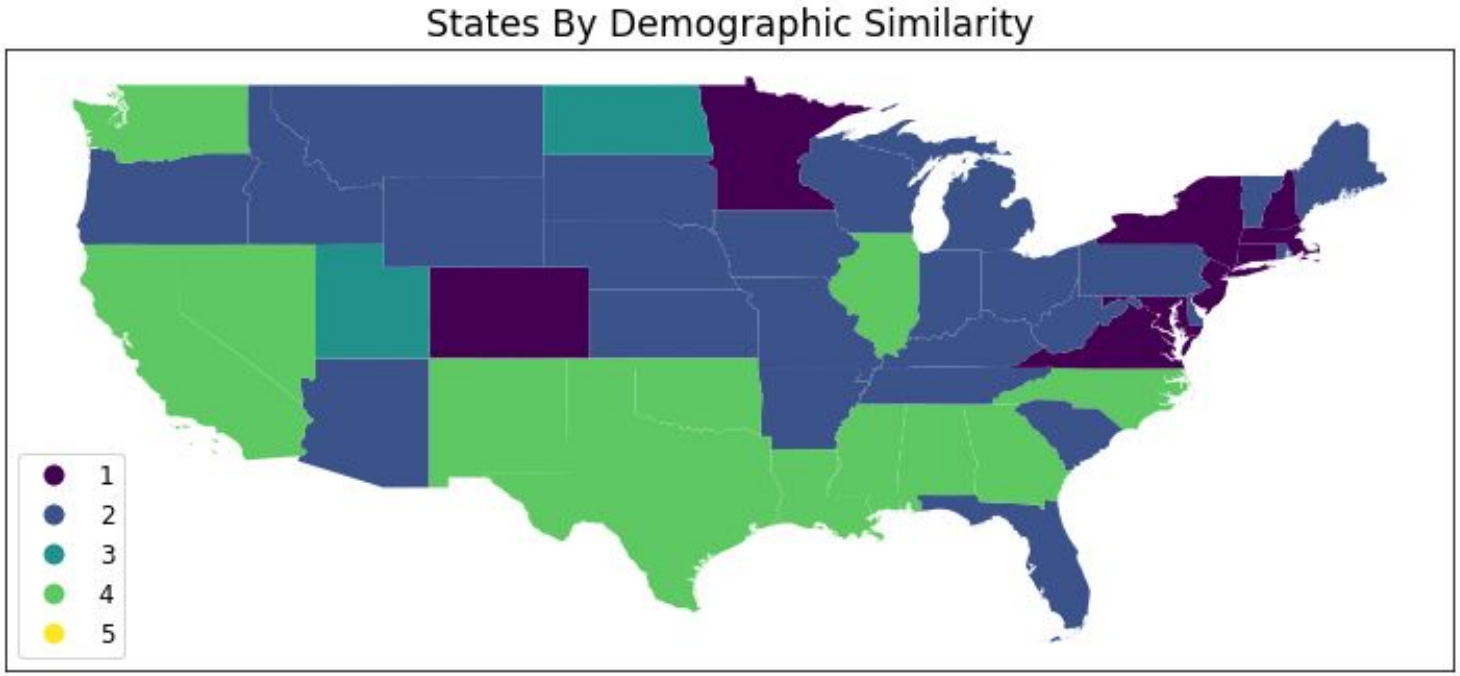
Question

Do the five Voter ID requirement categories line up with five different demographic compositions? How do the ID laws affect voter turnout at the state level?

Method

Create 5 clusters (using K Means on the demographic data) and examine how they align with Voter ID laws and turnout rates.

Clustering by Demographics at the State Level



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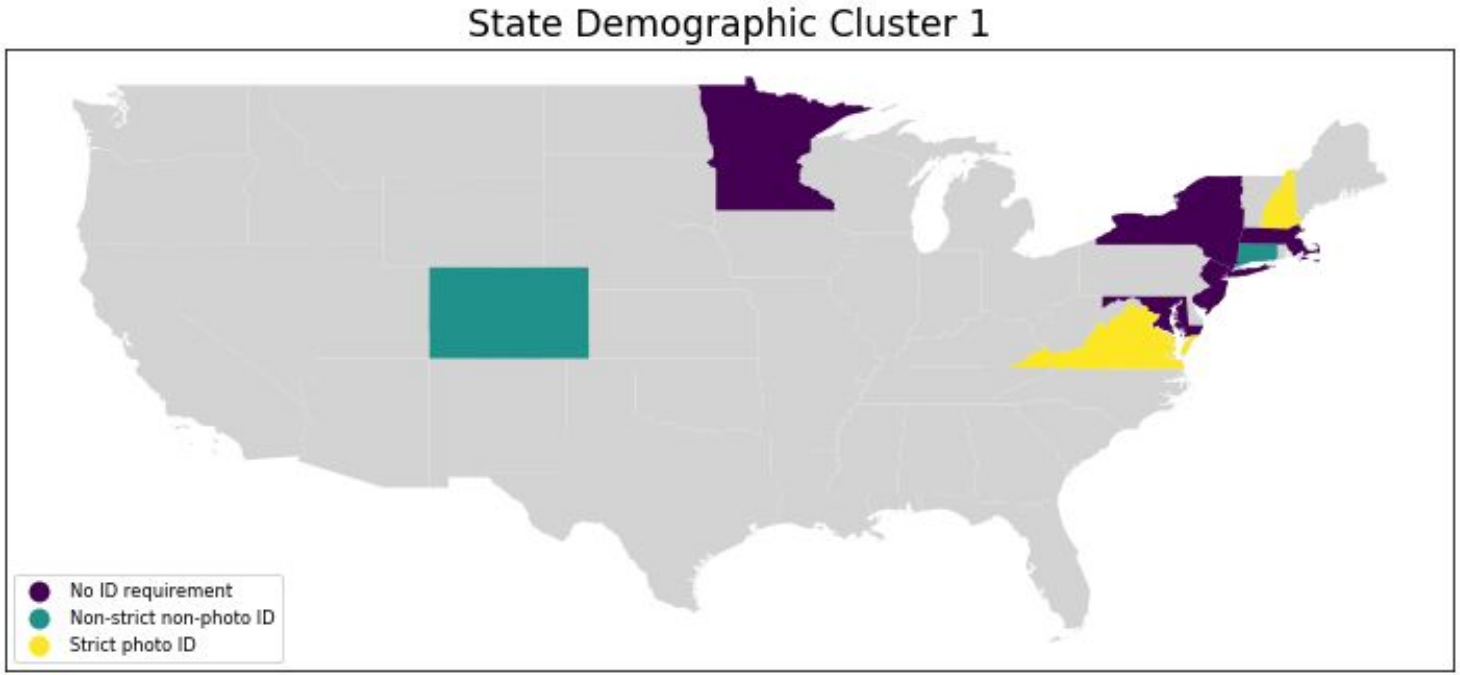

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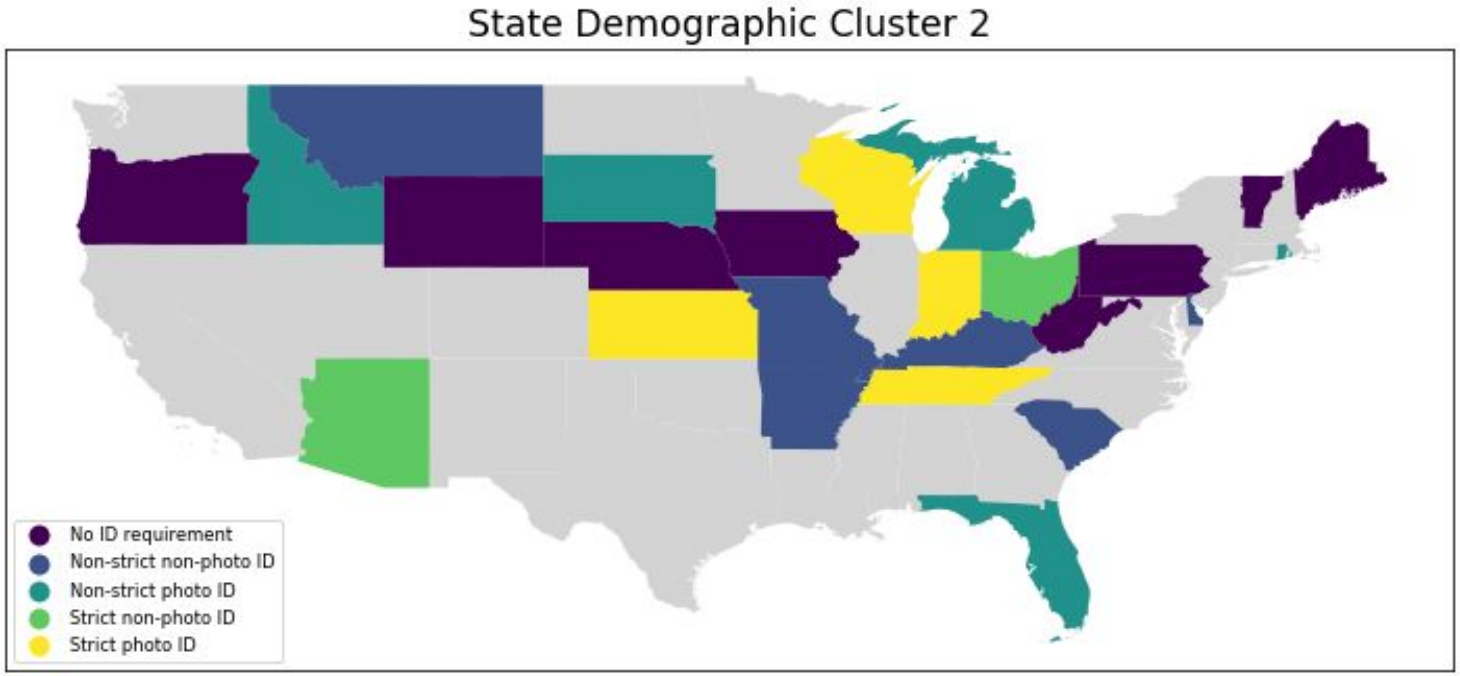

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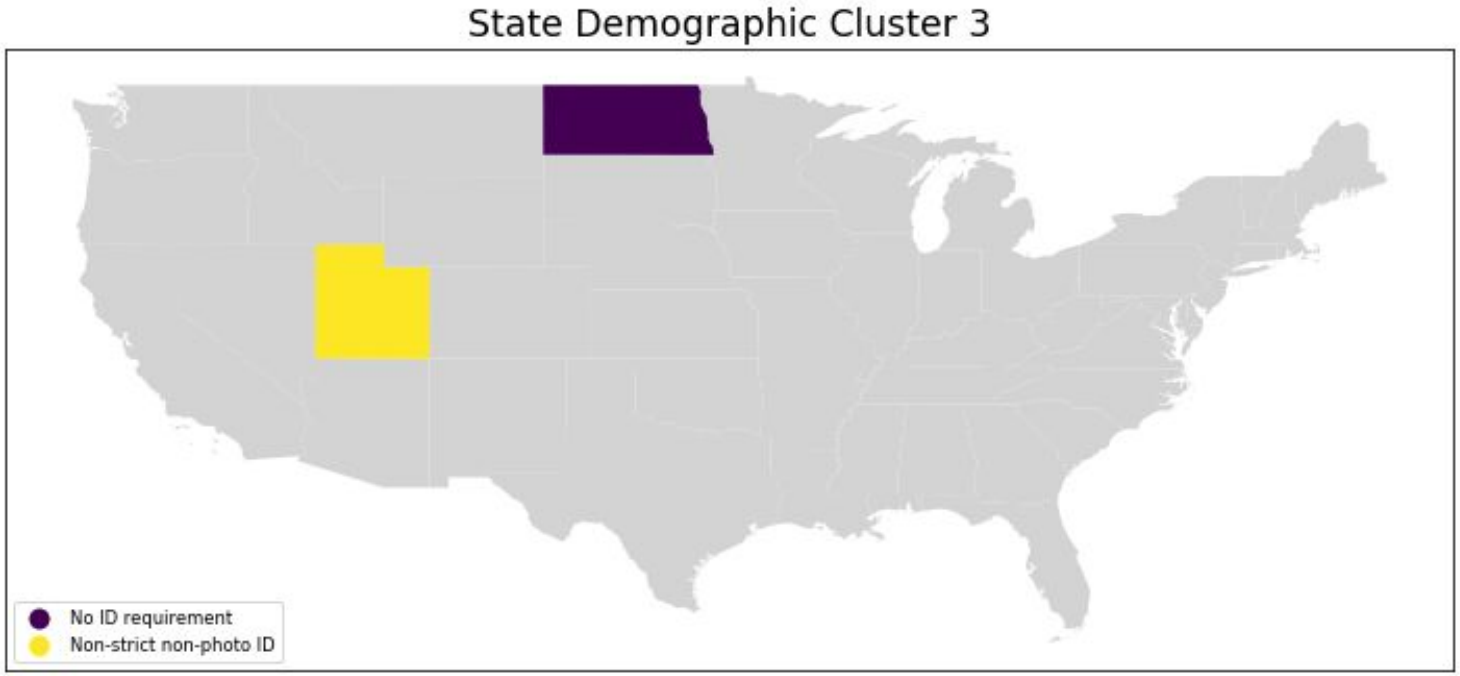

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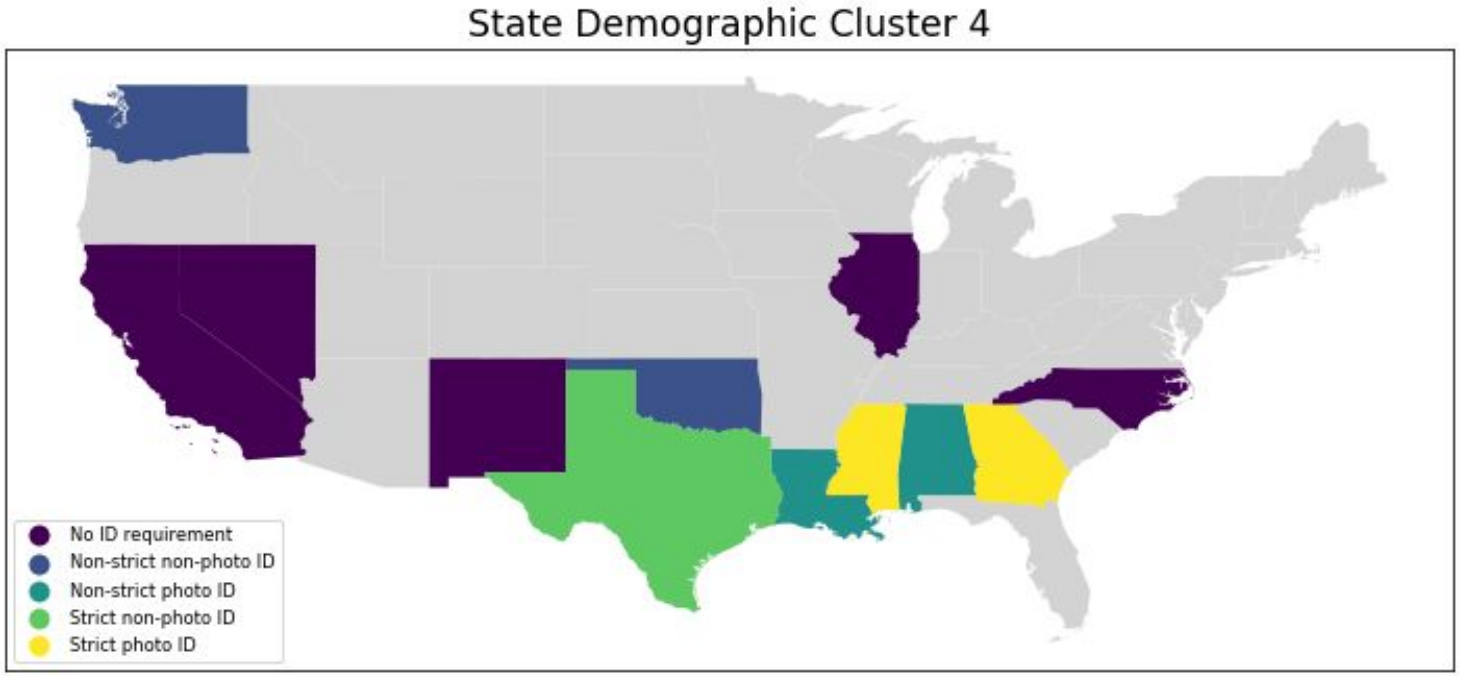
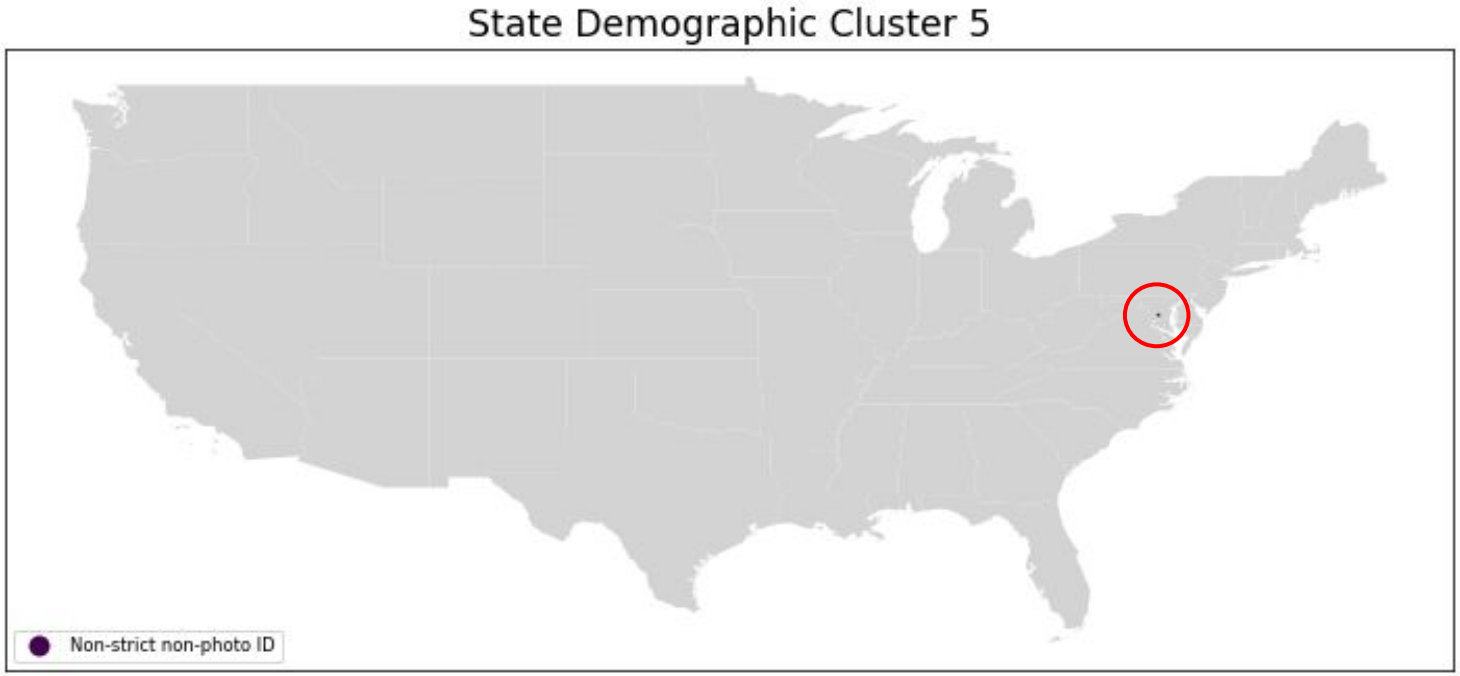


Clustering by Demographics at the State Level

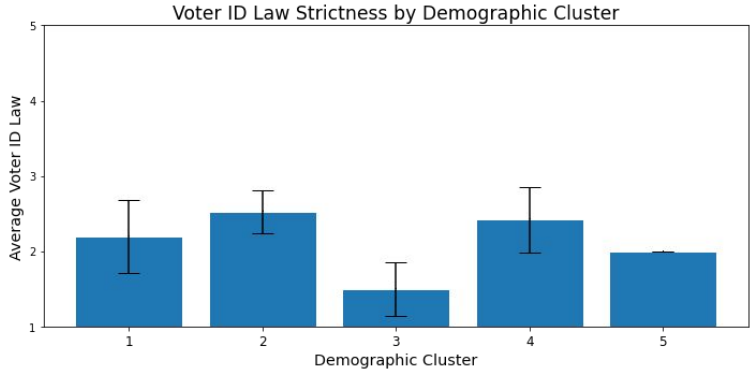


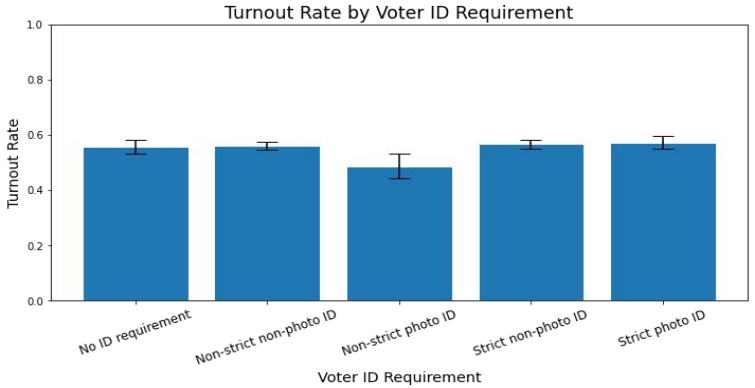
Compare Clusters

- These clusters were mostly similar to the county clusters found before
  - All clusters had states from multiple Voter ID categories (excluding cluster 5)
- The two clusterings were not very similar
  - Fowlkes-Mallows score of 0.243 (scale from 0 to 1)
- States were better partitioned by their demographic makeup than by their Voter ID category
  - Inertia (on the turnout rate) was 3% lower for the demographic clusters

Compare Clusters

- Demographic clusters did not have significantly different Voter ID laws.
- Voter ID clusters did not have significantly different turnout rates





Predicting Turnout Rate at the County Level

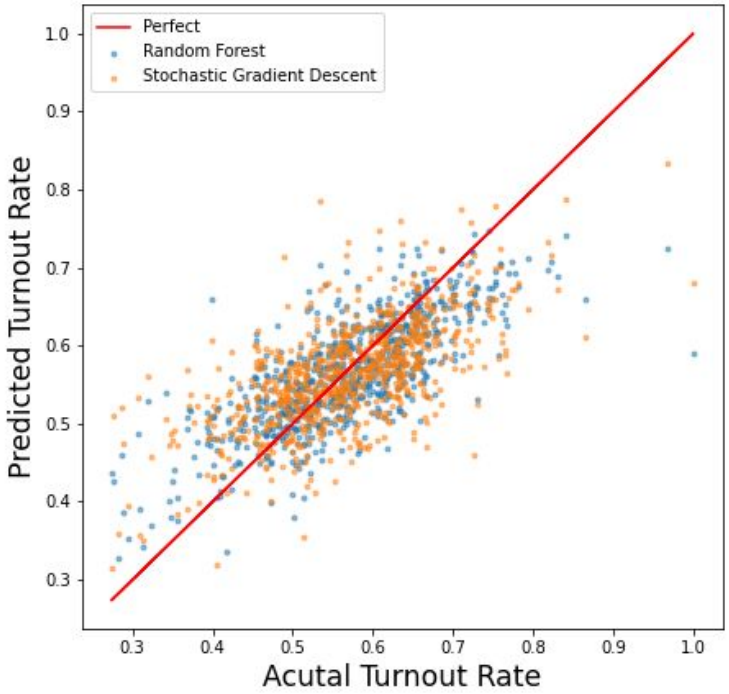
Question

Can we predict county-level turnout rates using demographic and Voter ID law data? How much do Voter ID laws influence turnout?

Method

Create two models (Random Forest and Stochastic Gradient Descent) to predict turnout rates. Measure their performance using mean absolute error. Examine the feature importances of each model.

Predicting Turnout Rate: Model Performance

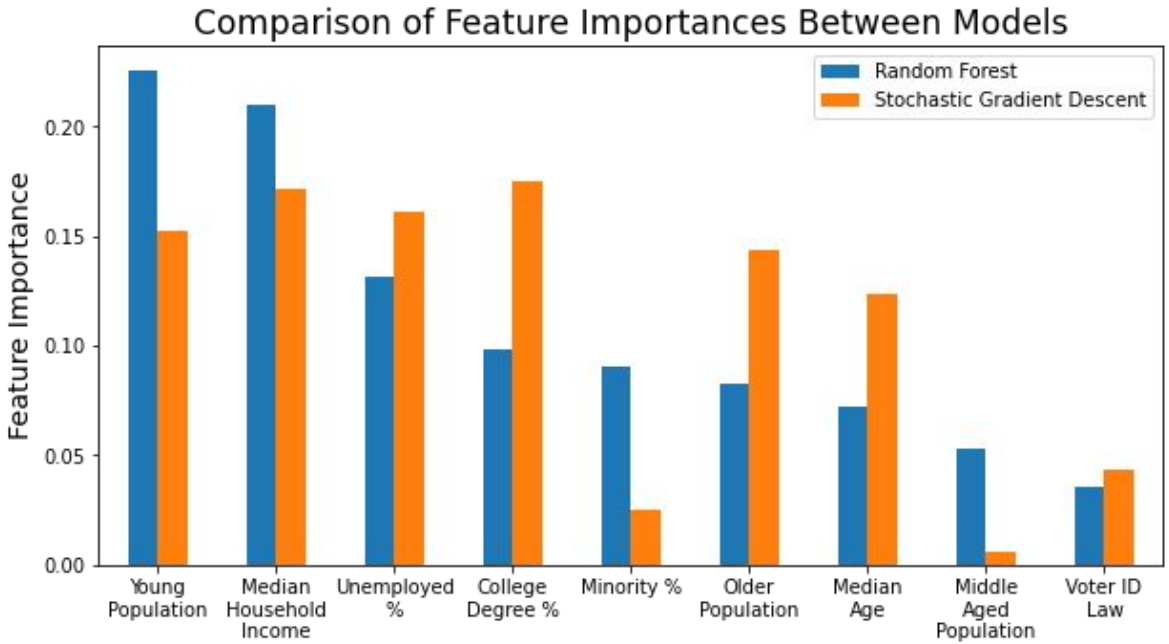


- The Random Forest model was found to be a better predictor of county turnout rates.
- However, both models were able to predict within a decently small margin

	Mean Absolute Error	
	Training Set	Test Set
Random Forest	2.10%	4.88%
SGD	5.63%	5.73%

Predicting Turnout Rate: Model Comparison

- The random forest model heavily weighted the Young population and Median Household Income.
- The SGD model was more evenly spread, considering most of the features equally.
- Neither model placed a significant importance on the Voter ID Law.



Conclusions

- How do demographics relate to turnout?
  - Minority % −
  - Education level +
  - Median household income +
  - Median Age −

- How do Voter ID laws affect turnout?
  - Stricter laws ≠ lower turnout
  - Less important than demographic features

Correlations Between Demographics, Voter ID Laws, and Voter Turnout in the United States

Thank you!