Homeless Population in 2016

Edwin Brown UMBC Data 690 Science Capstone

HUD, FRED, and Kaggle Data Set

Features

- An unsheltered homeless person resides in: In a place not meant for human habitation, such as cars, parks, sidewalks, abandoned buildings (on the street).
- A sheltered homeless person resides in: In an emergency shelter.
- 19 Features
- 5 independent Features
- 1 dependent Feature

Features Gathered From Data

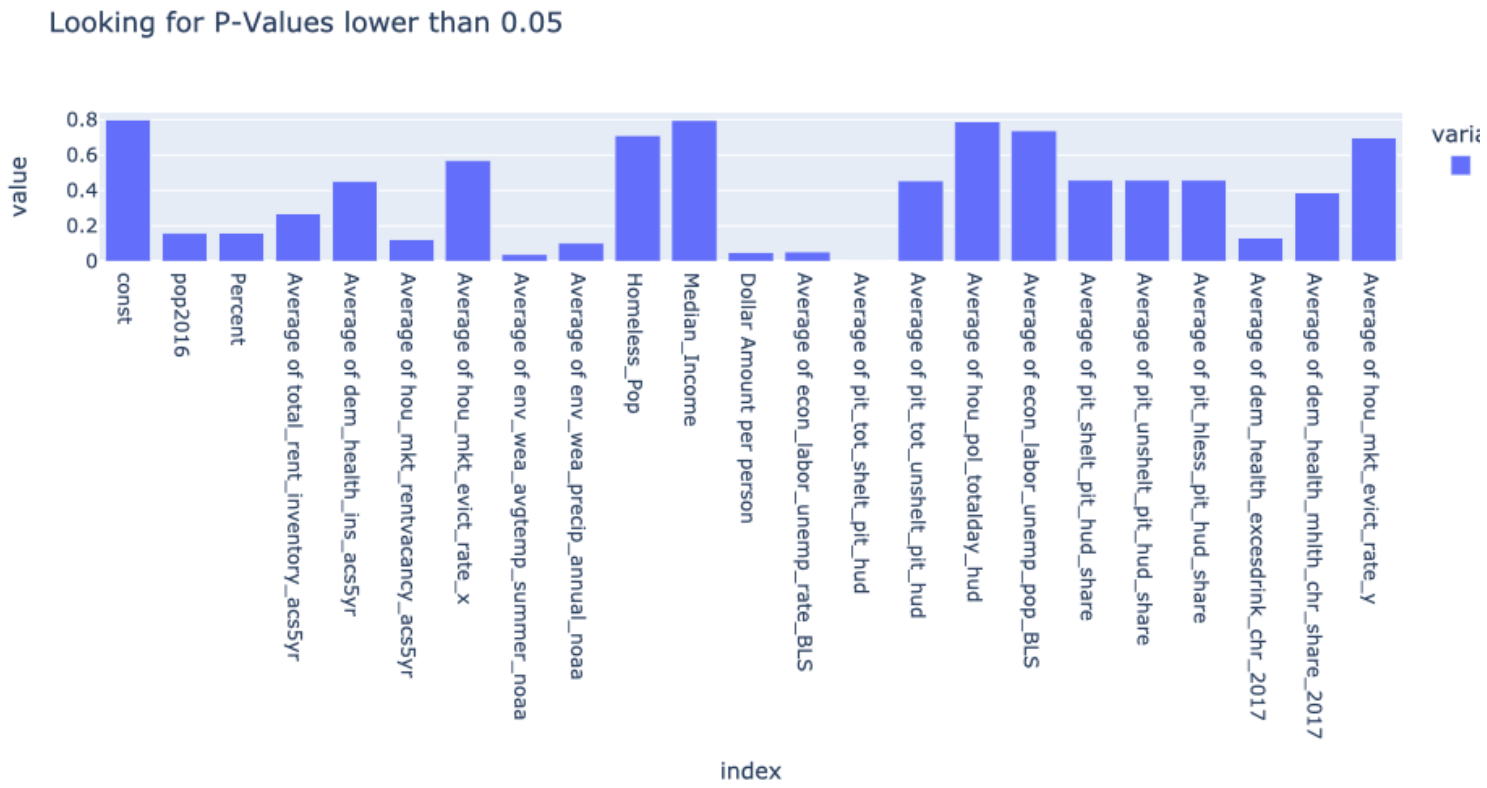
OLS Regression Results

Dep. Variable:	Rate of Homelessness	R-squared:	0.936
Model:	OLS	Adj. R-squared:	0.885
Method:	Least Squares	F-statistic:	18.08
Date:	Wed, 16 Aug 2023	Prob (F-statistic):	5.70e-11
Time:	22:52:25	Log-Likelihood:	-117.00
No. Observations:	50	AIC:	280.0
Df Residuals:	27	BIC:	324.0
Df Model:	22		
Covariance Type:	nonrobust		

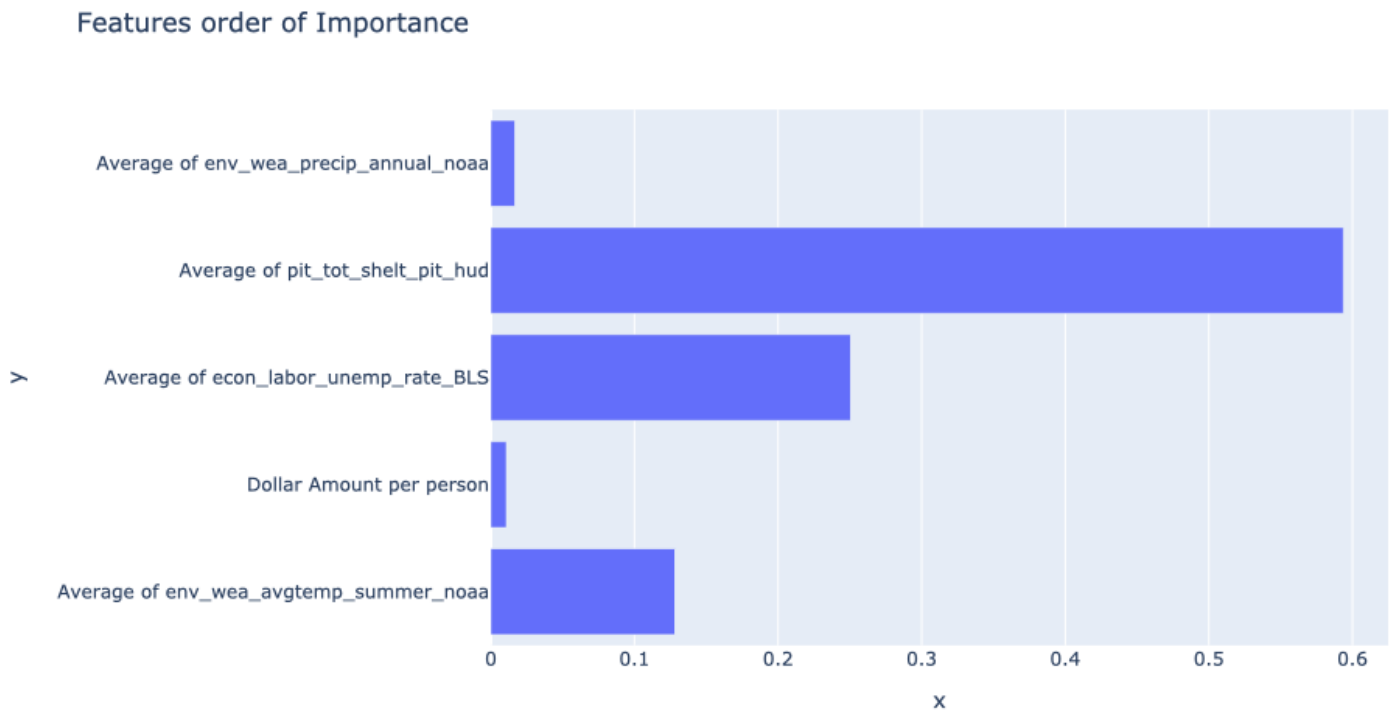
	coef	std err	t	P>|t|	[0.025	0.975]
const	-8.7524	33.622	-0.260	0.797	-77.739	60.235
pop2016	-1.013e-05	6.96e-06	-1.455	0.157	-2.44e-05	4.15e-06
Percent	32.2670	22.362	1.443	0.161	-13.616	78.150
Average of total_rent_inventory_acs5yr	-5.976e-05	5.31e-05	-1.126	0.270	-0.000	4.91e-05
Average of dem_health_ins_acs5yr	-22.6914	29.570	-0.767	0.450	-83.365	37.982
Average of hou_mkt_rentvacancy_acs5yr	-104.1592	65.567	-1.589	0.124	-238.692	30.373
Average of hou_mkt_evict_rate_x	-0.9071	1.567	-0.579	0.567	-4.122	2.308
Average of env_wea_avgtemp_summer_noaa	0.4385	0.201	2.185	0.038	0.027	0.850
Average of env_wea_precip_annual_noaa	-0.0867	0.051	-1.693	0.102	-0.192	0.018
Homeless_Pop	3.43e-05	9.13e-05	0.376	0.710	-0.000	0.000
Median_Income	-2.367e-05	9.01e-05	-0.263	0.795	-0.000	0.000
Dollar Amount per person	0.0079	0.004	2.053	0.050	3.55e-06	0.016
Average of econ_labor_unemp_rate_BLS	2.0403	1.010	2.019	0.053	-0.033	4.113
Average of pit_tot_shelt_pit_hud	0.0126	0.003	4.495	0.000	0.007	0.018
Average of pit_tot_unshelt_pit_hud	0.0027	0.004	0.758	0.455	-0.005	0.010
Average of hou_pol_totalday_hud	-6.082e-07	2.24e-06	-0.271	0.788	-5.21e-06	3.99e-06
Average of econ_labor_unemp_pop_BLS	-8.477e-05	0.000	-0.338	0.738	-0.001	0.000
Average of pit_shelt_pit_hud_share	1.525e+06	2.02e+06	0.754	0.458	-2.63e+06	5.68e+06
Average of pit_unshelt_pit_hud_share	1.525e+06	2.02e+06	0.754	0.458	-2.63e+06	5.68e+06
Average of pit_hless_pit_hud_share	-1.525e+06	2.02e+06	-0.754	0.458	-5.68e+06	2.63e+06
Average of dem_health_excesdrink_chr_2017	0.3995	0.259	1.540	0.135	-0.133	0.932
Average of dem_health_mhlth_chr_share_2017	-4.4002	5.001	-0.880	0.387	-14.661	5.860
Average of hou_mkt_evict_rate_y	0.6958	1.782	0.390	0.699	-2.961	4.353

Omnibus:	0.840	Durbin-Watson:	1.595
Prob(Omnibus):	0.657	Jarque-Bera (JB):	0.291
Skew:	0.139	Prob(JB):	0.865
Kurtosis:	3.251	Cond. No.	7.01e+13

Features with less than P-Value of 0.05 were selected



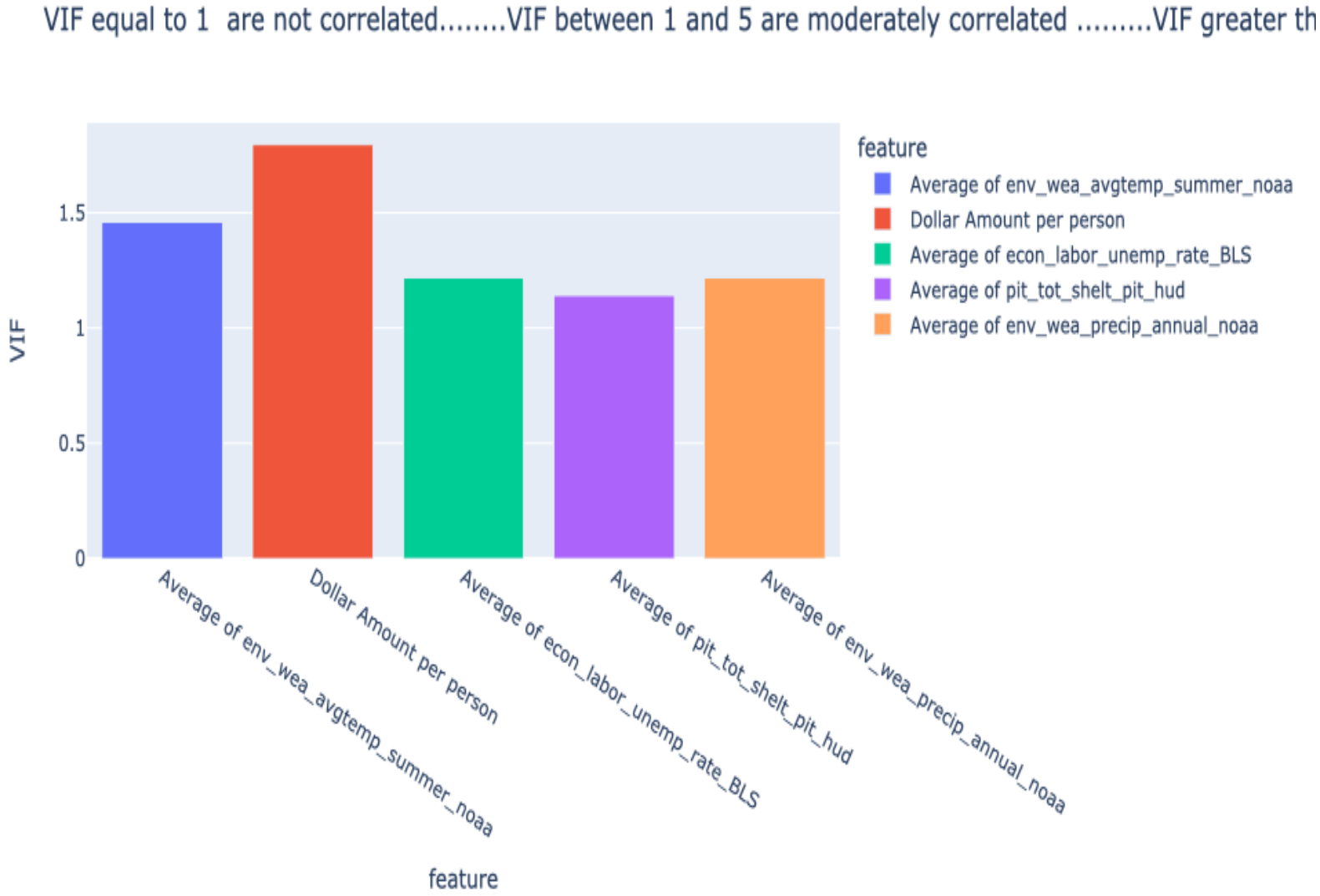
Order of importance The higher the score the more significant



- Vif = 1 not correlated

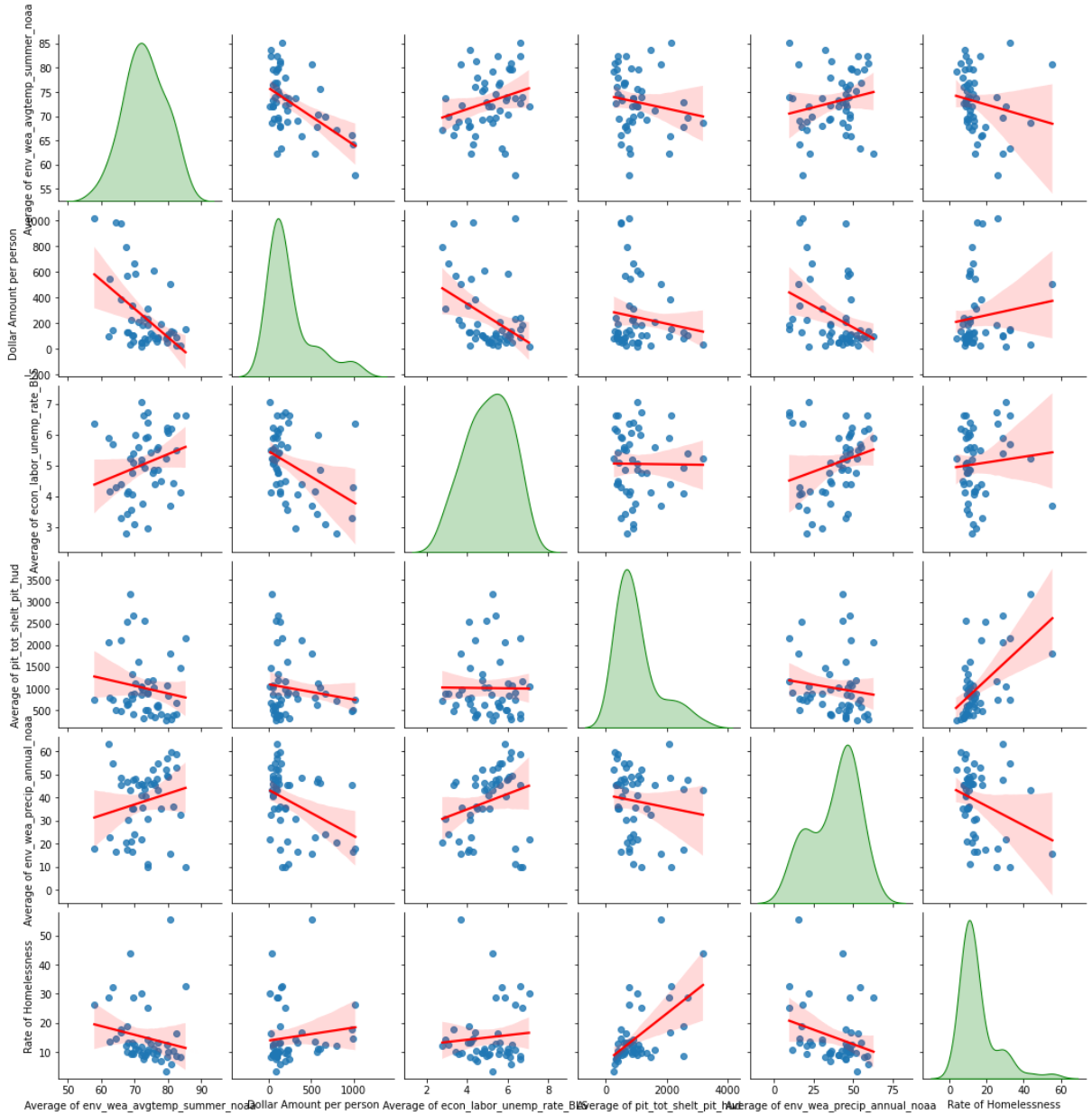
Vif 1 < 5 moderately correlated

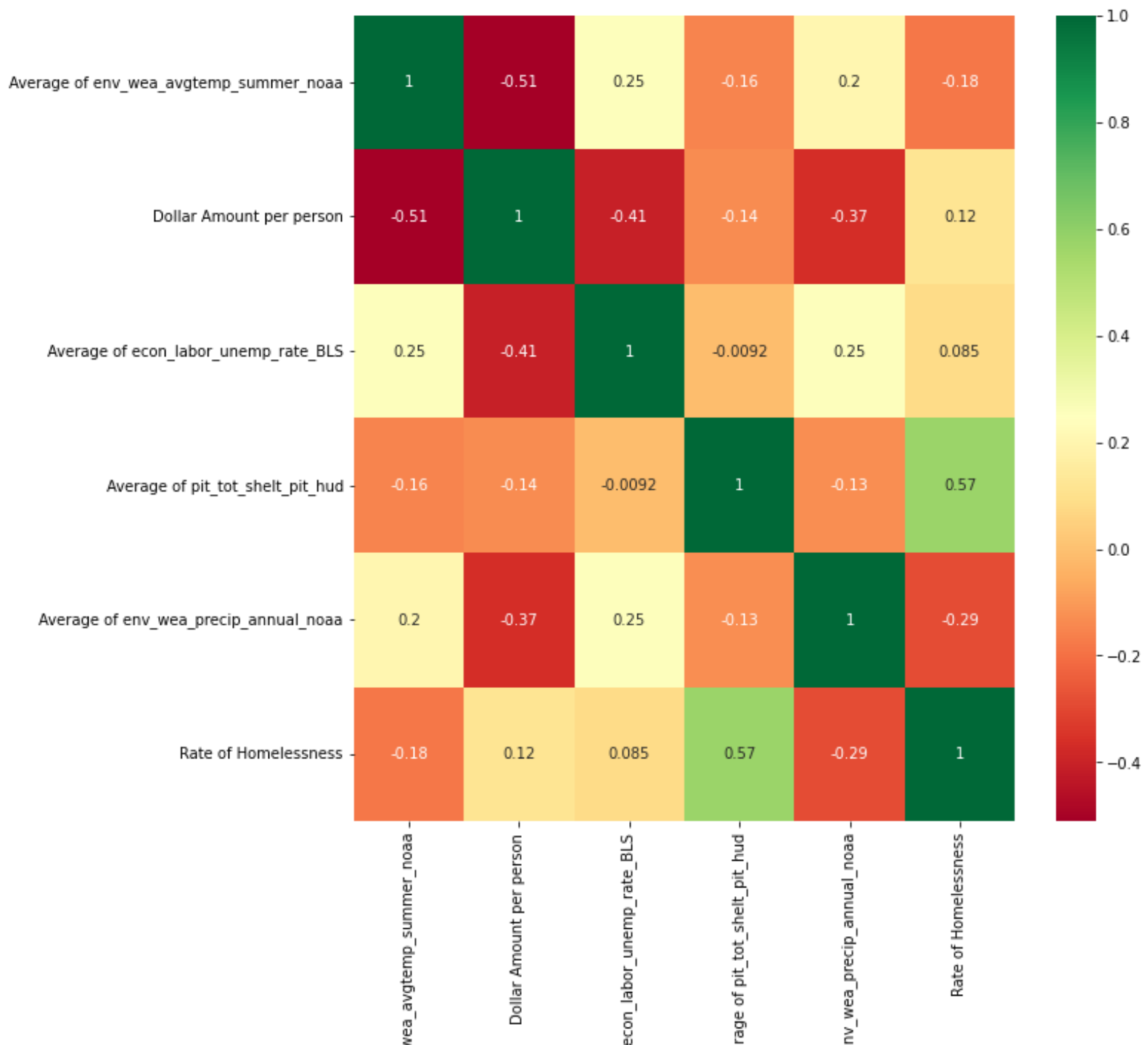
Vif 5 > correlated



Positive:
Dollar Amount,
Unemployment,
Sheltered

Negative:
Weather,
Precipitation



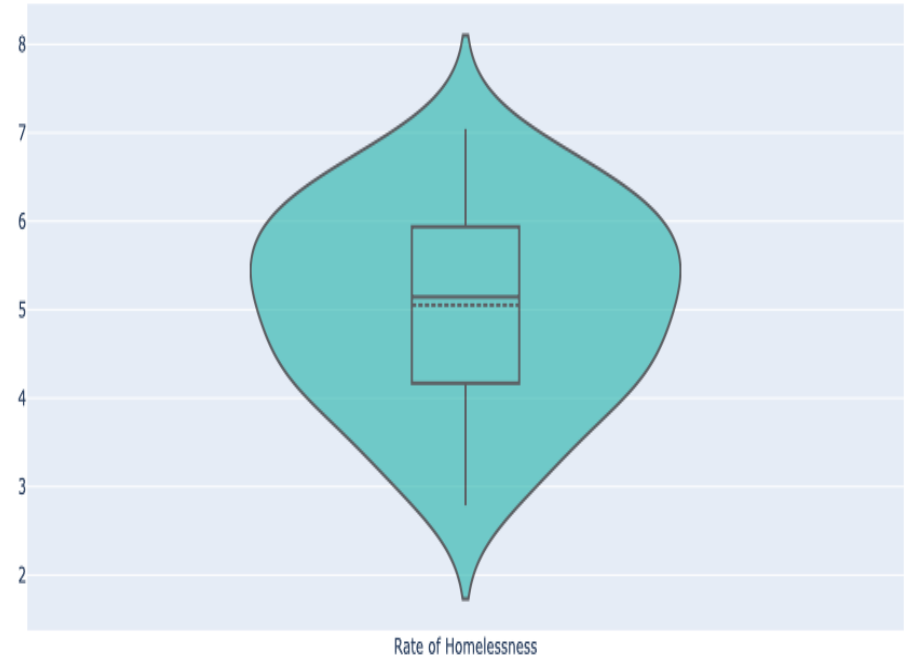


Numeric Correlation

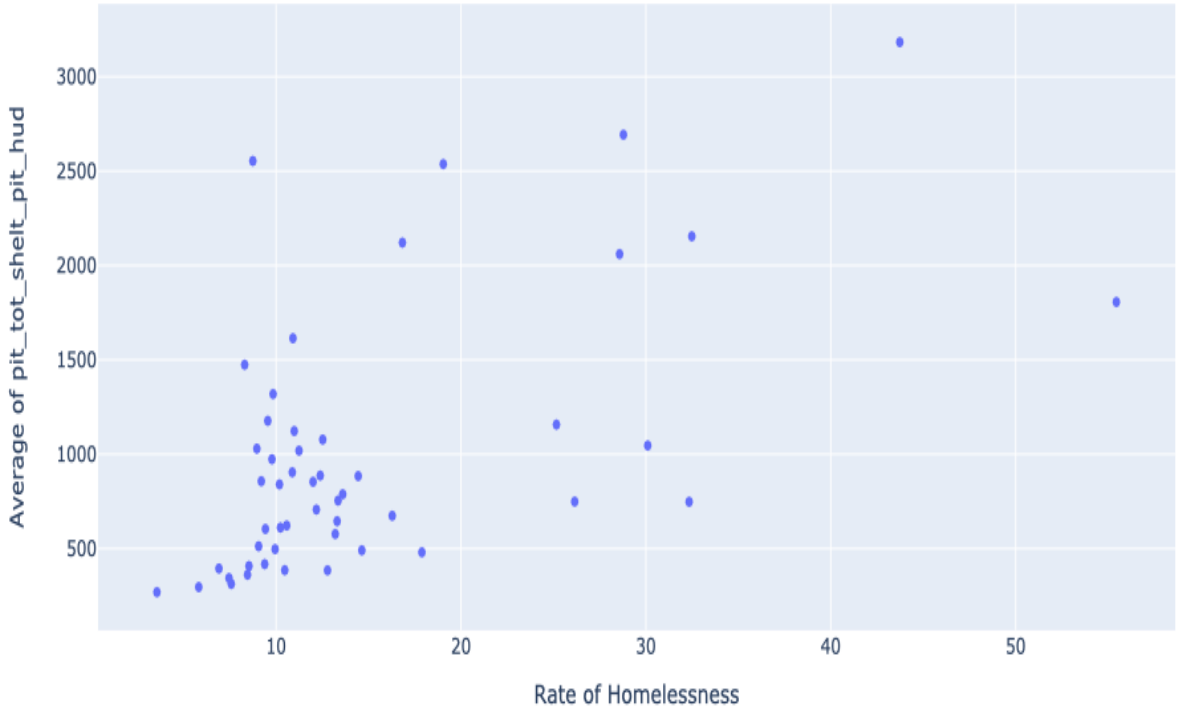
- Weather
- Accessibility
- Economic

Homelessness in relationship to higher unemployment Rate

Unemployment Rate is on the y axis

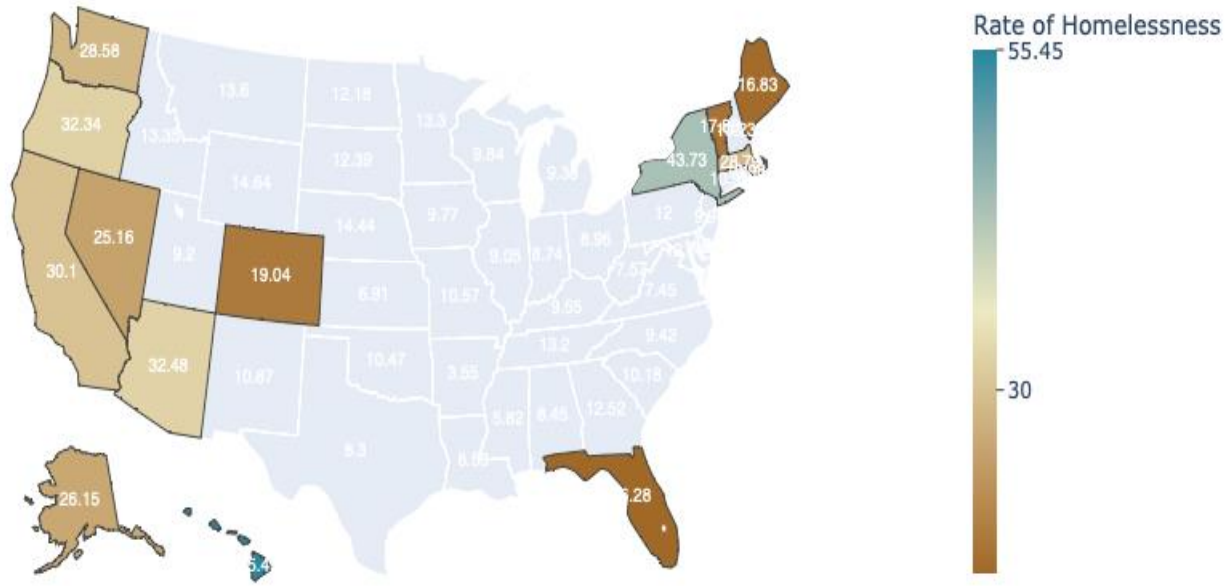


Homelessness occurs in low Sheltered areas



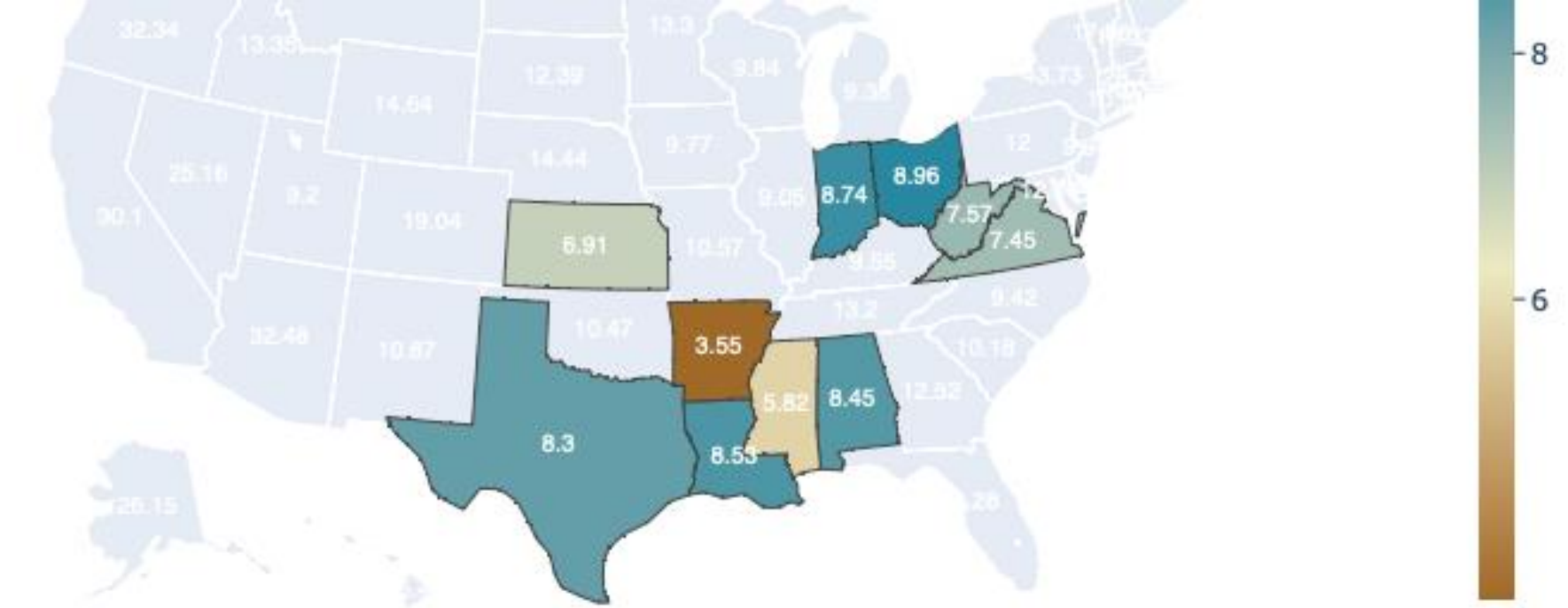
Not enough Shelters & High unemployment has impact on Higher Homelessness

For every 10,000 person that are homelessness between (15 -55)



Top States with Highest rate of homelessness

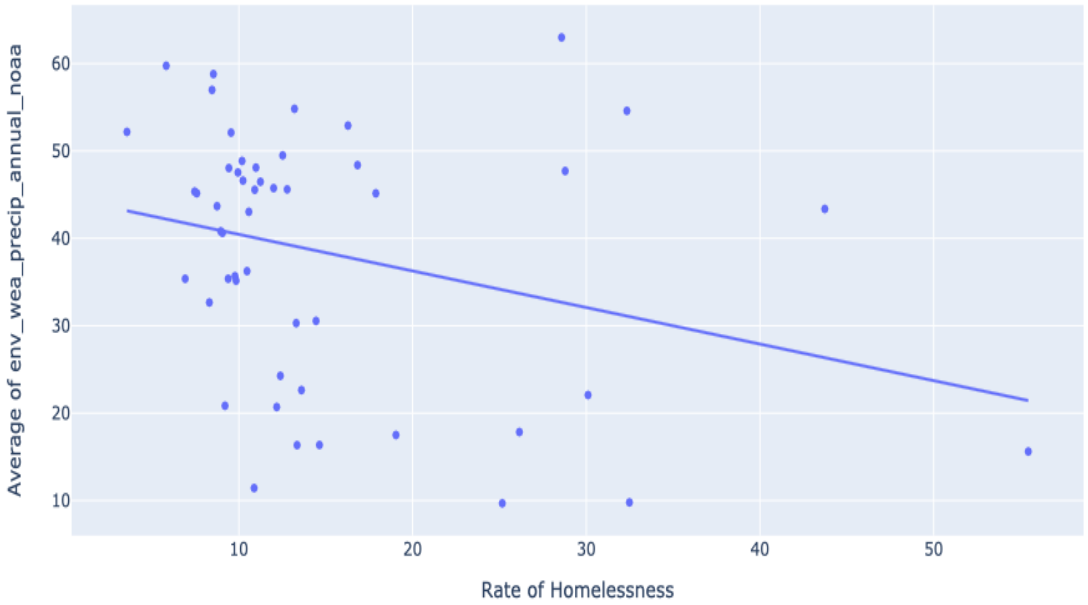
For Hawaii there are 55.45 person homeless for a population of 10,000 people	**State**
55.45	Hawaii
43.73	New York
32.48	Arizona
32.34	Oregon
30.10	California
28.79	Massachusetts
28.58	Washington



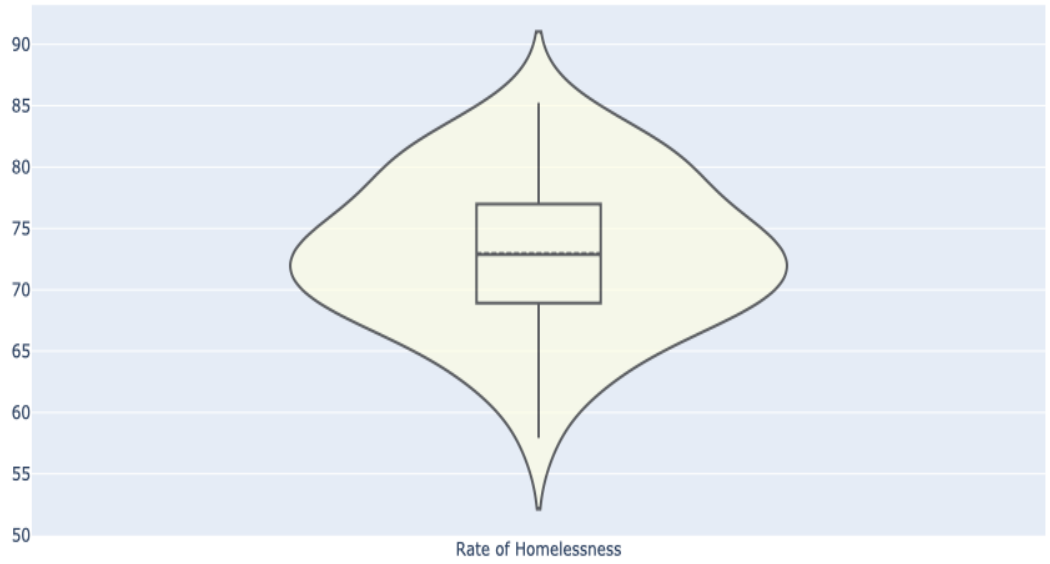
Top States with Lowest rate of homelessness

For Arkansas there are 3.35 person homeless for a population of 10,000 people	State
3.35	Arkansas
5.82	Mississippi
6.91	Kansas
7.45	Virgina
8.38	West Virgina
8.45	Texas

Rate of Homelessnes in relationship to Precipitation

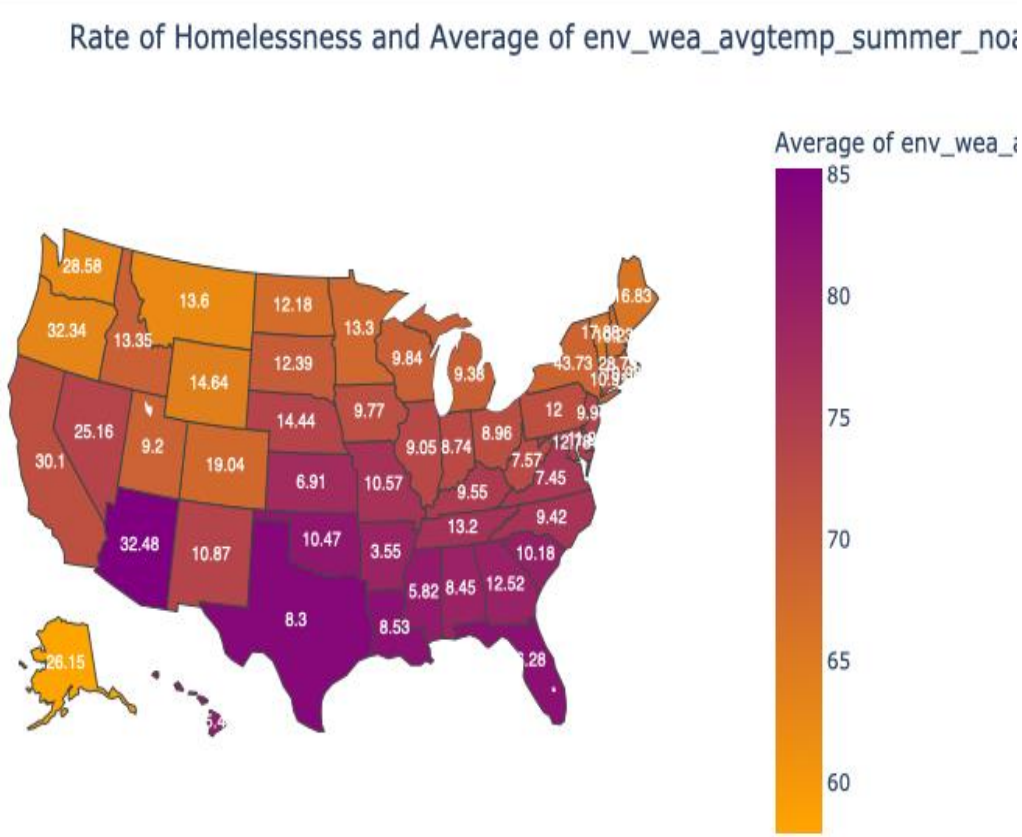


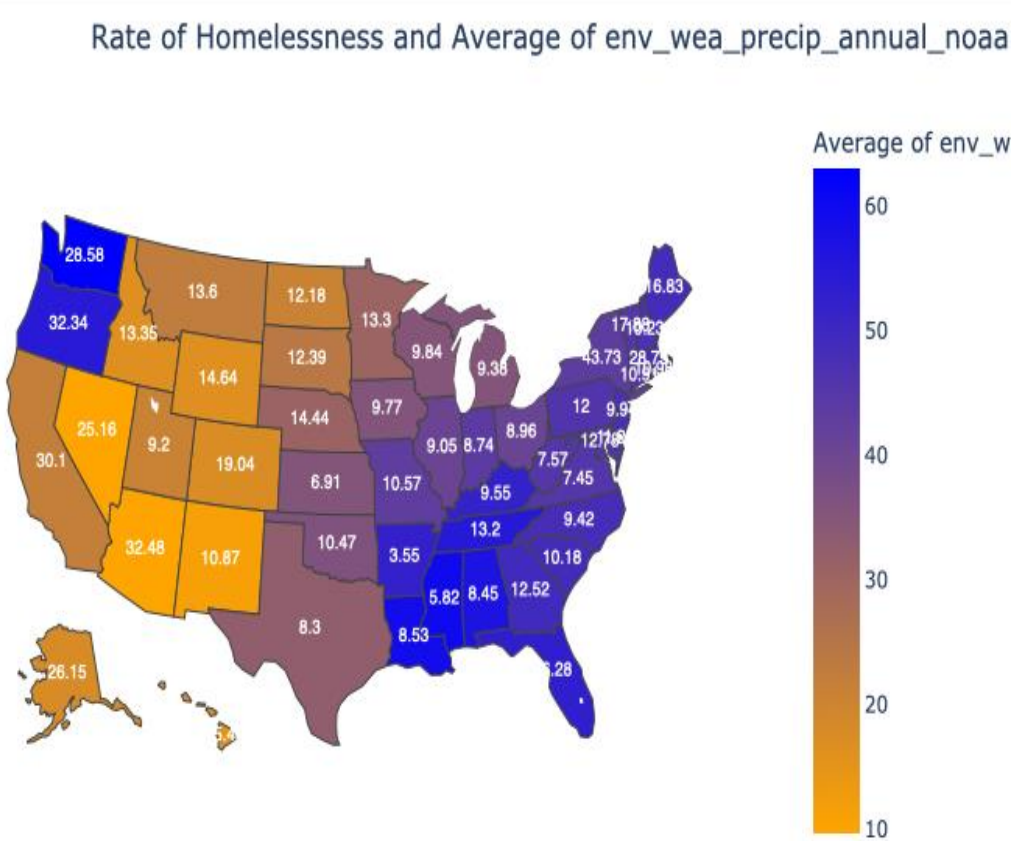
Homelessness in relationship to higher Temperature
Temperature Rate is on the y axis



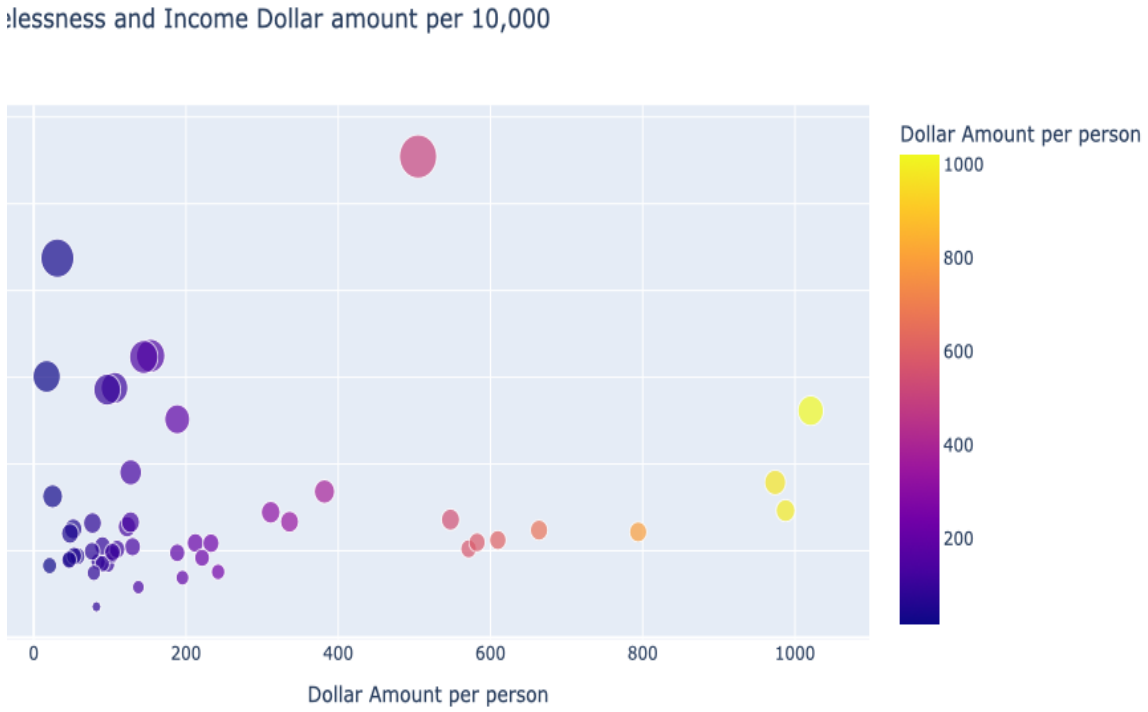
Climate Change Impact on Homelessness – Less precipitation and higher temperature

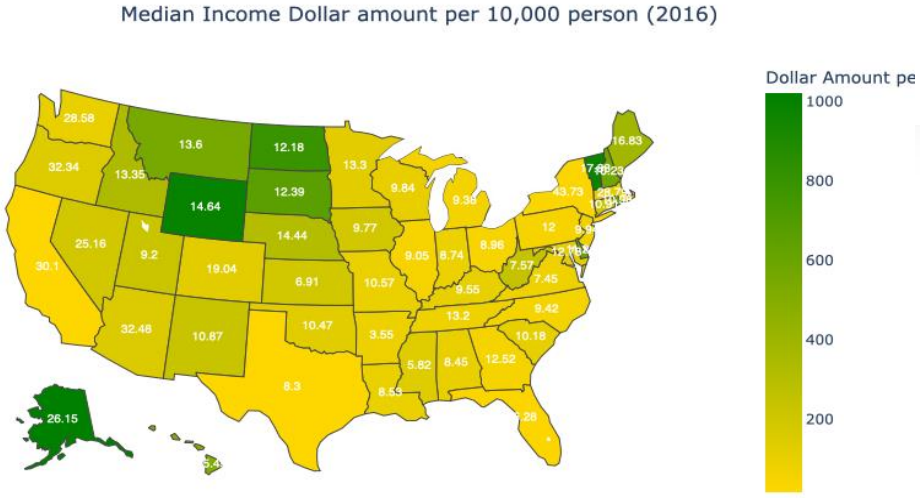
Climate Impact

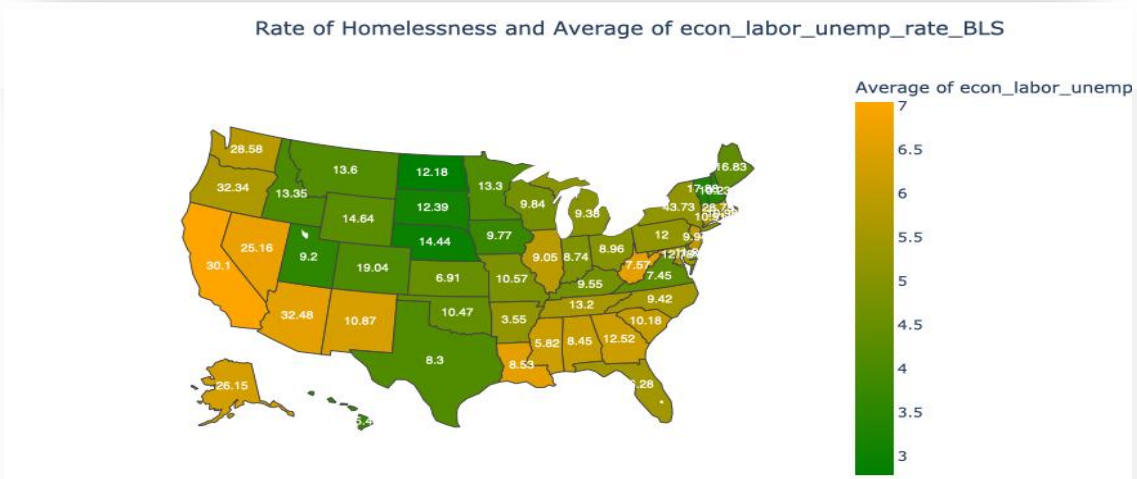




Economic Impact Low median Income Dollar, high unemployment rate

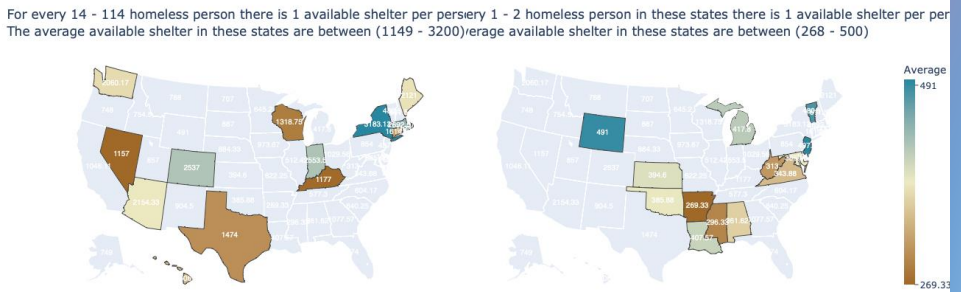






Access to Shelter per Homeless person

- For a range of 3 – 5 homeless person in states like Alaska and Oregon there is 1 shelter available. Most states do not have adequate access to shelters



Best Model

SGDRegressor ,

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R-squared: 0.42798600017979627
MSE:  53.04453210617563
RMSE:  7.283167724704383
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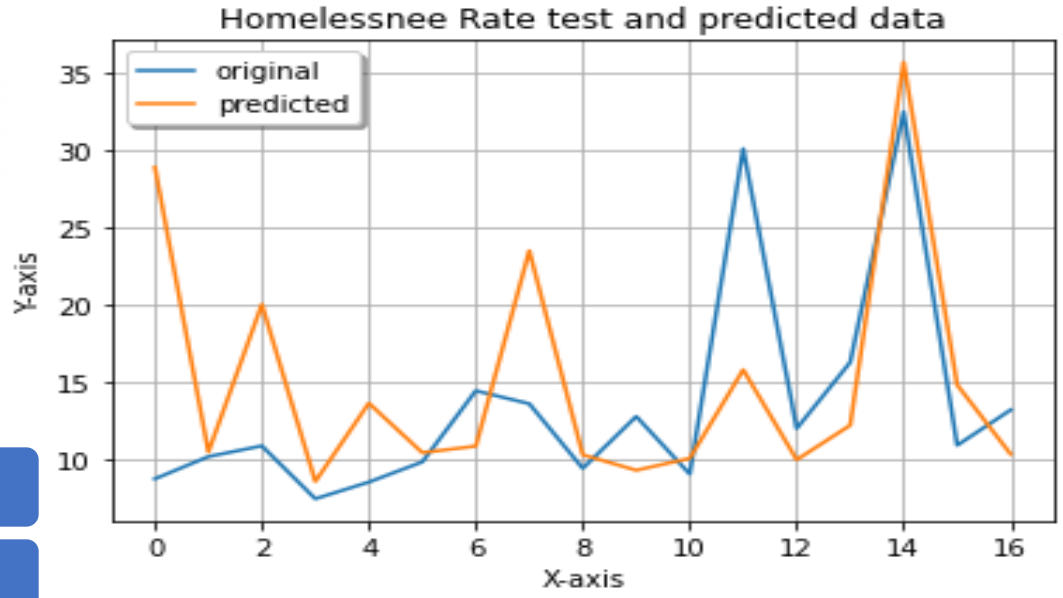
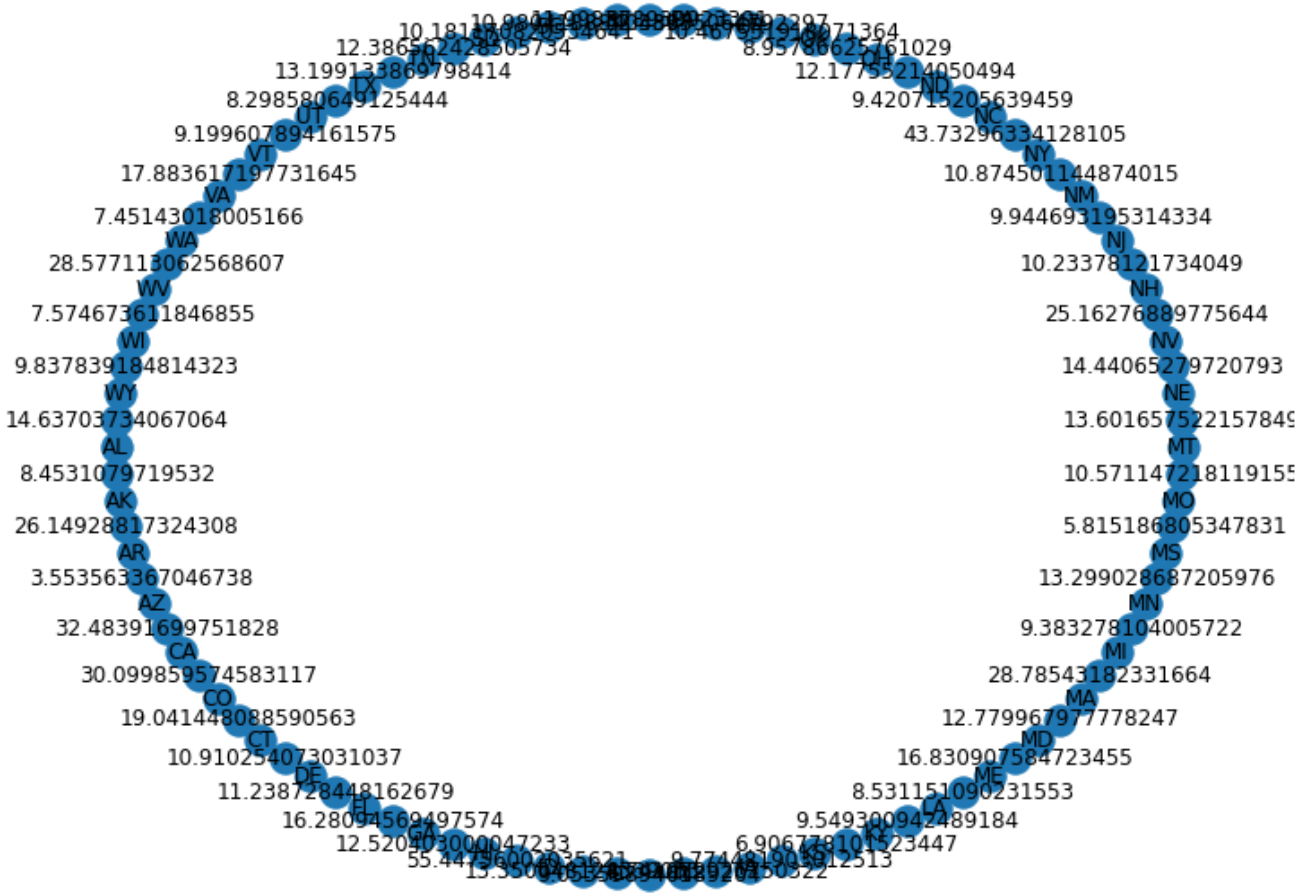


- Lasso,
- SGDRegressor ,
- LinearRegression,
- Ridge,
- BayesianRidge
- XGBRegressor
- DecisionTreeRegressor
- RandomForestRegressor

	Model	R-squared	CV mean score	Mean_Sq Error	Root Mean Square
0	(StandardScaler(), DecisionTreeRegressor())	1.00	-0.18	88.94	9.43
4	(StandardScaler(), XGBRegressor(alpha=0.4, bas...	1.00	0.19	94.79	9.74
1	(StandardScaler(), (DecisionTreeRegressor(max_...	0.89	0.33	54.69	7.40
5	(StandardScaler(), LinearRegression())	0.51	0.01	54.39	7.38
3	(StandardScaler(), Ridge())	0.51	0.08	52.33	7.23
6	(StandardScaler(), Lasso(alpha=0.4))	0.50	0.16	50.47	7.10
2	(StandardScaler(), BayesianRidge())	0.49	0.19	46.22	6.80
7	(StandardScaler(), SGDRegressor(alpha=0.4))	0.46	0.26	42.68	6.53

Insights and Factors

- Some of highest rate of Homelessness occurs in tourist states
  - Hawaii
  - New York
  - Arizona
  - Oregon
  - California
- Some of lowest rate of Homelessness per state(high precipitation, Mild Temp.)
  - Arkansas
  - Mississippi
  - Kansas
  - Virginia
  - West Virginia
- The less precipitation (snow, rain, etc) and more temperature raise
- High unemployment
- Median Low income
- Low Access to Shelters



What is next?

Graph Analysis

Revise based on comments

Test other features to see if there is an impact homelessness such as drinking water, access to health and crime levels

Question and Comments