Density of population in Chile
Applied Data Science Capstone.

Business problem

Chile is a country in South America. Santiago, its capital, sits in a valley surrounded by the Andes and Chilean Coast Range mountains.

Chile ranks number 63 in the list of countries (and dependencies) by population. The population density in Chile is 26 per Km2 (67 people per mi2). The median age in Chile is 35.3 years. Those numbers have been increasing due high level of migration to the country because good and gentle migration conditions and opportunity in the region.

For the interior government and administration within the State, the territory of the republic has been divided into 16 regions (regiones), 56 provinces (provincias) and 346 communes (comunas).
In this case of study we are going see the real values of population by regions and by comunas:
• Density of population by region
• The most density region in the country.
• the venues that people have in their comunas

With the idea of:
• Improve public service
• Improve infrastructure
• Evaluate economic cost in the most population density comuna.

Data acquisition

- I got a dataframe from the webpage of censo 2017 by comuna. It is available in: http://geoine-ine-chile.opendata.arcgis.com/datasets/1c64fcb18f5a41e088b25ef9f42b58d7_0?geometry=104.809%2C-59.306%2C79.321%2C-12.460&selectedAttribute=Densidad_ .There is available a cvs file with the information about it.

- Dataset with the decimal coordinates of chile. It is available in: https://github.com/2x3-la/geo-chile

- After merge and clean the dataset, it looks like this:

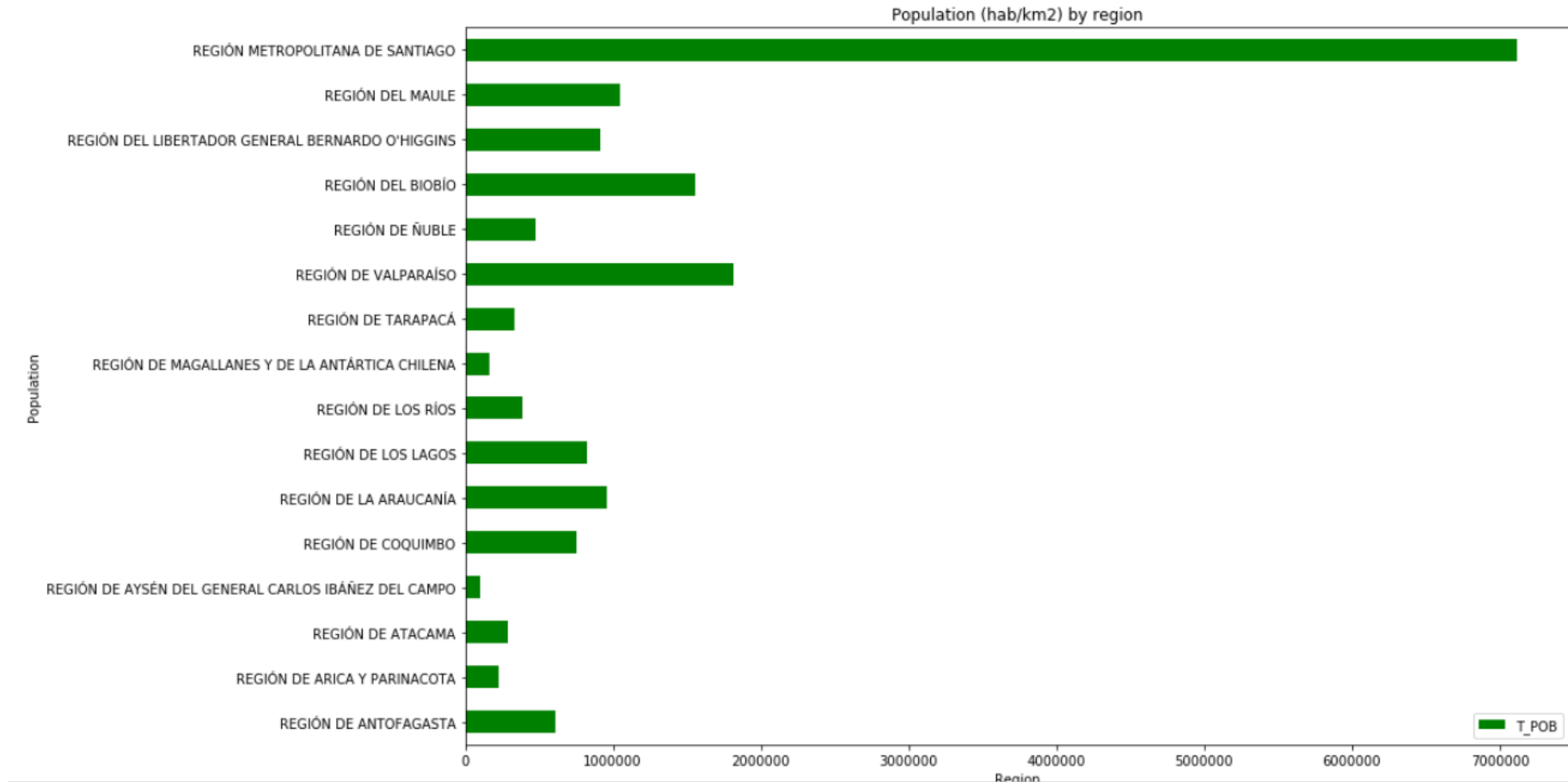| NOM_REGION	NOM_COMUNA	T_HOM_R	T_MUJ_R	T_POB_R	T_HOM_U	T_MUJ_U	T_POB_U	T_HOM	T_MUJ	T_POB	T_VIV_U	T_VIV_R	T_VIV	SUPERFICIE__KM2_	Densidad_	lng	lat
REGIÓN DE MAGALLANES Y DE LA ANTÁRTICA CHILENA	LAGUNA BLANCA	191	83	274	0	0	0	191	83	274	0	285	285	3496.802490	0.078357	-71.916667	-52.250000
REGIÓN DE MAGALLANES Y DE LA ANTÁRTICA CHILENA	TIMAUKEL	343	62	405	0	0	0	343	62	405	0	214	214	11018.557617	0.036756	-69.900000	-53.666667
REGIÓN DE AYSÉN DEL GENERAL CARLOS IBÁÑEZ DEL ...	TORTEL	285	238	523	0	0	0	285	238	523	0	320	320	20106.427734	0.026012	-73.566667	-47.833333
REGIÓN DE MAGALLANES Y DE LA ANTÁRTICA CHILENA	RÍO VERDE	522	95	617	0	0	0	522	95	617	0	231	231	9158.579102	0.067369	-71.483333	-52.650000
REGIÓN DE AYSÉN DEL GENERAL CARLOS IBÁÑEZ DEL ...	O'HIGGINS	374	251	625	0	0	0	374	251	625	0	363	363	7773.660156	0.080400	-72.566667	-48.466667

Methodology

I used exploratory data analysis in order to evaluate the distribution of people in the country: which region and comuna have the most density of population. With this knowledge I can focus in the comunas with more population and more density in order to evaluate the venues that it has in the área with Foursquare app.

Analysis and results

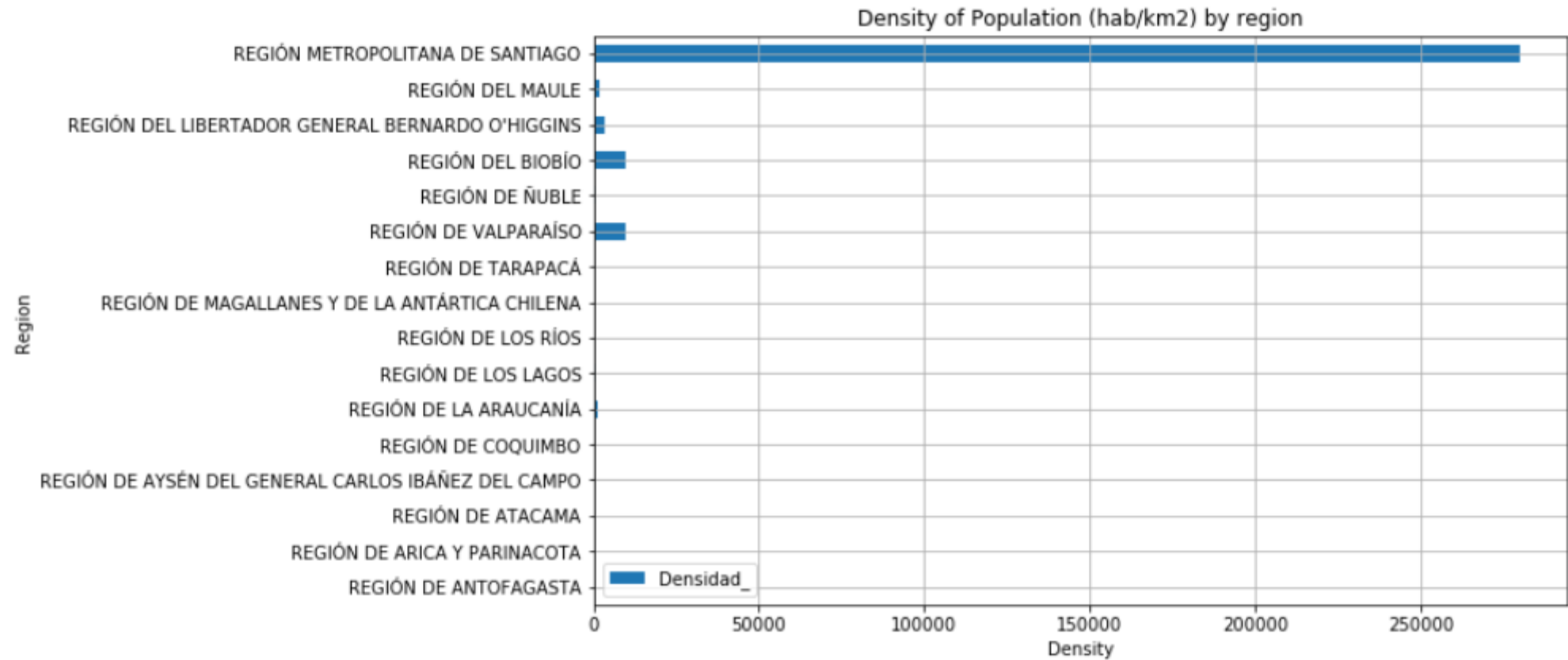| NOM_REGION	T_POB
REGIÓN DE ANTOFAGASTA	607534
REGIÓN DE ARICA Y PARINACOTA	226068
REGIÓN DE ATACAMA	286168
REGIÓN DE AYSÉN DEL GENERAL CARLOS IBÁÑEZ DEL ...	103158
REGIÓN DE COQUIMBO	757586
REGIÓN DE LA ARAUCANÍA	957224
REGIÓN DE LOS LAGOS	828708
REGIÓN DE LOS RÍOS	384837
REGIÓN DE MAGALLANES Y DE LA ANTÁRTICA CHILENA	166395
REGIÓN DE TARAPACÁ	330558
REGIÓN DE VALPARAÍSO	1815902
REGIÓN DE ÑUBLE	480609
REGIÓN DEL BIOBÍO	1556805
REGIÓN DEL LIBERTADOR GENERAL BERNARDO O'HIGGINS	914555
REGIÓN DEL MAULE	1044950
REGIÓN METROPOLITANA DE SANTIAGO	7112808

- The country has 16 regions. The chart show the amount of people for each one.

- The región with most population is the Region Metropolitana of Santiago, the capital of the country. The región with les people is the Aysen región.

Analysis and results

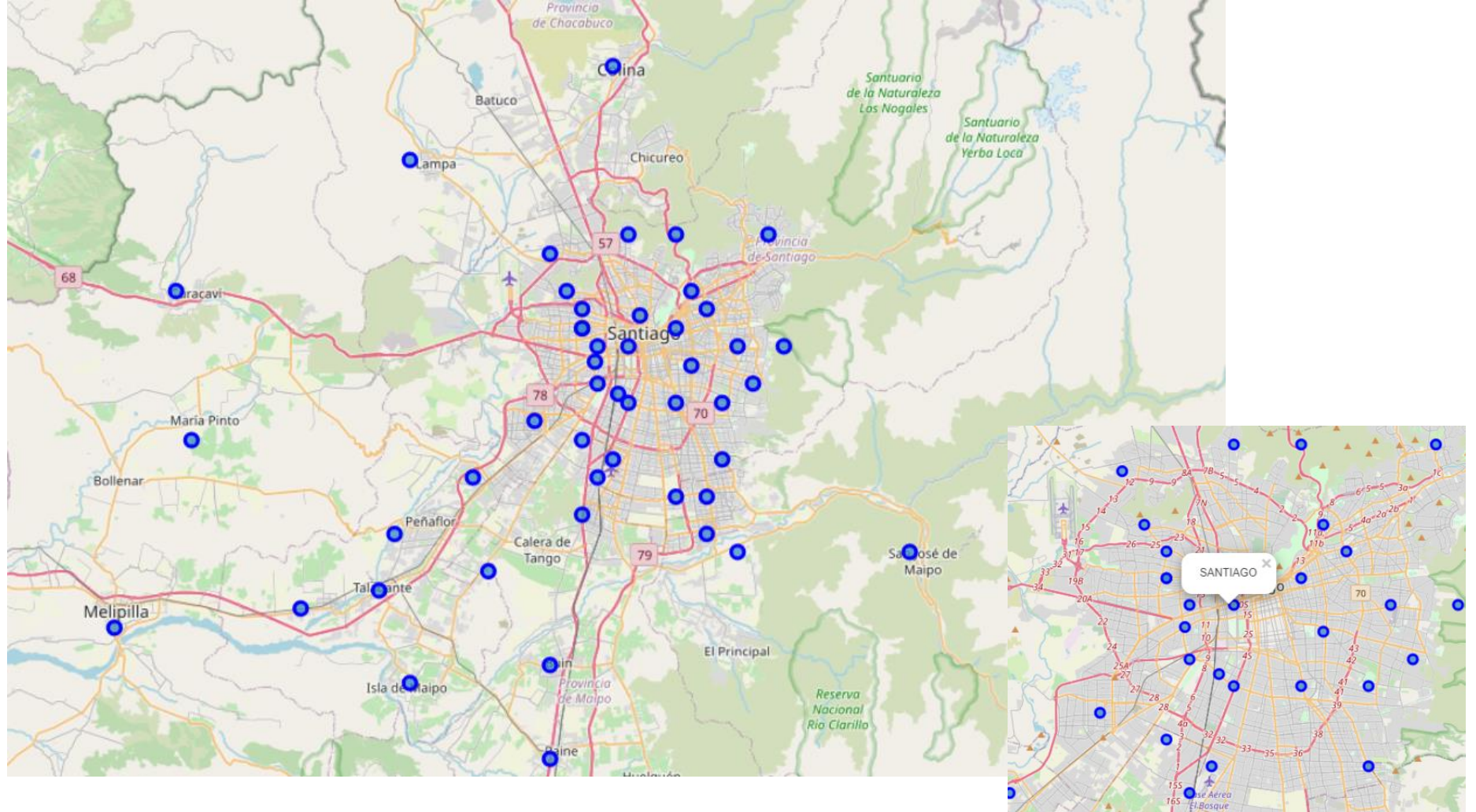Population (hab/km2) by region

In the graphic below, we can see that the region with most population is the capital of the country, Santiago (more than 7 millions). The difference of population with respect to others regions is huge. Its could say us that in the capital there are the most opportunities to get a better job or develop than another regions

Analysis and results

Density of Population (hab/km2) by region

Also, the Santiago región is the most crowded. That mean, there are more people in a space of territory.
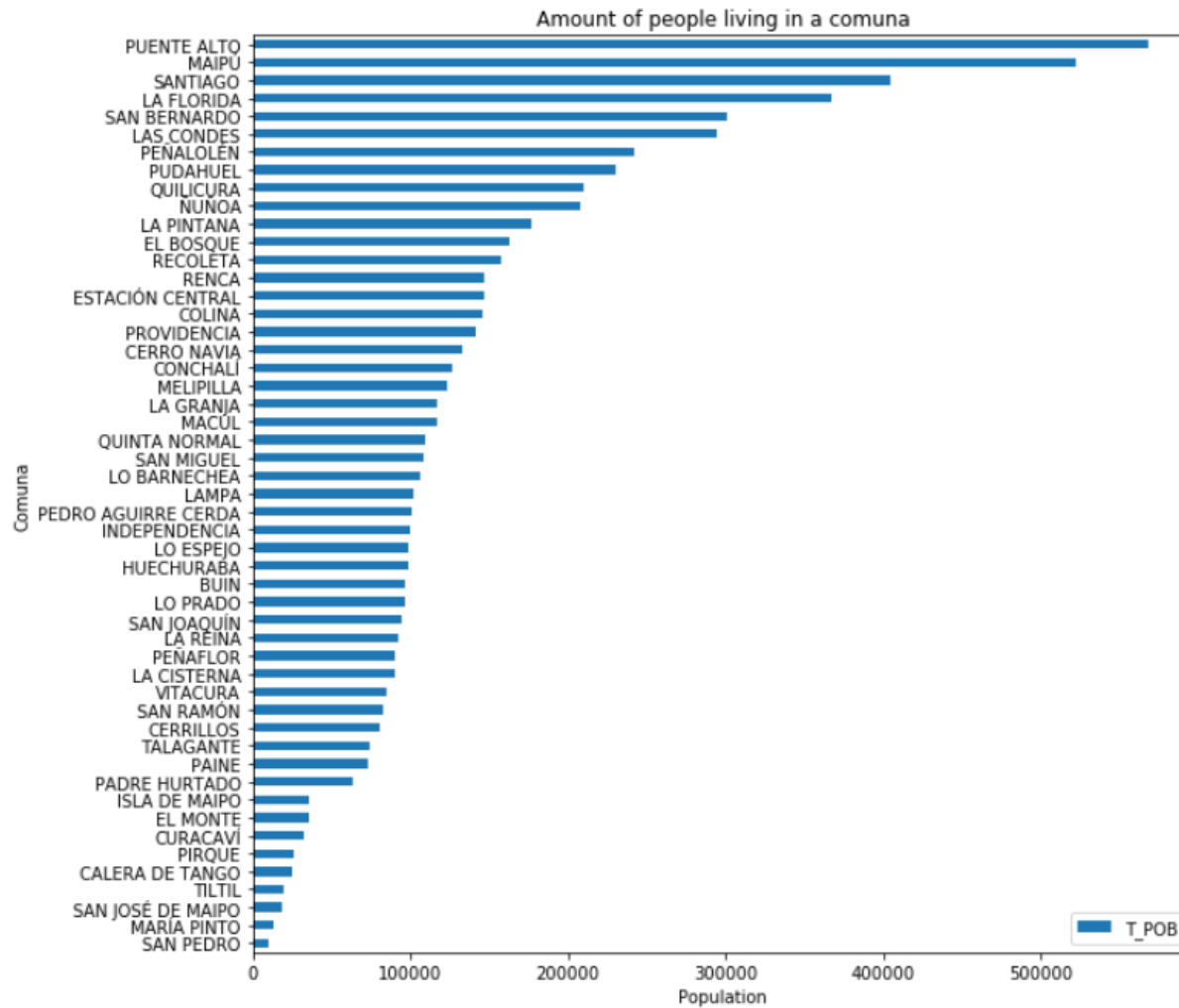
Analysis and results

Comunas of Santiago Region represented on the map. This comunas have the mayority amount of population in the country, specifically Santiago comuna.
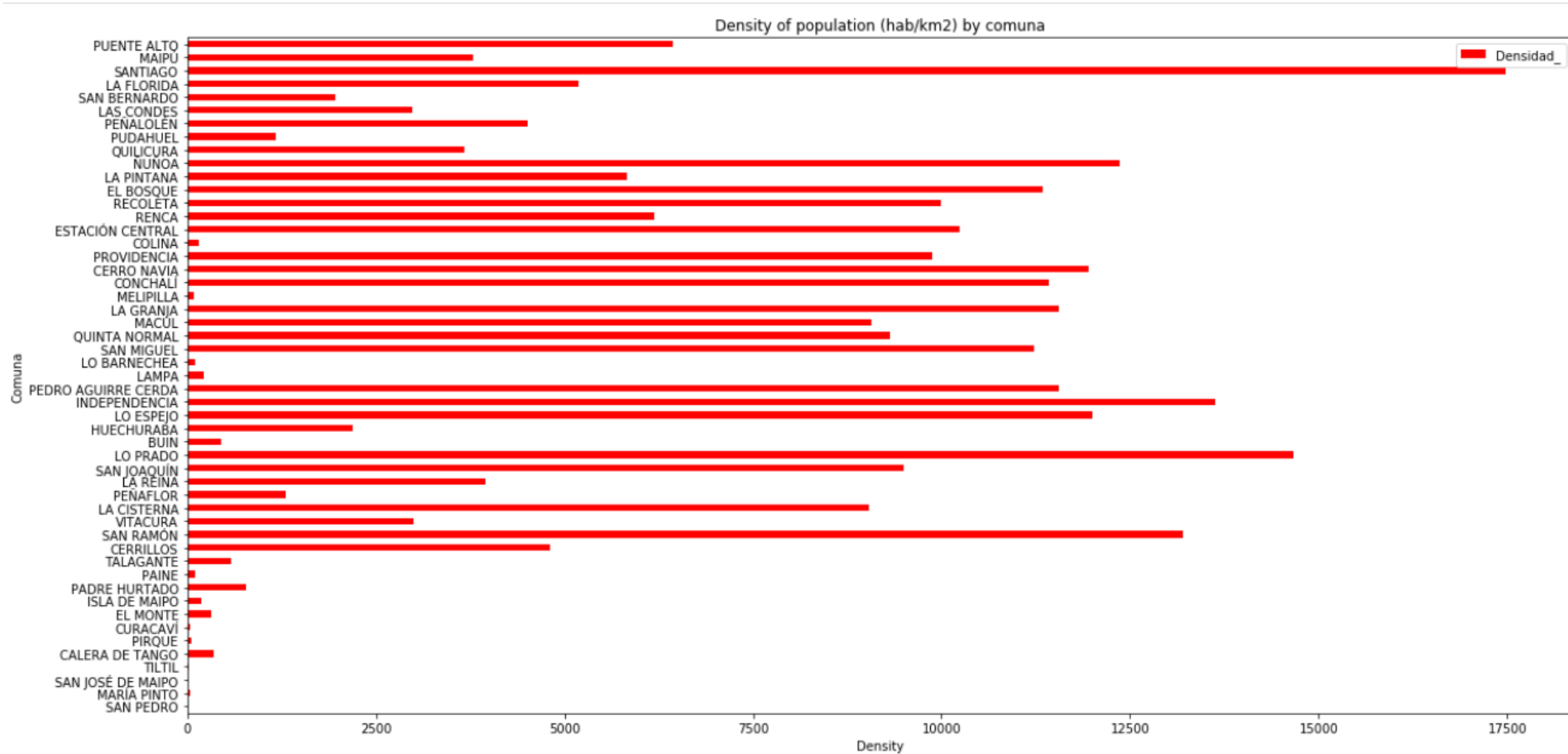
Analysis and results

Amount of people living in a comuna

These are comunas of Santiago Region. As you can see, the comuna with more amount of people is Puente Alto (more that 500 thousand), followed by Maipu and Santiago.

Analysis and results

Density of population (hab/km2) by comuna

Although Puente Alto has the most population, Santiago has the most density of population, with more thatn 17500 people in a km2.

Discussion

Based of análisis of data we can see:

- Chile has concentrated its population in the región metropolitana of Santiago.

- In the región of Santiago there are 51 comunas where is concentrated more tan 90% of population.

- The Santiago comuna has the most density of population, more tan 17500 people by km2.

- The comunas of Santiago región, like Las Condes, has venues accesible to the population, but comunas far from the capital don't have venues registered in Foursquare app. It could be:
    - to the few level of population that live.
    - Few level of visitors to this regions.
    - Internet Access limited in order to register venues in foursquare app.
    - Few people know the application.

Conclusion

- The capital of Chile is the región with most population in the rest of the country. Many countries have in the same situations, but Chile has a high density of population, that impact in the good provision of basic and public service like: transportation, security, rates of water and electricity, internet access. Also, high density affects the quality of air and water that impact in the health of habitants.

- So, it´s important take the considerations about these results in order to evaluate and improve the quality of life of people in crowded zones. Also, regions with few populations need attention of service that lack of them because of goverment could wrong thinks it isn't important to pay attention.

- Community application lake Foursquare has to do a effort to update his locations or try to arrive to this place where there is few locations registered.

Thank you