Analysis of Park Acres in Logan UT

Data Science Capstone - IBM Data Science Professional Certificate on Coursera

The City of Logan, Utah has seem significant growth in the last decade. Their is a budget surplus this fiscal year. The mayor would like to know how to best use this surplus, and one strategy would be to increase the city's parks budget. In order to align her city's park land with that of similar sized cities in the state, she has asked for the current park acreage in her city to be assessed to determine if Logan needs a new park.

Introduction

Parks are an essential public service. Access to parks and recreation facilities leads to healthy lifestyles. Playing at parks encourage the development of socialization skills, improves coordination and self-esteem. Strong evidence shows that when people have access to parks, they exercise more. As the obesity rates in this country increase parks will play an increasing role in encouraging physical activity.

Another benefit of parks is they provide a green space in a city. Green spaces improve the physical and mental health of people which in turn improves their quality of life. Parks are important because many trees are planted and maintained. Protecting trees are important as they clean the air we breathe and provide shade. It is estimated that in the United States, trees grown in urban areas remove 75,000 tons of air pollutants annually. Parks provide an excellent place to foster new tree.

There are also social benefits for a city having parks. Parks are a reflection of the quality of life in a community. They are a major factor in the perception of quality of life in a community. Parks and recreation services are often cited as one of the most important factors in surveys of how livable communities are. Not only can parks bring a sense of community but they can also reduce crime. Access to parks has been strongly linked to reductions in crime and to reduced juvenile delinquency.

Parks can help the economy in the city they are located. Parks increase property value of residential properties by as much as 20%. The economic impact that large tournaments, competitions and special events hosted in public parks bring to the local economy can offset park maintenance operating budgets. Having destination attractions in parks such as exhibits and state-of-the-art play spaces also attract tourist dollars.

Despite all the benefits that parks bring to the community parks are often overlooked and are not readily available to some of the population. As population increases the parks acreage does not always follow suite. It is important for city leader to take a look at its park acreage and access if they need add parks to their city.

Data

In 1914 Charles Downing Lay, a landscape architect for New York State, said that 12.5 percent of the total area of the city should be devoted to parks which is quite a lot of land devoted to parks and not really a realistic expectation. By 1940 about one quarter of all cities having park facilities met the standard of one acre per 100 population. Since that time the relationship between park acres and populations is no where near to that. Most cities have recognize the standard of one acre per 100 population but their has been a lot of diversity of opinion concerning total open space. This standard can not take into consideration all the different factors of each city such as cultural background, age, and socioeconomic status of the population. So it is hard to define how many acres to dedicate to a park.

In this report to simplify the question I look at different cities through out Utah and compare them to Logan Utah to see if it has enough parks compared to the rest of the state. I also see how many acres each city has compared to the standard one acre per 100 population. This will give us insight to see if a new park needs to be built in the city of Logan Utah. I looked at park acreage, number of parks in a city, total city acres, city population, city's medium income and population density.

To start gathering data I wanted to see how many parks that Logan has and where

they are located. To do this I used the foursquare API. I defined a user_agent and set the address to Logan Utah. I searched for a specific venue category that was "park". So I was able to define the URL and send the get request. This gave me a JSON file that I was able to clean and create a data frame. Then I could map the data and see where the parks are.

Next I wanted to look at the rest of the cities in Utah to see how many parks they had, how many park acres, population and city acres. I was able to get this information from three different place. To get park number and park acreage I went to the web site https://opendata.gis.utah.gov/. This web site is set up by Utah and has free data you can download. I downloaded this in a .csv file. I used pd.read_csv to read the csv file and put all the data in a data frame.

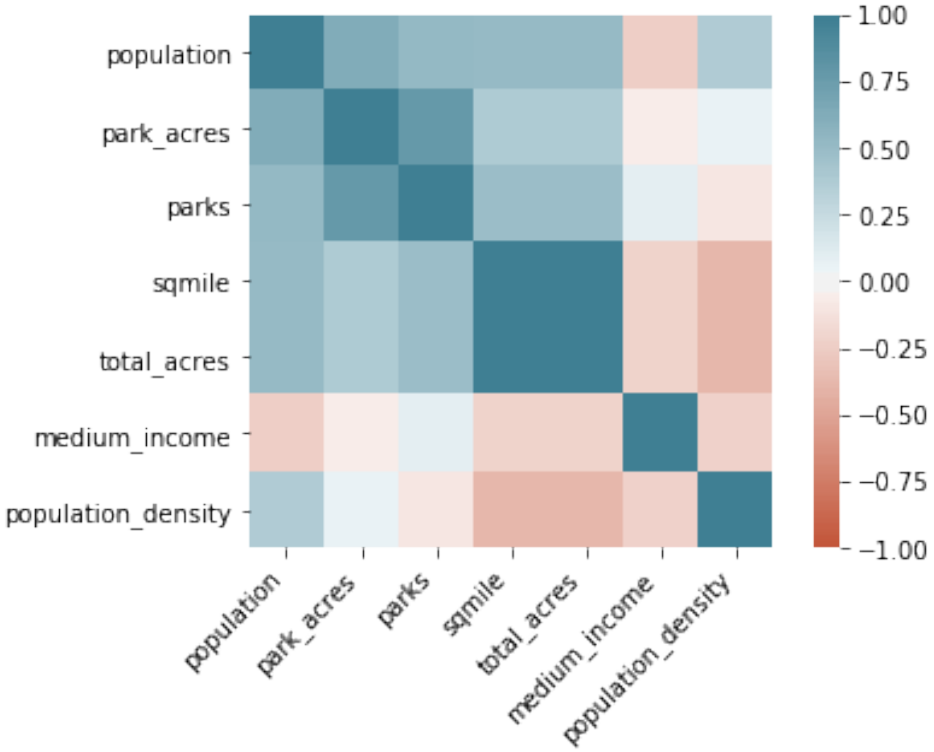
To get the population data I for the information I needed at the web site ,https://www.utah-demographics.com/cities_by_population. I did the same thing as the park information. I saved it as a .csv file and read it in to a panda data frame. The total city acres came from census data from the web site https://www2.census.gov/geo/docs/maps-data/data/gazetteer/2018_Gazetteer/2018_gaz_place_49.txt. This was also in a .csv format and I read it into a panda data frame. The last data I gathered was medium income by city. I found this information on the website https://en.wikipedia.org/wiki/List_of_municipalities_in_Utah.

I had four different data frames that I needed to combine into one data frame so it would be easier to graph. I did this using an inner join with the city as the index. I dropped all the rows that had Nan meaning they didn't have parks because probably their small size. I filtered the data to look at cities that we around the same size as Logan. I wanted to compare Logan to similar sized cities so I would get a better idea of how many park those cities had and if Logan was comparable. This gave me a data frame I could work with and start to analyze the data.

Methodology

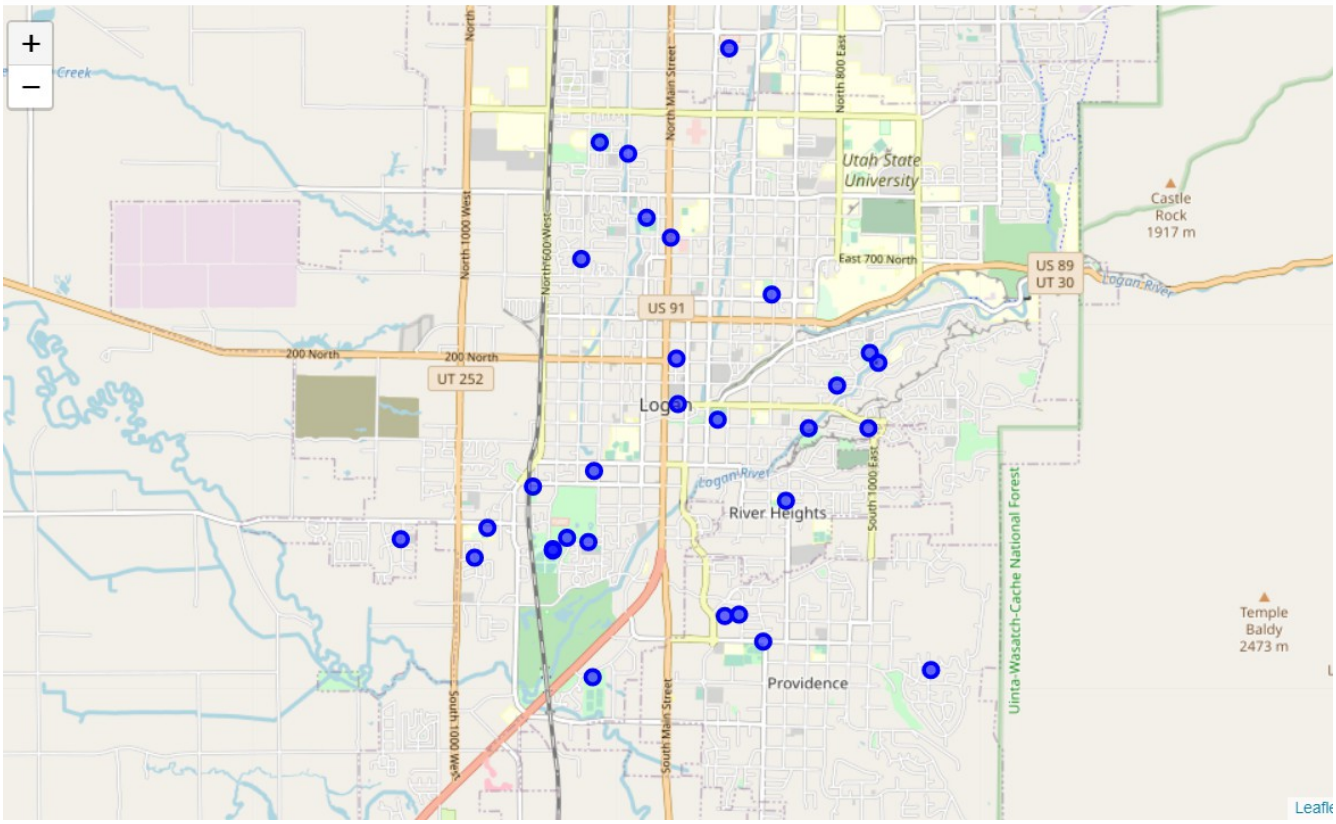
After doing some research on city parks and what variables were included I realized I needed a to add a calculated field for population density. Population density is is the number of people per unit of area usually a square mile. The formula for calculating population density is Dp= N/A. In this equation, Dp is the density of population, N is the total population as a number of people, and A is the land area covered by that population. I added this number into the column called population density.

To start analyzing the data I wanted to see what variables were correlated. I used Pearson's correlation coefficient which measures linear correlation between two variables. The p-value will have a value between +1 and −1. A value of +1 is total positive linear correlation, 0 is no linear correlation, and −1 is total negative linear correlation. I created a correlation coefficient heat map so I could easily see what was correlated across my whole data set.

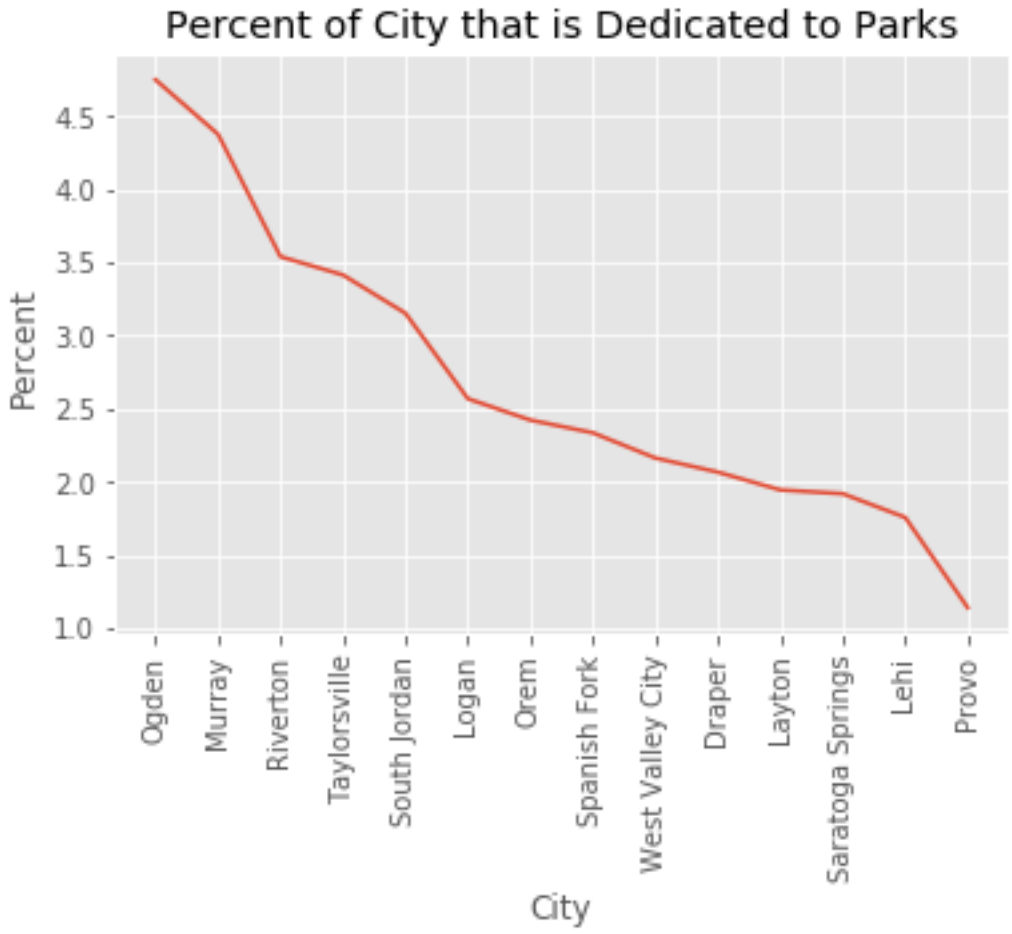


Results

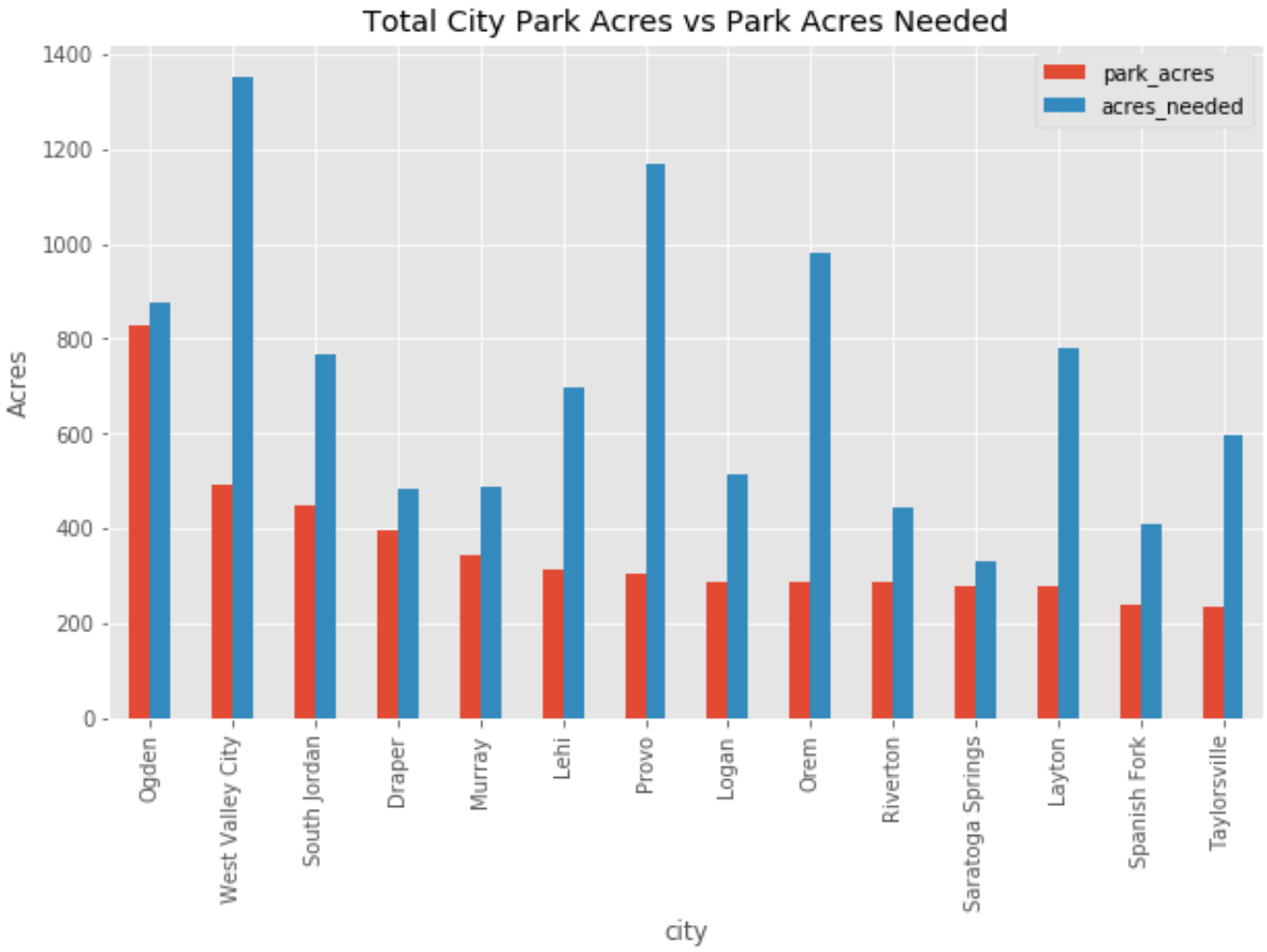
Logan's UT distribution of parks using the foursquare API has the parks distributed fairly evenly throughout the city. Their are several holes however where a new park would be most welcomed. One that stands out is on the west side of the city near 200 N since there is not one walking distance to the residents. Another place where a park would be beneficial is near Utah State University where young families live and would enjoy a park near their home.



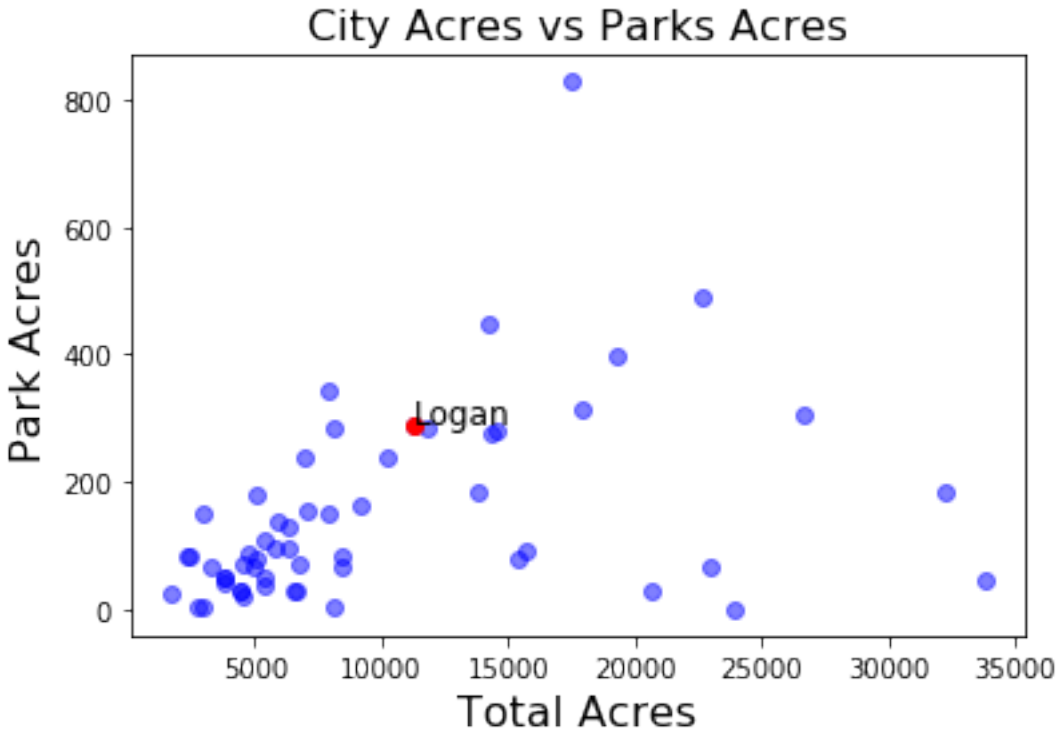
In an analysis comparing the percentage of the city's acreage that is devoted to parks. Logan has 11,300.48 acres of land in it's city with 290.19 aces of parks giving 2.56% of the city devoted to parks. Compared to city's that are similar in size Logan seems to have an average park acreage with Ogden having the most park space with 4.74% and Provo having the least about of space for parks with 1.14%



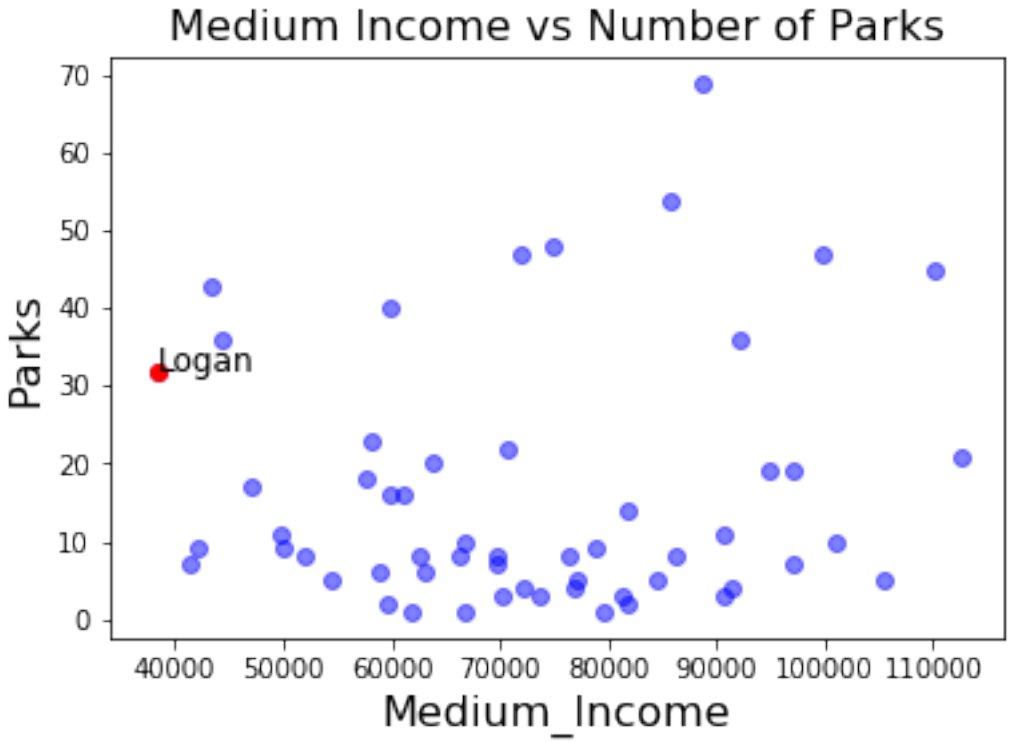
The standard of 1 acre per 100 people bar graph shows that Logan does not meet this standard although it comes closer than other similar cities. Ogden comes the closest to meeting this standard while West Valley City and Provo are not even close to the standard.



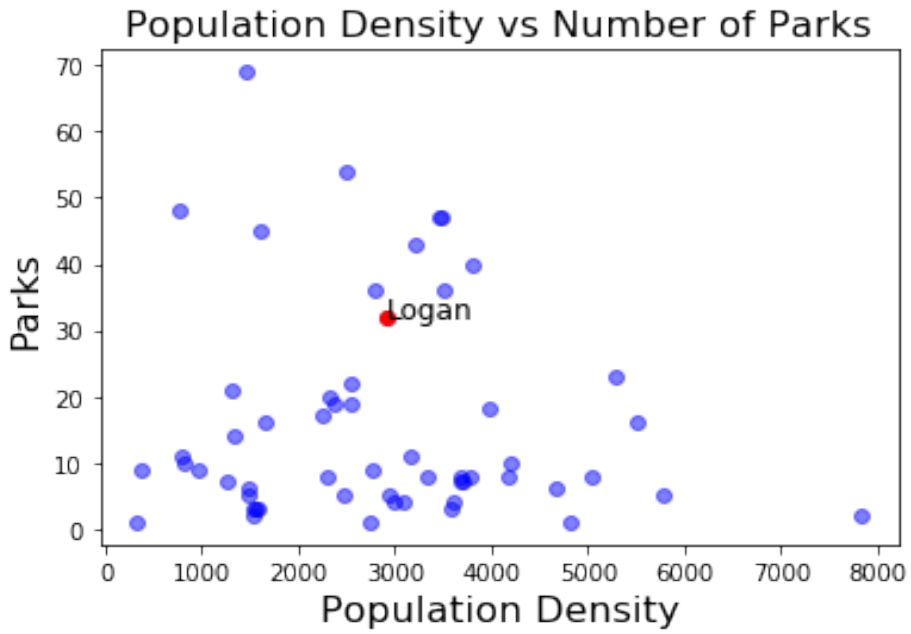
Below is a scatter plot showing how many acres in the city are dedicated to Parks. Logan shown in red shows that is seems to be similar and maybe slightly better other cities.

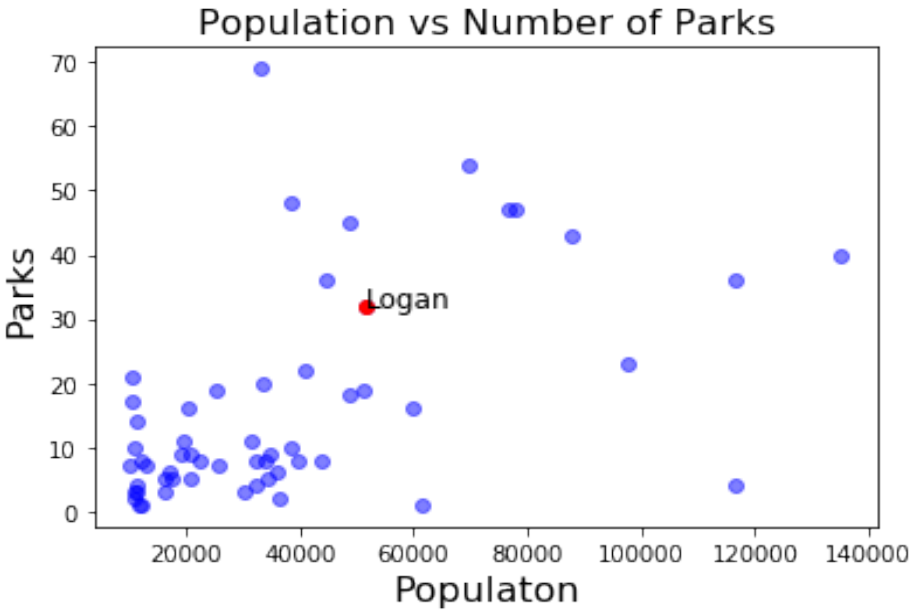


This was a interesting scatter plot. I had read that lower income cities had less parks while cities that had a higher medium income had more parks. This graph did that show that. The number of parks had no bearing on how much the medium income is. Logan for example has one of the lower medium incomes but it has a larger park count.



The two scatter plots are fairly similar. One looks at population density and the second one looks at population. Both scatter plots say the same thing. Logan seems to have more parks compared to other cities with similar populations.





Discussion

The discussion on how many parks a city need is a lot more complex than I originally though. It was hard to find data that was correlated and it seems like I am missing some data that would give more insight. Their are no regulations on city park acreage and there is not much consistency between cities. The standard that I was looking at 1 acre per 100 person can not take into consideration all the different factors of each city such as cultural background, age, and socioeconomic status of the population. It was take a lot more effort and time to get this information to give a clearer picture of what each city need for parks and recreation.

Conclusion

The fact is that parks play multiple roles in our communities. Parks are integral parts of our physical, social and emotional landscapes. They provide public gathering places. Parks and open spaces are a critical tool for protecting natural resources. Exposure to green spaces helps reduce our stress levels. Parks as open space have a essential role in city development.

Compared to the cities in Utah Logan has a large park acreage for it's city but it still falling short of the 1 acre per 100 population standard. I would recommend that Logan increase it's park acreage and make more green space in it's city. Parks are so beneficial to the community it would be an invaluable addition to it's city and funds should be added to the budget.