



Living in Milan

A practical guide for students



SECTION 1: INTRODUCTION

Nowadays moving to Milan for studying purposes is a fairly common practice. A lot of students move (especially from Middle and Southern Italy) to Milan to attend university (bachelor, master degrees and PhDs). Moving to a complex and dynamic city such as Milan is not always easy, especially for all those students who come from smaller cities (or even small villages) spread all over Italy. Being transplanted in such a caothic city may lead students to feel lost and disorienteted in the middle of all possibilities that the city has to offer.


SECTION 2: BUSINESS PROBLEM

The aim of the project is to help students to have a synthetic and global view of all the possibilities that Milan has to offer and how this opportunities are spread all over the territor. Where useful facilities are located? Which NILs (which are divisions of the territory that can be interpreted exactly as neighbourhoods) offer the best amusement possibilities? Where and which kind of restaurants, bar, pubs are available in the city? The project tries to answer to all this kind of questions and, moreover, takes into consideration even the average age of each NIL and the distribution of all the universities in the city to best fit the necessities of new students.

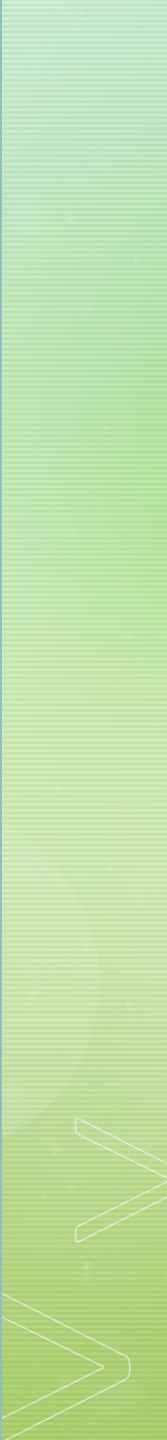
SECTION 3: DATA


The first dataset is about the different NILs (or most commonly neighbourhoods) of Milan. The fields in the dataset must be interpreted as follows:

- 1. ID_NIL: stands for "Nuclei di identità locali", which represents neighbourhoods of Milan
- 2. NIL: name description of the neighbourhood
- 3. Valido_dal: indicates the starting validity date of the data
- 4. Valido_al: indicates if the neighbourhood is still valid nowadays
- 5. Fonte: indicates if the neighbourhoods data are approved
- 6. Shape_Length: linear extension of the neighbourhood
- 7. Shape_Area: area extension of the neighbourhood
- 8. OBJECTID: unique id
- 9. geometry: spatial coordinates of the boundaries of the neighbourhood

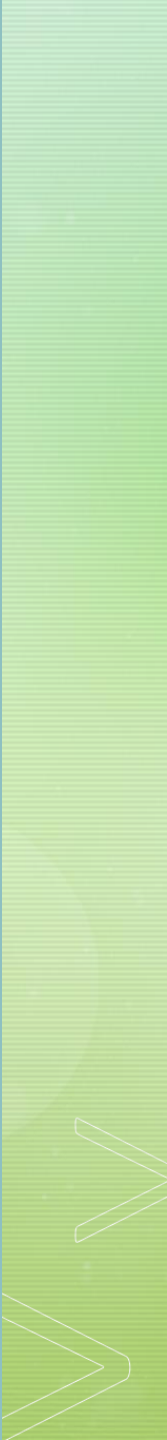



The second dataset is necessary to associate to each NIL its latitude and longitude coordinates, which will be necessary for the application of the Foursquare API. The fields in the dataset must be interpreted as follows:

- 1. id_nil: stands for "Nuclei di identità locali", which represents neighbourhoods of Milan
 - 2. nil_name: name description of the nil (neighbourhood)
 - 3. lng: calculated longitude for the nil (neighbourhood)
 - 4. lat: calculated latitude for the nil (neighbourhood)
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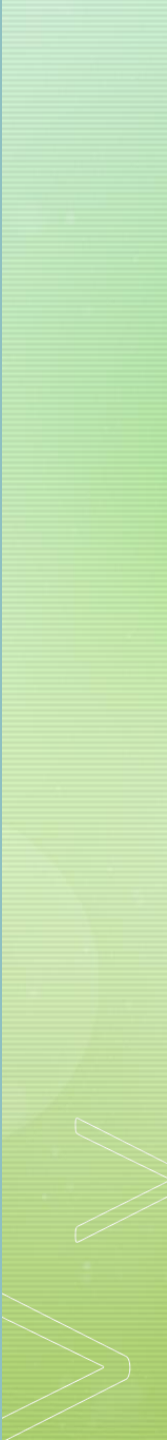


The third dataset contains a lot of different data about population. Different indicators about population are stored in the dataset, but in the project we will be interested in the average age for each NIL of the city. The fields in the dataset must be interpreted as follows:

- 1. Anno: year of census (the data are available for 1991, 2001 and 2011)
 - 2. Territorio: division of the territory (for example division by NIL)
 - 3. Indicators: indicator analyzed (different types of indicators are stored all together in the dataset)
 - 4. Definizione: description of the indicator taken into consideration
 - 5. Valore indicatore: numeric value for the indicator taken into consideration
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The last dataset is about universities in Milan. The fields in the dataset must be interpreted as follows:

- 1. T_LAUREA: course of study available inside the university
 - 2. DENOMINAZ: denomination of the university
 - 3. LONG_X_4326: longitude coordinate of the university
 - 4. LANG_Y_4326: latitude coordinate of the university
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SECTION 4: METHODOLOGY

Data about venues in Milan

To explore the most relevant venues in the city of Milan, we decided to preliminarily explore NIL s of the city (i.e. neighborhoods) using Foursquare API, then we segment them, and finally we grouped them into clusters to find similar NILs. The clusterization of all the NIL gathered using Foursquare API is carried out using a form of unsupervised machine learning algorithm from Scikit-Learn package: k-means clustering algorithm.

id_nil	nil_name	lng	lat	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	
0	48	RONCHETTO SUL NAVIGLIO - Q. RE LODOVICO IL MORO	9.137280	45.438480	3.0	Theater	Supermarket	Italian Restaurant	Pizza Place	Fast Food Restaurant	Fish & Chips Shop	Flea Market	Flower Shop	Food
1	64	TRENNO	9.101675	45.492822	0.0	Pizza Place	Adult Education Center	Pub	Sandwich Place	Soccer Field	Ice Cream Shop	Plaza	Park	Bakery
2	67	PORTELLO	9.153947	45.484490	3.0	Italian Restaurant	Café	Japanese Restaurant	Hotel	Bar	Pub	Pizza Place	Restaurant	Pastry Shop
3	81	BOVISASCA	9.156731	45.517433	3.0	Soccer Field	Shopping Plaza	Park	Supermarket	Restaurant	Art Gallery	Gym / Fitness Center	Bus Stop	Italian Restaurant
4	84	PARCO NORD	9.184235	45.523514	2.0	Football Stadium	Playground	Wine Shop	Fast Food Restaurant	Frozen Yogurt Shop	Fried Chicken Joint	Fountain	Food Truck	Food Court



Data about average age in Milan

To obtain data about average of each NIL of Milan we used a dataframe where are stored a lot of useful informations about different kind of indicators concerning age of the population. We ended up with the average age for every NIL in 3 different decades: 1991, 2001, and 2011. Since no data are available for the year 2021, we implemented a simple linear regression model which predict the trend of age of the population from data about previous years censi

	NIL	Età_media_1991	Età_media_2001	Età_media_2011	Età_media_2021
0	1	42.8	44.0	45.3	0.0
1	2	43.2	44.9	45.9	0.0
2	4	42.9	44.8	46.5	0.0
3	5	43.5	45.2	46.3	0.0
4	6	42.5	44.1	45.3	0.0
...
64	79	41.8	43.4	42.9	0.0
65	80	41.3	43.8	43.7	0.0
66	81	39.3	44.6	46.9	0.0
67	82	43.2	45.4	43.6	0.0
68	83	38.1	42.9	45.3	0.0



Data about universities in Milan

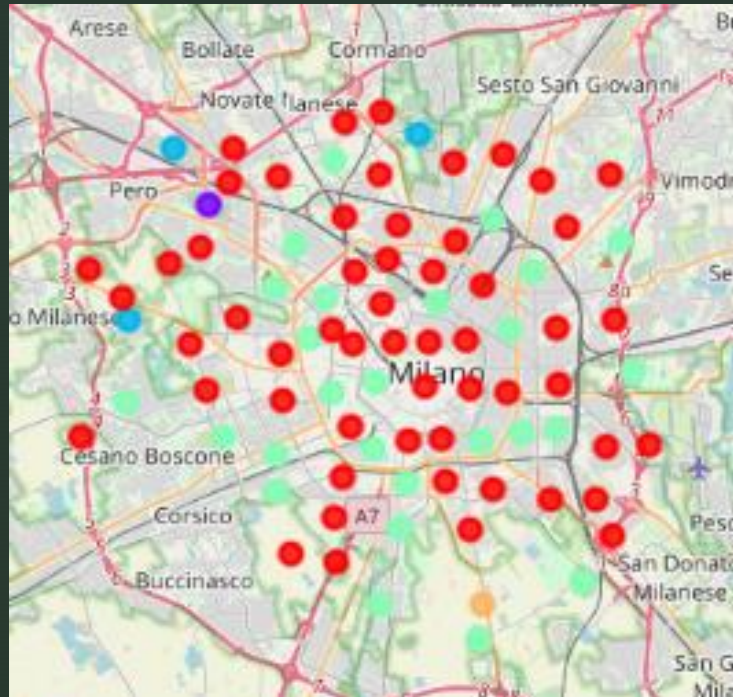
To get informations about all the different universities located in Milan, we explored a dataframe where are stored all the universities with their latitude and longitude coordinates; together with the denomination of the university are made available all the different degrees that the university has to offer

DENOMINAZ	LONG_X_4326	LAT_Y_4326
ACCADEMIA DI BELLE ARTI DI BRERA	9.187689	45.472245
ACCADEMIA DI BELLE ARTI DI BRERA	9.187689	45.472245
ACCADEMIA DI BELLE ARTI DI BRERA	9.187689	45.472245
ACCADEMIA DI BELLE ARTI DI BRERA	9.187689	45.472245
ACCADEMIA DI BELLE ARTI DI BRERA	9.187689	45.472245
...
VITA-SALUTE SAN RAFFAELE	9.267605	45.506910
VITA-SALUTE SAN RAFFAELE	9.267605	45.506910
VITA-SALUTE SAN RAFFAELE	9.228890	45.499750
VITA-SALUTE SAN RAFFAELE	9.267605	45.506910
VITA-SALUTE SAN RAFFAELE	9.267605	45.506910

SECTION 5: RESULTS

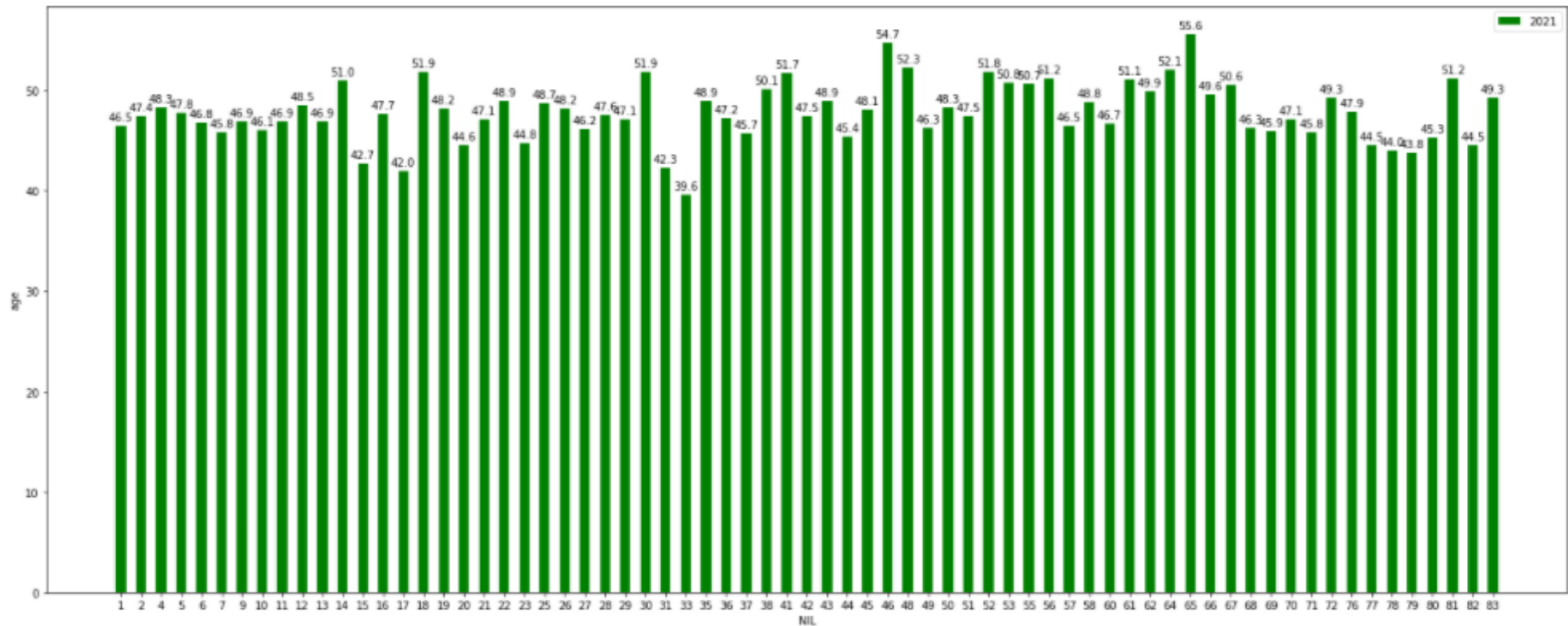
Results about venues in Milan

The clustering algorithm lead to division of venues in Milan in 5 different clusters (Figure 6). Each cluster is clearly analyzed in the Notebook of the project



Results about average age in Milan

For each NIL is obtained the average age of the population.



Results about universities in Milan

The location of all the universities (and the available degrees) is depicted in figure



SECTION 6: DISCUSSION

Generally speaking, the city of Milan has many opportunities to offer to a student moving there for the first time. A lot of different venues have been found using Foursquare API. Different facilities, entertainment places are well spread all over the city.

The average age of the city is estimated at 47.8 years, anyway the age distribution between NILs may vary a lot, ranging from the minimum 39.6 years up to 55.6 years as a maximum.

Universities are abundant in the city and still remain one of the main attractive the city has to offer for students coming from all over Italy. Anyway the distribution of universities is not as fair as the distribution of venues in the city: most of universities (with their respective offered degrees) are located in the South-east part of the city.



SECTION 7: CONCLUSION

The city of Milan has so many thing to offer to incoming students who can benefit from the big variety of universities on the territory and, at the same time, enjoy life thanks to all the facilities and events spread all over the city.

This project can be seen as a starting point to build a more wide analysis on all the relevant aspects a student has to face when moving to a big city such as Milan. An interesting analysis could be made on the average houses prices, particularly the average cost for renting a room or an house depending on the different NILs of Milan could be very useful for a new student moving to the city.

