TO WHICH EUROPEAN CITIES CAN AFRICANS GO?

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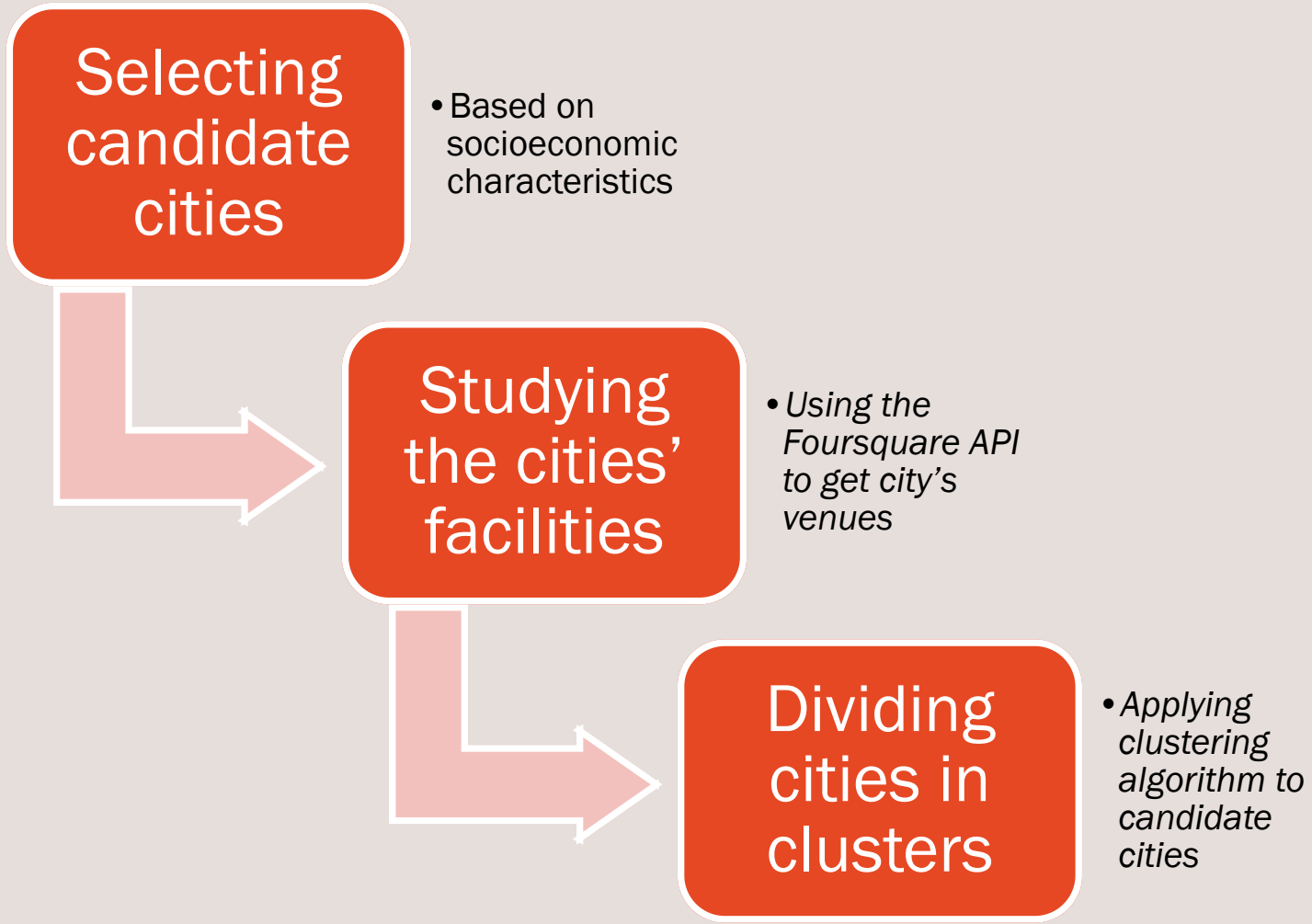
Business Problem

- A thousand of African executives leave the continent to settle elsewhere and particularly in Europe.
- This migration of the African elite has been amplified in the last decade due the technological boom
- So, to which European cities would be more judicious for Africans to go?

Methodology



Data

1- Population of cities

https://worldpopulationreview.com/continents/cities-in-europe/

CSV JSON

Name	Country	2020 Population ▾
Moscow	Russia	10,381,222
London	United Kingdom	7,556,900
Saint Petersburg	Russia	5,028,000
Berlin	Germany	3,426,354
Madrid	Spain	3,255,944
Kyiv	Ukraine	2,797,553
Rome	Italy	2,318,895
Paris	France	2,138,551
Bucharest	Romania	1,877,155
Minsk	Belarus	1,742,124
Budapest	Hungary	1,741,041

Data

2- Standard of living

https://en.wikipedia.org/wiki/List_of_sovereign_states_in_Europe_by_GDP_(PPP)_per_capita

Table of sovereign states in Europe by GDP (PPP) per capita [edit]

Below is a table of sovereign states in Europe by GDP (PPP) per capita in international dollars.[2] Countries are ranked by their projected 2019 figures.

Note: transcontinental countries that are partly (but not entirely) located in Europe are also shown in the table, but the values shown are for the entire country.

Rank	Country	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
1	Luxembourg	90,661	92,969	92,102	94,823	99,738	101,255	103,286	106,373	110,870	112,622
2	Ireland	43,291	45,359	46,058	47,422	52,133	65,656	69,248	75,538	79,925	81,686
3	Norway	61,601	62,656	64,699	65,673	67,377	68,795	69,807	71,830	74,065	76,620
4	Switzerland	53,263	54,769	55,728	57,098	58,808	59,423	60,365	61,421	63,380	66,780
5	Netherlands	44,839	46,309	46,491	47,015	48,363	49,780	51,248	53,634	56,435	59,105
6	Iceland	38,594	40,022	41,005	42,953	44,220	46,146	49,683	51,841	54,121	56,915
7	Germany	40,850	43,249	44,266	45,127	46,627	47,429	48,532	50,425	52,801	54,984
8	Denmark	41,957	43,193	43,933	44,882	46,223	47,202	48,338	49,883	51,643	54,564
9	Sweden	42,021	43,719	44,057	44,906	46,410	48,518	49,995	51,474	53,077	54,474
10	Austria	42,540	44,541	45,466	45,934	46,778	47,327	48,013	49,868	51,936	54,084
11	Belgium	40,121	41,077	41,647	42,168	43,338	44,200	45,124	46,553	48,258	49,705
12	Finland	38,741	40,377	40,340	40,490	40,771	41,114	42,408	44,332	46,342	48,221
13	France	37,284	38,657	39,251	39,912	40,801	41,507	42,366	43,760	45,473	47,113
14	Malta	28,609	29,518	30,682	32,246	34,921	37,884	39,510	41,944	44,670	47,061
15	United Kingdom	36,038	37,007	37,994	39,154	40,762	41,838	42,838	44,117	45,565	47,042
16	Spain	32,251	32,467	32,076	32,158	33,285	34,835	36,443	38,285	40,289	42,120
17	Cyprus	34,966	34,923	33,588	31,962	32,373	33,806	35,220	37,023	38,980	41,572

Data

3- willingness to receive immigrants

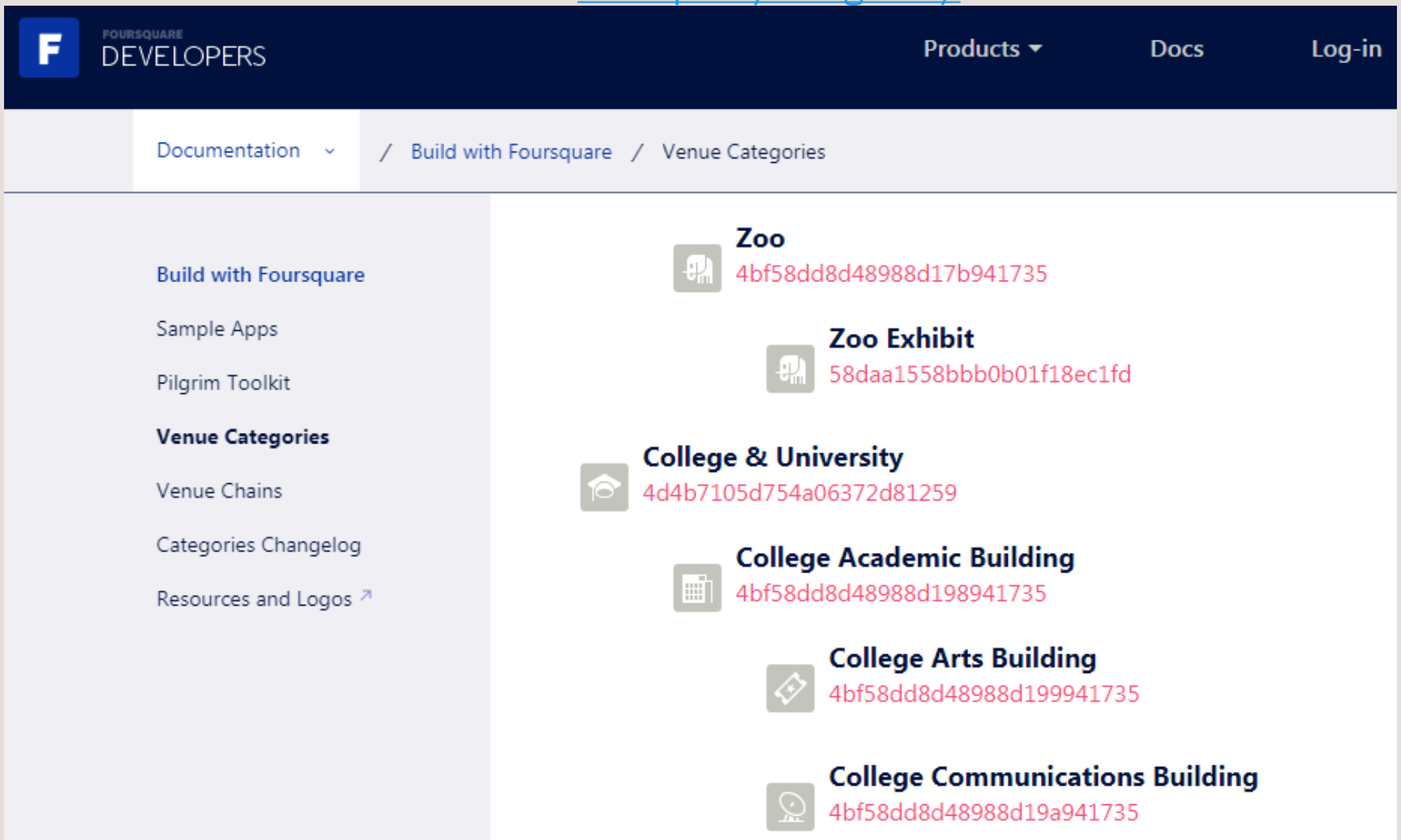
https://en.wikipedia.org/wiki/Immigration_to_Europe#2013_data

Country	Number of immigrants	Percentage of total number of immigrants in the world	Immigrants as percentage of national population
Russia	11,048,064	4.8	7.7
Germany	9,845,244	4.3	11.9
United Kingdom	7,824,131	3.4	12.4
France	7,439,086	3.2	11.6
Spain	5,891,208	2.8	9.6 (2016)
Italy	5,721,457	2.5	9.4
Ukraine	5,151,378	2.2	11.4
Switzerland	2,335,059	1.0	28.9
Netherlands	1,964,922	0.9	11.7
Sweden	1,130,025	0.7	15.9
Austria	1,333,807	0.6	15.7
Belgium	1,159,801	0.5	10.4
Belarus	1,085,396	0.5	11.6
Greece	988,245	0.4	8.9
Portugal	893,847	0.4	8.4
Croatia	756,980	0.3	17.6
Ireland	735,535	0.3	15.9
Norway	694,508	0.3	13.8
Poland	663,755	0.3	0.9

Data

4- Infrastructure of candidate cities

https://developer.foursquare.com/docs/build-with-foursquare/categories/



Implementation
1- Selecting the candidate cities

- Combining the socioeconomic criteria to find the candidate cities
  - *Population*
  - *Standard of living*
  - *willingness to receive immigrants*
- 500 cities, chosen from the most European populated cities, were ranked based on these criteria
- 100 most ranked are selected for further study

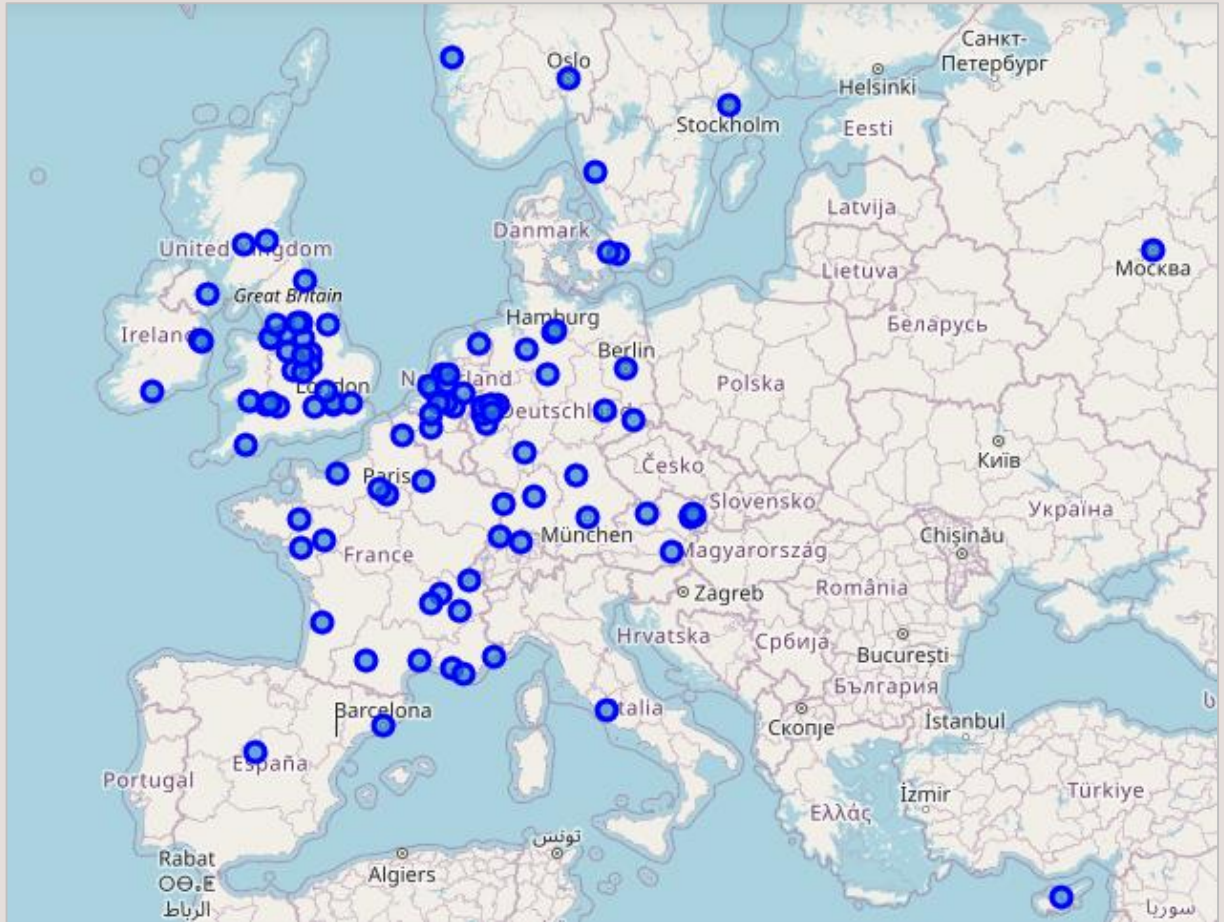
Implementation
1- Selecting the candidate cities

- Results : Number of candidate cities by country

country	Austria	Belgium	Cyprus	Denmark	France	Germany	Ireland	Italy	Netherlands	Norway	Russia	Spain	Sweden	Switzerland	United Kingdom
city	6	2	1	1	18	19	3	1	10	2	1	2	3	3	28

Implementation
1- Selecting the candidate cities

- Results : map of selected cities



Implementation
2- Studying the cities' facilities

- The infrastructure properties of the cities were extracted from the Foursquare location data.
- 8 main features (venue categories) were selected for this target to characterize the attractiveness of each city in terms of education, health, leisure, business, sports, culture and consular services

Implementation
2- Studying the cities' facilities

- Foursquare location data / venue categories

Category	Subcategory	Category ID
College & University	University	4bf58dd8d48988d1ae941735
Outdoors & Recreation	Gym / Fitness Center	4bf58dd8d48988d175941735
Professional & Other Places	Business Center	56aa371be4b08b9a8d573517
	Cultural Center	52e81612bcbc57f1066b7a32
Government Building	Embassy / Consulate	4bf58dd8d48988d12c951735
Medical Center	Hospital	4bf58dd8d48988d196941735
Shop & Service	Bank	4bf58dd8d48988d10a951735
Travel & Transport	Train Station	4bf58dd8d48988d129951735

Implementation
2- Studying the cities' facilities

- Results : Number of venues per category per city

	University	Hospital	Business Center	Cultural Center	Embassy Consulate	Bank	Train Station	Gym Center
Zurich	32	33	4	10	11	66	79	88
Geneve	17	17	11	5	5	58	18	44
Basel	9	12	11	8	8	44	26	26
London	147	122	45	18	97	185	257	217
Dublin	54	15	10	1	13	46	12	79

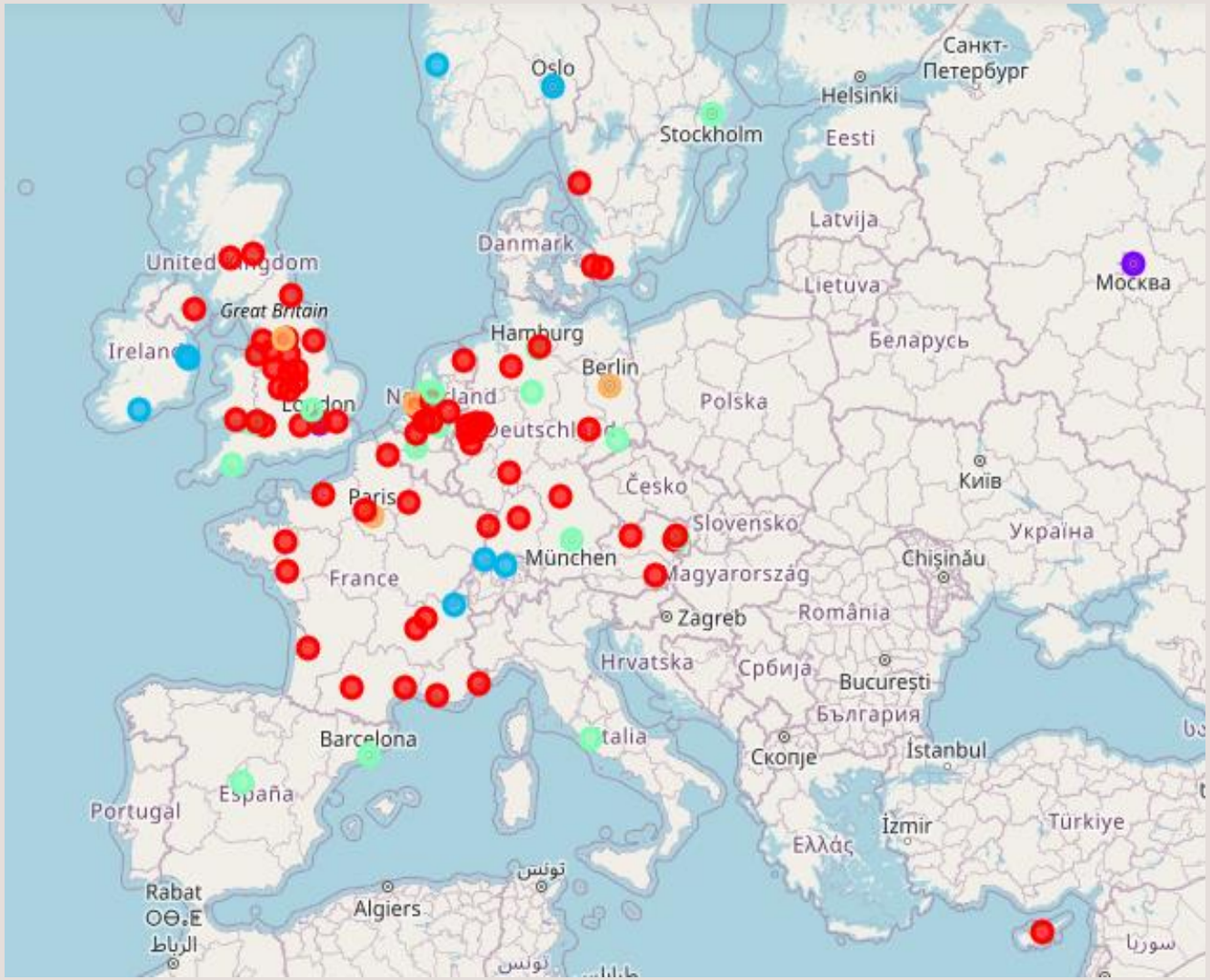
Implementation
3- Applying clustering algorithm to candidate cities

- Applying a clustering type machine learning method to data to derive homogenous classes of cities
- Algorithm : K-Means
- Number of target clusters : 5

Implementation

3- Applying clustering algorithm to candidate cities

- Results : Map of resulting clusters



Implementation
3- Applying clustering algorithm to candidate cities

- Results : Resulting clusters
- First Cluster : Megalopolis Cities

	city	country
3	London	United Kingdom
5	Moscow	Russia

Implementation
3- Applying clustering algorithm to candidate cities

- Results : Resulting clusters
- Second Cluster : European big capitals

	city	country
10	Berlin	Germany
13	Paris	France
29	The Hague	Netherlands
86	Bradford	United Kingdom

Implementation

3- Applying clustering algorithm to candidate cities

- Results : Resulting clusters
- Third Cluster : wealthy cities

	city	country
0	Zurich	Switzerland
1	Geneve	Switzerland
2	Basel	Switzerland
4	Dublin	Ireland
6	Cork	Ireland
7	Dun Laoghaire	Ireland
8	Oslo	Norway
9	Bergen	Norway

Implementation
3- Applying clustering algorithm to candidate cities

- Results : Resulting clusters
- Fourth Cluster : level two capitals + relative big cities

	city	country
11	Vienna	Austria
12	Stockholm	Sweden
14	Madrid	Spain
16	Hamburg	Germany
21	Donaustadt	Austria
23	Munich	Germany
24	Amsterdam	Netherlands
27	Rome	Italy
28	Brussels	Belgium
32	Liverpool	United Kingdom
36	Eindhoven	Netherlands
40	Almere Stad	Netherlands
47	Essen	Germany
53	Barcelona	Spain
56	Hannover	Germany
60	Cardiff	United Kingdom
62	Dresden	Germany
94	Plymouth	United Kingdom
95	Luton	United Kingdom

Implementation
3- Applying clustering algorithm to candidate cities

- Results : Resulting clusters
- Fifth Cluster : Medium-sized cities

['Goeteborg', 'Malmoe', 'Graz', 'Linz', 'Favoriten', 'Floridsdorf', 'Rotterdam', 'Birmingham', 'Koeln', 'Marseille', 'Nottingham', 'Utrecht', 'Sheffield', 'Tilburg', 'Groningen', 'Bristol', 'Breda', 'Nijmegen', 'Frankfurt am Main', 'Glasgow', 'Nicosia', 'Lyon', 'Stuttgart', 'Dortmund', 'Duesseldorf', 'Toulouse', 'Leicester', 'Bremen', 'Edinburgh', 'Leeds', 'Leipzig', 'Duisburg', 'Nuernberg', 'Nice', 'Manchester', 'Stoke-on-Trent', 'Antwerpen', 'Coventry', 'Nantes', 'Wandsbek', 'Strasbourg', 'Sunderland', 'Bochum', 'Montpellier', 'Birkenhead', 'Bochum-Hordel', 'Islington', 'Reading', 'Copenhagen', 'Kingston upon Hull', 'Preston', 'Bordeaux', 'Lille', 'Newport', 'Wuppertal', 'Swansea', 'Southend-on-Sea', 'Rennes', 'Reims', 'Belfast', 'Derby', 'Le Havre', 'Cergy-Pontoise', 'Saint-Etienne']

Conclusion

- The study had allowed to set up a methodology for the clustering of European cities according to their disposition to welcome African emigrants
- The work was done based on socioeconomic characteristics and location data derived using Foursquare API
- This work can be further developed by adding other evaluation criteria (venues categories) and may well be extended to other geographical contexts.