Coursera Capstone Project for IBM Data Science Professional Certificate - Battle of sporty neighbourhoods - Final Report

By COIFFET Jean-sébastien - January 2021

Introduction and Problematic

Considering that France will organise summer olympic games 2024, a craze for sport (at all levels of practice) could be expected in France in the next years. This project aim on modeling a neighborhood recommender for someone who want to make sport in one of the two main cities of french region "Pays de la Loire" :

- Nantes, regional capital
- Angers, second city by size of the region

The study will focus on the following 3 sports : Football, Basketball and Swimming.

I've chosen these sports because first they are olympic sports, second because they need equipments and third because i estimate them interesting for the reader and/or for me.

Football and basketball are the two more practiced sports in the region (see Bibliography/Input_PDF_1).

I will consider two levels of practice for each sport : Leisure and Competition.

So the initial problem will be to find in which district of a city a sporty person should settle, depending on his/her favorite sports and the level of practice.

Data Sources References (1/2)

INPUT_CSV_1 : Nantes Métropole official postal code database (544 records but i will use only 25)
https://data.nantesmetropole.fr/explore/dataset/244400404_base-codes-postaux-nantes-metropole/information/?disjunctive.code_commune_insee&disjunctive.nom_de_la_commune&disjunctive.code_postal&disjunctive.ligne_5

INPUT_CSV_2 : NANTES Metropole Data Portal/Region_Sport_Equipments (8981 records) - gives both Nantes and Angers sports equipments.
https://data.nantesmetropole.fr/explore/dataset/234400034_004-009_activites-des-fiches-equipements-rpdl%40paysdelaloire/information/?disjunctive.comlib&disjunctive.actlib&disjunctive.actnivlib

INPUT_CSV_3 : For Angers postal codes : https://www.data.gouv.fr/es/datasets/base-officielle-des-codes-postaux/

INPUT_CSV_4 : Demographic infos on Nantes and Angers metropolises : https://www.insee.fr/fr/statistiques/4989704?sommaire=4989761

Data Sources References (2/2)

MAIN_CLUBS_1 - Main sport clubs of Nantes and Angers :

FOOT/NANTES : https://fr.wikipedia.org/wiki/Football_Club_de_Nantes at Training center of La Jonelière
District La Chapelle-sur-Erdre / GPS : 47.26003625074568, -1.5431419374263136

FOOT/ANGERS : https://fr.wikipedia.org/wiki/Angers_sporting_club_de_l'Ouest at Training center of La Baumette
District Angers / GPS : 47.46022228358844, -0.5687972904023035

BASKET/NANTES : https://fr.wikipedia.org/wiki/Nantes_Basket_Hermine at Sports Complex of REZE -> NATIONAL_2 Level
District Rézé / GPS : 47.1804447592872, -1.5716645075361122

BASKET/ANGERS : https://fr.wikipedia.org/wiki/%C3%89toile_Angers_Basket at Sports Complex Jean Bouin
District Angers / GPS : 47.460179020489846, -0.5313707516520269

SWIMMING/NANTES : Nantes Natation at Leo Lagrange swimming pool
District Nantes / GPS : 47.210138455645044, -1.5594551310482154

SWIMMING/ANGERS : Angers Natation at Jean Bouin swimming pool. 1000 members, 350 doing competition.
District Angers / GPS : 47.459135380533176, -0.5321586598738427

Methodology

In this study, i will do for each of the 2 city :

- Data cleaning, data exploration
- A K-Mean clustering
- Another data exploration for the most interesting cluster of the city
- Discussion on city results
- Conclusion for the city

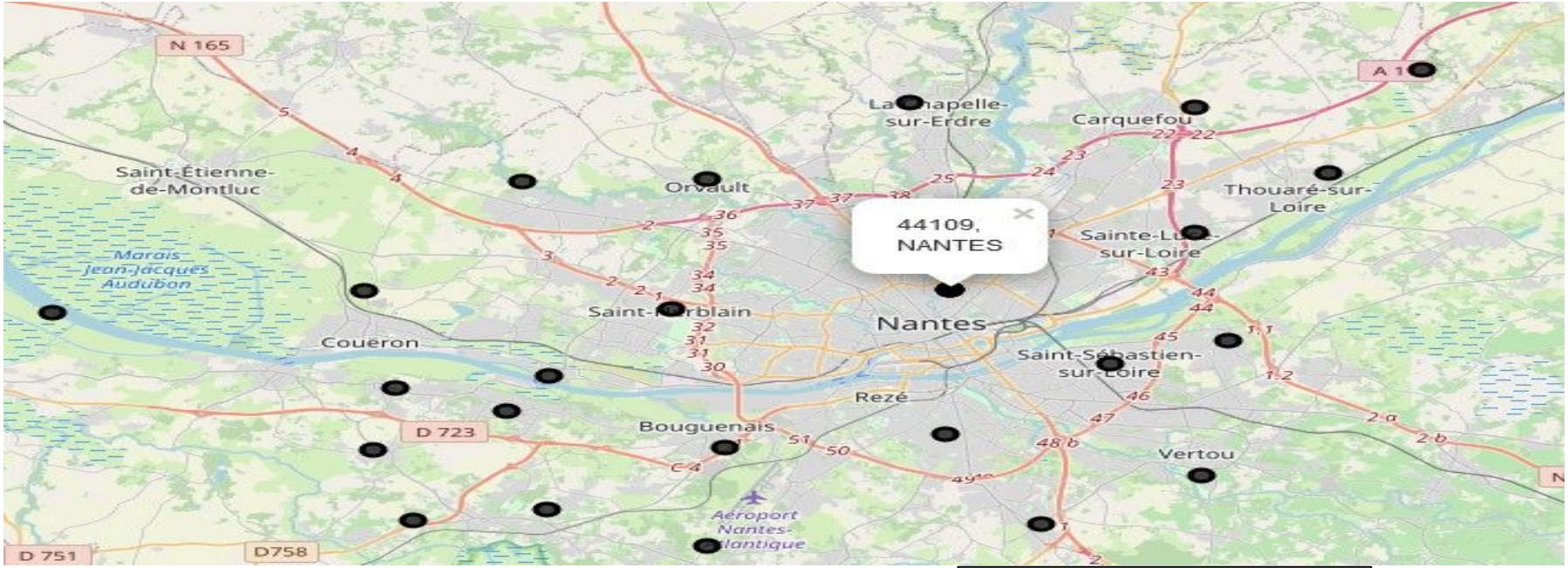
At the end i will also do a global conclusion on both cities.

The goal is to determine, where a sporty person should settle, depending on his/her favorite sport(s) and level of practice.I may also consider the situation of a family including two sporty people wanting each 1 of the 3 studied sports.

Technically, I will use Anaconda 3.8 with python 3.8, jupyter notebooks 6.1.4 and Folium library for the map. Folium is using OpenStreetMap.

DATA EXPLORATION - Districts map

Here is the (Folium) map of the Nantes 25 districts, each one with a postal code :



REF_DATA_SOURCE_REF : INPUT_CSV_1

DATA EXPLORATION - Public equipments per district and activity level

Code_INSEE	Niveau_activite	Nombre_equipements
44001	Competition	2
44002	Competition	2
	Leisure	2
44003	Competition	4
	Leisure	1
. . .		

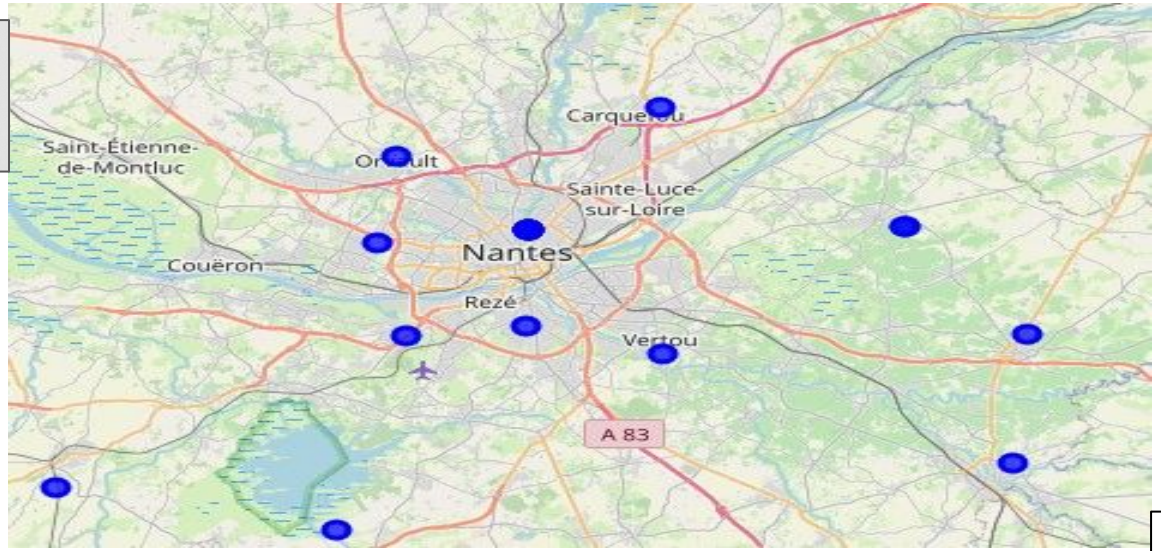
Code_INSEE	Niveau_activite	Nombre_equipements
44001	Leisure	2
44002	Competition	2
	Leisure	1
44003	Competition	3
	Leisure	1
. . .		

Code_INSEE	Niveau_activite	Nombre_equipements
44003	Training	2
44012	Leisure	1
44015	Competition	1
	Training	1
44020	Training	1
. . .		

REF_DATA_SOURCE_REF : INPUT_CSV_2

Only first datas are displayed.
All districts have football and basketball public equipments, some for competition and some for leisure, even both sometimes.
Some districts don’t have any public swimming pool (example : 44001)

DATA EXPLORATION - Districts with public swimming pools - Map



REF_DATA_SOURCE_REF :
INPUT_CSV_2

NOTE : Only nantes metropole public swimming pools are indicated and they are grouped by districts.

DATA EXPLORATION - Public equipments per activity level

Activity level	Equipments_number
Competition	473
Leisure	209
Training	150

Activity level	Equipments_number
Competition	271
Leisure	231
Training	40

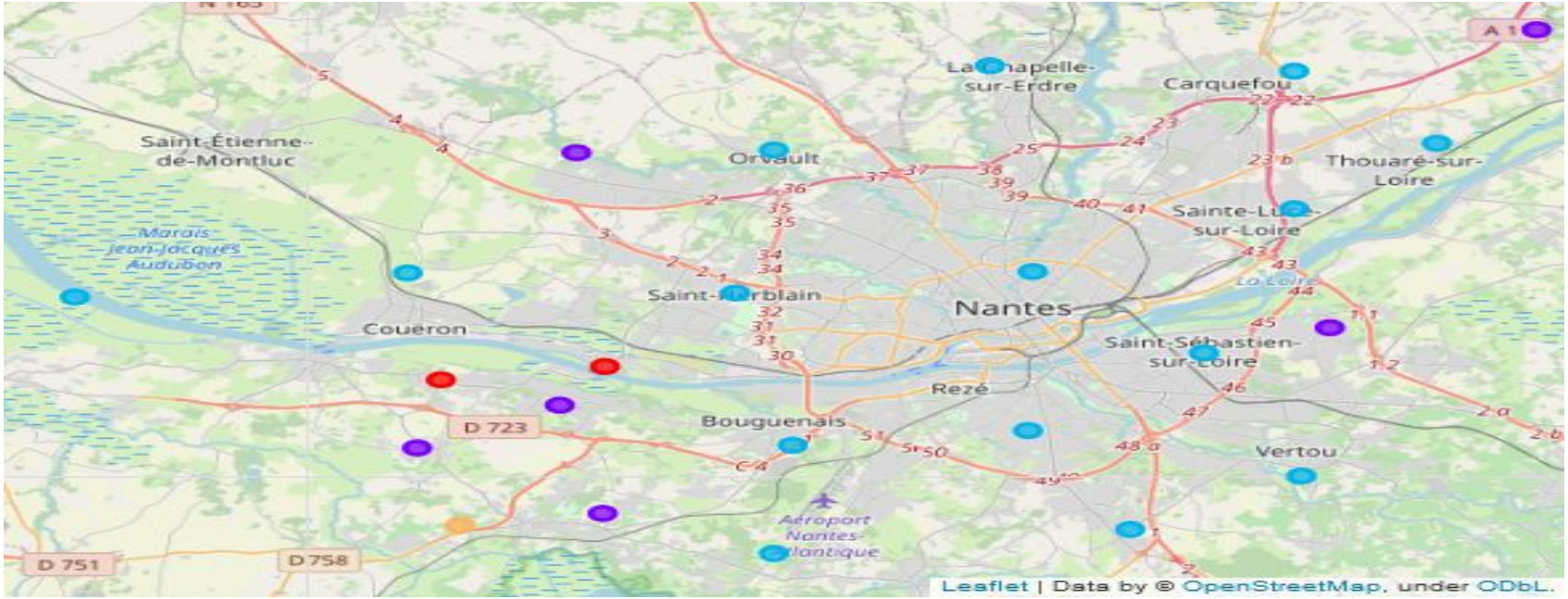
Activity level	Equipments_number
Competition	13
Leisure	3
Training	25

REF_DATA_SOURCE_REF :
INPUT_CSV_2

IMPORTANT NOTE : Competition equipments can be used for training. Mostly by the resident clubs of course. And training equipments can also sometimes be used for leisure.

CLUSTERING districts

Choosing 4 clusters give the following result :



In the 4 next pages, this map dot colours will be use
at the top of pages to associate them with the 4 clusters.

REF_DATA_SOURCE_REF :
INPUT_CSV_1 and INPUT_CSV_2

CLUSTERING districts - CLUSTER 1 on 4

15 Districts - Mostly center districts - Most of the population of the metropole with most of the equipments.

	Nom_commune	Cluster Labels	1st Most Common Equip	2nd Most Common Equip	3rd Most Common Equip	4th Most Common Equip	5th Most Common Equip
1	REZE	1	basket_Leisure_105	swim_Training_1	foot_Leisure_18	foot_Competition_7	basket_Training_32
2	ST AIGNAN GRANDLIEU	1	foot_Competition_3	basket_Training_8	basket_Competition_13	basket_Leisure_18	swim_Training_2
5	BOUGUENAIS	1	foot_Leisure_1	foot_Training_1	swim_Training_1	basket_Competition_37	basket_Training_23
6	COUERON	1	basket_Leisure_46	foot_Competition_5	basket_Training_28	basket_Competition_41	foot_Training_2
7	NANTES	1	basket_Leisure_536	foot_Training_13	basket_Competition_269	foot_Competition_46	foot_Leisure_35
8	LE PELLERIN	1	basket_Training_6	basket_Leisure_18	foot_Competition_3	basket_Competition_9	basket_Leisure_105
9	LES SORINIERES	1	foot_Competition_3	foot_Leisure_1	basket_Competition_11	basket_Training_19	basket_Leisure_18
10	THOUARE SUR LOIRE	1	basket_Training_14	foot_Competition_3	basket_Leisure_22	basket_Competition_15	foot_Training_1
12	CARQUEFOU	1	basket_Training_45	foot_Competition_6	swim_Competition_1	foot_Training_6	basket_Leisure_64
13	LA CHAPELLE SUR ERDRE	1	basket_Training_48	foot_Competition_8	foot_Leisure_3	basket_Leisure_63	basket_Competition_63
15	ST HERBLAIN	1	foot_Leisure_16	swim_Training_1	basket_Training_45	basket_Competition_73	basket_Leisure_132
19	ORVAULT	1	foot_Leisure_15	swim_Competition_1	foot_Competition_7	basket_Competition_42	basket_Training_27
20	VERTOU	1	basket_Leisure_53	basket_Competition_44	swim_Training_1	foot_Competition_7	basket_Training_35
22	STE LUCE SUR LOIRE	1	basket_Competition_18	foot_Competition_3	basket_Leisure_22	basket_Training_27	foot_Training_1
23	ST SEBASTIEN SUR LOIRE	1	basket_Training_36	basket_Leisure_56	basket_Competition_36	foot_Competition_7	foot_Training_5

CLUSTERING districts - CLUSTER 2 on 4

One District only - Seems that this district St Leger les vignes, located at the south west of Nantes, is the less equiped of all districts and the clustering has isolated it alone in a cluster.

	Nom_commune	Cluster Labels	1st Most Common Equip	2nd Most Common Equip	3rd Most Common Equip	4th Most Common Equip	5th Most Common Equip
3	ST LEGER LES VIGNES	2	foot_Leisure_1	basket_Training_1	basket_Leisure_9	basket_Competition_2	basket_Leisure_19

CLUSTERING districts - CLUSTER 3 on 4

Two districts - located west from Nantes and near the river Loire, which seem ready to organise nice basketball competitions.

	Nom_commune	Cluster Labels	1st Most Common Equip	2nd Most Common Equip	3rd Most Common Equip	4th Most Common Equip	5th Most Common Equip	6th Most Common Equip	7th Most Common Equip
16	ST JEAN DE BOISEAU	3	basket_Competition_9	foot_Leisure_1	basket_Training_9	basket_Leisure_4	foot_Competition_1	basket_Leisure_15	basket_Leisure_21
17	INDRE	3	basket_Competition_8	foot_Leisure_2	basket_Training_2	foot_Competition_1	basket_Leisure_15	swim_Training_2	basket_Leisure_18

CLUSTERING districts - CLUSTER 4 on 4

Six districts - Suburbs districts with less population and less equipements
The clustering gives Mauves sur loire is in this cluster and not the 3rd one, which would have seemed more logical to me considering his “basketball competition” orientation.

	Nom_commune	Cluster Labels	1st Most Common Equip	2nd Most Common Equip	3rd Most Common Equip	4th Most Common Equip	5th Most Common Equip
0	BASSE GOULAINE	4	foot_Competition_2	basket_Competition_16	basket_Leisure_29	basket_Training_20	foot_Training_1
4	SAUTRON	4	foot_Competition_2	basket_Leisure_22	basket_Competition_7	basket_Training_20	foot_Leisure_6
11	BRAINS	4	foot_Leisure_1	basket_Leisure_13	basket_Training_3	basket_Competition_5	foot_Competition_2
14	LA MONTAGNE	4	basket_Training_4	basket_Leisure_11	foot_Leisure_1	basket_Competition_22	foot_Competition_2
18	MAUVES SUR LOIRE	4	basket_Competition_8	basket_Leisure_14	basket_Training_1	foot_Competition_2	foot_Training_1
21	BOUAYE	4	foot_Competition_2	basket_Leisure_28	basket_Competition_22	basket_Training_9	foot_Training_1

Main cluster data exploration

Top number of equipments by 1000 habitants :

	Code_INSEE	Niveau_activite	Nombre_equipements	Nom_commune	Population_totale	nb_equip_by_1000hab
22	44114	Leisure	15	ORVAULT	27623	0.543026
29	44150	Competition	2	ST AIGNAN GRANDLIEU	4019	0.497636
28	44143	Leisure	18	REZE	43153	0.417120
23	44120	Competition	2	LE PELLERIN	5347	0.374042
34	44162	Leisure	16	ST HERBLAIN	47062	0.339977
6	44026	Training	6	CARQUEFOU	20494	0.292769

ST AIGNAN GRANDLIEU and LE PELLERIN districts come ahead for competition equipments :
ST AIGNAN GRANDLIEU has got a club named FC GRAND LIEU (main team is DEPARTEMENTAL_1 LEVEL)
LE PELLERIN has got a club named FC BASSE LOIRE (main team is DEPARTEMENTAL_1 LEVEL)

CARQUEFOU has got the training center of the main city club (FC Nantes, see MAIN_CLUBS_1).

ORVAULT, REZE and ST HERBLAIN district comes ahead for Leisure football, in this “by_habitant” top 6.

Main cluster data exploration

Top number of equipments by 1000 habitants :

	Code_INSEE	Niveau_activite	Nombre_equipements	Nom_commune	Population_totale	nb_equip_by_1000hab
20	44114	Leisure	9	ORVAULT	27623	0.325815
30	44172	Competition	4	STE LUCE SUR LOIRE	15510	0.257898
25	44150	Leisure	1	ST AIGNAN GRANDLIEU	4019	0.248818
35	44190	Leisure	6	ST SEBASTIEN SUR LOIRE	28063	0.213805
24	44143	Leisure	8	REZE	43153	0.185387
29	44162	Leisure	8	ST HERBLAIN	47062	0.169989
16	44109	Leisure	53	NANTES	319284	0.165996
5	44026	Leisure	3	CARQUEFOU	20494	0.146384
23	44143	Competition	6	REZE	43153	0.139040
11	44047	Leisure	3	COUERON	22137	0.135520
37	44198	Training	1	LES SORINIERES	8825	0.113314
36	44198	Competition	1	LES SORINIERES	8825	0.113314

REZE has got the main club of the city (see MAIN_CLUBS_1, main team in NATIONAL_2 Level).
ST LUCE SUR LOIRE have a DEPARTEMENTAL level club.
LES SORINIERES also have a DEPARTEMENTAL level club.

Many districts has got a good quantity of basket ball leisure equipments.

Main cluster data exploration

Top number of equipments by 10 000 habitants :

	Code_INSEE	Niveau_activite	Nombre_equipements	Nom_commune	Population_totale	nb_equip_by_10000hab
0	44020	Training	1	BOUGUENAIS	19962	0.050095
1	44026	Competition	1	CARQUEFOU	20494	0.048795
8	44215	Training	1	VERTOU	25633	0.039012
5	44114	Competition	1	ORVAULT	27623	0.036202
6	44143	Training	1	REZE	43153	0.023173
7	44162	Training	1	ST HERBLAIN	47062	0.021249
3	44109	Competition	3	NANTES	319284	0.009396
2	44109	Competition	2	NANTES	319284	0.006264
4	44109	Training	1	NANTES	319284	0.003132

NANTES has got the main club of the city (see MAIN_CLUBS_1).
ORVAULT has a small racing club also. (see http://sconatation.blogspot.com)
SAINT HERBLAIN has got small racing club also (see http://saintherblainnatation.org/general/presentation/)
CARQUEFOU has a racing club also. (see http://natation.asc-carquefou.fr)
REZE has a racing club also. (see https://asbrnatation.com)

Discussion on the city results

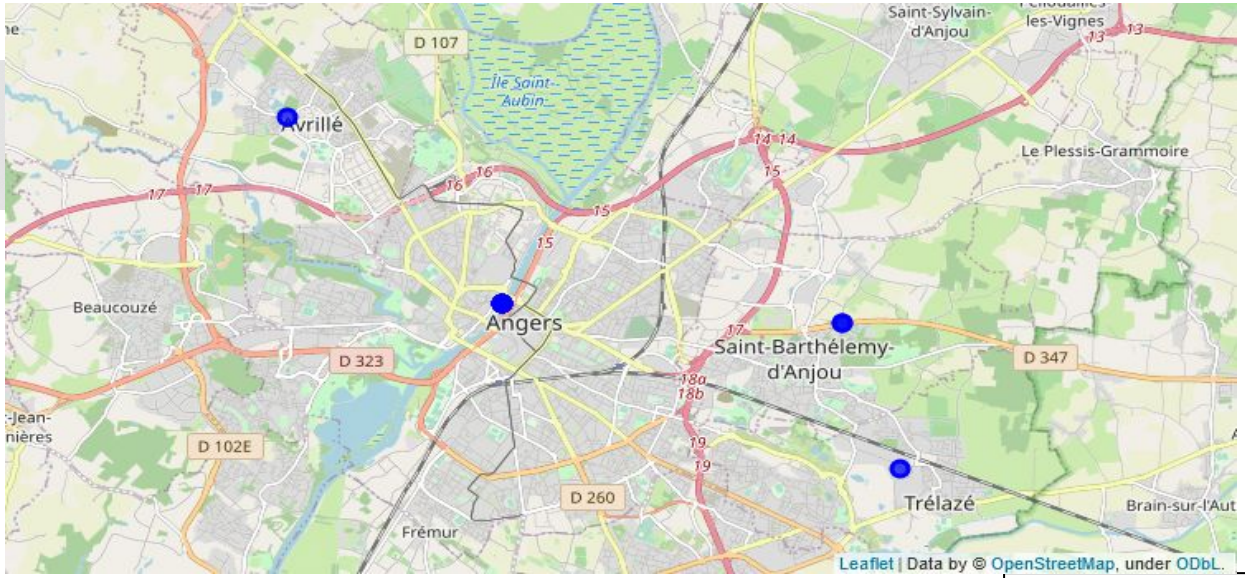
	For competition, CARQUEFOU district has the training center of the biggest club. The equipment datas allows us to find ST AIGNAN GRANDLIEU or LE PELLERIN districts are good second choice. For Leisure, ORVAULT is a good district to play amateur football.
	For competition, REZE district has got the biggest club. The equipment datas allows us to find ST LUCE SUR LOIRE or LES SORINIERES districts are good second choice. For Leisure, many districts offers good equipments. (see main cluster data exploration page).
	For competition, NANTES district has got the biggest club. The equipment datas allows us to find at least 4 other districts with smaller competition clubs. Leisure swimming is very badly referenced in the sport equipments database INPUT_CSV_2.

DATA EXPLORATION - DISTRICTS MAP

Here is the (folium) map of the Angers 29 districts, each one with a postal code :

REF_DATA_SOURCE_REF : INPUT_CSV_3

DATA EXPLORATION - Districts with public swimming pools - Map



REF_DATA_SOURCE_REF : INPUT_CSV_2

NOTE : Only Angers metropole public swimming pools are indicated, and they are grouped by districts.

DATA EXPLORATION - Public equipments per activity level

	Equipments_number		Equipments_number		Equipments_number
	activity_level		activity_level		activity_level	
1	Competition	509	Competition	201	Competition	4
	Leisure	236	Leisure	253	Leisure	1
	Training	122	Training	6	Training	26
	Scolaire	173	Scolaire	283	Scolaire	1

REF_DATA_SOURCE_REF : INPUT_CSV_2

All districts have football and basketball public equipments, some for competition and some for leisure. Angers has a special category for scholar foot equipments.

DATA EXPLORATION - Public equipments per activity level

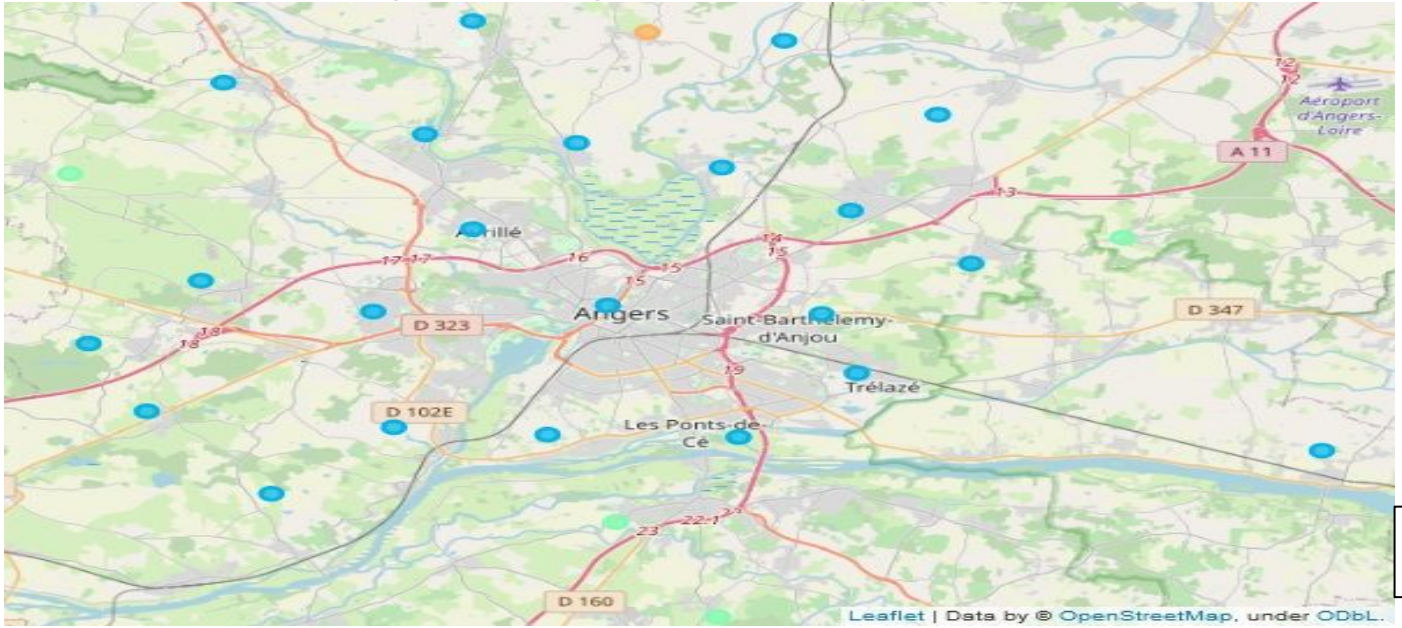
	Nombre_equipements Niveau_activite		Nombre_equipements Niveau_activite		Nombre_equipements Niveau_activite	
1	Competition	509	Competition	201	Competition	4
	Leisure	236	Leisure	253	Leisure	1
	Training	122	Training	6	Training	26
	Scolaire	173	Scolaire	283	Scolaire	1

REF_DATA_SOURCE_REF :
INPUT_CSV_2

IMPORTANT NOTE : Competition equipments can be used for training. Mostly by the resident clubs of course. And training equipments can also sometimes be used for leisure.

CLUSTERING districts

Choosing 3 clusters give the following result :



REF_DATA_SOURCE_REF :
INPUT_CSV_2 and INPUT_CSV_3

In the 3 next pages, this map dot colours will be use
at the top of pages to associate them with the 3 clusters.

CLUSTERING districts - CLUSTER 1 on 3

23 Districts - Mostly center districts

	Nom_commune	1st Most Common Equip	2nd Most Common Equip	3rd Most Common Equip	4th Most Common Equip	5th Most Common Equip
0	ANGERS	Non defini_1	basket_Leisure_19	basket_Competition_1	Scolaire_53	foot_Leisure_53
1	AVRILLE	basket_Leisure_5	foot_Competition_12	basket_Competition_4	foot_Leisure_13	Scolaire_13
2	BEAUCOUZE	foot_Training_1	basket_Leisure_2	foot_Leisure_4	basket_Competition_2	foot_Competition_6
3	BOUCHEMAINE	Non defini_1	foot_Competition_4	basket_Competition_1	foot_Leisure_6	foot_Training_1
4	BRIOLLAY	Scolaire_2	foot_Competition_4	basket_Competition_1	foot_Leisure_2	basket_Leisure_1
5	CANTENAY EPINARD	foot_Training_1	basket_Competition_1	foot_Competition_3	swim_Training_4	Scolaire_96
6	ECOUFLANT	foot_Leisure_2	Scolaire_2	basket_Competition_1	foot_Competition_5	Scolaire_3
8	FENEU	basket_Competition_1	basket_Leisure_2	foot_Competition_4	foot_Leisure_2	swim_Training_4
9	LOIRE AUTHION	basket_Leisure_1	basket_Competition_1	foot_Competition_3	foot_Leisure_2	basket_Competition_8
10	LONGUENEE EN ANJOU	foot_Leisure_3	basket_Competition_1	basket_Leisure_2	foot_Competition_4	basket_Competition_8
11	LE PLESSIS GRAMMOIRE	foot_Leisure_2	Scolaire_2	basket_Competition_1	foot_Competition_4	basket_Leisure_1
12	LES PONTS DE CE	Scolaire_21	foot_Leisure_7	basket_Training_1	foot_Competition_9	Scolaire_10
13	MONTREUIL JUIGNE	Scolaire_7	basket_Leisure_2	basket_Competition_2	foot_Leisure_5	foot_Competition_8
15	RIVES DU LOIR EN ANJOU	foot_Training_1	basket_Competition_1	foot_Competition_3	swim_Training_4	Scolaire_96
17	SAVENNIERES	foot_Competition_1	foot_Leisure_2	basket_Leisure_1	basket_Leisure_5	basket_Leisure_4
20	ST BARTHELEMY D ANJOU	basket_Training_1	foot_Competition_7	foot_Leisure_15	basket_Leisure_9	basket_Competition_2
22	ST LAMBERT LA POTHERIE	foot_Competition_4	basket_Competition_1	foot_Leisure_1	Scolaire_2	basket_Leisure_1
23	ST LEGER DE LINIERES	basket_Leisure_1	basket_Competition_1	foot_Competition_4	foot_Leisure_2	basket_Competition_8
24	ST MARTIN DU FOUILLOUX	foot_Leisure_4	basket_Competition_1	basket_Leisure_2	foot_Competition_3	swim_Training_4
25	STE GEMMES SUR LOIRE	Scolaire_3	Scolaire_1	basket_Competition_2	foot_Leisure_5	foot_Competition_9
26	TRELAZE	foot_Training_1	Scolaire_3	swim_Training_1	basket_Leisure_4	Scolaire_1
27	VERRIERES EN ANJOU	basket_Training_2	foot_Training_2	foot_Leisure_3	basket_Competition_1	Scolaire_4

CLUSTERING districts - CLUSTER 2 on 3

Five Districts - Very far from center districts. Scholar equipments are rather a priority.

	Nom_commune	1st Most Common Equip	2nd Most Common Equip	3rd Most Common Equip	4th Most Common Equip	5th Most Common Equip
7	ECUILLE	Scolaire_1	foot_Leisure_2	basket_Leisure_1	swim_Training_4	basket_Competition_8
14	MURS ERIGNE	Scolaire_1	foot_Leisure_3	basket_Competition_2	foot_Competition_7	foot_Training_2
16	SARRIGNE	foot_Competition_1	Scolaire_1	Scolaire_2	basket_Leisure_1	basket_Competition_1
18	SOULAINES SUR AUBANCE	Scolaire_1	foot_Leisure_5	basket_Leisure_3	swim_Training_4	basket_Competition_8
21	ST CLEMENT DE LA PLACE	Scolaire_1	foot_Training_1	basket_Leisure_1	basket_Competition_1	foot_Leisure_1

CLUSTERING districts - CLUSTER 3 on 3

One districts - Suburb district at the north of Angers with less population and less equipements

As for Nantes, one district is isolated from the others, even with a weak number of clusters. This district is very specific (very few equipements).

	Nom_commune	1st Most Common Equip	2nd Most Common Equip	3rd Most Common Equip	4th Most Common Equip	5th Most Common Equip
19	SOULAIRE ET BOURG	basket_Leisure_1	foot_Training_1	basket_Competition_1	foot_Leisure_1	foot_Competition_2

Main cluster data exploration

Top number of equipments by 1000 habitants :

Niveau_activite	Nombre_equipements	DISTRICT	Population_totale	nb_equip_by_1000hab
Competition	7	STE GEMMES SUR LOIRE	3649	1.918334
Competition	3	FENEU	2209	1.358081
Competition	3	LE PLESSIS GRAMMOIRE	2508	1.196172
Leisure	2	ST MARTIN DU FOUILLOUX	1710	1.169591
Competition	2	ST MARTIN DU FOUILLOUX	1710	1.169591
Competition	3	ST LAMBERT LA POTHERIE	2910	1.030928
Competition	3	BRIOLLAY	3076	0.975293
Competition	4	ECOUFLANT	4305	0.929152
Scolaire	5	BEAUCOUZE	5402	0.925583
Competition	2	CANTENAY EPINARD	2352	0.850340
Scolaire	11	LES PONTS DE CE	13354	0.823723
Leisure	3	STE GEMMES SUR LOIRE	3649	0.822143
Competition	3	ST LEGER DE LINIERES	3699	0.811030

In STE GEMME SUR LOIRE, there is a club named Olympique Sainte-Gemmes-sur-Loire (the best team is at DEPARTEMENTAL_2 level)
In BEAUCOUZE, there is a club named Sporting Club Beaucouze(the best team is at REGIONAL_1 level), with a important football school.

Main cluster data exploration

Top number of equipments by 1000 habitants :

Niveau_activite	Nombre_equipements	DISTRICT	Population_totale	nb_equip_by_1000hab
Leisure	2	ST MARTIN DU FOUILLOUX	1710	1.169591
Leisure	9	ST BARTHELEMY D ANJOU	9436	0.953794
Leisure	2	FENEU	2209	0.905387
Scolaire	10	LES PONTS DE CE	13354	0.748839
Leisure	1	SAVENNIERES	1386	0.721501
Scolaire	2	BRIOLLAY	3076	0.650195
Scolaire	9	AVRILLE	14420	0.624133
Competition	1	ST MARTIN DU FOUILLOUX	1710	0.584795
Scolaire	3	BEAUCOUZE	5402	0.555350
Competition	2	STE GEMMES SUR LOIRE	3649	0.548095
Leisure	2	STE GEMMES SUR LOIRE	3649	0.548095
Scolaire	5	ST BARTHELEMY D ANJOU	9436	0.529886
Scolaire	4	VERRIERES EN ANJOU	7659	0.522261

ST MARTIN DU FOUILLOUX has created with 2 other cities a club named LAMBOISIERES MARTIN BASKET (the best team is at REGIONAL level)

Main cluster data exploration

Top number of equipments by 10000 habitants :

Niveau_activite	Nombre_equipements	DISTRICT	Population_totale	nb_equip_by_10000hab
Training	2	ST BARTHELEMY D ANJOU	9436	0.211954
Competition	1	AVRILLE	14420	0.069348
Training	1	TRELAZE	14924	0.067006
Scolaire	1	ANGERS	157577	0.006346
Training	1	ANGERS	157577	0.006346

ST BARTHELEMY D'ANJOU has got a swimming club called Slycap.

AVRILLE has got a important swimming club called ASA Natation, which makes competitions. (560 members in 2019, to be compared to the 1000 members of the Angers club)

NOTE : We see here that Angers swimming pool is not referenced in the database as a competition one, which is a bit surprising.

Discussion on the city results

	For competition, ANGERS district has the biggest club (see MAIN_CLUBS_1). The equipment datas allows us to find STE GEMME SUR LOIRE district is a good second choice. For Leisure, ST MARTIN DU FOUILLOUX, FENEU or ST BARTHELEMY are good districts to play amateur football. For youngs who want to learn football, BEAUCOUZE district is also a good solution.
	For competition, ANGERS district has the biggest club (see MAIN_CLUBS_1). Both for competition and leisure, the equipment datas show ST MARTIN DU FOUILLOUX district is also a very good choice to play baskball. Note : Special congratulation to ST MARTIN DU FOUILLOUX which appears both in FOOT and BASKET top districts.
	For competition, ANGERS district has the biggest club (see MAIN_CLUBS_1). The equipment datas allows us to find the AVRILLE club is a good second choice. For Leisure, TRELAZE or ST BARTHELEMY are also good districts to swim without racing.

STUDY CONCLUSION

During study preparation, i was wondering if i should include more clubs datas in sources. I see now well it was not necessary because of the good correlation between competition grade equipments and competition levels of the clubs. This correlation allowed me :

- To easily find the equipments of the six main clubs i had decided to notice.
- But also to detect many departemental or regional level clubs, in each city, just finding first their competition grade equipments and then making a simple web search “name of district+name of sport” to find the given club.

In both cities, most of the equipments are in a “center cluster of districts”. But it is not true that the center district is the better as in both cities, small districts of this cluster manage to have very good levels of equipments per habitant, especially for foot or basket.

Concerning high level competition, one big club per city per sport was the rule. Concerning mid level competition in the two cities, possibilities are rising to 2 to 5 (other) clubs per city, depending on the sport. The main club of swimming is in the center district in both cities whereas the main football club isn’t, needing far more space. The main basket club of Angers is, the Nantes’ one isn’t (it is in Reze).

Finally finding leisure equipment in a main sport (football or basket) is rather easy. For swimming pools it is more complicated but the database has clearly some weakness on this subject. I suspect some swimming equipments are shared leisure or training competition, but only classified training or competition

BIBLIOGRAPHY

Input_PDF_1 : Sports in pays de la Loire : https://www.sraenutrition.fr/wp-content/uploads/2020/09/Fiche-sport-Pays-de-la-Loire-2020.pdf

Input_PDF_2 : Sports equipments in France : https://injep.fr/wp-content/uploads/2020/07/FR49_lieux_pratiquesportive.pdf (2018)

Input_PDF_3 : Angers swimming club : https://abcnatation.fr/files/club-200490148/up/News/Angers_Natation_Course_N43.pdf

The 3 documents are in french.