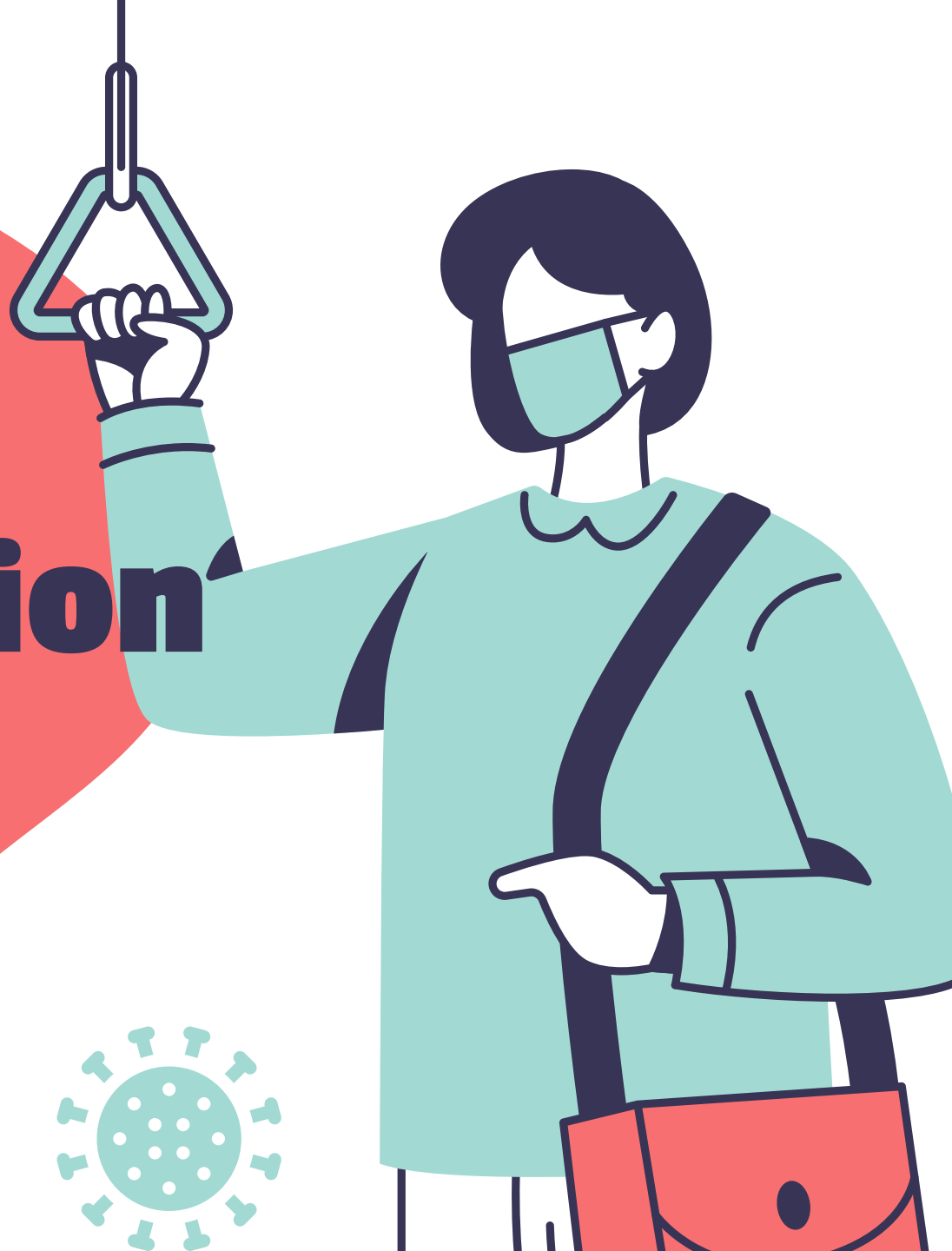
COVID-19 and 2020 Election

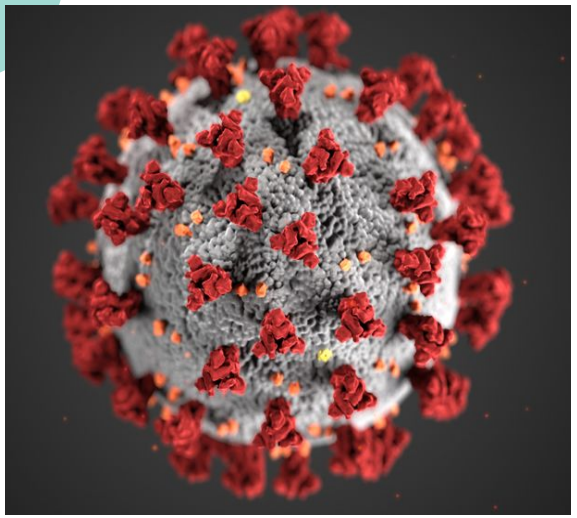


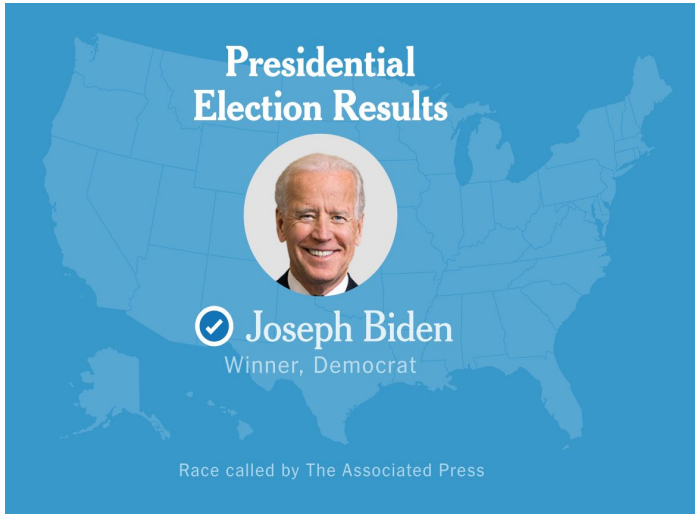
42 Elephants Ate Pie
Lindsey Ulmer
Chiaoya Chang
Yanyan Guan

01

Background

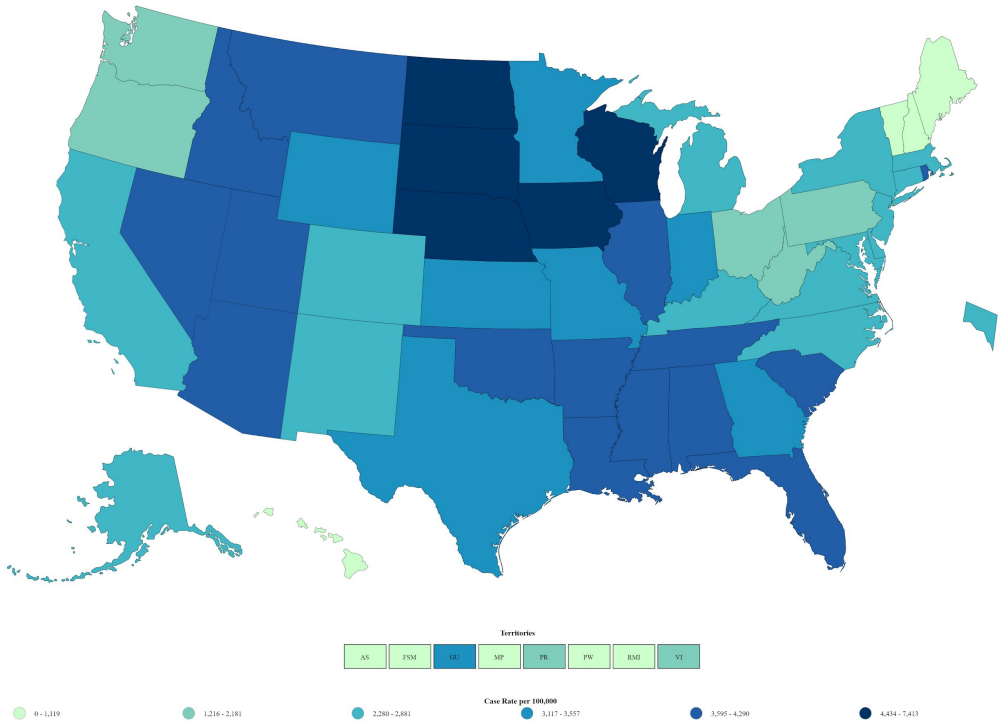
Covid Case Count, Voting Method, and Election Results

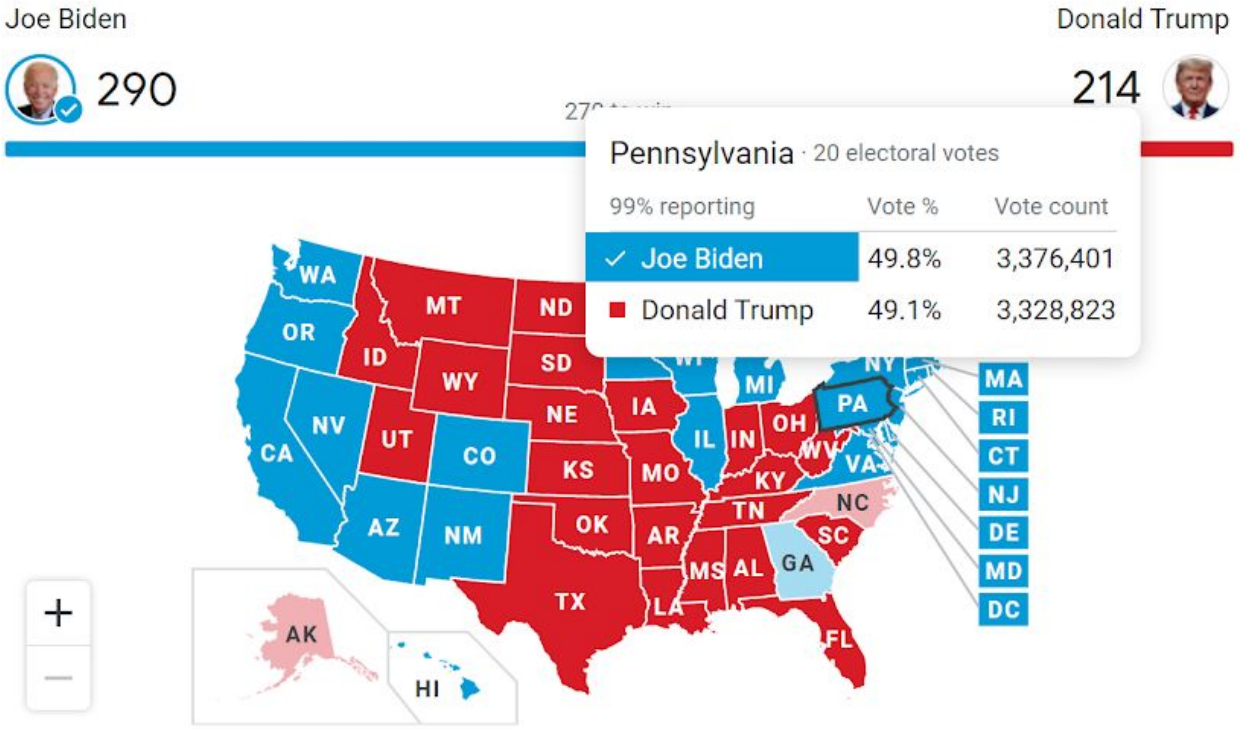




Goal

Visualize COVID and Voting Data in one plot to help the public compare





02

Data Used

Data Used

Dataset	Source	Format
COVID-19 Cases	CDC	Download as CSV
2020 Election results	nbcnews.com	copied into csv
2020 Mail in voting data	The guardian	Copied into a csv
Poll data on covid as a voting issue	Commonwealth Fund	Downloaded as CSV
2016 Election results	FEC	Download as CSV
2016 Vote by mail data	Healthy elections.org	Download as excel sheet

03

Software Design

User Profile

US citizen

- Concerned about the COVID trends and election results
- Familiar with basic Python and Pandas
- Does not have experience to make plots

News Reporter

- Help people get the objective information
- Provide the analysis reports to people
- Have data from previous elections

Anyone

- Interested in the COVID-19 and US voting data
- No experience needed
- Like to view visualized results

Use Case

1

Add data to our base data

Users can provide their own state-level data to join our base data.

2

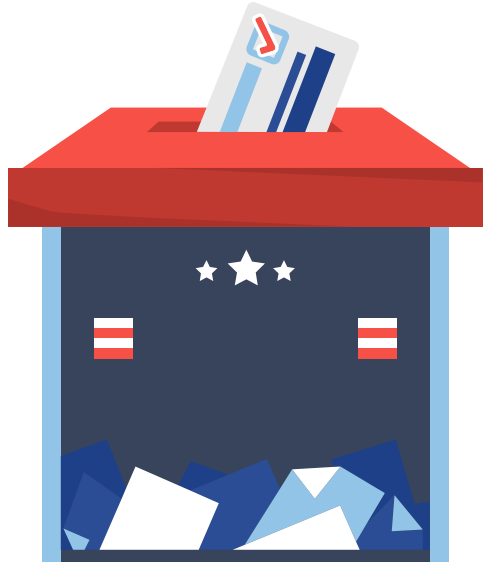
Create interactive figures for all states

The figures would show the information for all states.

3

Create figures for the swing states

The figures would show the information for only swing states.



Component Specification 1

1

add_data

If users want to visualize additional data in our dashboards, they could merge their data with our base data.

Input dataframe

Output dataframe

2

make_plot_2020_and_2016

Users could follow the instructions to provide the attributes they would like to explore for all states, and the generate the interactive state-level maps.

Input dataframe

Output Plots

3

make_plot_map

Users can make a map to show the different years' election results in the swing states.

Input dataframe

Output Plots

Component Specification 2

3-2

make_plot_scatter

Users can make a scatter plot to show the relationship among COVID-19 positive cases, deaths and election results in the swing states.

Input dataframe

Output Plots

3-3

make_plot_bar

Users can make a bar chart to compare the percentage of turnout by mail in 2016 and 2020 election.

Input dataframe

Output Plots

3-4

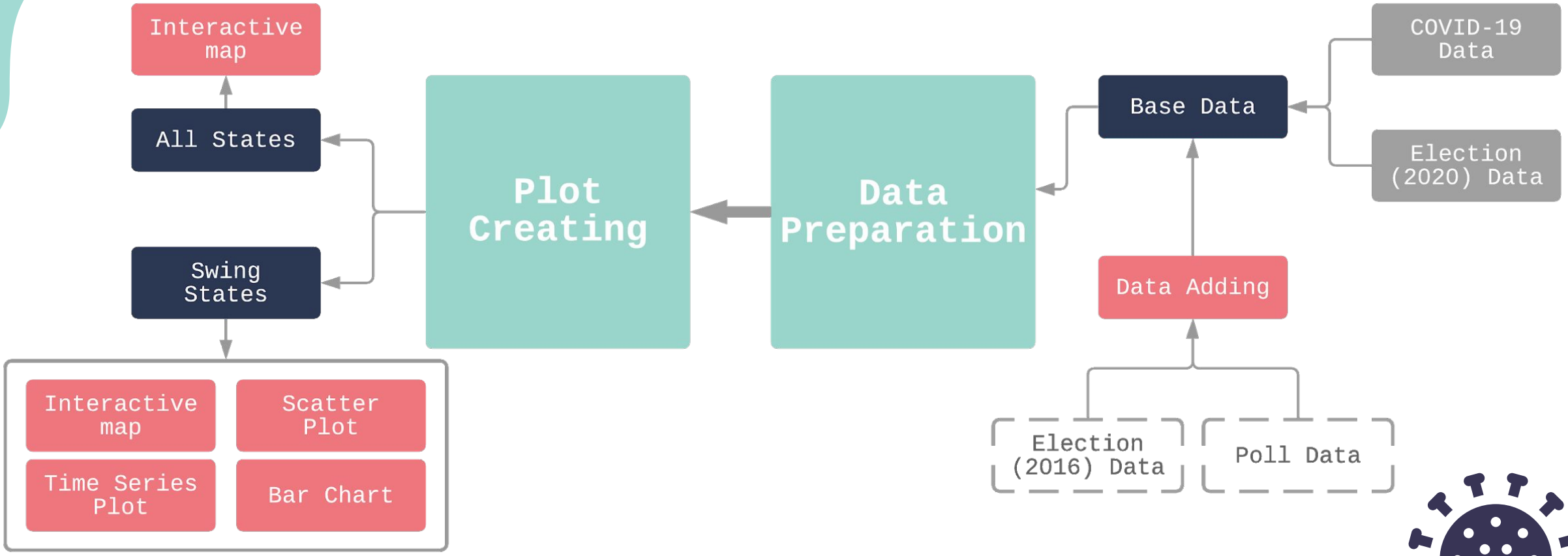
make_plot_time_series

Users can make a time series chart to show the total cumulative cases for states where each party won in the election.

Input dataframe

Output Plots

Design Process



04

Demo

Input: 'data/coviddataand2020Election.csv'

	STATEFP	STATENS	AFFGEOID	GEOID	STUSPS	NAME	LSAD	ALAND	AWATER	geometry	Total Case	Confirmed	Probable	Cases in L	Case Rate	Total Deat	Confirmed	Probable	Deaths in	Death Rat	Case Rate	Death Rat	States	BIDEN_pe	BIDEN_vo	TRUMP_p	TRUMP_votes
0	24	1714934	0400000US	24	MD	Maryland	0	2.52E+10	6.98E+09	MULTIPOL	185464			15659	3069	4481	4325	156	146	74	37	0.4	Maryland	0.657	1985023	0.323	976414
1	19	1779785	0400000US	19	IA	Iowa	0	1.45E+11	1.08E+09	POLYGON	213223			24845	6756	2207			216	69	112.5	1	Iowa	0.449	758881	0.532	897467
2	10	1779781	0400000US	10	DE	Delaware	0	5.05E+09	1.4E+09	POLYGON	32664	31336	1328	3112	3377	757	666	91	18	78	46	0.3	Delaware	0.588	296268	0.398	200603
3	39	1085497	0400000US	39	OH	Ohio	0	1.06E+11	1.03E+10	MULTIPOL	363304	344054	19250	57940	3108	6020	5635	385	278	51	70.8	0.3	Ohio	0.452	2678501	0.532	3153336
4	42	1779798	0400000US	42	PA	Pennsylva	0	1.16E+11	3.39E+09	POLYGON	314401	293367	21034	44788	2455	9870			545	77	50	0.6	Pennsylva	0.5	3458229	0.488	3377674
5	31	1779792	0400000US	31	NE	Nebraska	0	1.99E+11	1.37E+09	POLYGON	115921			14320	6008	934			137	48	106	1	Nebraska	0.393	374583	0.585	556846
6	53	1779804	0400000US	53	WA	Washingt	0	1.72E+11	1.26E+10	MULTIPOL	147537			16005	1958	2655			107	35	30.3	0.2	Washingt	0.584	2369437	0.39	1584588
7	1	1779775	0400000US	1	AL	Alabama	0	1.31E+11	4.59E+09	POLYGON	234080	195887	38193	14848	4789	3459	3155	304	210	70	43.4	0.6	Alabama	0.366	849624	0.62	1441170
8	5	68085	0400000US	5	AR	Arkansas	0	1.35E+11	2.96E+09	POLYGON	146190			11842	4851	2387			162	79	56.1	0.8	Arkansas	0.348	423916	0.624	760613

Input: 'data/coviddataand2020Election.csv'

	STATEFP	STATENS	AFFGEOID	GEOID	STUSPS	NAME	LSAD	ALAND	AWATER	geometry	Total Case	Confirmed	Probable	Cases in L	Case Rate	Total Deat	Confirmed	Probable	Deaths in	Death Rat	Case Rate	Death Rat	States	BIDEN_pe	BIDEN_vo	TRUMP_p	TRUMP_votes
0	24	1714934	0400000US	24	MD	Maryland	0	2.52E+10	6.98E+09	MULTIPOL	185464			15659	3069	4481	4325	156	146	74	37	0.4	Maryland	0.657	1985023	0.323	976414
1	19	1779785	0400000US	19	IA	Iowa	0	1.45E+11	1.08E+09	POLYGON	213223			24845	6756	2207			216	69	112.5	1	Iowa	0.449	758881	0.532	897467
2	10	1779781	0400000US	10	DE	Delaware	0	5.05E+09	1.4E+09	POLYGON	32664	31336	1328	3112	3377	757	666	91	18	78	46	0.3	Delaware	0.588	296268	0.398	200603
3	39	1085497	0400000US	39	OH	Ohio	0	1.06E+11	1.03E+10	MULTIPOL	363304	344054	19250	57940	3108	6020	5635	385	278	51	70.8	0.3	Ohio	0.452	2678501	0.532	3153336
4	42	1779798	0400000US	42	PA	Pennsylva	0	1.16E+11	3.39E+09	POLYGON	314401	293367	21034	44788	2455	9870			545	77	50	0.6	Pennsylva	0.5	3458229	0.488	3377674
5	31	1779792	0400000US	31	NE	Nebraska	0	1.99E+11	1.37E+09	POLYGON	115921			14320	6008	934			137	48	106	1	Nebraska	0.393	374583	0.585	556846
6	53	1779804	0400000US	53	WA	Washingt	0	1.72E+11	1.26E+10	MULTIPOL	147537			16005	1958	2655			107	35	30.3	0.2	Washingt	0.584	2369437	0.39	1584588
7	1	1779775	0400000US	1	AL	Alabama	0	1.31E+11	4.59E+09	POLYGON	234080	195887	38193	14848	4789	3459	3155	304	210	70	43.4	0.6	Alabama	0.366	849624	0.62	1441170
8	5	68085	0400000US	5	AR	Arkansas	0	1.35E+11	2.96E+09	POLYGON	146190			11842	4851	2387			162	79	56.1	0.8	Arkansas	0.348	423916	0.624	760613

\+ Input: 'data/raw_7_keystates_covid_voting_issue_poll.csv'

States	Ability to	Likelihood	Likelihood to lower the cost of your health care
National	40	39	20
Arizona	34	44	22
Florida	42	38	20
Georgia	39	42	19
Michigan	41	46	13
Minnesot	33	52	14
North Car	40	39	22
Ohio	38	46	16
Pennsylva	37	45	19
Texas	38	37	25
Wisconsin	39	45	16

Input: 'data/coviddataand2020Election.csv'

	STATEFP	STATENS	AFFGEOID	GEOID	STUSPS	NAME	LSAD	ALAND	AWATER	geometry	Total Case	Confirmed	Probable	Cases in L	Case Rate	Total Deat	Confirmed	Probable	Deaths in	Death Rat	Case Rate	Death Rat	States	BIDEN_pe	BIDEN_vo	TRUMP_p	TRUMP_votes
0	24	1714934	0400000US	24	MD	Maryland	0	2.52E+10	6.98E+09	MULTIPOL	185464			15659	3069	4481	4325	156	146	74	37	0.4	Maryland	0.657	1985023	0.323	976414
1	19	1779785	0400000US	19	IA	Iowa	0	1.45E+11	1.08E+09	POLYGON	213223			24845	6756	2207			216	69	112.5	1	Iowa	0.449	758881	0.532	897467
2	10	1779781	0400000US	10	DE	Delaware	0	5.05E+09	1.4E+09	POLYGON	32664	31336	1328	3112	3377	757	666	91	18	78	46	0.3	Delaware	0.588	296268	0.398	200603
3	39	1085497	0400000US	39	OH	Ohio	0	1.06E+11	1.03E+10	MULTIPOL	363304	344054	19250	57940	3108	6020	5635	385	278	51	70.8	0.3	Ohio	0.452	2678501	0.532	3153336
4	42	1779798	0400000US	42	PA	Pennsylva	0	1.16E+11	3.39E+09	POLYGON	314401	293367	21034	44788	2455	9870			545	77	50	0.6	Pennsylva	0.5	3458229	0.488	3377674
5	31	1779792	0400000US	31	NE	Nebraska	0	1.99E+11	1.37E+09	POLYGON	115921			14320	6008	934			137	48	106	1	Nebraska	0.393	374583	0.585	556846
6	53	1779804	0400000US	53	WA	Washingt	0	1.72E+11	1.26E+10	MULTIPOL	147537			16005	1958	2655			107	35	30.3	0.2	Washingt	0.584	2369437	0.39	1584588
7	1	1779775	0400000US	1	AL	Alabama	0	1.31E+11	4.59E+09	POLYGON	234080	195887	38193	14848	4789	3459	3155	304	210	70	43.4	0.6	Alabama	0.366	849624	0.62	1441170
8	5	68085	0400000US	5	AR	Arkansas	0	1.35E+11	2.96E+09	POLYGON	146190			11842	4851	2387			162	79	56.1	0.8	Arkansas	0.348	423916	0.624	760613

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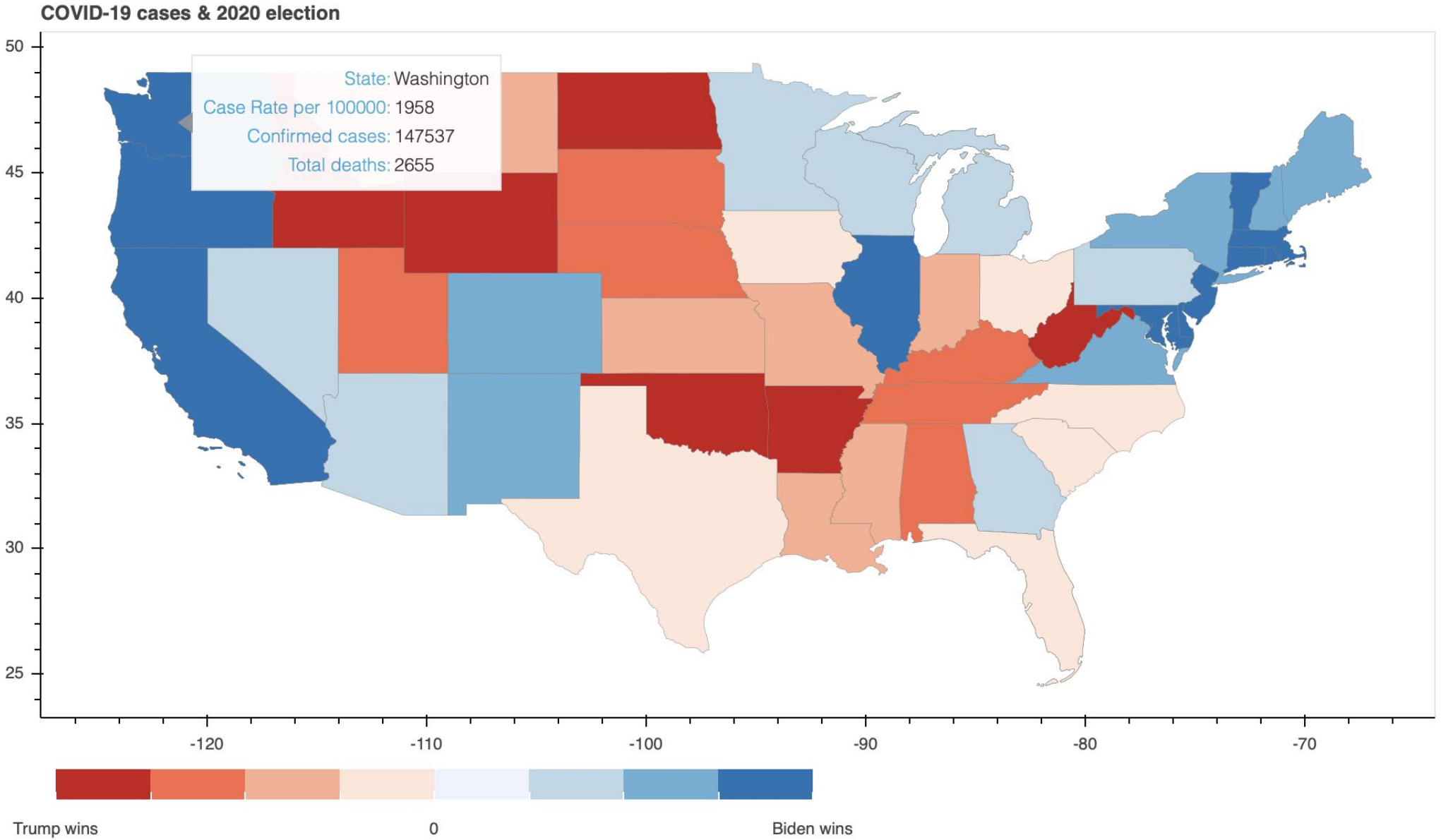
Minnesot	33	52	14
North Car	40	39	22
Ohio	38	46	16
Pennsylva	37	45	19
Texas	38	37	25
Wisconsin	39	45	16

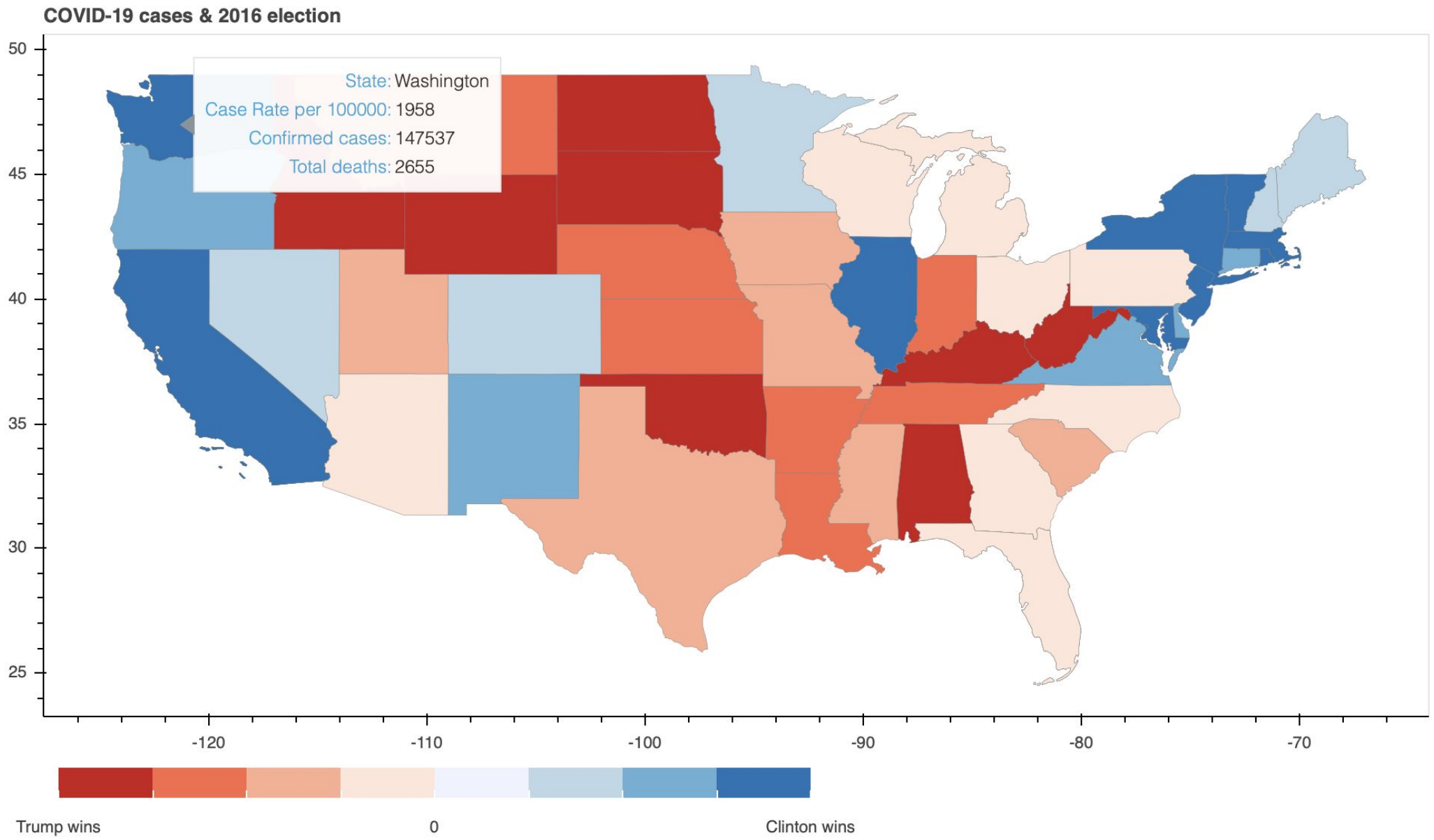
= keystates_covid_2020voting_poll.csv

NAME	LSAD	ALAND	AWATER	geometry	Total Case	Confirmed	Probable	Cases in L	Case Rate	Total Deat	Confirmed	Probable	Deaths in	Death Rat	Case Rate	Death Rat	States_x	BIDEN_pe	BIDEN_vo	TRUMP_p	TRUMP_v	States_y	Ability to	Likelihood	Likelihood to
Ohio	0	1.06E+11	1.03E+10	MULTIPOL	363304	344054	19250	57940	3108	6020	5635	385	278	51	70.8	0.3	Ohio	0.452	2678501	0.532	3153336	Ohio	38	46	16
Pennsylva	0	1.16E+11	3.39E+09	POLYGON	314401	293367	21034	44788	2455	9870			545	77	50	0.6	Pennsylva	0.5	3458229	0.488	3377674	Pennsylva	37	45	19
Texas	0	6.77E+11	1.9E+10	POLYGON	1100979			73090	3836	20588			1009	71	36.4	0.5	Texas	0.465	5261061	0.52	5891792	Texas	38	37	25
Georgia	0	1.49E+11	4.42E+09	POLYGON	451056	406220	44836	24820	4288	9215	8644	571	248	87	33.7	0.3	Georgia	0.495	2474507	0.493	2461837	Georgia	39	42	19
Michigan	0	1.47E+11	1.04E+11	MULTIPOL	340964	314216	26748	52010	3414	8940	8543	397	509	89	74.4	0.7	Michigan	0.506	2804040	0.478	2649852	Michigan	41	46	13
Florida	0	1.39E+11	3.14E+10	MULTIPOL	930728			53388	4370	18085			526	84	35.8	0.4	Florida	0.479	5297045	0.512	5668731	Florida	42	38	20
Minnesot	0	2.06E+11	1.89E+10	POLYGON	276500			45482	4928	3321	3205	116	348	59	115.8	0.9	Minnesot	0.525	1716602	0.454	1483821	Minnesot	33	52	14
Arizona	0	2.94E+11	1.03E+09	POLYGON	302324	293574	8750	25412	4216	6464	5992	472	162	90	50.6	0.3	Arizona	0.494	1672143	0.491	1661686	Arizona	34	44	22

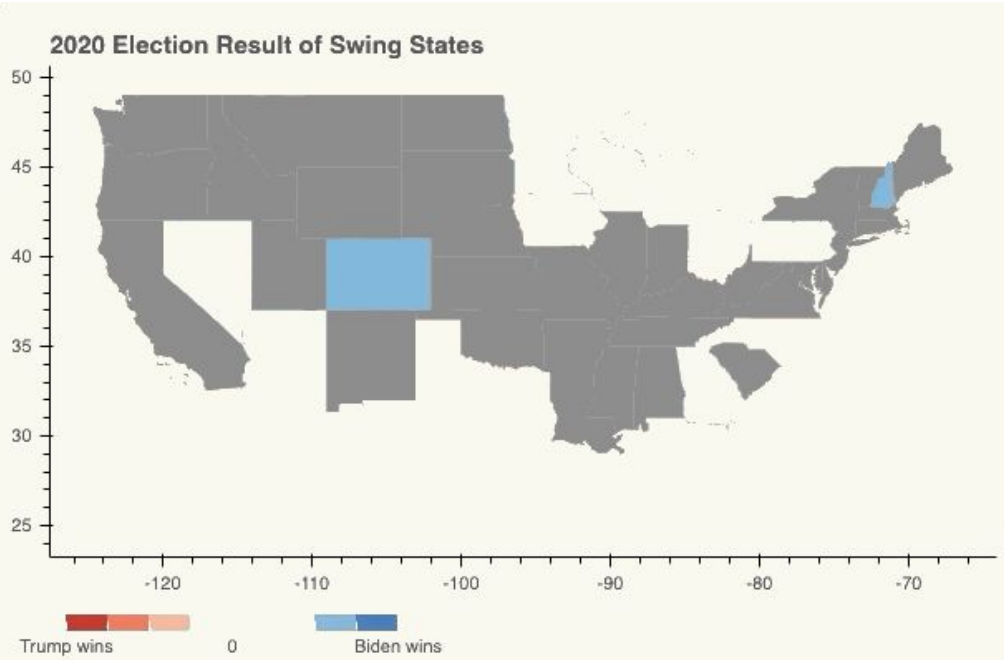
COVID-19 cases & 2020 election | COVID-19 cases & 2016 election

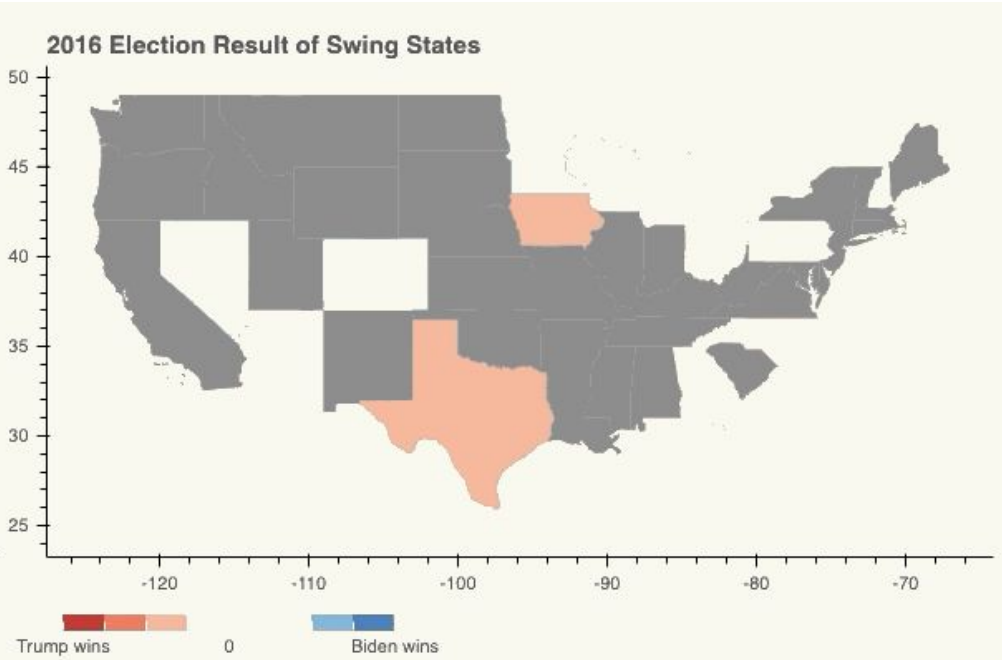


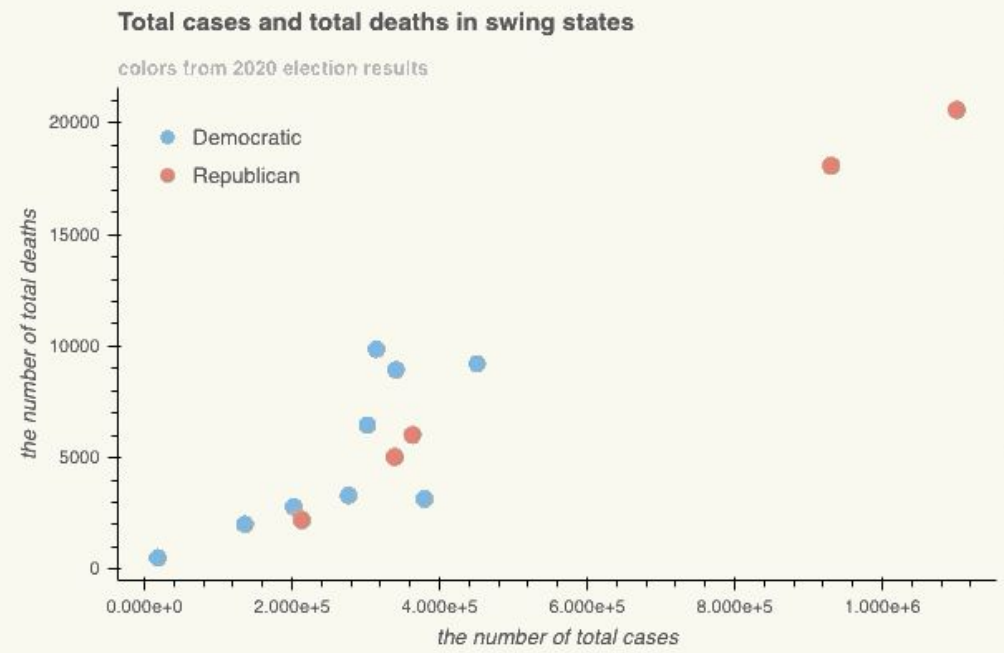
COVID-19 cases & 2020 election | COVID-19 cases & 2016 election

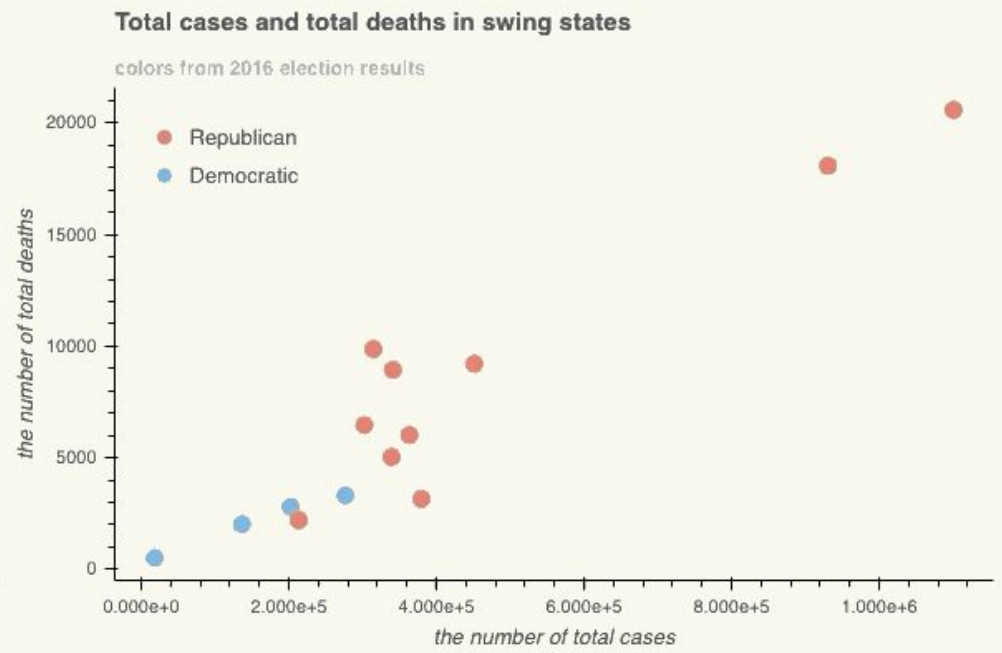


demo: making plots for swing states









the percentage of turnout by mail in 2016 and 2020 election

05

Project Structure

Repository Structure

- **CovidVoting**: This directory holds the code for preparing data for visualization and making interactive plots to show Covid counts and voting results simultaneously. It also contains unit tests to prove the functionalities of each module.

- **data**: This directory contains data downloaded from multiple sources, including election results data from 2016 and 2020, Covid related data, and shapefile data that stores the geometric information of the United States.

- **docs**: This directory contains documentation including the functional specification, the design specification, the component specification and the final project presentation.

- **example**: This directory includes examples of using the functions in the CovidVoting directory.

06

Take Away & Future Work

Lessons Learned

- Learned to use new packages like Bokeh, and combine the functionalities of it with others to create the features in our project
- Collaborated project with github, and learned the importance of pull/push regularly
- Set up the virtual environments and continuous integration, and enables the code to work on different systems

Future Improvements

- Incorporate more data like different policies in every state, and compare the results
- Increase map accuracy to show information on county level
- Provide more information on graphs to users
- Add more unit tests for making plots functions
- Learn more about Travis CI

THANKS!

Do you have any questions?