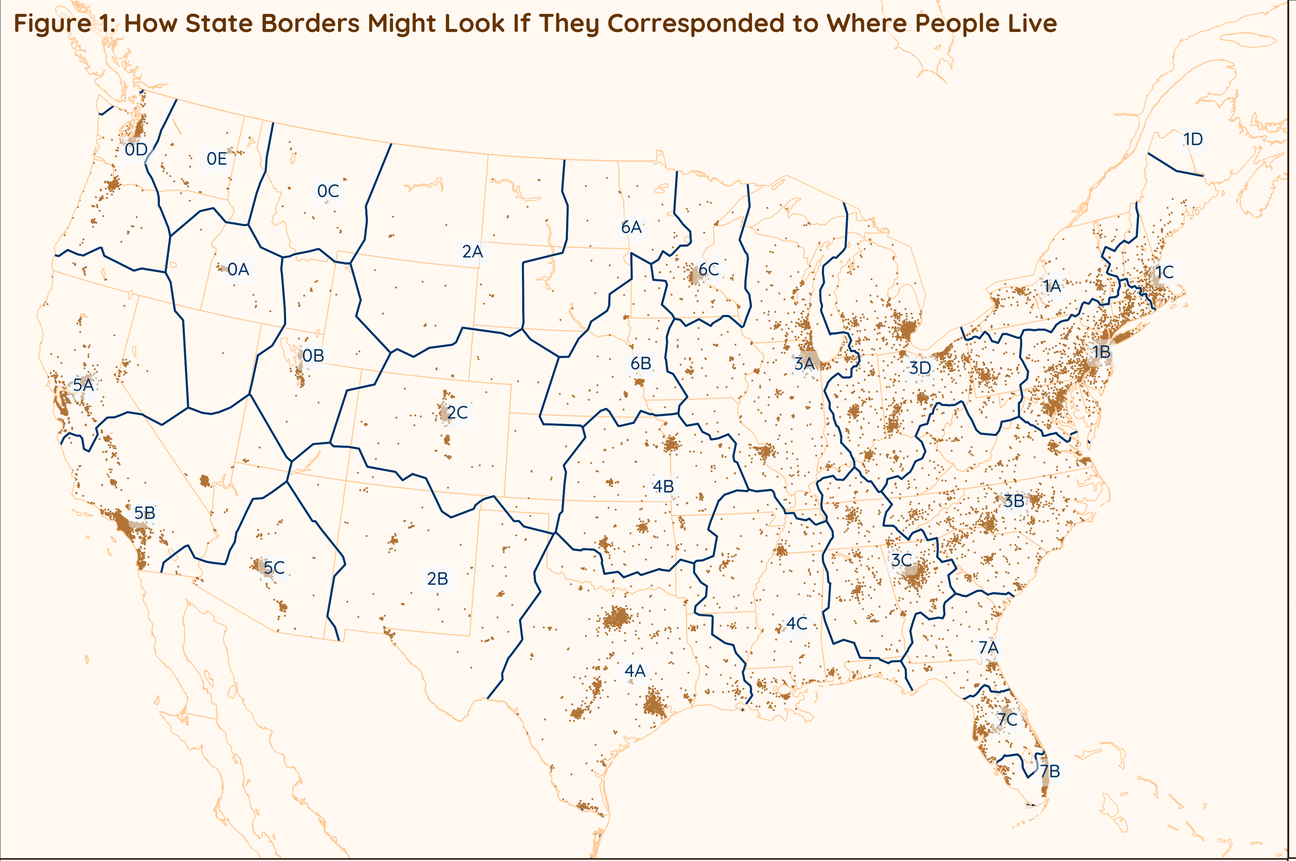
Figure 1: How State Borders Might Look If They Corresponded to Where People Live



Redrawing State Borders to Match Where People Live

States are the preeminent geopolitical units of the United States. Americans live under different public institutions and laws in each state. However, state boundaries are counterintuitive, given their importance. For example, in Kansas City, the Missouri-Kansas boundary cuts the metropolitan area in half. In Texas, El Paso is 285 miles from the nearest metro area in Texas (Odessa) but only 45 miles from the closest one in New Mexico (Las Cruces).

What if the state boundaries of the United States matched where Americans live? This project applies machine learning to reimagine the borders of the contiguous United States. The algorithm groups people who live near each other, placing the new state borders in unpopulated expanses of land between groups. The algorithm suggests grouping the contiguous US population into 28 new states. Figure 1 draws boundaries (blue lines) around population centers (brown dots) to illustrate how the new state borders correspond to where people live.

How would the new states differ in typical quality of life and politics? Figures 2a, 3a, and 4a present the Human Development Index (HDI), total population, and the percentage that voted for the 2020 Republican presidential candidate for each new state. HDI is a quality of life score that considers high income per capita, long average lifespan, and high average years of education to be signs of high quality of life. Presidential vote is an indicator of general political inclinations. The new states are ordered the same way in all three bar charts to facilitate side-by-side comparisons. Figures 2b, 3b, and 4b present these statistics as maps.

METHOD: The project applies two-stage agglomerative clustering to formulate new state borders. Agglomerative clustering is a machine learning technique that groups points (places) into clusters. The algorithm initially groups neighboring places and then iteratively adds more sites to each set, starting with places that are very close to all the places already in the cluster. It also merges nearby clusters until the number of clusters is less than a given threshold. The project does this once to split the country into regions, and then again to split each region into new states.

Fig. 2a: New State HDI Scores

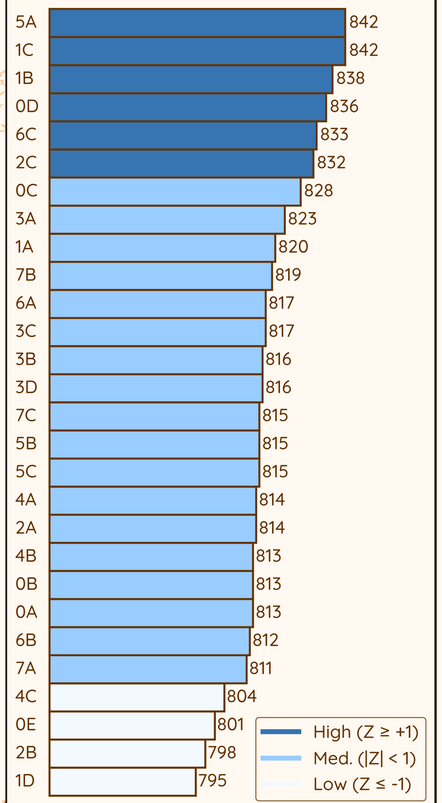


Fig. 3a: New State Population

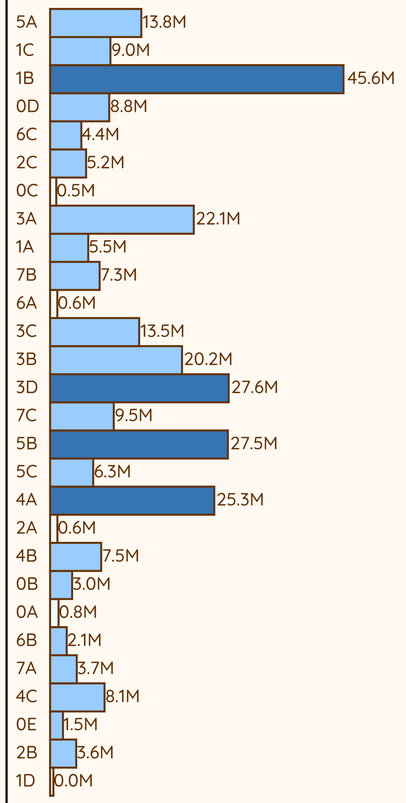


Fig. 4a: N.S. Percent Republican

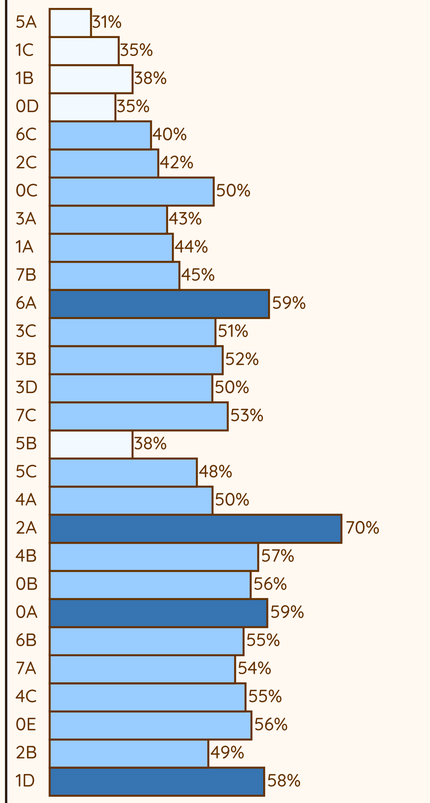


Fig. 2b: HDI Quantile Map

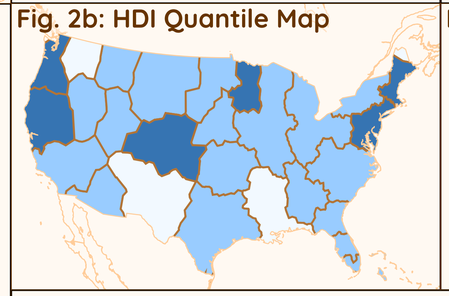


Fig. 3b: Population Quantile Map

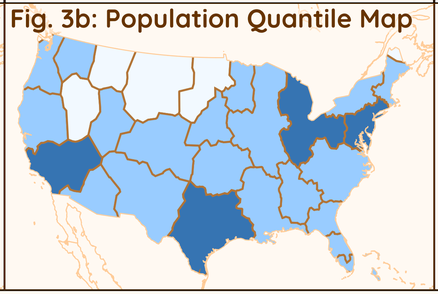


Fig. 4b: Republican Quantile Map

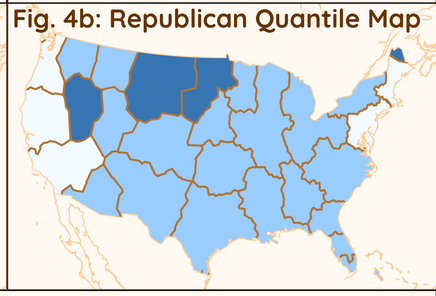


FIGURE 1: Many cities are on current state borders because those borders follow rivers, and cities need abundant fresh water. The algorithm keeps these cities whole, leading to divergent new borders. It recommends 28 new states to replace the 48 contiguous states, so current borders may overly fragment the country.

FIGURE 2: The median new state HDI score is 815, and all new state HDI scores would be considered ‘high’ (>700) or ‘very high’ (>800) by global standards. The new states containing Seattle WA, San Francisco CA, Denver CO, Minneapolis MN, and the urban corridor from Boston MA to Washington DC (“Bos-Wash”) have relatively high scores.

FIGURE 3: The median new state population is 6.8 million, but population size varies widely. The top 5 new states have a combined total population of 148.1 million, outnumbering the other 23 states.

FIGURE 4: In the median new state, 50 percent of voters chose the 2020 Republican candidate. Of the 28 new states, 8 would lean towards republicans, and 10 would lean towards democrats. HDI negatively corresponds with republican lean. The median HDI among republican-leaning new states is 813, compared to 832 among democrat-leaning new states.