Weather vs Gas Prices

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INTRODUCTION

Does weather have an impact on gas prices across the United States.

H: Weather does have an impact on Gas Prices

NH: There is no correlation between Weather and Gas Prices

Questions

1. What month was the hottest?
2. What month had the highest gas prices?3
3. What city is the hottest (yearly and monthly)? 4.
4. What city has the highest gas prices (yearly and monthly)?
5. How does each city compare to US average (weather and gas)?
6. Does the weather affect gas prices?

Data Sources

Gasoline Prices

U.S. Enegry Information Administration

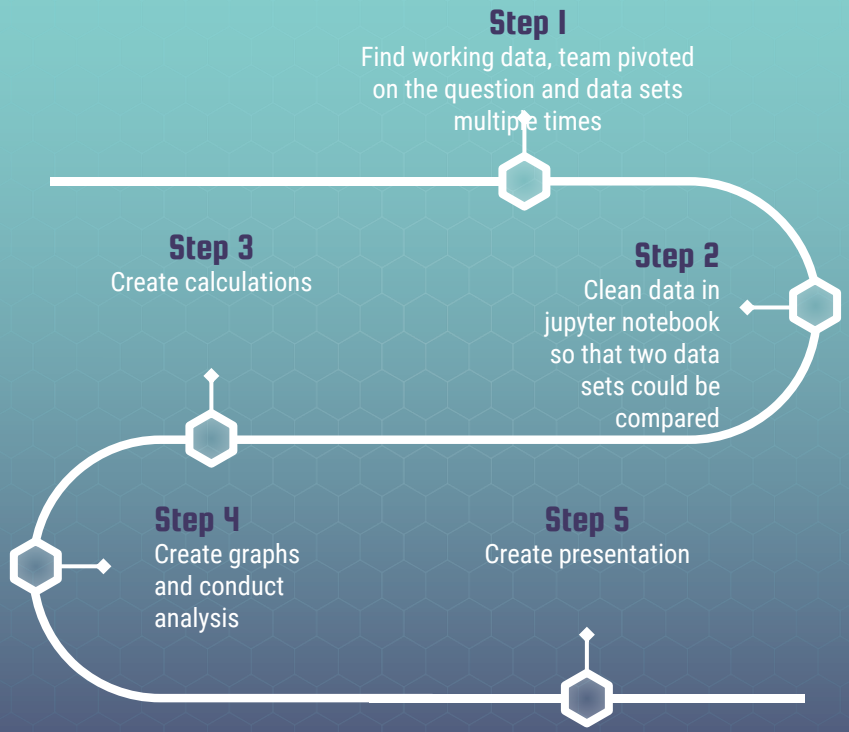
https://www.eia.gov/dnav/pet/pet_pri_gnd_a_epmr_pte_dpgal_w.htm

Weather Data

World Weather Online

https://www.worldweatheronline.com/developer/

Process


Step 1
Find working data, team pivoted on the question and data sets multiple times
Step 2
Clean data in jupyter notebook so that two data sets could be compared
Step 3
Create calculations
Step 4
Create graphs and conduct analysis
Step 5
Create presentation

Data Clean Up – Gas Prices

1. Import CSV into Jupyter
2. Rename columns to just the cities
3. Transpose City columns to one City Column
4. Filter for only 2019 Dates
5. Rename 2019 Dates
6. Add a unique column to merge on

	Date	Boston, MA Regular All Formulations Retail Gasoline Prices (Dollars per Gallon)	Chicago Regular All Formulations Retail Gasoline Prices (Dollars per Gallon)	Cleveland, OH Regular All Formulations Retail Gasoline Prices (Dollars per Gallon)	Denver Regular All Formulations Retail Gasoline Prices (Dollars per Gallon)	Houston Regular All Formulations Retail Gasoline Prices (Dollars per Gallon)	Los Angeles Regular All Formulations Retail Gasoline Prices (Dollars per Gallon)	Miami, FL Regular All Formulations Retail Gasoline Prices (Dollars per Gallon)	New York City Regular All Formulations Retail Gasoline Prices (Dollars per Gallon)	San Francisco Regular All Formulations Retail Gasoline Prices (Dollars per Gallon)	Seattle, WA Regular All Formulations Retail Gasoline Prices (Dollars per Gallon)
0	Jun-2000	NaN	2.034	NaN	1.566	1.526	1.543	NaN	1.663	1.770	NaN
1	Jul-2000	NaN	1.570	NaN	1.605	1.537	1.597	NaN	1.696	1.856	NaN
2	Aug-2000	NaN	1.365	NaN	1.497	1.463	1.541	NaN	1.638	1.854	NaN
3	Sep-2000	NaN	1.520	NaN	1.543	1.447	1.682	NaN	1.629	1.957	NaN
4	Oct-2000	NaN	1.512	NaN	1.529	1.418	1.700	NaN	1.611	1.949	NaN

	Date	City	Gas Price	Unique
0	01-January	Boston	2.429	01-JanuaryBoston
1	02-February	Boston	2.372	02-FebruaryBoston
2	03-March	Boston	2.443	03-MarchBoston
3	04-April	Boston	2.657	04-AprilBoston
4	05-May	Boston	2.819	05-MayBoston
...	...	...	...	...
115	08-August	Seattle	3.285	08-AugustSeattle
116	09-September	Seattle	3.251	09-SeptemberSeattle
117	10-October	Seattle	3.373	10-OctoberSeattle
118	11-November	Seattle	3.401	11-NovemberSeattle
119	12-December	Seattle	3.248	12-DecemberSeattle

Data Clean Up – Weather

1. Import CSV into Jupyter
2. Drop Unecessary columns
3. Transpose Date columns to one Date Column
4. Rename 2019 Dates
5. Add a unique column to merge on

	Unnamed: 0	City	January	February	March	April	May	June	July	August	September	October	November	December
0	0	Boston	30.58	33.50	38.52	53.40	60.87	71.63	80.19	76.55	67.73	58.06	43.37	36.00
1	1	Chicago	22.45	28.89	35.58	48.63	57.29	67.90	79.13	76.26	71.97	55.90	37.07	36.58
2	2	Cleveland	24.71	31.54	34.26	49.83	60.61	69.30	78.35	74.32	70.17	58.03	37.70	36.32
3	3	Denver	32.39	31.75	39.90	53.37	55.68	69.17	78.06	76.90	71.67	47.68	40.30	34.77
4	4	Houston	52.00	60.36	63.90	73.67	82.55	87.60	87.87	89.74	85.70	75.90	63.20	60.61
5	5	Los Angeles	58.42	54.86	66.23	71.33	69.00	76.87	82.52	84.39	80.80	78.52	70.87	61.71
6	6	Miami	68.81	74.64	74.97	79.57	82.77	85.77	85.94	86.39	82.63	82.58	76.97	75.13
7	7	New York	33.58	37.11	42.06	56.37	64.68	74.10	81.65	78.00	71.77	62.16	46.07	41.00
8	8	San Francisco	52.90	50.71	56.55	63.50	61.81	70.20	68.90	71.29	69.53	66.29	60.87	54.48
9	9	Seattle	44.68	36.61	50.29	54.97	65.77	68.43	72.87	74.03	64.83	53.23	47.80	43.45

	Date	City	Weather	Unique
0	01-January	Boston	30.58	01-JanuaryBoston
1	01-January	Chicago	22.45	01-JanuaryChicago
2	01-January	Cleveland	24.71	01-JanuaryCleveland
3	01-January	Denver	32.39	01-JanuaryDenver
4	01-January	Houston	52.00	01-JanuaryHouston
...	...	...	...	...
115	12-December	Los Angeles	61.71	12-DecemberLos Angeles
116	12-December	Miami	75.13	12-DecemberMiami
117	12-December	New York	41.00	12-DecemberNew York
118	12-December	San Francisco	54.48	12-DecemberSan Francisco
119	12-December	Seattle	43.45	12-DecemberSeattle

Merge Data

1. Left Merge on Column - Unique
2. Rename Columns
3. Drop Columns

```
#Merge Tables
Combined = pd.merge(left=Temps, right=Gas, how='left', left_on='Unique', right_on='Unique')

Combined
```

	Date_x	City_x	Weather	Unique	Date_y	City_
0	01-January	Boston	30.58	01-JanuaryBoston	01-January	Bosto
1	01-January	Chicago	22.45	01-JanuaryChicago	01-January	Chicag
2	01-January	Cleveland	24.71	01-JanuaryCleveland	01-January	Clevelan
3	01-January	Denver	32.39	01-JanuaryDenver	01-January	Denve
4	01-January	Houston	52.00	01-JanuaryHouston	01-January	Housto
...	...	...	...	...	...	.
115	12-December	Los Angeles	61.71	12-DecemberLos Angeles	12-December	Los Angele
116	12-December	Miami	75.13	12-DecemberMiami	12-December	Miam
117	12-December	New York	41.00	12-DecemberNew York	12-December	New Yor
118	12-December	San Francisco	54.48	12-DecemberSan Francisco	12-December	San Francisc
119	12-December	Seattle	43.45	12-DecemberSeattle	12-December	Seattl

```
# Rename Columns
Combined = Combined.rename(columns={"Date_x": "Date",
                                    "City_x": "City"})
Combined
```

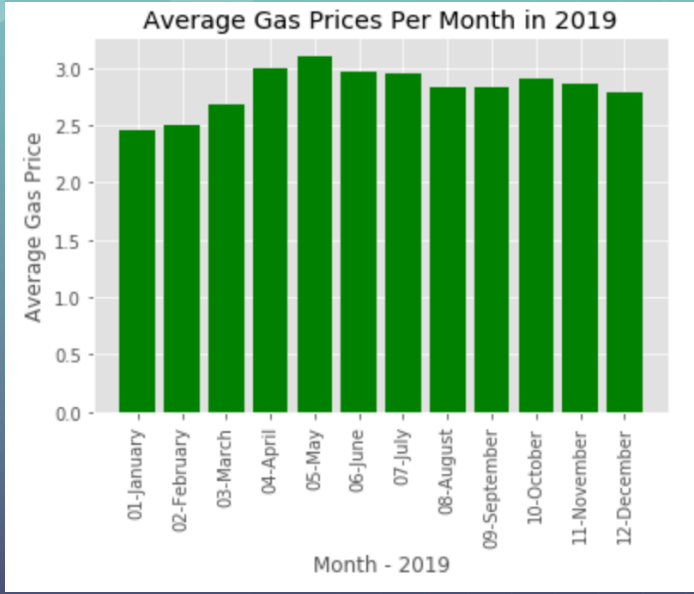
	Date	City	Weather	Unique	Date_y	City_y	Gas
0	01-January	Boston	30.58	01-JanuaryBoston	01-January	Boston	
1	01-January	Chicago	22.45	01-JanuaryChicago	01-January	Chicago	
2	01-January	Cleveland	24.71	01-JanuaryCleveland	01-January	Cleveland	
3	01-January	Denver	32.39	01-JanuaryDenver	01-January	Denver	
4	01-January	Houston	52.00	01-JanuaryHouston	01-January	Houston	
...	...	...	...	...	...	...	
115	12-December	Los Angeles	61.71	12-DecemberLos Angeles	12-December	Los Angeles	
116	12-December	Miami	75.13	12-DecemberMiami	12-December	Miami	
117	12-December	New York	41.00	12-DecemberNew York	12-December	New York	2.532
118	12-December	San Francisco	54.48	12-DecemberSan Francisco	12-December	San Francisco	3.566
119	12-December	Seattle	43.45	12-DecemberSeattle	12-December	Seattle	3.248

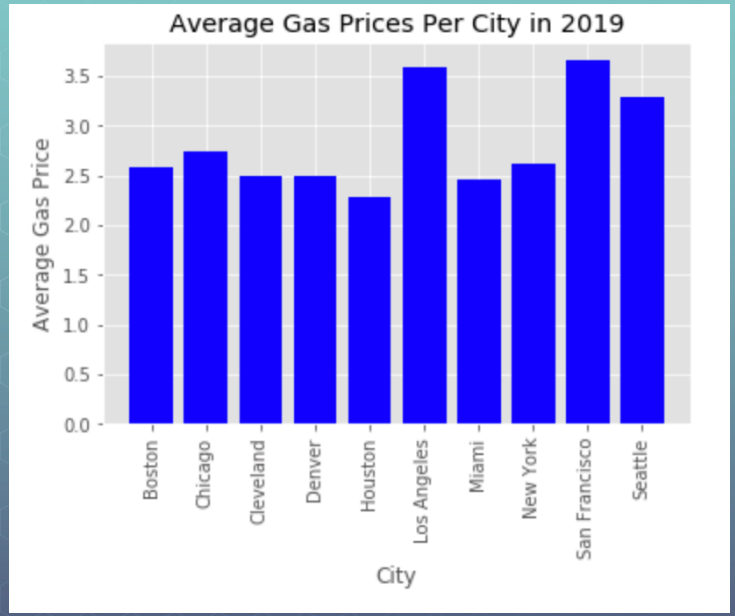
```
# Drop Columns
Combined = Combined.drop(['Unique','Date_y','City_y'], axis=1)
Combined
```

	Date	City	Weather	Gas Price
0	01-January	Boston	30.58	2.429
1	01-January	Chicago	22.45	2.149
2	01-January	Cleveland	24.71	1.989
3	01-January	Denver	32.39	2.043
4	01-January	Houston	52.00	1.930
...	...	...	...	...
115	12-December	Los Angeles	61.71	3.530
116	12-December	Miami	75.13	2.448
117	12-December	New York	41.00	2.532
118	12-December	San Francisco	54.48	3.566
119	12-December	Seattle	43.45	3.248

Gas Data

$3.11 – May

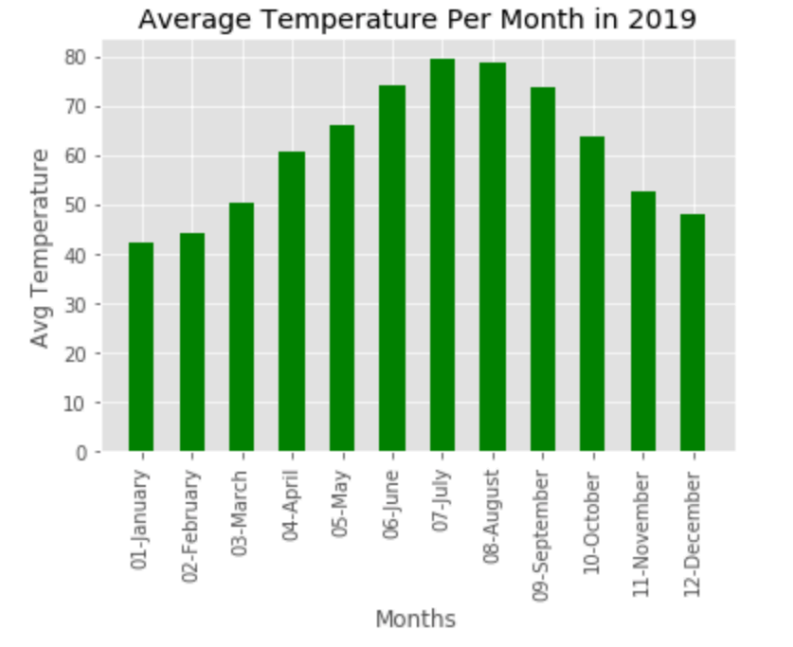


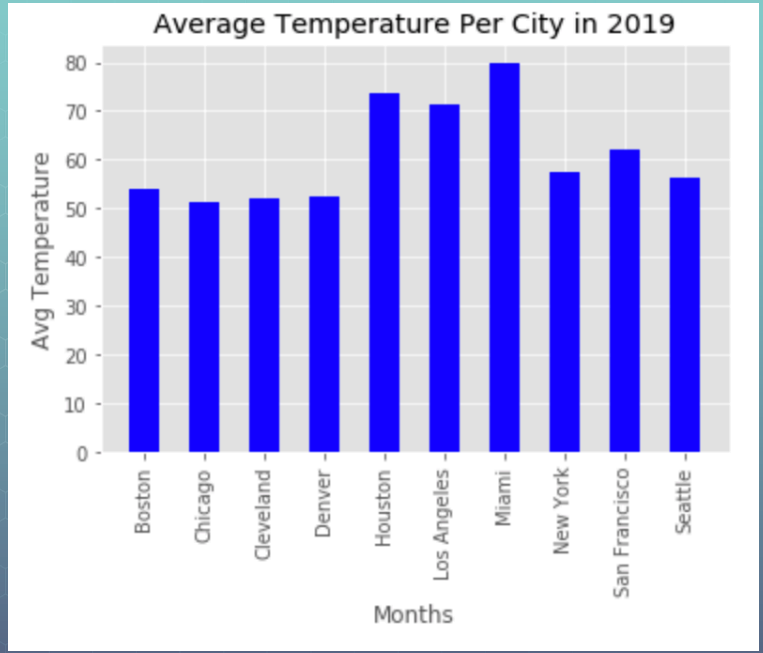


$3.65 – San Francisco

Weather Data

79.54 – May

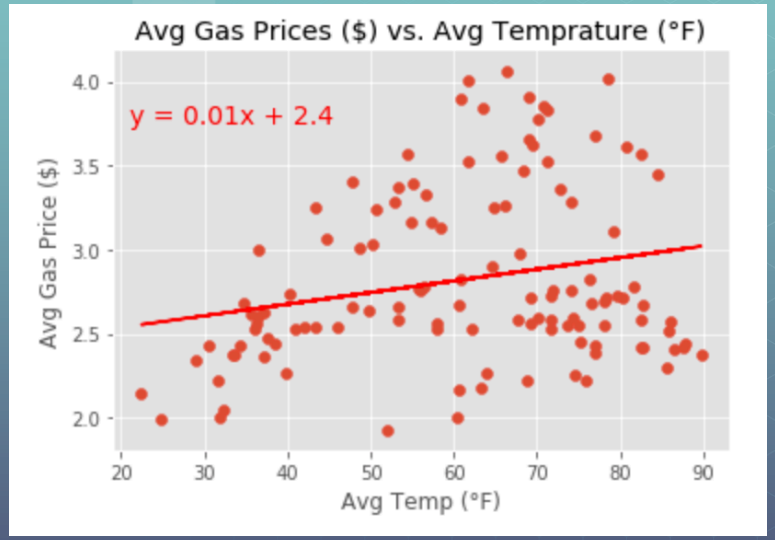


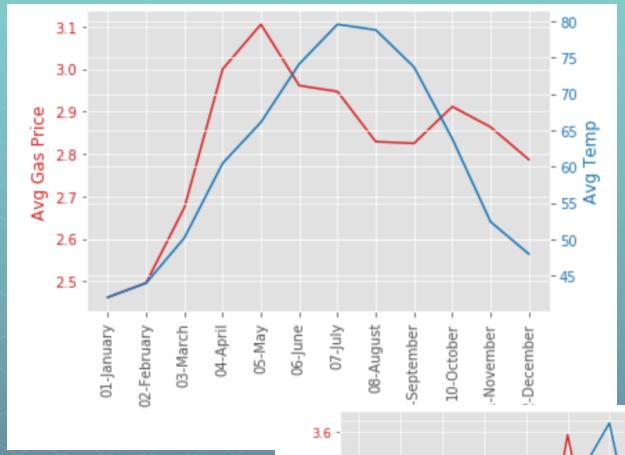


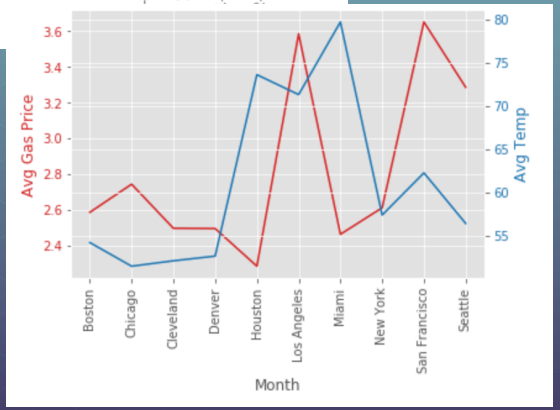
79.68 – Miami

Gas/Weather Data

The correlation coefficient between temperature and gas prices is 0.23 and shows that there is a weak correlation







Summary

There is no correlation between temperature and gas price.

Final Project Folder:
https://github.com/stephenkmin/Project-1/tree/master/Final%20Project