US Political Party Affiliation: Data Exploration and Visualization

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Data Cleaning

```
import pandas as pd
import numpy as np

df = pd.read_csv(r"TEST.csv")

df.head()
```

```
        name party state    1    2    3    4    5    6    7    8    9
10  \
0  Alexander     R    TN  0.0  1.0  1.0  1.0  1.0  0.0  0.0  1.0  1.0
1.0
1     Ayotte     R    NH  0.0  1.0  1.0  1.0  1.0  0.0  0.0  1.0  0.0
1.0
2    Baldwin     D    WI  1.0  0.0  0.0  1.0  0.0  1.0  0.0  1.0  0.0
0.0
3   Barrasso     R    WY  0.0  1.0  1.0  1.0  1.0  0.0  1.0  1.0  1.0
1.0
4     Bennet     D    CO  0.0  0.0  0.0  1.0  0.0  1.0  0.0  1.0  0.0
0.0

    11   12   13   14   15
0  0.0  0.0  0.0  0.0  0.0
1  0.0  1.0  0.0  1.0  0.0
2  1.0  1.0  0.0  1.0  1.0
3  0.0  0.0  1.0  0.0  0.0
4  0.0  1.0  0.0  1.0  0.0
```

```
df.shape
```

```
(100, 18)
```

```
# Dataset is very clean already with features already scaled between
0-1, so no need to rescale
# Features name, party, state are all categorical, and features 1-15
are all numerical

# Check duplicates; there are no duplicates
len(df["name"].unique())
```

```
100
```

```python
# Drop missing data
df.dropna(inplace=True)

# Dataset does not have any missing values
df.shape
```

```
(100, 18)
```

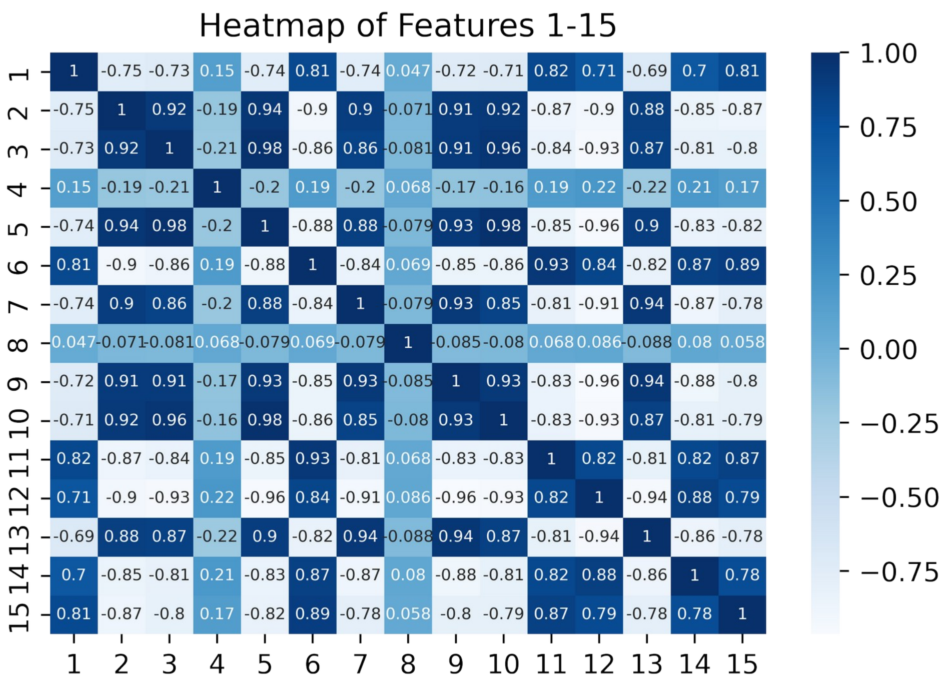
```python
# Check for multicollinearity between features 1-15
corr_matrix = df.iloc[:,3:].corr()
corr_matrix
```

```
           1         2         3         4         5         6         
7  \
1   1.000000 -0.748194 -0.728347  0.150170 -0.743783  0.809405 -
0.743783
2  -0.748194  1.000000  0.921373 -0.190826  0.940315 -0.896510  
0.899276
3  -0.728347  0.921373  1.000000 -0.209044  0.979869 -0.861334  
0.857856
4   0.150170 -0.190826 -0.209044  1.000000 -0.204394  0.186416 -
0.204394
5  -0.743783  0.940315  0.979869 -0.204394  1.000000 -0.879824  
0.877788
6   0.809405 -0.896510 -0.861334  0.186416 -0.879824  1.000000 -
0.838648
7  -0.743783  0.899276  0.857856 -0.204394  0.877788 -0.838648  
1.000000
8   0.046571 -0.071116 -0.081390  0.067969 -0.078790  0.068590 -
0.078790
9  -0.720585  0.912145  0.908057 -0.170258  0.929029 -0.851918  
0.929029
10 -0.714642  0.918172  0.958933 -0.162365  0.979420 -0.856271  
0.854639
11  0.822404 -0.869975 -0.835672  0.185199 -0.854035  0.931967 -
0.812567
12  0.709422 -0.898313 -0.934256  0.217258 -0.955365  0.838600 -
0.914555
13 -0.694719  0.880300  0.874030 -0.222122  0.895438 -0.820978  
0.936223
14  0.695756 -0.853129 -0.811164  0.207769 -0.831304  0.874986 -
0.872214
15  0.806276 -0.873826 -0.803541  0.168028 -0.820486  0.892535 -
0.778225

           8         9        10        11        12        13        
14  \
1   0.046571 -0.720585 -0.714642  0.822404  0.709422 -0.694719  
0.695756
2  -0.071116  0.912145  0.918172 -0.869975 -0.898313  0.880300 -
```

```
0.853129
3  -0.081390  0.908057  0.958933 -0.835672 -0.934256  0.874030 -
0.811164
4   0.067969 -0.170258 -0.162365  0.185199  0.217258 -0.222122
0.207769
5  -0.078790  0.929029  0.979420 -0.854035 -0.955365  0.895438 -
0.831304
6   0.068590 -0.851918 -0.856271  0.931967  0.838600 -0.820978
0.874986
7  -0.078790  0.929029  0.854639 -0.812567 -0.914555  0.936223 -
0.872214
8   1.000000 -0.084880 -0.080446  0.067686  0.085775 -0.088458
0.080497
9  -0.084880  1.000000  0.927600 -0.826111 -0.964093  0.943986 -
0.881978
10 -0.080446  0.927600  1.000000 -0.829641 -0.933773  0.872611 -
0.807002
11  0.067686 -0.826111 -0.829641  1.000000  0.823366 -0.805840
0.817897
12  0.085775 -0.964093 -0.933773  0.823366  1.000000 -0.938917
0.877872
13 -0.088458  0.943986  0.872611 -0.805840 -0.938917  1.000000 -
0.858493
14  0.080497 -0.881978 -0.807002  0.817897  0.877872 -0.858493
1.000000
15  0.057640 -0.795065 -0.794578  0.874565  0.793375 -0.777235
0.784294

          15
1   0.806276
2  -0.873826
3  -0.803541
4   0.168028
5  -0.820486
6   0.892535
7  -0.778225
8   0.057640
9  -0.795065
10 -0.794578
11  0.874565
12  0.793375
13 -0.777235
14  0.784294
15  1.000000

# There are many features with high correlation or high negative
correlations with each other (|r| >0.7)

import seaborn as sns
hm = sns.heatmap(corr_matrix, annot=True,
```

```
cmap="Blues",annot_kws={"fontsize":6})
hm.set(title='Heatmap of Features 1-15')
display(hm)
```

```
<AxesSubplot:title={'center':'Heatmap of Features 1-15'}>
```




```
# Dark blues have high correlation with each other
# For example, features 2 and 3 have a 0.92 correlation with each
other, so we will drop feature 3

# We're going to keep the first feature and drop the second one
# Anything above |r| >= 0.7 is going to be considered high
collinearity, so only one will be kept
# Usually the threshold I would use is r>0.7, but I'm going to use 0.9
otherwise too much data will be dropped

columns = corr_matrix.columns
my_tuples = []
for c in range(1, 16):
    for i, x in enumerate(list(corr_matrix[str(c)])):
        if abs(x)>=0.9 and x!=1:
            print (columns[i], c)
            my_tuples.append((int(columns[i]), c))
```

```
3 2
5 2
9 2
10 2
```

```
2 3
5 3
9 3
10 3
12 3
2 5
3 5
9 5
10 5
12 5
11 6
9 7
12 7
13 7
2 9
3 9
5 9
7 9
10 9
12 9
13 9
2 10
3 10
5 10
9 10
12 10
6 11
3 12
5 12
7 12
9 12
10 12
13 12
7 13
9 13
12 13
```

```
my_tuples
```

```
[(3, 2),
 (5, 2),
 (9, 2),
 (10, 2),
 (2, 3),
 (5, 3),
 (9, 3),
 (10, 3),
 (12, 3),
 (2, 5),
 (3, 5),
```

```
 (9, 5),
 (10, 5),
 (12, 5),
 (11, 6),
 (9, 7),
 (12, 7),
 (13, 7),
 (2, 9),
 (3, 9),
 (5, 9),
 (7, 9),
 (10, 9),
 (12, 9),
 (13, 9),
 (2, 10),
 (3, 10),
 (5, 10),
 (9, 10),
 (12, 10),
 (6, 11),
 (3, 12),
 (5, 12),
 (7, 12),
 (9, 12),
 (10, 12),
 (13, 12),
 (7, 13),
 (9, 13),
 (12, 13)]
```

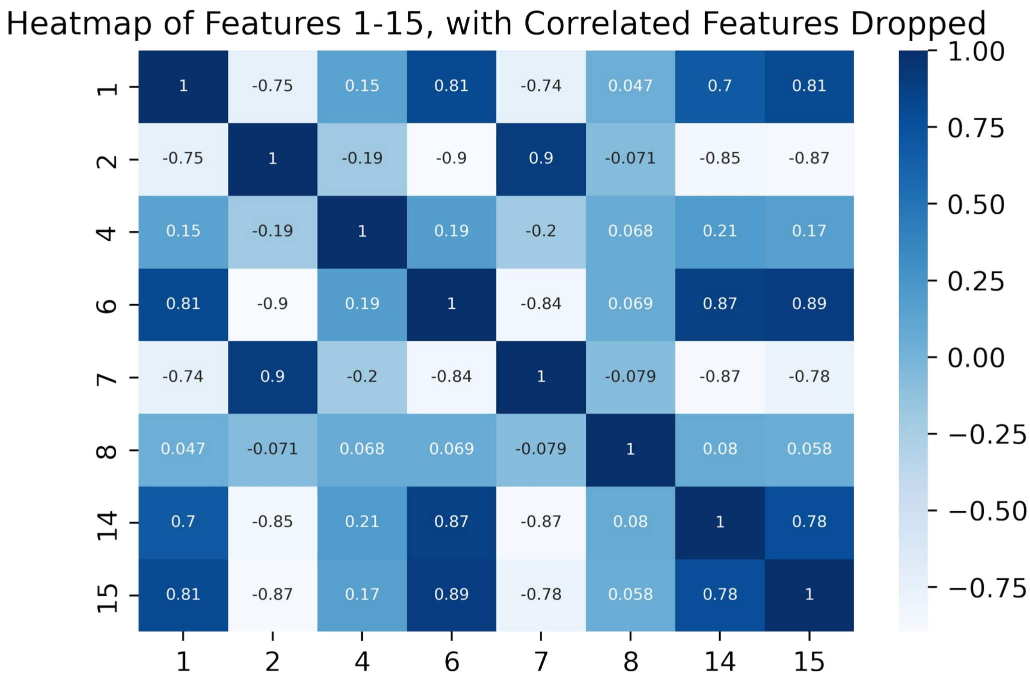
```python
to_drop = []
for t in my_tuples:
    if max(t) not in to_drop:
        to_drop.append(max(t))

# These are the columns to be dropped
to_drop
```

```
[3, 5, 9, 10, 12, 11, 13]
```

```python
# Recalculate the correlation matrix
df2 = df.drop([str(x) for x in to_drop],axis=1)
corr_matrix2 = df2.corr()

corr_matrix2
```

```
          1         2         4         6         7         8
14  \
1   1.000000 -0.748194  0.150170  0.809405 -0.743783  0.046571
0.695756
2  -0.748194  1.000000 -0.190826 -0.896510  0.899276 -0.071116 -
```

```
0.853129
4   0.150170 -0.190826  1.000000  0.186416 -0.204394  0.067969
0.207769
6   0.809405 -0.896510  0.186416  1.000000 -0.838648  0.068590
0.874986
7  -0.743783  0.899276 -0.204394 -0.838648  1.000000 -0.078790 -
0.872214
8   0.046571 -0.071116  0.067969  0.068590 -0.078790  1.000000
0.080497
14  0.695756 -0.853129  0.207769  0.874986 -0.872214  0.080497
1.000000
15  0.806276 -0.873826  0.168028  0.892535 -0.778225  0.057640
0.784294

          15
1   0.806276
2  -0.873826
4   0.168028
6   0.892535
7  -0.778225
8   0.057640
14  0.784294
15  1.000000

hm2 = sns.heatmap(corr_matrix2, annot=True,
cmap="Blues",annot_kws={"fontsize":6})
hm2.set(title='Heatmap of Features 1-15, with Correlated Features
Dropped')
display(hm)

# The reason why there are still a few 0.9 in the heatmap is because
the value is 0.899276, and it was rounded up to 0.9

<AxesSubplot:title={'center':'Heatmap of Features 1-15'}>
```




```
# Save a copy of the cleaned dataset
df2.to_csv("test_cleaned.csv")
```

Data Exploration

```
df2.head()
```

	name	party	state	1	2	4	6	7	8	14	15
0	Alexander	R	TN	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0
1	Ayotte	R	NH	0.0	1.0	1.0	0.0	0.0	1.0	1.0	0.0
2	Baldwin	D	WI	1.0	0.0	1.0	1.0	0.0	1.0	1.0	1.0
3	Barrasso	R	WY	0.0	1.0	1.0	0.0	1.0	1.0	0.0	0.0
4	Bennet	D	CO	0.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0

```
# Let's explore the features based on state
states = df2.groupby("state").mean()
states
```

	1	2	4	6	7	8	14	15
state								
AK	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
AL	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
AR	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
AZ	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
CA	0.75	0.00	1.00	1.00	0.00	1.00	1.00	1.00
CO	0.00	0.50	1.00	0.50	0.50	1.00	0.50	0.00
CT	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00
DE	0.50	0.00	1.00	1.00	0.00	1.00	1.00	1.00

```
FL      0.50  0.50  1.00  0.50  0.50  1.00  0.25  0.75
GA      0.00  1.00  1.00  0.00  1.00  1.00  0.00  0.00
HI      1.00  0.00  1.00  1.00  0.00  1.00  1.00  1.00
IA      0.00  1.00  1.00  0.00  1.00  1.00  0.00  0.00
ID      0.00  1.00  1.00  0.00  1.00  1.00  0.00  0.00
IL      0.50  0.50  1.00  1.00  0.50  1.00  1.00  0.50
IN      0.00  0.50  1.00  0.00  0.50  1.00  0.00  0.00
KS      0.00  1.00  1.00  0.00  1.00  1.00  0.00  0.00
KY      0.00  1.00  0.50  0.00  1.00  1.00  0.00  0.00
LA      0.00  1.00  1.00  0.00  1.00  1.00  0.00  0.00
MA      1.00  0.00  1.00  1.00  0.00  1.00  1.00  1.00
MD      1.00  0.00  1.00  1.00  0.00  1.00  1.00  1.00
ME      0.00  0.50  1.00  0.50  0.00  1.00  1.00  0.50
MI      0.00  0.00  1.00  1.00  0.00  1.00  1.00  1.00
MN      0.50  0.00  1.00  1.00  0.00  1.00  1.00  0.50
MO      0.00  0.50  1.00  0.00  0.50  1.00  0.50  0.00
MS      0.00  1.00  1.00  0.00  1.00  0.50  0.00  0.00
MT      0.00  0.50  1.00  0.00  0.50  1.00  0.50  0.00
NC      0.00  1.00  1.00  0.00  1.00  1.00  0.00  0.00
ND      0.00  1.00  1.00  0.00  1.00  1.00  0.00  0.00
NE      0.00  1.00  0.50  0.00  1.00  1.00  0.00  0.00
NH      0.50  0.50  1.00  0.50  0.00  1.00  1.00  0.50
NJ      1.00  0.00  1.00  1.00  0.00  1.00  1.00  1.00
NM      0.50  0.00  1.00  1.00  0.00  1.00  1.00  1.00
NV      0.25  0.75  0.75  0.25  0.75  0.75  0.75  0.25
NY      1.00  0.00  1.00  1.00  0.00  1.00  1.00  1.00
OH      0.50  0.50  1.00  0.50  0.50  1.00  0.50  0.50
OK      0.00  1.00  0.50  0.00  1.00  1.00  0.00  0.00
OR      1.00  0.00  1.00  1.00  0.00  1.00  1.00  1.00
PA      0.00  0.50  1.00  0.50  1.00  1.00  0.50  0.50
RI      1.00  0.00  1.00  1.00  0.00  1.00  1.00  1.00
SC      0.00  1.00  1.00  0.00  1.00  1.00  0.00  0.00
SD      0.00  1.00  1.00  0.00  1.00  1.00  0.00  0.00
TN      0.00  1.00  1.00  0.00  0.50  1.00  0.00  0.00
TX      0.00  1.00  0.50  0.00  1.00  1.00  0.00  0.00
UT      0.00  1.00  0.50  0.00  1.00  1.00  0.00  0.00
VA      1.00  0.50  1.00  1.00  0.00  1.00  1.00  0.00
VT      1.00  0.00  1.00  1.00  0.00  1.00  1.00  1.00
WA      1.00  0.00  1.00  1.00  0.00  1.00  1.00  1.00
WI      0.50  0.50  1.00  0.50  0.50  1.00  0.50  0.50
WV      0.25  1.00  1.00  0.00  1.00  1.00  0.00  0.00
WY      0.00  1.00  1.00  0.00  1.00  1.00  0.00  0.00
```

```python
for i in states.columns:
    print(i, list(states[states[i]==1].index))
```

```
1 ['CT', 'HI', 'MA', 'MD', 'NJ', 'NY', 'OR', 'RI', 'VA', 'VT', 'WA']
2 ['AK', 'AL', 'AR', 'AZ', 'GA', 'IA', 'ID', 'KS', 'KY', 'LA', 'MS',
'NC', 'ND', 'NE', 'OK', 'SC', 'SD', 'TN', 'TX', 'UT', 'WV', 'WY']
4 ['AK', 'AL', 'AR', 'AZ', 'CA', 'CO', 'CT', 'DE', 'FL', 'GA', 'HI',
```

```
'IA', 'ID', 'IL', 'IN', 'KS', 'LA', 'MA', 'MD', 'ME', 'MI', 'MN',
'MO', 'MS', 'MT', 'NC', 'ND', 'NH', 'NJ', 'NM', 'NY', 'OH', 'OR',
'PA', 'RI', 'SC', 'SD', 'TN', 'VA', 'VT', 'WA', 'WI', 'WV', 'WY']
6 ['CA', 'CT', 'DE', 'HI', 'IL', 'MA', 'MD', 'MI', 'MN', 'NJ', 'NM',
'NY', 'OR', 'RI', 'VA', 'VT', 'WA']
7 ['AK', 'AL', 'AR', 'AZ', 'GA', 'IA', 'ID', 'KS', 'KY', 'LA', 'MS',
'NC', 'ND', 'NE', 'OK', 'PA', 'SC', 'SD', 'TX', 'UT', 'WV', 'WY']
8 ['AK', 'AL', 'AR', 'AZ', 'CA', 'CO', 'CT', 'DE', 'FL', 'GA', 'HI',
'IA', 'ID', 'IL', 'IN', 'KS', 'KY', 'LA', 'MA', 'MD', 'ME', 'MI',
'MN', 'MO', 'MT', 'NC', 'ND', 'NE', 'NH', 'NJ', 'NM', 'NY', 'OH',
'OK', 'OR', 'PA', 'RI', 'SC', 'SD', 'TN', 'TX', 'UT', 'VA', 'VT',
'WA', 'WI', 'WV', 'WY']
14 ['CA', 'CT', 'DE', 'HI', 'IL', 'MA', 'MD', 'ME', 'MI', 'MN', 'NH',
'NJ', 'NM', 'NY', 'OR', 'RI', 'VA', 'VT', 'WA']
15 ['CA', 'CT', 'DE', 'HI', 'MA', 'MD', 'MI', 'NJ', 'NM', 'NY', 'OR',
'RI', 'VT', 'WA']
```

Observations:

- Feature 8 is generally all 1's across states, and it's the most common factor among all states
- Features 6, 14, and 15 seem like policies associated with blue (D) states
- Features 7 and 2 seem like policies associated with red (R) states

```
# Let's explore the features based on party
party = df2.groupby("party").mean()
party

              1         2         4         6         7         8
14  \
party

D      0.704545  0.079545  0.988636  0.875000  0.079545  0.988636
0.897727
I      0.500000  0.000000  1.000000  1.000000  0.000000  1.000000
1.000000
R      0.009259  1.000000  0.907407  0.018519  0.944444  0.981481
0.083333

             15
party
D      0.784091
I      1.000000
R      0.009259
```

Observations

- Feature 1 is relatively popular among Democrats, evenly split among Independents, and extremely unpopular among Republicans

- Feature 2 and 7 are extremely popular among Republicans, and extremely unpopular among Democrats and Independents
- Features 4 and 8 are extremely popular regardless of political affiliation
- Features 6, 14, and 15 are extremely popular among Democrats and Independents, but extremely unpopular with Republicans
- This lines up with the analysis based on states

```
# Let's see the percentage of Democrats, Republicans, or Independents that live in each state
# Democrats=1, Independent=0.5, and Republicans = 0

num_party = []
for x in df2["party"]:
    if x=="D":
        num_party.append(1)
    elif x=="I":
        num_party.append(0.5)
    else:
        num_party.append(0)

df2["affiliation"] = num_party

# Political leanings of each state (closer to 1==D, closer to 0==R)
party2 = df2.groupby("state").mean()
affiliation = party2[['affiliation']].sort_values(by=['affiliation'])
affiliation
```

	affiliation
state	
AK	0.00
UT	0.00
TX	0.00
TN	0.00
SD	0.00
SC	0.00
OK	0.00
NE	0.00
NC	0.00
LA	0.00
KY	0.00
KS	0.00
MS	0.00
WY	0.00
IA	0.00
AL	0.00
GA	0.00
AR	0.00
AZ	0.00
ID	0.00
ME	0.25

WI	0.50
CO	0.50
PA	0.50
OH	0.50
NV	0.50
NH	0.50
IL	0.50
FL	0.50
IN	0.50
MT	0.50
WV	0.50
MO	0.50
ND	0.50
VT	0.75
DE	1.00
WA	1.00
VA	1.00
HI	1.00
MA	1.00
MD	1.00
RI	1.00
MI	1.00
MN	1.00
OR	1.00
CT	1.00
NY	1.00
NJ	1.00
CA	1.00
NM	1.00

Observations

- Results are expected: states like California, New York, and New Jersey are majority Democrats, while states like Utah, Texas, and South Dakota are majority Republicans
- Traditional swing states like Wisconsin, Pennsylvania, and Florida have 0.5 which is an even mix of political affiliations

```
# Save a copy of the cleaned dataset
df2.to_csv("test_cleaned.csv")
```

Data Visualization

```
import geopandas as gp
import matplotlib.pyplot as plt

# States shape files were downloaded from the US Census website:
#
https://www.census.gov/geographies/mapping-files/time-series/geo/carto
```

```
-boundary-file.html
gdf = gp.read_file(r"cb_2018_us_state_500k.shp")

plt.rcParams['figure.dpi'] = 500

gdf['boundary'] = gdf.boundary
gdf["area"] = gdf.area
```

```
C:\Users\calvi\AppData\Local\Temp/ipykernel_10924/1225304276.py:2:
UserWarning: Geometry is in a geographic CRS. Results from 'area' are
likely incorrect. Use 'GeoSeries.to_crs()' to re-project geometries to
a projected CRS before this operation.

  gdf["area"] = gdf.area
```

```
gdf
```

```
   STATEFP   STATENS     AFFGEOID GEOID STUSPS  \
0       28  01779790  0400000US28    28     MS
1       37  01027616  0400000US37    37     NC
2       40  01102857  0400000US40    40     OK
3       51  01779803  0400000US51    51     VA
4       54  01779805  0400000US54    54     WV
5       22  01629543  0400000US22    22     LA
6       26  01779789  0400000US26    26     MI
7       25  00606926  0400000US25    25     MA
8       16  01779783  0400000US16    16     ID
9       12  00294478  0400000US12    12     FL
10      31  01779792  0400000US31    31     NE
11      53  01779804  0400000US53    53     WA
12      35  00897535  0400000US35    35     NM
13      72  01779808  0400000US72    72     PR
14      46  01785534  0400000US46    46     SD
15      48  01779801  0400000US48    48     TX
16      06  01779778  0400000US06    06     CA
17      01  01779775  0400000US01    01     AL
18      13  01705317  0400000US13    13     GA
19      42  01779798  0400000US42    42     PA
20      29  01779791  0400000US29    29     MO
21      08  01779779  0400000US08    08     CO
22      49  01455989  0400000US49    49     UT
23      47  01325873  0400000US47    47     TN
24      56  01779807  0400000US56    56     WY
25      36  01779796  0400000US36    36     NY
26      20  00481813  0400000US20    20     KS
27      02  01785533  0400000US02    02     AK
28      32  01779793  0400000US32    32     NV
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37       60  01802701  0400000US60    60      AS
38       78  01802710  0400000US78    78      VI
39       34  01779795  0400000US34    34      NJ
40       24  01714934  0400000US24    24      MD
41       23  01779787  0400000US23    23      ME
42       15  01779782  0400000US15    15      HI
43       10  01779781  0400000US10    10      DE
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46       44  01219835  0400000US44    44      RI
47       21  01779786  0400000US21    21      KY
48       39  01085497  0400000US39    39      OH
49       55  01779806  0400000US55    55      WI
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51       38  01779797  0400000US38    38      ND
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                                                      NAME LSAD
ALAND  \
0                                              Mississippi   00   121533519481

1                                           North Carolina   00   125923656064

2                                                 Oklahoma   00   177662925723

3                                                 Virginia   00   102257717110

4                                            West Virginia   00    62266474513

5                                                Louisiana   00   111897594374

6                                                 Michigan   00   146600952990

7                                            Massachusetts   00    20205125364

8                                                    Idaho   00   214049787659

9                                                  Florida   00   138949136250

10                                                Nebraska   00   198956658395

11                                              Washington   00   172112588220
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17	Alabama	00	131174048583
18	Georgia	00	149482048342
19	Pennsylvania	00	115884442321
20	Missouri	00	178050802184
21	Colorado	00	268422891711
22	Utah	00	212886221680
23	Tennessee	00	106802728188
24	Wyoming	00	251458544898
25	New York	00	122049149763
26	Kansas	00	211755344060
27	Alaska	00	1478839695958
28	Nevada	00	284329506470
29	Illinois	00	143780567633
30	Vermont	00	23874175944
31	Montana	00	376962738765
32	Iowa	00	144661267977
33	South Carolina	00	77864918488
34	New Hampshire	00	23189413166
35	Arizona	00	294198551143
36	District of Columbia	00	158340391
37	American Samoa	00	197759063

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39                                      New Jersey   00    19047825980
40                                        Maryland   00    25151100280
41                                           Maine   00    79887426037
42                                          Hawaii   00    16633990195
43                                        Delaware   00     5045925646
44                                            Guam   00      543555840
45  Commonwealth of the Northern Mariana Islands   00      472292529
46                                    Rhode Island   00     2677779902
47                                        Kentucky   00   102279490672
48                                            Ohio   00   105828882568
49                                       Wisconsin   00   140290039723
50                                          Oregon   00   248606993270
51                                    North Dakota   00   178707534813
52                                        Arkansas   00   134768872727
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54                                       Minnesota   00   206228939448
55                                     Connecticut   00    12542497068

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# Combining with affiliation
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right_on='STUSPS')
merged = gp.GeoDataFrame(merged)
merged

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Alaska
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Utah
2           0.00      48  01779801  0400000US48    48     TX
Texas
3           0.00      47  01325873  0400000US47    47     TN
Tennessee
4           0.00      46  01785534  0400000US46    46     SD    South
Dakota
5           0.00      45  01779799  0400000US45    45     SC  South
Carolina
6           0.00      40  01102857  0400000US40    40     OK
Oklahoma
7           0.00      31  01779792  0400000US31    31     NE
Nebraska
8           0.00      37  01027616  0400000US37    37     NC  North
Carolina
9           0.00      22  01629543  0400000US22    22     LA
Louisiana
10          0.00      21  01779786  0400000US21    21     KY
Kentucky
11          0.00      20  00481813  0400000US20    20     KS
Kansas
12          0.00      28  01779790  0400000US28    28     MS
Mississippi
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Wyoming
14          0.00      19  01779785  0400000US19    19     IA
Iowa
15          0.00      01  01779775  0400000US01    01     AL
Alabama
16          0.00      13  01705317  0400000US13    13     GA
Georgia
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Arkansas
18          0.00      04  01779777  0400000US04    04     AZ
Arizona
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22	0.50	08	01779779	0400000US08	08	CO	Colorado
23	0.50	42	01779798	0400000US42	42	PA	Pennsylvania
24	0.50	39	01085497	0400000US39	39	OH	Ohio
25	0.50	32	01779793	0400000US32	32	NV	Nevada
26	0.50	33	01779794	0400000US33	33	NH	New Hampshire
27	0.50	17	01779784	0400000US17	17	IL	Illinois
28	0.50	12	00294478	0400000US12	12	FL	Florida
29	0.50	18	00448508	0400000US18	18	IN	Indiana
30	0.50	30	00767982	0400000US30	30	MT	Montana
31	0.50	54	01779805	0400000US54	54	WV	West Virginia
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36	1.00	53	01779804	0400000US53	53	WA	Washington
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Oregon
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Connecticut
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York
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Jersey
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California
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Mexico

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46   00   122049149763   19246994695
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                                              geometry  \
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22  POLYGON ((-109.06025 38.59933, -109.05954 38.7...
23  POLYGON ((-80.51989 40.90666, -80.51909 40.921...
24  MULTIPOLYGON (((-82.73571 41.60336, -82.73392 ...
25  POLYGON ((-120.00574 39.22866, -120.00559 39.2...
26  MULTIPOLYGON (((-70.61702 42.97718, -70.61529 ...
27  POLYGON ((-91.51297 40.18106, -91.51107 40.188...
28  MULTIPOLYGON (((-80.17628 25.52505, -80.17395 ...
29  POLYGON ((-88.09776 37.90403, -88.09448 37.905...
30  POLYGON ((-116.04914 48.50205, -116.04913 48.5...
```

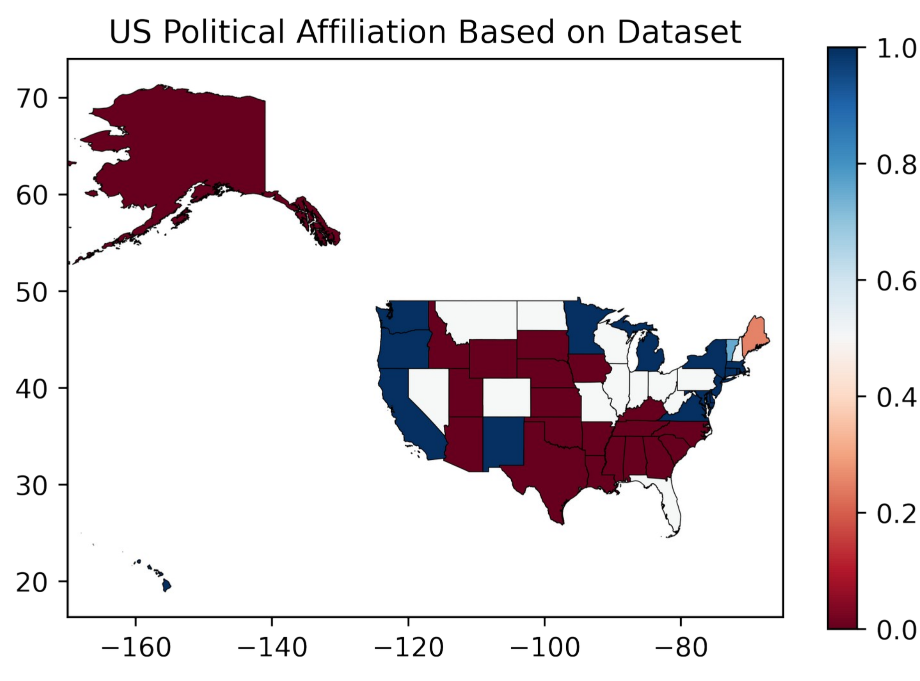
```
31  POLYGON ((-82.64320 38.16909, -82.64300 38.169...
32  POLYGON ((-95.77355 40.57820, -95.76853 40.583...
33  POLYGON ((-104.04868 48.86378, -104.04865 48.8...
34  POLYGON ((-73.43774 44.04501, -73.43199 44.063...
35  MULTIPOLYGON (((-75.56555 39.51485, -75.56174 ...
36  MULTIPOLYGON (((-122.57039 48.53785, -122.5686...
37  MULTIPOLYGON (((-75.74241 37.80835, -75.74151 ...
38  MULTIPOLYGON (((-156.06076 19.73055, -156.0566...
39  MULTIPOLYGON (((-70.23405 41.28565, -70.22361 ...
40  MULTIPOLYGON (((-76.05015 37.98691, -76.04998 ...
41  MULTIPOLYGON (((-71.28802 41.64558, -71.28647 ...
42  MULTIPOLYGON (((-83.19159 42.03537, -83.18993 ...
43  MULTIPOLYGON (((-89.59206 47.96668, -89.59147 ...
44  MULTIPOLYGON (((-123.59892 46.25145, -123.5984...
45  MULTIPOLYGON (((-72.76143 41.24233, -72.75973 ...
46  MULTIPOLYGON (((-72.03683 41.24984, -72.03496 ...
47  POLYGON ((-75.55910 39.62906, -75.55945 39.629...
48  MULTIPOLYGON (((-118.60442 33.47855, -118.5987...
49  POLYGON ((-109.05017 31.48000, -109.04984 31.4...

                                             boundary        area
0   MULTILINESTRING ((179.48246 51.98283, 179.4865...  282.010909
1   LINESTRING (-114.05296 37.59278, -114.05247 37...   22.975117
2   MULTILINESTRING ((-94.71830 29.72885, -94.7172...   65.327671
3   LINESTRING (-90.31030 35.00429, -90.30988 35.0...   10.889272
4   LINESTRING (-104.05788 44.99761, -104.05078 44...   22.578332
5   MULTILINESTRING ((-79.50795 33.02008, -79.5071...    7.856399
6   LINESTRING (-103.00257 36.52659, -103.00219 36...   18.005001
7   LINESTRING (-104.05342 41.17054, -104.05324 41...   21.614456
8   MULTILINESTRING ((-75.72681 35.93584, -75.7182...   12.782192
9   MULTILINESTRING ((-88.86770 29.86155, -88.8656...   11.544209
10  MULTILINESTRING ((-89.40565 36.52817, -89.3986...   10.667940
11  LINESTRING (-102.05174 40.00308, -101.91670 40...   22.004328
12  MULTILINESTRING ((-88.50297 30.21523, -88.4917...   11.885417
13  LINESTRING (-111.05456 45.00095, -111.04507 45...   27.970715
14  LINESTRING (-96.63970 42.73707, -96.63589 42.7...   15.857239
15  MULTILINESTRING ((-88.05338 30.50699, -88.0510...   12.891866
16  MULTILINESTRING ((-81.27939 31.30792, -81.2771...   14.668462
17  LINESTRING (-94.61783 36.49941, -94.61765 36.4...   13.585449
18  LINESTRING (-114.81629 32.50804, -114.81432 32...   28.919220
19  LINESTRING (-117.24267 44.39655, -117.23484 44...   24.456461
20  MULTILINESTRING ((-67.35580 44.64226, -67.3543...    9.753205
21  MULTILINESTRING ((-86.95617 45.35549, -86.9546...   16.490074
22  LINESTRING (-109.06025 38.59933, -109.05954 38...   28.039251
23  LINESTRING (-80.51989 40.90666, -80.51909 40.9...   12.535838
24  MULTILINESTRING ((-82.73571 41.60336, -82.7339...   11.319913
25  LINESTRING (-120.00574 39.22866, -120.00559 39...   29.939669
26  MULTILINESTRING ((-70.61702 42.97718, -70.6152...    2.683567
27  LINESTRING (-91.51297 40.18106, -91.51107 40.1...   15.408211
```

```
28  MULTILINESTRING ((-80.17628 25.52505, -80.1739...   13.934848
29  LINESTRING (-88.09776 37.90403, -88.09448 37.9...    9.873749
30  LINESTRING (-116.04914 48.50205, -116.04913 48...   45.079799
31  LINESTRING (-82.64320 38.16909, -82.64300 38.1...    6.493880
32  LINESTRING (-95.77355 40.57820, -95.76853 40.5...   18.615445
33  LINESTRING (-104.04868 48.86378, -104.04865 48...   21.839797
34  LINESTRING (-73.43774 44.04501, -73.43199 44.0...    2.797954
35  MULTILINESTRING ((-75.56555 39.51485, -75.5617...    0.541590
36  MULTILINESTRING ((-122.57039 48.53785, -122.56...   20.899636
37  MULTILINESTRING ((-75.74241 37.80835, -75.7415...   10.685779
38  MULTILINESTRING ((-156.06076 19.73055, -156.05...    1.448263
39  MULTILINESTRING ((-70.23405 41.28565, -70.2236...    2.318548
40  MULTILINESTRING ((-76.05015 37.98691, -76.0499...    2.772298
41  MULTILINESTRING ((-71.28802 41.64558, -71.2864...    0.307763
42  MULTILINESTRING ((-83.19159 42.03537, -83.1899...   17.054770
43  MULTILINESTRING ((-89.59206 47.96668, -89.5914...   25.539811
44  MULTILINESTRING ((-123.59892 46.25145, -123.59...   28.178454
45  MULTILINESTRING ((-72.76143 41.24233, -72.7597...    1.396679
46  MULTILINESTRING ((-72.03683 41.24984, -72.0349...   14.006969
47  LINESTRING (-75.55910 39.62906, -75.55945 39.6...    2.130952
48  MULTILINESTRING ((-118.60442 33.47855, -118.59...   41.668273
49  LINESTRING (-109.05017 31.48000, -109.04984 31...   30.892917
```

```python
myplt = merged.plot("affiliation", legend=True, cmap="RdBu",
edgecolor='black', linewidth=0.3)
myplt.set_title("US Political Affiliation Based on Dataset")
myplt.set_xlim(-170,-65)
```

```
(-170.0, -65.0)
```



Observations

- Closer to 1 means that the state has more Democrats, while closer to 0 means that the state has more Republicans
- The general colors of the states look correct, for example, California and New York are blue, and Alaska and Texas are red
- If there were more data points, the colors would not look so pure and would resemble the actual electoral maps more closely