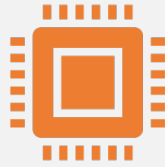# Exploring the Fastest Growing U.S. Cities

Tom Allen

IBM Data Science Certification Capstone

2/9/2020

Background

Technology and applications have made exploring a different area easier than ever

Cities are becoming more dense causing issues including rising housing costs, increased traffic and lack of supporting infrastructure

I wanted to see what cities and areas are growing the most and any patterns between them

DATA COLLECTION

1,000 Largest Cities in U.S.

- Link to dataset here

- Listed the largest cities in the United States and their coordinates

- Also contains the population growth in each of the cities

	City	Rank	State	Growth From 2000 to 2013	Population	Coordinates
0	Marysville	552	Washington	115.7	63269	48.0517637,-122.1770818
1	Perris	466	California	98.7	72326	33.7825194,-117.2286478
2	Cleveland	48	Ohio	-18.1	390113	41.49932,-81.6943605
3	Worcester	129	Massachusetts	5.8	182544	42.2625932,-71.8022934
4	Columbia	192	South Carolina	11.7	133358	34.0007104,-81.0348144

First 5 rows of dataset

U.S. States with Regions

- Contains every U.S. state with their Region/Division

- Will be used to merge with the main dataset to get the regions

	State	State Code	Region	Division
0	Alaska	AK	West	Pacific
1	Alabama	AL	South	East South Central
2	Arkansas	AR	South	West South Central
3	Arizona	AZ	West	Mountain
4	California	CA	West	Pacific

First 5 rows of dataset

Data Cleaning
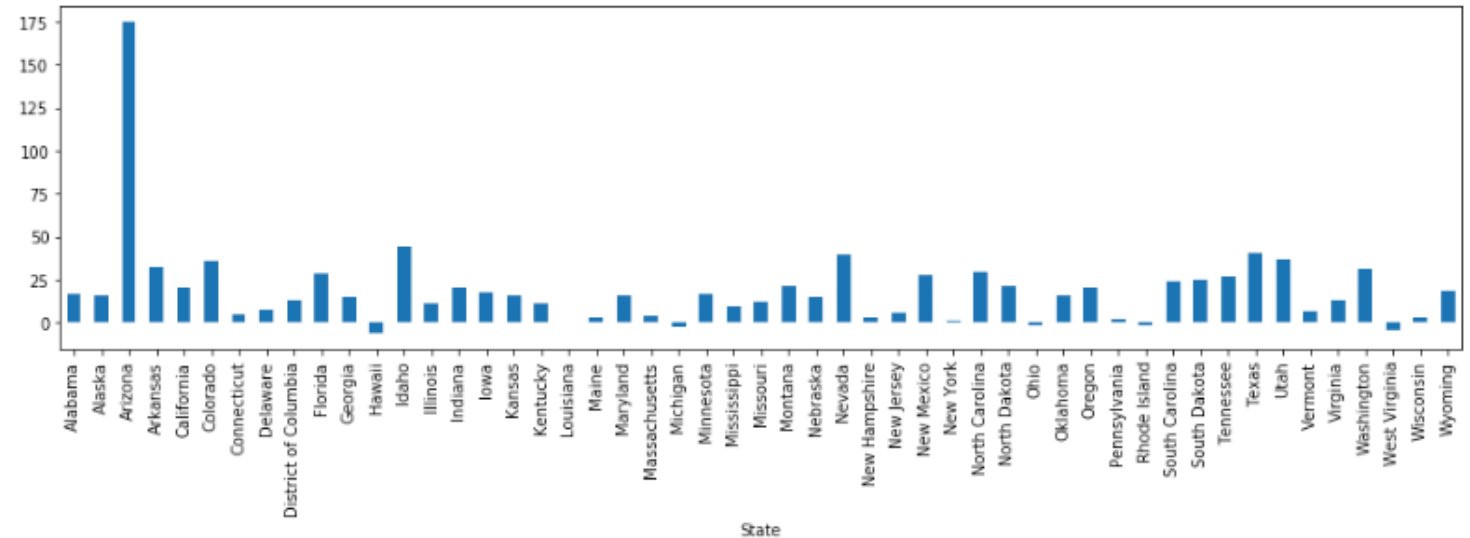
- Data was clean to begin with
  - No missing values, errors or duplicates
1) Split Coordinates column into Latitude and Longitude columns
2) Merged datasets on State key to get regions for each state
3) Created two different data frames to analyze
   1) Top 10 Most Populous Cities
   2) Top 10 Fastest Growing Cities

	City	Rank	State	Growth	Population	Latitude	Longitude	State Code	Division
0	Maricopa	817	Arizona	2503.4	45508	33.058106	-112.047642	AZ	Mountain
1	Buckeye	641	Arizona	480.9	56683	33.370320	-112.583777	AZ	Mountain
2	Frisco	186	Texas	287.7	136791	33.150674	-96.823612	TX	West South Central
3	Lincoln	822	California	285.2	45237	38.891565	-121.293008	CA	Pacific
4	Surprise	216	Arizona	281.9	123546	33.629234	-112.367928	AZ	Mountain
5	Goodyear	462	Arizona	271.0	72864	33.435339	-112.357657	AZ	Mountain
6	Beaumont	910	California	254.5	40481	33.929461	-116.977248	CA	Pacific
7	Plainfield	879	Illinois	203.6	41734	41.632223	-88.212031	IL	East North Central
8	Wylie	828	Texas	185.2	44575	33.015120	-96.538879	TX	West South Central
9	Lehi	673	Utah	176.3	54382	40.391617	-111.850766	UT	Mountain

First 10 rows of dataset
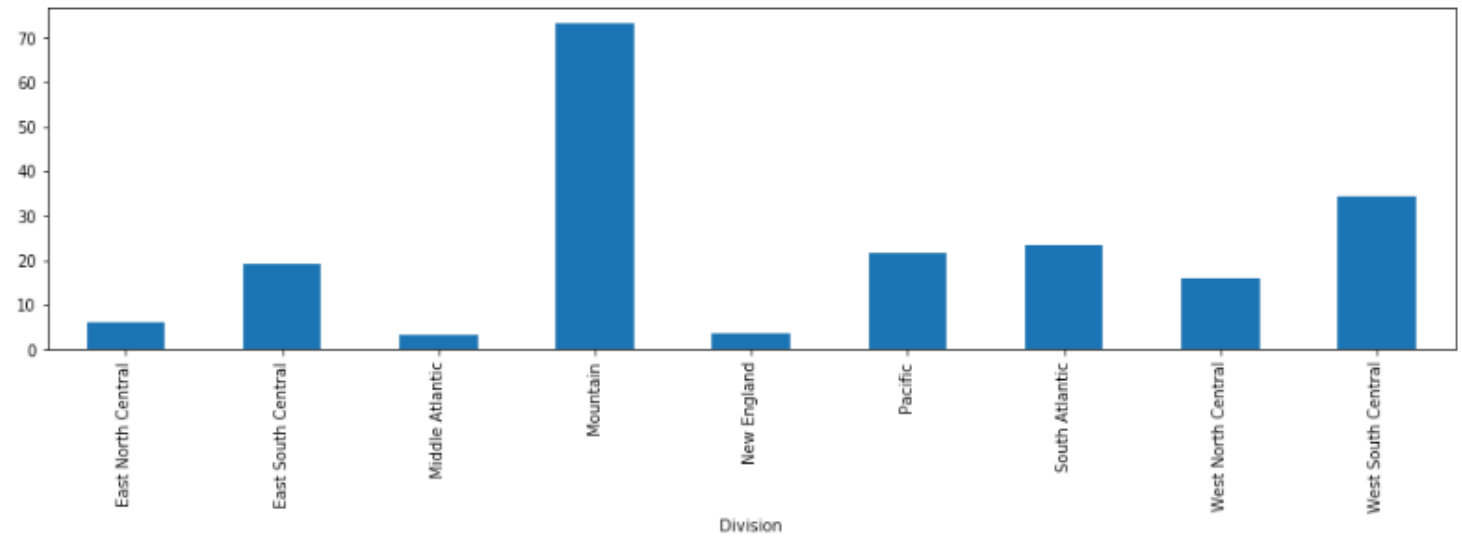
Fastest Growing States

- Grouped by state and aggregated by the mean of the growth rate
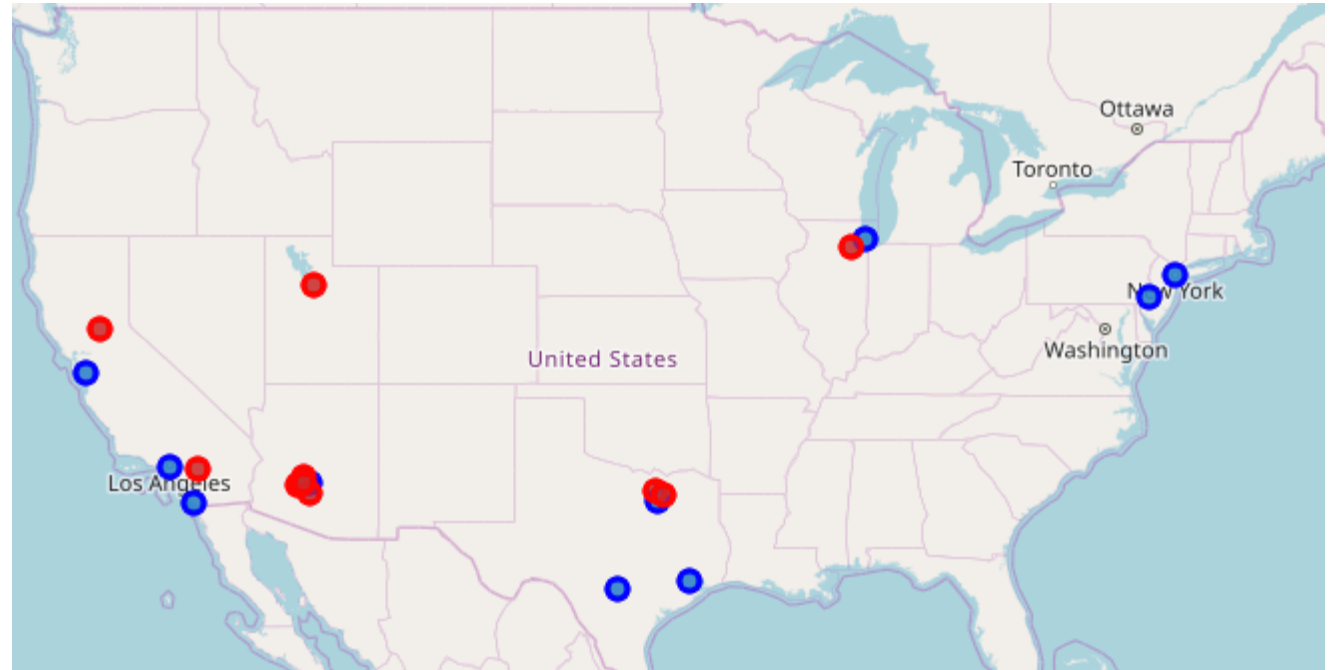- Arizona, Idaho, Nevada and Texas were the fastest growing states

Fastest Growing Regions

- Grouped by region and aggregated by the mean of the growth rate
- Mountain Region
  - Arizona, Colorado, Idaho, Montana, New Mexico, Nevada, Wyoming
- West South Central
  - Arkansas, Louisiana, Oklahoma, Texas

Fast Growing vs Most Populous

- Used a Folium map to plot the fastest growing vs the most populous cities

- Seems the fastest growing cities are located near major cities

  - The major cities becoming to clustered forcing people to move outside?

Foursqaure

- The Foursqaure API allows users to extract data from certain locations
  - Venues, tips, users, weather, etc.

- Requires client identification number and client secret number
- https://foursquare.com/

Getting Nearby Venues

- Using the Foursqaure API to get nearby venues in a 500-meter radius of the fastest growing cities

- Returned the city, venue and its respective category

	City	City Latitude	City Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Maricopa	33.058106	-112.047642	Honeycutt Coffee	33.058341	-112.044423	Coffee Shop
1	Maricopa	33.058106	-112.047642	Helen's Kitchen	33.053753	-112.048868	American Restaurant
2	Maricopa	33.058106	-112.047642	Domino's Pizza	33.061536	-112.048774	Pizza Place
3	Maricopa	33.058106	-112.047642	Amtrak Maricopa Station	33.056270	-112.048117	Train Station
4	Maricopa	33.058106	-112.047642	Head Quarters	33.058179	-112.048288	American Restaurant
...	...	...	...	...	...	...	...
106	Lehi	40.391617	-111.850766	Thai House	40.387930	-111.853502	Thai Restaurant
107	Lehi	40.391617	-111.850766	Domino's Pizza	40.387779	-111.851021	Pizza Place
108	Lehi	40.391617	-111.850766	SHED BUILDERS	40.393970	-111.852163	Business Service
109	Lehi	40.391617	-111.850766	John Hutchings Museum of Natural History	40.388462	-111.849489	History Museum
110	Lehi	40.391617	-111.850766	Wines Park	40.394434	-111.848239	Park

Venue Category Frequency

- Grouping by category type to see which kinds of venues are most frequent

- Could tell a better story about which types of venues a city tends to attract

```
----Lincoln----
            venue  freq
0  Mexican Restaurant  0.15
1                 ATM  0.10
2       Grocery Store  0.10
3      Breakfast Spot  0.10
4      Sandwich Place  0.10


----Maricopa----
              venue  freq
0  American Restaurant  0.14
1                 Gym  0.07
2      Breakfast Spot  0.07
3         Gas Station  0.07
4    Martial Arts Dojo  0.07


----Plainfield----
             venue  freq
0             Trail  0.5
1  Business Service  0.5
2               ATM  0.0
3  Photography Studio  0.0
4             Hotel  0.0
```

```
----Beaumont----
               venue  freq
0  Fast Food Restaurant  0.21
1                 Hotel  0.07
2    Mexican Restaurant  0.07
3          Dessert Shop  0.07
4            Coffee Shop  0.07


----Buckeye----
              venue  freq
0  Mexican Restaurant  0.14
1      Discount Store  0.14
2         Video Store  0.07
3         Gas Station  0.07
4          Coffee Shop  0.07


----Frisco----
               venue  freq
0   Mexican Restaurant  0.15
1  American Restaurant  0.10
2           Food Truck  0.10
3             Boutique  0.05
4                Diner  0.05
```

```
----Goodyear----
                                    venue  freq
0  Residential Building (Apartment / Condo)  0.4
1                         Automotive Shop   0.2
2                            Intersection   0.2
3                                Bus Stop   0.2
4                      Photography Studio   0.0


----Lehi----
                 venue  freq
0       History Museum  0.14
1          Pizza Place  0.14
2  Gym / Fitness Center  0.14
3               Bakery  0.14
4      Thai Restaurant  0.14


----Lincoln----
             venue  freq
0  Mexican Restaurant  0.15
1                 ATM  0.10
2       Grocery Store  0.10
3      Breakfast Spot  0.10
4      Sandwich Place  0.10
```

Conclusion

Observations

Mountain region was the fastest growing area

- Are people wanting to move to warmer climates or are businesses re-locating here?

Fastest growing cities were located outside of major cities

- Is traffic becoming a major problem? Housing prices increasing too much?

These types of observations could help entrepreneurs locate their businesses in high-growth markets with the potential of having a first-mover advantage

RECOMMENDATIONS

Mexican Restaurant in Mountain Region

- Mexican restaurants are extremely popular in the Mountain Region

- This is a high-growth market, near the Mexico border which could have a lot of Mexican influence

- Place restaurant strategically near other popular venues that attract a lot of foot traffic

Moving Outside of Major Cities

- Areas outside of major cities are growing at a fast pace

- Movers could see benefits of moving to these areas early

  - Lower purchase price of homes

    - Can sell when these areas grow even more

  - Take advantage of lower city taxes