Helping people relocate in Brussels

Charles-Emmanuel de Lannoy
04/2020

Determine the best place to live in Brussels for each EU member delegate.

- Brussels is made of 19 municipalities, each of them having its own characteristics
- Objective: install in Brussels the European delegates and their families (if any) according to their needs

- ➔ Use data and a classification approach to determine the best place to live in Brussels for each member delegate.

Data acquisition

- For the list of municipalities: [Wikipedia](#)

- For statistics about population: [bestat.statbel.fgov.be](#)

- Geographical coordinates: use of Geopy & Nominatim.

- Municipalities characteristics: Use of foursquare to find the number of restaurants, public transport stations, parks, shops and schools at proximity.

	PostalCode	Municipality	Latitude	Longitude	size(km^2)	population	Population_density	population_average_age	restaurants	schools	public_transport_station	shops	parks
0	1000	1000 Bruxelles	50.84656	4.351697	32.61	179797	5514	41.86	30	10	18	30	2
1	1030	Schaerbeek	50.8676	4.373712	8.14	131547	16161	32.99	17	6	7	10	3
2	1040	Etterbeek	50.83615	4.386174	3.15	48008	15241	35.75	25	6	8	30	2

Choose discriminant variables

- Population density and average age may be used as high variation observed among municipalities.

	Population_density	population_average_age
min	1,947	33
median	8,948	38
max	23,761	43

- Correlation between number of shops & number of restaurant is significant to use only number of shops

➔ Use of Population density, average age, number of public transport stations, parks, shops and schools in the model.

modeling

- best discriminant way to fit the best municipality: classification approach

➔Choose of Decision tree for model

- Variable of concern are "Population_density", "population_average_age", "shops" , "schools", "public_transport_station" and "parks".

Decision tree

- Decision tree gives the following

level 1	level 2	level 3	level 4	level 5	Municipality
shops <=14.5	schools <=4.5	PTS <=2.5	pop dens <=9470		Berchem-Sainte-Agathe
shops <=14.5	schools <=4.5	PTS <=2.5	pop dens > 9470		Jette
shops <=14.5	schools <=4.5	PTS > 2.5	PTS <=3.5		Evere
shops <=14.5	schools <=4.5	PTS > 2.5	PTS > 3.5		Woluwe-Saint-Pierre
shops <=14.5	schools > 4.5	PTS <=2.5	parks <=3		Forest
shops <=14.5	schools > 4.5	PTS <=2.5	parks >3		Watermael-Boitsfort
shops <=14.5	schools > 4.5	PTS > 2.5	pop dens <=9961		Auderghem
shops <=14.5	schools > 4.5	PTS > 2.5	pop dens > 9961	parks <=2.5	Koekelberg
shops <=14.5	schools > 4.5	PTS > 2.5	pop dens > 9961	parks >2.5	Schaerbeeck
shops > 14.5	parks <=1.5	schools <=6.5	shops <=17.5		Ganshoren
shops > 14.5	parks <=1.5	schools <=6.5	shops > 17.5	pop dens <=8641	Uccle
shops > 14.5	parks <=1.5	schools <=6.5	shops > 17.5	pop dens > 8641	Ixelles
shops > 14.5	parks <=1.5	schools > 6.5	shops <=21.5		Anderlecht
shops > 14.5	parks <=1.5	schools > 6.5	shops > 21.5		Saint Gilles
shops > 14.5	parks > 1.5	pop dens <=11553	parks <=2.5		1000 Bruxelles
shops > 14.5	parks > 1.5	pop dens <=11553	parks > 2.5		Woluwe-Saint-Lambert
shops > 14.5	parks > 1.5	pop dens > 11553	aver age <= 35.68		Saint-Josse-ten-Noode
shops > 14.5	parks > 1.5	pop dens > 11553	aver age > 35.68	pop dens <=15812	Etterbeek
shops > 14.5	parks > 1.5	pop dens > 11553	aver age > 35.68	pop dens > 15812	Molenbeek-Saint-Jean

- First discriminant factor is number of shops with threshold around 15
- Schools or Park that comes as second criterion. Population density, public transport and average age come next.
- People with children would prefer municipalities with schools and Parks at proximity
- Single people would prefer shops and would choose according to their preferences in population density and/or average age of population.

Conclusion

- Obtained results are accurate but would be improved by adding bespoke criterions like type of shops, type of restaurants and selecting best average notes for all criterion.

- Risk of too complicated model: find good balance between accuracy and complexity

- Choosing a place to live imply visiting the area.

- ➜ model only gives a trend for people that would help them to choose.