Analysis of the quality of life in Lombardia through mobility

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Our team

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Dataset I

Dataset Cuebiq

	timestamp	cuebiq_id	device	latitude	longitude	datetime	timedelta	spacedelta	journey_id
1:	1581929946	000010ea370b30a0852752c327ef84485f6e34615019f878db959f8647d696fb	iOS	45.47189	9.232399	2020-02-17 08:59:06	NA	NA	10679985068439837699
2:	1581930029	000010ea370b30a0852752c327ef84485f6e34615019f878db959f8647d696fb	iOS	45.47391	9.230220	2020-02-17 09:00:29	83	2.813337e+02	10679985068439837699
3:	1581930030	000010ea370b30a0852752c327ef84485f6e34615019f878db959f8647d696fb	iOS	45.47391	9.230220	2020-02-17 09:00:30	1	9.508233e-11	10679985068439837699
4:	1581930186	000010ea370b30a0852752c327ef84485f6e34615019f878db959f8647d696fb	iOS	45.47729	9.226828	2020-02-17 09:03:06	156	4.605476e+02	10679985068439837699
5:	1581930187	000010ea370b30a0852752c327ef84485f6e34615019f878db959f8647d696fb	iOS	45.47729	9.226828	2020-02-17 09:03:07	1	2.952881e-11	10679985068439837699

41659937:	1584786842	fffc630ca9db9a4a683b47a4045d266ac04b938a959e6d27a8bdedafcaa6bac8	iOS	45.88727	8.509733	2020-03-21 10:34:02	285	1.358148e+02	17597053727002038291
41659938:	1584808053	fffc630ca9db9a4a683b47a4045d266ac04b938a959e6d27a8bdedafcaa6bac8	iOS	45.88718	8.510728	2020-03-21 16:27:33	21211	7.789884e+01	16928687691662952227
41659939:	1584808107	fffc630ca9db9a4a683b47a4045d266ac04b938a959e6d27a8bdedafcaa6bac8	iOS	45.88705	8.509594	2020-03-21 16:28:27	54	8.900743e+01	16928687691662952227
41659940:	1584978441	fffc630ca9db9a4a683b47a4045d266ac04b938a959e6d27a8bdedafcaa6bac8	iOS	45.88715	8.510400	2020-03-23 15:47:21	170334	6.334805e+01	16333545190944165531
41659941:	1584979434	fffc630ca9db9a4a683b47a4045d266ac04b938a959e6d27a8bdedafcaa6bac8	iOS	45.88718	8.509684	2020-03-23 16:03:54	993	5.571437e+01	16333545190944165531

Our additional variables are:

- Mean time of journey
- Mean speed
- Number of journeys

Dataset II

Dataset of Lombardia population

	Territorio	Stato.civile	Value
1	Lombardia	nubile/celibe	37093
2	Lombardia	totale	37093
3	Lombardia	nubile/celibe	35467
4	Lombardia	totale	35467
5	Lombardia	nubile/celibe	72560
6	Lombardia	totale	72560
7	Varese	nubile/celibe	3150
8	Varese	totale	3150
9	Varese	nubile/celibe	3115
10	Varese	totale	3115

Sources: Istat and Arpa

Datasets of air pollution ($\frac{\mu g}{m^3}$) and of precipitations (mm) in Milan

	Benzene Senato	Biossido Senato	PM10 Senato	Benzene città studi	Biossido città studi	PM10 città studi
1	1.2041667	59.33750	56	2.150000	57.71667	54
2	1.3541667	57.19583	69	2.375000	49.60833	59
3	1.5875000	57.44167	64	2.745833	47.05000	51
4	1.1125000	61.23333	32	1.675000	51.25417	25
5	1.5291667	68.29583	56	2.608333	58.62083	46
6	1.0750000	62.55000	65	1.741667	53.77917	54
7	0.7291667	45.90833	52	1.500000	40.30417	44

	Brera	Juvara	Lambrate	Rosellini	Zavattari
10	0.0	0.0	0.0	0.0	0.0
11	0.0	0.0	0.0	0.0	0.0
12	0.0	0.0	0.0	0.0	0.0
13	0.0	0.0	0.0	0.0	0.2
14	0.4	0.4	0.2	0.2	0.4
15	0.2	0.2	0.2	0.2	0.2
16	0.2	0.0	0.2	0.2	0.2
17	0.2	0.2	0.4	0.2	0.2
18	0.2	0.4	0.2	0.2	0.2
19	0.2	0.2	0.2	0.0	0.2
20	0.4	0.2	0.2	0.2	0.4

Research questions I

- Explorative analysis:
  - Comparison of the variables between different time of the day and different type of days (weekdays and weekend).
    $\rightarrow$ Permutation tests
  - Try to identify critical situations with respect to the traffic
    $\rightarrow$ Nonparametric forecasting
- Identify patterns to improve the mobility
- Identify a correlation between the population and the variables and try to compare cities with respect their citizens
  $\rightarrow$ Nonparametric regression

Research questions II

- Restrict our analysis to the city of Milan
  - Comparison between trips starting from outside or within Milan
    $\rightarrow$ Permutation tests
  - Accesses to *Area C*
    $\rightarrow$ Permutation tests
  - Possible correlation between air quality and our variables
    $\rightarrow$ Nonparametric regression
  - Possible correlation between precipitations and our variables
    $\rightarrow$ Nonparametric regression