

The Battle of Neighborhood II

Madrid Rent Apartment neighborhood report

By Alberto Cuesta

1. Introduction:

Madrid is the capital of Spain and the largest municipality in both the Community of Madrid and Spain as a whole. The city has almost 3.3 million inhabitants and a metropolitan area population of approximately 6.5 million. It is the third-largest city in the European Union (EU), smaller than only London and Berlin, and its monocentric metropolitan area is the third-largest in the EU, smaller only than those of London and Paris. The municipality covers 604.3 km² (233.3 sq mi). The Madrid urban agglomeration has the third-largest GDP in the European Union and its influence in politics, education, entertainment, environment, media, fashion, science, culture, and the arts all contribute to its status as one of the world's major global cities. Madrid is home to two world-famous football clubs, Real Madrid and Atlético Madrid. Due to its economic output, high standard of living, and market size, Madrid is considered the leading economic hub of the Iberian Peninsula and of Southern Europe

2. Objectives:

In this report, we will study in details the area classification using Foursquare data and machine learning segmentation and clustering. The aim of this report is to segment areas of Madrid based on the most common places captured from Foursquare.

We will try to determine, using segmentation, clustering and visualization:

- a. The similarity or dissimilarity of districts/neighborhood of Madrid
- b. Determine the factors involved in increasing the apartment rental price in Madrid

3. Data:

The data acquired from:

URLs: https://datos.madrid.es/sites/v/index.jsp?vgnextoid=374512b9ace9f310VgnVCM100000171f5a0aRCRD&buscar=true&Texto=&Sector=vivienda&Formato=&Periodicidad=&orderByCombo=CONTENT_INSTA NCE_NAME_DECODE

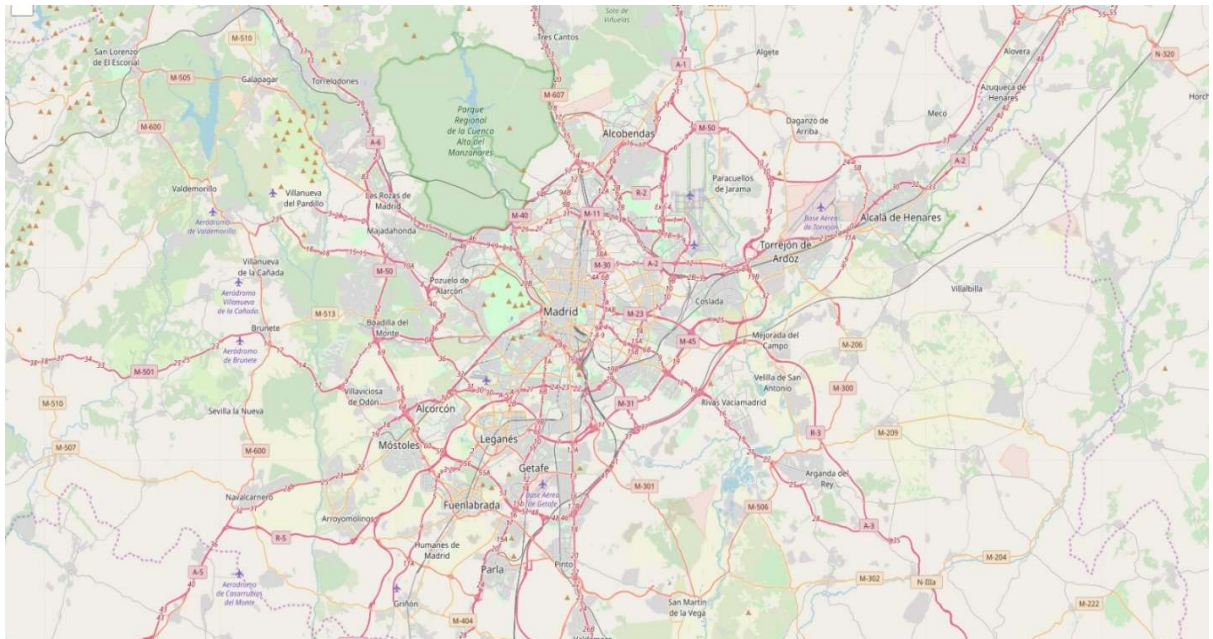
The data acquired from URL, was restructured for easier manipulation and reading into files:

- MADRID_RENT_APARTMENTS.csv

4. Madrid: Analyzing and visualization

4.1 Madrid: Map

Coordinates of Madrid: 40.4167047, -3.7035825



4.2 Madrid: Districts & Neighborhoods

City	District	Neighborhood	Postal	Latitude	Longitude	2019	2018
Madrid	ARGANZUELA	IMPERIAL	28005	40.405551	-3.7145658	15.7	14.6
Madrid	ARGANZUELA	ACACIAS	28005	40.402135	-3.7031695	15.7	14.6
Madrid	ARGANZUELA	PALOS DE MOGUER	28045	40.405575	-3.6913967	15.7	14.6
Madrid	ARGANZUELA	DELICIAS	28045	40.394283	-3.6934728	15.7	14.6
Madrid	ARGANZUELA	ATOCHA	28045	40.397445	-3.6783516	15.7	14.6
Madrid	ARGANZUELA	LEGAZPI	28045	40.392243	-3.6881497	15.7	14.6
Madrid	BARAJAS	TIMON	28042	40.470708	-3.5840209	11.9	12.3
Madrid	BARAJAS	ALAMEDA DE OSUNA	28042	40.458947	-3.5847919	11.9	12.3
Madrid	BARAJAS	TIMON	28042	40.470477	-3.5904598	11.9	12.3
Madrid	CARABANCHEL	COMILLAS	28019	40.397504	-3.7150109	11.9	11.6
Madrid	CARABANCHEL	SAN ISIDRO	28019	40.394605	-3.7232402	11.9	11.6
Madrid	CARABANCHEL	OPAÑEL	28019	40.387611	-3.7252508	11.9	11.6
Madrid	CARABANCHEL	ABRANTES	28025	40.384816	-3.7255743	11.9	11.6
Madrid	CARABANCHEL	PUERTA BONITA	28025	40.380913	-3.74285	11.9	11.6
Madrid	CARABANCHEL	BUENAVISTA	28044	40.367425	-3.7541976	11.9	11.6
Madrid	CARABANCHEL	VISTA ALEGRE	28047	40.386071	-3.7463469	11.9	11.6
Madrid	CENTRO	JUSTICIA	28004	40.426642	-3.699723	18.4	18.8
Madrid	CENTRO	UNIVERSIDAD	28004	40.426793	-3.7045815	18.4	18.8
Madrid	CENTRO	PALACIO	28005	40.411085	-3.7113832	18.4	18.8
Madrid	CENTRO	EMBAJADORES	28005	40.40613	-3.7069234	18.4	18.8
Madrid	CENTRO	CORTES	28014	40.410557	-3.6929209	18.4	18.8

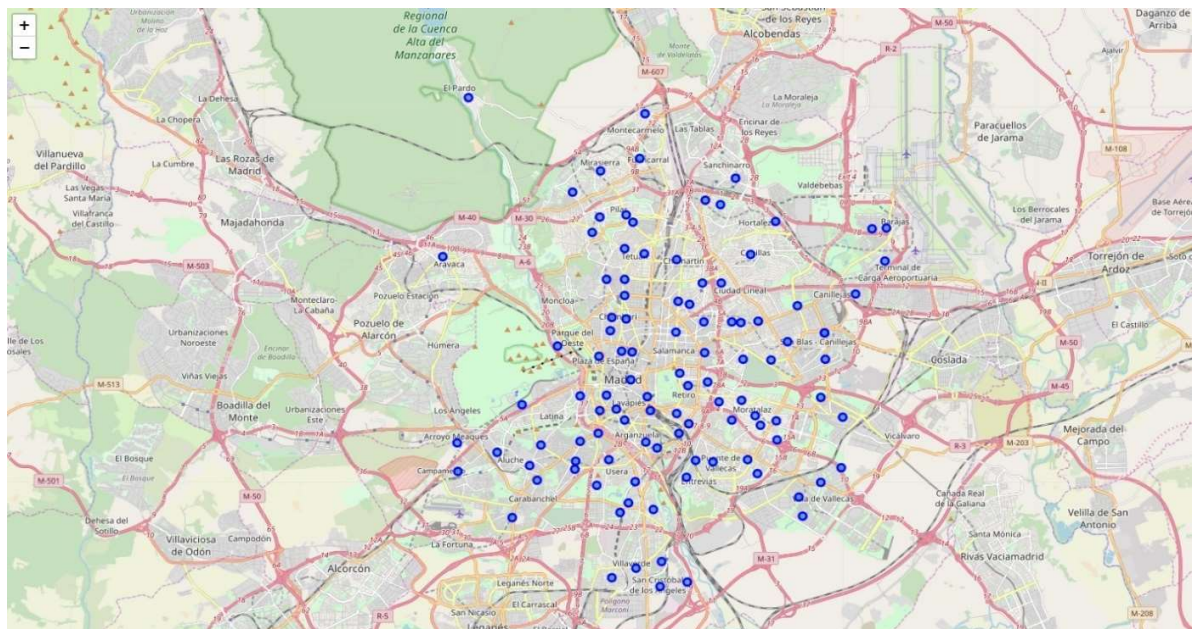
Madrid	CHAMARTIN	PROSPERIDAD	28002	40.443681	-3.6735453	16.4	16.6
Madrid	CHAMARTIN	CIUDAD JARDIN	28002	40.451219	-3.667724	16.4	16.6
Madrid	CHAMARTIN	EL VISO	28002	40.444624	-3.678637	16.4	16.6
Madrid	CHAMARTIN	NUEVA ESPAÑA	28016	40.459537	-3.6795419	16.4	16.6
Madrid	CHAMBERI	RIOS ROSAS	28003	40.446613	-3.7031139	18.2	17.7
Madrid	CHAMBERI	VALLEHERMOSO	28003	40.438965	-3.7088354	18.2	17.7
Madrid	CHAMBERI	TRAFALGAR	28010	40.438211	-3.7024605	18.2	17.7
Madrid	CHAMBERI	ARAPILES	28015	40.434104	-3.7097393	18.2	17.7
Madrid	CIUDAD LINEAL	PUEBLO NUEVO	28017	40.423746	-3.6365083	13.7	13.1
Madrid	CIUDAD LINEAL	VENTAS	28017	40.424019	-3.6490418	13.7	13.1
Madrid	CIUDAD LINEAL	SAN PASCUAL	28027	40.437241	-3.6544039	13.7	13.1
Madrid	CIUDAD LINEAL	QUINTANA	28027	40.43748	-3.6423326	13.7	13.1
Madrid	CIUDAD LINEAL	CONCEPCION	28027	40.437148	-3.6500523	13.7	13.1
Madrid	CIUDAD LINEAL	COSTILLARES	28033	40.480641	-3.6663283	13.7	13.1
Madrid	CIUDAD LINEAL	SAN JUAN BAUTISTA	28043	40.451161	-3.6590202	13.7	13.1
Madrid	FUENCARRAL-EL PARDO	LA PAZ	28029	40.47541	-3.7024233	12.3	12.1
Madrid	FUENCARRAL-EL PARDO	EL PILAR	28029	40.474597	-3.7144124	12.3	12.1
Madrid	FUENCARRAL-EL PARDO	VALVERDE	28034	40.495511	-3.6960481	12.3	12.1
Madrid	FUENCARRAL-EL PARDO	MIRASIERRA	28034	40.491139	-3.7141984	12.3	12.1
Madrid	FUENCARRAL-EL PARDO	PEÑA GRANDE	28035	40.483493	-3.7267183	12.3	12.1
Madrid	FUENCARRAL-EL PARDO	EL PARDO	28048	40.517157	-3.7742643	12.3	12.1
Madrid	FUENCARRAL-EL PARDO	EL GOLOSO	28049	40.511578	-3.6938181	12.3	12.1
Madrid	HORTALEZA	HELLIN	28022	40.433338	-3.6120522	12.7	13.4
Madrid	HORTALEZA	PINAR DEL REY	28033	40.473018	-3.6345432	12.7	13.4
Madrid	HORTALEZA	APOSTOL SANTIAGO	28033	40.478977	-3.6596343	12.7	13.4
Madrid	HORTALEZA	CANILLAS	28043	40.461443	-3.6457808	12.7	13.4
Madrid	HORTALEZA	VALDEFUENTES	28050	40.488603	-3.6525544	12.7	13.4
Madrid	LATINA	LUCERO	28011	40.407634	-3.7498731	11.8	11.5
Madrid	LATINA	PUERTA DEL ANGEL	28011	40.41092	-3.7234031	11.8	11.5
Madrid	LATINA	LAS AGUILAS	28024	40.383983	-3.7788989	11.8	11.5
Madrid	LATINA	CAMPAMENTO	28024	40.394142	-3.7792987	11.8	11.5
Madrid	LATINA	ALUCHE	28024	40.390832	-3.7609979	11.8	11.5
Madrid	LATINA	LOS CARMENES	28047	40.393474	-3.7412324	11.8	11.5
Madrid	MONCLOA-ARAVACA	CASA DE CAMPO	28008	40.428702	-3.7337086	14.9	15.2
Madrid	MONCLOA-ARAVACA	ARGUELLES	28008	40.424919	-3.7149121	14.9	15.2
Madrid	MONCLOA-ARAVACA	ARAVACA	28023	40.460576	-3.7857037	14.9	15.2
Madrid	MONCLOA-ARAVACA	VALDEZARZA	28039	40.469162	-3.7177757	14.9	15.2
Madrid	MORATALAZ	VINATEROS	28030	40.403824	-3.64358	11.4	10.8
Madrid	MORATALAZ	PAVONES	28030	40.395114	-3.6335756	11.4	10.8
Madrid	MORATALAZ	MEDIA LEGUA	28030	40.408838	-3.6602926	11.4	10.8
Madrid	MORATALAZ	MARROQUINA	28030	40.409437	-3.6499859	11.4	10.8
Madrid	MORATALAZ	PAVONES	28030	40.401914	-3.6339104	11.4	10.8
Madrid	MORATALAZ	FONTARRON	28030	40.40054	-3.6411565	11.4	10.8
Madrid	PUENTE DE VALLECAS	PALOMERAS SURESTE	28018	40.383109	-3.6426052	12	11.9

Madrid	PUENTE DE VALLECAS	PALOMERAS BAJAS	28018	40.387427	-3.662805	12	11.9
Madrid	PUENTE DE VALLECAS	PORTAZGO	28038	40.388191	-3.6472367	12	11.9
Madrid	PUENTE DE VALLECAS	NUMANCIA	28038	40.402204	-3.6544887	12	11.9
Madrid	PUENTE DE VALLECAS	SAN DIEGO	28053	40.387904	-3.6707625	12	11.9
Madrid	PUENTE DE VALLECAS	ENTREVIAS	28053	40.381835	-3.6748845	12	11.9
Madrid	RETIRO	ESTRELLA	28007	40.415864	-3.6652056	16.1	15.8
Madrid	RETIRO	PACIFICO	28007	40.404728	-3.6793321	16.1	15.8
Madrid	RETIRO	ADEFAS	28007	40.400841	-3.6737663	16.1	15.8
Madrid	RETIRO	NIÑO JESUS	28009	40.41455	-3.6743509	16.1	15.8
Madrid	RETIRO	IBIZA	28009	40.419016	-3.6778727	16.1	15.8
Madrid	SALAMANCA	CASTELLANA	28006	40.433501	-3.6796687	18.7	19.1
Madrid	SALAMANCA	FUENTE DEL BERRO	28028	40.42628	-3.6665578	18.7	19.1
Madrid	SALAMANCA	GUINDALERA	28028	40.437286	-3.6670202	18.7	19.1
Madrid	SALAMANCA	RECOLETOS	28001	40.41669	-3.700346	18.7	19.1
Madrid	SAN BLAS-CANILLEJAS	HELLIN	28022	40.433338	-3.6120522	11.7	11.8
Madrid	SAN BLAS-CANILLEJAS	REJAS	28022	40.44724	-3.5980275	11.7	11.8
Madrid	SAN BLAS-CANILLEJAS	ARCOS	28022	40.423997	-3.6116846	11.7	11.8
Madrid	SAN BLAS-CANILLEJAS	EL SALVADOR	28027	40.443091	-3.6245572	11.7	11.8
Madrid	SAN BLAS-CANILLEJAS	SIMANCAS	28037	40.430113	-3.6288345	11.7	11.8
Madrid	TETUAN	CUATRO CAMINOS	28020	40.452478	-3.7029628	16	15.1
Madrid	TETUAN	CASTILLEJOS	28020	40.461603	-3.6942	16	15.1
Madrid	TETUAN	ALMENARA	28029	40.472906	-3.6993418	16	15.1
Madrid	TETUAN	BELLAS VISTAS	28039	40.452427	-3.7113472	16	15.1
Madrid	TETUAN	VALDEACEDERAS	28039	40.463279	-3.7032287	16	15.1
Madrid	USERA	MOSCARDO	28026	40.388109	-3.7103755	11.4	11.5
Madrid	USERA	ALMENDRALES	28026	40.3802	-3.6982527	11.4	11.5
Madrid	USERA	ZOFIO	28026	40.378931	-3.7158394	11.4	11.5
Madrid	USERA	ORCASUR	28041	40.372589	-3.7012482	11.4	11.5
Madrid	USERA	ORCASITAS	28041	40.369312	-3.7051368	11.4	11.5
Madrid	USERA	SAN FERMIN	28041	40.370439	-3.6899303	11.4	11.5
Madrid	VICALVARO	CASCO H.VICALVARO	28032	40.403201	-3.6036949	10.9	10
Madrid	VICALVARO	AMBROZ	28032	40.410311	-3.6136821	10.9	10
Madrid	VILLA DE VALLECAS	SANTA EUGENIA	28031	40.385261	-3.6044065	11.2	10.9
Madrid	VILLA DE VALLECAS	CASCO H.VALLECAS	28031	40.36804	-3.6221677	11.2	10.9
Madrid	VILLA DE VALLECAS	SANTA EUGENIA	28031	40.380102	-3.6139498	11.2	10.9
Madrid	VILLA DE VALLECAS	CASCO H.VALLECAS	28031	40.374905	-3.6238094	11.2	10.9
Madrid	VILLAVERDE	LOS ROSALES	28021	40.351867	-3.6861847	10.8	10.4
Madrid	VILLAVERDE	BUTARQUE	28021	40.344393	-3.6747467	10.8	10.4
Madrid	VILLAVERDE	SAN CRISTOBAL	28021	40.342907	-3.6870005	10.8	10.4
Madrid	VILLAVERDE	SAN ANDRES	28021	40.346045	-3.7089567	10.8	10.4
Madrid	VILLAVERDE	LOS ANGELES	28021	40.349499	-3.6979477	10.8	10.4

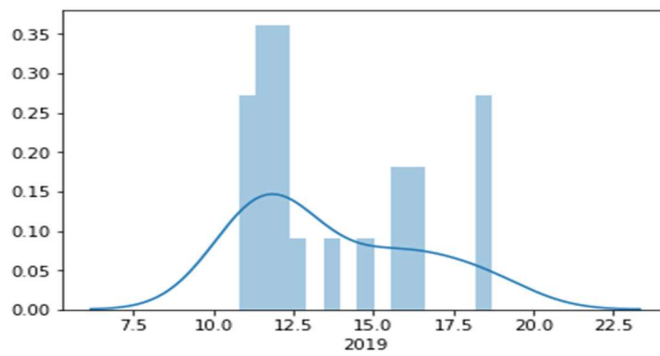
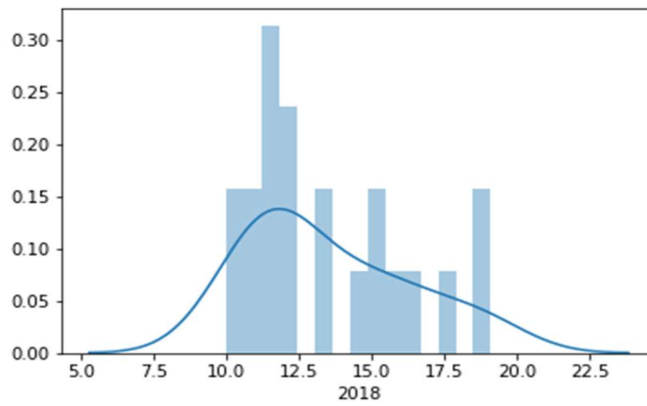
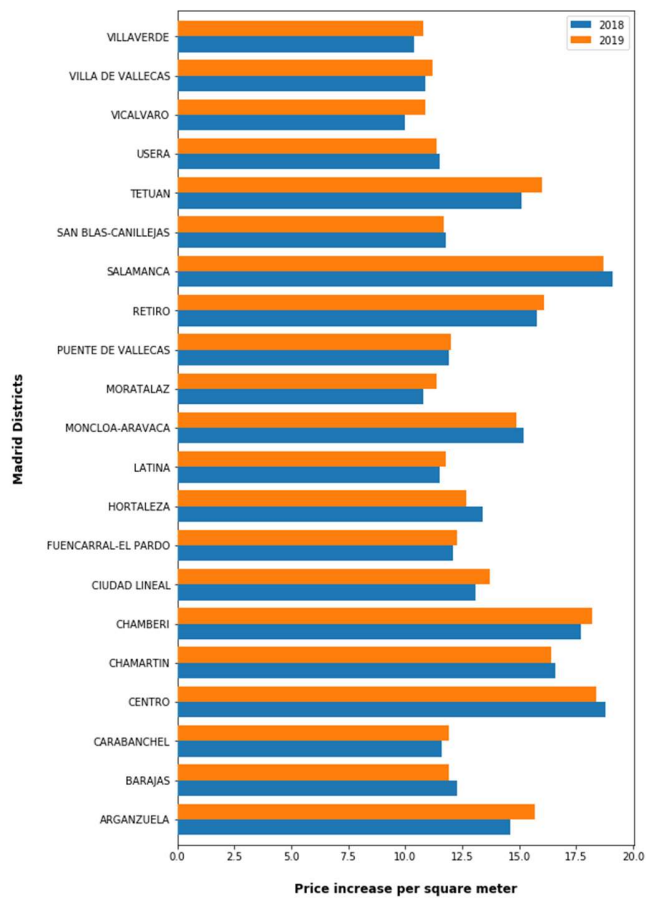
Grouping Madrid by district we obtained:

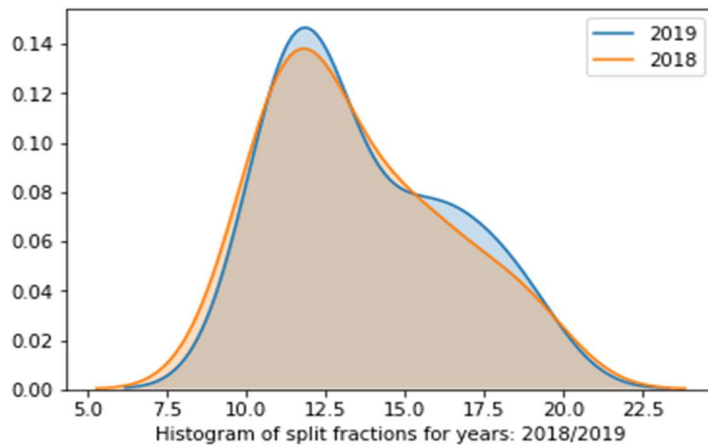
- 21 district
- 106 neighborhood.

	District	Neighborhood
1	ARGANZUELA	IMPERIAL, ACACIAS, PALOS DE MOGUER, DELICIAS, ...
2	BARAJAS	TIMON, ALAMEDA DE OSUNA, TIMON
3	CARABANCHEL	COMILLAS, SAN ISIDRO, OPAÑEL, ABRANTES, PUERTA...
4	CENTRO	JUSTICIA, UNIVERSIDAD, PALACIO, EMBAJADORES, C...
5	CHAMARTIN	PROSPERIDAD, CIUDAD JARDIN, EL VISO, NUEVA ESPAÑA
6	CHAMBERI	RIOS ROSAS, VALLEHERMOSO, TRAFALGAR, ARAPILES
7	CIUDAD LINEAL	PUEBLO NUEVO, VENTAS, SAN PASCUAL, QUINTANA, C...
8	FUENCARRAL-EL PARDO	LA PAZ, EL PILAR, VALVERDE, MIRASIERRA, PEÑA G...
9	HORTALEZA	HELLIN, PINAR DEL REY, APOSTOL SANTIAGO, CANIL...
10	LATINA	LUCERO, PUERTA DEL ANGEL, LAS AGUILAS, CAMPAME...
11	MONCLOA-ARAVACA	CASA DE CAMPO, ARGUELLES, ARAVACA, VALDEZARZA
12	MORATALAZ	VINATEROS, PAVONES, MEDIA LEGUA, MARROQUINA, P...
13	PUENTE DE VALLECAS	PALOMERAS SURESTE, PALOMERAS BAJAS, PORTAZGO, ...
14	RETIRO	ESTRELLA, PACIFICO, ADELFA, NIÑO JESUS, IBIZA
15	SALAMANCA	CASTELLANA, FUENTE DEL BERRO, GUINDALERA, RECO...
16	SAN BLAS-CANILLEJAS	HELLIN, REJAS, ARCOS, EL SALVADOR, SIMANCAS
17	TETUAN	CUATRO CAMINOS, CASTILLEJOS, ALMENARA, BELLAS ...
18	USERA	MOSCARDO, ALMENDRALES, ZOFIO, ORCASUR, ORCASIT...
19	VICALVARO	CASCO H.VICALVARO, AMBROZ
20	VILLA DE VALLECAS	SANTA EUGENIA, CASCO H.VALLECAS, SANTA EUGENIA...
21	VILLAVERDE	LOS ROSALES, BUTARQUE, SAN CRISTOBAL, SAN ANDR..



4.3 Madrid: Rent apartment price increase per square meter between 2018-2019





4.4 Madrid: Segmentation & Clustering

4.4.1 List of each neighborhood along with the top 5 most common venues

ABRANTES

		venue freq
0	Supermarket	0.07
1	Athletics & Sports	0.07
2	Brazilian Restaurant	0.07
3	Soccer Field	0.07
4	Grocery Store	0.07

ACACIAS

		venue freq
0	Spanish Restaurant	0.10
1	Restaurant	0.07
2	Bar	0.04
3	Park	0.04
4	Gym / Fitness Center	0.04

ADEFAS

		venue freq
0	Bar	0.09
1	Grocery Store	0.09
2	Pizza Place	0.06
3	Spanish Restaurant	0.06
4	Tapas Restaurant	0.06

ALAMEDA DE OSUNA

		venue freq
0	Grocery Store	0.13
1	Hotel	0.13
2	Metro Station	0.07
3	Coffee Shop	0.07
4	Shop & Service	0.07

ALMENARA

		venue freq
0	Bar	0.17
1	Flea Market	0.17
2	Gym / Fitness Center	0.17
3	Library	0.17
4	Tapas Restaurant	0.17

ALMENDRALES----

		venue freq
0	Spanish Restaurant	0.3
1	Coffee Shop	0.1
2	Train Station	0.1
3	Chinese Restaurant	0.1
4	Bar	0.1

ALUCHE		
		venue freq
0	Italian Restaurant	0.12
1	Shopping Mall	0.12
2	Farmers Market	0.06
3	Bar	0.06
4	Burger Joint	0.06

AMBROZ		
		venue freq
0	Spanish Restaurant	0.25
1	Grocery Store	0.25
2	Arts & Crafts Store	0.25
3	Café	0.25
4	Yoga Studio	0.00

APOSTOL SANTIAGO		
		venue freq
0	Spanish Restaurant	0.33
1	Park	0.17
2	Soccer Field	0.17
3	Grocery Store	0.17
4	Metro Station	0.17

ARAPILES		
		venue freq
0	Spanish Restaurant	0.12
1	Bar	0.08
2	Restaurant	0.06
3	Bakery	0.05
4	Café	0.05

ARAVACA		
		venue freq
0	Restaurant	0.18
1	Italian Restaurant	0.14
2	Spanish Restaurant	0.09
3	Deli / Bodega	0.05
4	Mexican Restaurant	0.05

ARCOS		
		venue freq
0	Pizza Place	0.19
1	Grocery Store	0.12
2	Supermarket	0.06
3	Pharmacy	0.06
4	Spanish Restaurant	0.06

ARGUELLES		
		venue freq
0	Hotel	0.14
1	Spanish Restaurant	0.10
2	Tapas Restaurant	0.06
3	Bar	0.05
4	Mediterranean Restaurant	0.04

ATOCHA		
		venue freq
0	Café	0.14
1	Italian Restaurant	0.10
2	Department Store	0.10
3	Train Station	0.05
4	Multiplex	0.05

BELLAS VISTAS		
		venue freq
0	Spanish Restaurant	0.10
1	Supermarket	0.10
2	Park	0.10
3	Pool	0.07
4	Grocery Store	0.07

BUENAVISTA		
		venue freq
0	Bar	0.50
1	BBQ Joint	0.25
2	Cocktail Bar	0.25
3	Peruvian Restaurant	0.00
4	Noodle House	0.00

BUTARQUE		
		venue freq
0	Mediterranean Restaurant	0.14
1	Sandwich Place	0.14
2	Grocery Store	0.14
3	Park	0.14
4	Bakery	0.14

CAMPAMENTO		
		venue freq
0	Spanish Restaurant	0.33
1	Light Rail Station	0.33
2	Metro Station	0.33
3	Yoga Studio	0.00
4	Pastry Shop	0.00

CANILLAS		
		venue freq
0	Soccer Field	0.1
1	Restaurant	0.1
2	Gymnastics Gym	0.1
3	Bar	0.1
4	Tapas Restaurant	0.1

CASA DE CAMPO-		
		venue freq
0	Food	0.09
1	Pool	0.09
2	Spanish Restaurant	0.09
3	Seafood Restaurant	0.09
4	Pub	0.09

CASCO H.VALLECAS-		
		venue freq
0	Grocery Store	0.21
1	Pie Shop	0.07
2	Basketball Court	0.07
3	Metro Station	0.07
4	Bakery	0.07

CASCO H.VICALVARO		
		venue freq
0	Grocery Store	0.22
1	Breakfast Spot	0.11
2	Restaurant	0.11
3	Electronics Store	0.11
4	Ice Cream Shop	0.11

CASTELLANA-		
		venue freq
0	Spanish Restaurant	0.18
1	Restaurant	0.10
2	Coffee Shop	0.08
3	Tapas Restaurant	0.05
4	Bar	0.04

CASTILLEJOS-		
		venue freq
0	Spanish Restaurant	0.15
1	Restaurant	0.08
2	Coffee Shop	0.05
3	Hotel	0.04
4	Chinese Restaurant	0.03

CIUDAD JARDIN----		
		venue freq
0	Coffee Shop	0.10
1	Tapas Restaurant	0.07
2	Seafood Restaurant	0.07
3	Bakery	0.07
4	Café	0.07

COMILLAS		
		venue freq
0	Spanish Restaurant	0.12
1	Supermarket	0.09
2	Tapas Restaurant	0.09
3	Bar	0.06
4	Plaza	0.06

CONCEPCION		
		venue freq
0	Spanish Restaurant	0.12
1	Bar	0.09
2	Tapas Restaurant	0.06
3	Coffee Shop	0.06
4	Park	0.06

CORTES		
		venue freq
0	Spanish Restaurant	0.09
1	Bar	0.07
2	Restaurant	0.07
3	Hotel	0.06
4	Café	0.06

COSTILLARES		
		venue freq
0	Gym / Fitness Center	0.13
1	Bar	0.09
2	Restaurant	0.09
3	Japanese Restaurant	0.04
4	Pet Store	0.04

CUATRO CAMINOS		
		venue freq
0	Spanish Restaurant	0.17
1	Bakery	0.08
2	Tapas Restaurant	0.06
3	Clothing Store	0.05
4	Pizza Place	0.05

DELICIAS		
		venue freq
0	Spanish Restaurant	0.07
1	Bar	0.05
2	Plaza	0.05
3	Café	0.05
4	Tapas Restaurant	0.05

EL GOLOSO		
		venue freq
0	Grocery Store	0.12
1	Deli / Bodega	0.06
2	Bakery	0.06
3	Dessert Shop	0.06
4	Restaurant	0.06

EL PARDO		
		venue freq
0	Restaurant	0.27
1	Spanish Restaurant	0.27
2	Plaza	0.18
3	Bakery	0.09
4	Tapas Restaurant	0.09

EL PILAR		
		venue freq
0	Pizza Place	0.14
1	Bar	0.14
2	Diner	0.09
3	Tapas Restaurant	0.09
4	Gym / Fitness Center	0.09

EL SALVADOR----

		venue freq
0	Restaurant	0.17
1	Hotel	0.17
2	Mediterranean Restaurant	0.08
3	Supermarket	0.08
4	Tennis Court	0.08

EL VISO

		venue freq
0	Restaurant	0.10
1	Spanish Restaurant	0.10
2	Bar	0.08
3	Grocery Store	0.07
4	Plaza	0.07

EMBAJADORES

		venue freq
0	Bar	0.12
1	Spanish Restaurant	0.08
2	Tapas Restaurant	0.08
3	Café	0.08
4	Coffee Shop	0.06

ENTREVIAS

		venue freq
0	Pizza Place	0.29
1	Chinese Restaurant	0.14
2	Park	0.14
3	Spanish Restaurant	0.14
4	Gym / Fitness Center	0.14

ESTRELLA

		venue freq
0	Cocktail Bar	0.15
1	Brewery	0.08
2	Asian Restaurant	0.08
3	Coffee Shop	0.08
4	Park	0.08

FONTARRON----

		venue freq
0	Plaza	0.25
1	Playground	0.25
2	Bus Station	0.25
3	Skating Rink	0.25
4	Yoga Studio	0.00

FUENTE DEL BERRO

		venue freq
0	Spanish Restaurant	0.21
1	Bar	0.07
2	Restaurant	0.07
3	Bakery	0.07
4	Brewery	0.04

GUINDALERA

		venue freq
0	Spanish Restaurant	0.08
1	Hotel	0.08
2	Bar	0.08
3	Japanese Restaurant	0.06
4	Seafood Restaurant	0.06

HELLIN

		venue freq
0	Sandwich Place	0.12
1	Plaza	0.12
2	Metro Station	0.12
3	Gym	0.12
4	Pizza Place	0.12

IBIZA

		venue freq
0	Spanish Restaurant	0.18
1	Restaurant	0.14
2	Tapas Restaurant	0.14
3	Bakery	0.05
4	Seafood Restaurant	0.05

IMPERIAL		
		venue freq
0	Spanish Restaurant	0.10
1	Bar	0.10
2	Café	0.06
3	Hotel	0.06
4	Tapas Restaurant	0.06

JUSTICIA		
		venue freq
0	Restaurant	0.07
1	Bar	0.06
2	Cocktail Bar	0.05
3	Plaza	0.05
4	Bookstore	0.04

LA PAZ		
		venue freq
0	Tapas Restaurant	0.17
1	Restaurant	0.17
2	Pizza Place	0.08
3	Dog Run	0.08
4	Park	0.08

LAS AGUILAS		
		venue freq
0	Spanish Restaurant	0.11
1	Tapas Restaurant	0.11
2	Sporting Goods Shop	0.11
3	Bar	0.11
4	Train Station	0.11

LEGAZPI		
		venue freq
0	Bar	0.08
1	Spanish Restaurant	0.08
2	Restaurant	0.06
3	Café	0.06
4	Grocery Store	0.06

LOS ANGELES		
		venue freq
0	Spanish Restaurant	0.33
1	Grocery Store	0.33
2	Mediterranean Restaurant	0.17
3	Bus Station	0.17
4	Pastry Shop	0.00

LOS CARMENES		
		venue freq
0	Grocery Store	0.29
1	Breakfast Spot	0.14
2	Fast Food Restaurant	0.14
3	Café	0.14
4	Tapas Restaurant	0.14

LOS ROSALES		
		venue freq
0	Metro Station	0.25
1	Supermarket	0.08
2	Latin American Restaurant	0.08
3	Auto Garage	0.08
4	Pet Store	0.08

LUCERO		
		venue freq
0	Theme Park Ride / Attraction	0.47
1	Snack Place	0.07
2	Food	0.07
3	Tapas Restaurant	0.07
4	Park	0.07

MARROQUINA		
		venue freq
0	Coffee Shop	0.15
1	Bar	0.15
2	Plaza	0.10
3	Deli / Bodega	0.05
4	Bakery	0.05

MEDIA LEGUA		
		venue freq
0	Restaurant	0.18
1	Bar	0.12
2	Fast Food Restaurant	0.12
3	Plaza	0.06
4	Supermarket	0.06
MIRASIERRA		
		venue freq
0	Sports Club	0.2
1	Convenience Store	0.2
2	Grocery Store	0.2
3	Café	0.2
4	Gym	0.2
MOSCARDO		
		venue freq
0	Grocery Store	0.18
1	Shop & Service	0.09
2	Seafood Restaurant	0.09
3	Bar	0.09
4	Bakery	0.09
NIÑO JESUS		
		venue freq
0	Spanish Restaurant	0.09
1	Tapas Restaurant	0.06
2	Italian Restaurant	0.06
3	Bar	0.05
4	Café	0.05
NUEVA ESPAÑA		
		venue freq
0	Spanish Restaurant	0.16
1	Restaurant	0.07
2	Tapas Restaurant	0.07
3	Nightclub	0.05
4	Plaza	0.05
NUMANCIA		
		venue freq
0	Mediterranean Restaurant	0.2
1	Park	0.1
2	Plaza	0.1
3	Supermarket	0.1
4	Restaurant	0.1
OPAÑEL		
		venue freq
0	Plaza	0.17
1	Kebab Restaurant	0.08
2	Ice Cream Shop	0.08
3	Supermarket	0.08
4	Grocery Store	0.08
ORCASITAS		
		venue freq
0	Soccer Field	0.2
1	Train Station	0.2
2	Playground	0.2
3	Market	0.2
4	Tapas Restaurant	0.2
ORCASUR		
		venue freq
0	Coffee Shop	0.33
1	Clothing Store	0.17
2	Diner	0.17
3	Beer Garden	0.17
4	Market	0.17
PACIFICO		
		venue freq
0	Spanish Restaurant	0.13
1	Bar	0.13
2	Restaurant	0.07
3	Museum	0.07
4	Grocery Store	0.05

PALACIO		
		venue freq
0	Tapas Restaurant	0.16
1	Spanish Restaurant	0.15
2	Bar	0.07
3	Café	0.05
4	Restaurant	0.04

PALOMERAS BAJAS		
		venue freq
0	Park	0.17
1	Supermarket	0.17
2	Spanish Restaurant	0.17
3	Tapas Restaurant	0.17
4	Concert Hall	0.17

PALOMERAS SURESTE		
		venue freq
0	Grocery Store	0.17
1	Pizza Place	0.17
2	Asian Restaurant	0.17
3	Chinese Restaurant	0.17
4	Fast Food Restaurant	0.17

PALOS DE MOGUER----		
		venue freq
0	Spanish Restaurant	0.10
1	Restaurant	0.09
2	Hotel	0.08
3	Tapas Restaurant	0.05
4	Sandwich Place	0.04

PAVONES		
		venue freq
0	Spanish Restaurant	0.14
1	Athletics & Sports	0.14
2	Breakfast Spot	0.07
3	Grocery Store	0.07
4	Snack Place	0.07

PEÑA GRANDE		
		venue freq
0	Soccer Field	0.17
1	Argentinian Restaurant	0.17
2	Bar	0.17
3	BBQ Joint	0.17
4	Asian Restaurant	0.17

PINAR DEL REY		
		venue freq
0	Spanish Restaurant	0.18
1	Hotel	0.06
2	Supermarket	0.06
3	Soup Place	0.06
4	Football Stadium	0.06

PORTAZGO----		
		venue freq
0	Bar	0.50
1	Building	0.25
2	Chinese Restaurant	0.25
3	Persian Restaurant	0.00
4	Noodle House	0.00

PROSPERIDAD		
		venue freq
0	Spanish Restaurant	0.12
1	Bar	0.08
2	Supermarket	0.07
3	Tapas Restaurant	0.05
4	Café	0.04

PUEBLO NUEVO		
		venue freq
0	Park	0.50
1	Supermarket	0.12
2	Electronics Store	0.12
3	Shopping Mall	0.12
4	Metro Station	0.12

PUERTA BONITA		
		venue freq
0	Bakery	0.19
1	Athletics & Sports	0.06
2	Cosmetics Shop	0.06
3	Chinese Restaurant	0.06
4	Seafood Restaurant	0.06

PUERTA DEL ANGEL		
		venue freq
0	Spanish Restaurant	0.12
1	Grocery Store	0.10
2	Beer Garden	0.05
3	Brewery	0.05
4	Park	0.05

QUINTANA		
		venue freq
0	Spanish Restaurant	0.11
1	Tapas Restaurant	0.11
2	Clothing Store	0.08
3	Bar	0.08
4	Brewery	0.05

RECOLETOS		
		venue freq
0	Hotel	0.13
1	Spanish Restaurant	0.13
2	Tapas Restaurant	0.07
3	Restaurant	0.06
4	Plaza	0.04

REJAS		
		venue freq
0	Mediterranean Restaurant	0.17
1	Pub	0.17
2	Bar	0.17
3	Hotel	0.17
4	Plaza	0.17

RIOS ROSAS		
		venue freq
0	Spanish Restaurant	0.12
1	Bar	0.08
2	Tapas Restaurant	0.07
3	Restaurant	0.06
4	Café	0.04

SAN ANDRES		
		venue freq
0	Bar	0.25
1	Wine Shop	0.25
2	Spanish Restaurant	0.25
3	Pizza Place	0.25
4	Pastry Shop	0.00

SAN CRISTOBAL		
		venue freq
0	Snack Place	0.25
1	Breakfast Spot	0.25
2	Locksmith	0.25
3	Train Station	0.25
4	Yoga Studio	0.00

SAN DIEGO		
		venue freq
0	Spanish Restaurant	0.4
1	Music Venue	0.1
2	Restaurant	0.1
3	Park	0.1
4	Electronics Store	0.1

SAN FERMIN		
		venue freq
0	Tennis Stadium	0.08
1	Shopping Mall	0.08
2	Furniture / Home Store	0.08
3	Tennis Court	0.08
4	Supermarket	0.08

SAN ISIDRO		
	venue	freq
0	Dessert Shop	0.1
1	Grocery Store	0.1
2	Flea Market	0.1
3	Gym / Fitness Center	0.1
4	Metro Station	0.1

SAN JUAN BAUTISTA----		
	venue	freq
0	Bar	0.17
1	Spanish Restaurant	0.11
2	Restaurant	0.11
3	Diner	0.06
4	Hotel	0.06

SAN PASCUAL		
	venue	freq
0	Spanish Restaurant	0.19
1	Grocery Store	0.11
2	Restaurant	0.08
3	Tapas Restaurant	0.08
4	Park	0.06

SANTA EUGENIA		
	venue	freq
0	Spanish Restaurant	0.15
1	Farmers Market	0.15
2	Plaza	0.08
3	Bar	0.08
4	Soccer Field	0.08

SIMANCAS		
	venue	freq
0	Café	0.19
1	Supermarket	0.12
2	Spanish Restaurant	0.12
3	Asian Restaurant	0.12
4	Hotel	0.12

TIMON		
	venue	freq
0	Hotel	0.18
1	Restaurant	0.16
2	Coffee Shop	0.08
3	Spanish Restaurant	0.08
4	Supermarket	0.05

TRAFALGAR		
	venue	freq
0	Tapas Restaurant	0.17
1	Spanish Restaurant	0.13
2	Bar	0.11
3	Mediterranean Restaurant	0.06
4	Theater	0.06

UNIVERSIDAD		
	venue	freq
0	Bar	0.08
1	Tapas Restaurant	0.06
2	Cocktail Bar	0.05
3	Café	0.04
4	Bookstore	0.04

VALDEACEDERAS		
	venue	freq
0	Spanish Restaurant	0.22
1	Tapas Restaurant	0.07
2	Restaurant	0.07
3	Breakfast Spot	0.07
4	Grocery Store	0.04

VALDEFUENTES		
	venue	freq
0	Park	0.12
1	Bar	0.12
2	Pharmacy	0.08
3	Light Rail Station	0.08
4	Supermarket	0.04

VALDEZARZA

		venue freq
0	Spanish Restaurant	0.25
1	Mediterranean Restaurant	0.12
2	Farmers Market	0.12
3	Supermarket	0.12
4	Soccer Field	0.12

VALLEHERMOSO

		venue freq
0	Bar	0.17
1	Theater	0.11
2	Café	0.11
3	Seafood Restaurant	0.06
4	Spanish Restaurant	0.06

VALVERDE

		venue freq
0	Café	0.17
1	Pharmacy	0.17
2	Peruvian Restaurant	0.17
3	Track Stadium	0.17
4	Athletics & Sports	0.17

VENTAS

		venue freq
0	Bar	0.15
1	Grocery Store	0.15
2	Soccer Field	0.15
3	Supermarket	0.08
4	Restaurant	0.08

VINATEROS

		venue freq
0	Plaza	0.09
1	Metro Station	0.09
2	Shopping Mall	0.09
3	Bakery	0.09
4	Skating Rink	0.09

VISTA ALEGRE

		venue freq
0	Spanish Restaurant	0.08
1	Tapas Restaurant	0.08
2	Seafood Restaurant	0.08
3	Park	0.08
4	Bakery	0.08

ZOFIO

		venue freq
0	Spanish Restaurant	0.25
1	Athletics & Sports	0.25
2	Beer Garden	0.25
3	Park	0.25
4	Yoga Studio	0.00

4.4.2 Madrid: Cluster 0

Cluster	District	1st Most Common Venue
0	CHAMARTIN	Spanish Restaurant
0	CIUDAD LINEAL	Spanish Restaurant
0	FUENCARRAL-EL PARDO	Spanish Restaurant
0	HORTALEZA	Spanish Restaurant
0	HORTALEZA	Spanish Restaurant
0	LATINA	Spanish Restaurant
0	LATINA	Spanish Restaurant
0	MONCLOA-ARAVACA	Food
0	MONCLOA-ARAVACA	Spanish Restaurant

0	MORATALAZ	Athletics & Sports
0	MORATALAZ	Athletics & Sports
0	PUENTE DE VALLECAS	Chinese Restaurant
0	PUENTE DE VALLECAS	Spanish Restaurant
0	PUENTE DE VALLECAS	Spanish Restaurant
0	PUENTE DE VALLECAS	Pizza Place
0	RETIRO	Spanish Restaurant
0	SALAMANCA	Spanish Restaurant
0	SALAMANCA	Spanish Restaurant
0	TETUAN	Spanish Restaurant
0	TETUAN	Spanish Restaurant
0	USERA	Grocery Store
0	USERA	Spanish Restaurant
0	USERA	Park
0	VICALVARO	Grocery Store
0	VICALVARO	Spanish Restaurant
0	VILLAVERDE	Wine Shop
0	VILLAVERDE	Spanish Restaurant

4.4.3 Madrid: Cluster 1

Cluster	District	1st Most Common Venue
1	ARGANZUELA	Spanish Restaurant
1	ARGANZUELA	Spanish Restaurant
1	ARGANZUELA	Spanish Restaurant
1	ARGANZUELA	Spanish Restaurant
1	ARGANZUELA	Café
1	ARGANZUELA	Bar
1	BARAJAS	Hotel
1	BARAJAS	Hotel
1	CARABANCHEL	Spanish Restaurant
1	CARABANCHEL	Bakery
1	CARABANCHEL	Pizza Place
1	CENTRO	Restaurant
1	CENTRO	Bar
1	CENTRO	Tapas Restaurant
1	CENTRO	Bar
1	CENTRO	Spanish Restaurant
1	CHAMARTIN	Spanish Restaurant
1	CHAMARTIN	Coffee Shop
1	CHAMARTIN	Spanish Restaurant
1	CHAMBERI	Spanish Restaurant

1	CHAMBERI	Bar
1	CHAMBERI	Tapas Restaurant
1	CHAMBERI	Spanish Restaurant
1	CIUDAD LINEAL	Soccer Field
1	CIUDAD LINEAL	Tapas Restaurant
1	CIUDAD LINEAL	Spanish Restaurant
1	CIUDAD LINEAL	Gym / Fitness Center
1	CIUDAD LINEAL	Bar
1	FUENCARRAL-EL PARDO	Restaurant
1	FUENCARRAL-EL PARDO	Pizza Place
1	FUENCARRAL-EL PARDO	Grocery Store
1	HORTALEZA	Rock Club
1	HORTALEZA	Park
1	LATINA	Theme Park Ride / Attraction
1	LATINA	Convenience Store
1	LATINA	Italian Restaurant
1	MONCLOA-ARAVACA	Hotel
1	MONCLOA-ARAVACA	Restaurant
1	MORATALAZ	Restaurant
1	MORATALAZ	Coffee Shop
1	RETIRO	Cocktail Bar
1	RETIRO	Spanish Restaurant
1	RETIRO	Bar
1	RETIRO	Spanish Restaurant
1	SALAMANCA	Hotel
1	SALAMANCA	Spanish Restaurant
1	SAN BLAS-CANILLEJAS	Bar
1	SAN BLAS-CANILLEJAS	Pizza Place
1	SAN BLAS-CANILLEJAS	Hotel
1	SAN BLAS-CANILLEJAS	Café
1	TETUAN	Spanish Restaurant
1	TETUAN	Bar
1	TETUAN	Spanish Restaurant
1	USERA	Coffee Shop
1	USERA	Market
1	USERA	Grocery Store
1	VILLA DE VALLECAS	Farmers Market
1	VILLA DE VALLECAS	Farmers Market
1	VILLVERDE	Metro Station
1	VILLVERDE	Breakfast Spot

4.4.4 Madrid: Cluster 2

Cluster	District	1st Most Common Venue
2	CARABANCHEL	Bar
2	PUENTE DE VALLECAS	Bar

4.4.5 Madrid: Cluster 3

Cluster	District	1st Most Common Venue
3	CIUDAD LINEAL	Park

4.4.6 Madrid: Cluster 4

Cluster	District	1st Most Common Venue
4	BARAJAS	Hotel
4	CARABANCHEL	Coffee Shop
4	CARABANCHEL	Plaza
4	CARABANCHEL	Brazilian Restaurant
4	FUENCARRAL-EL PARDO	Sports Club
4	HORTALEZA	Fast Food Restaurant
4	LATINA	Grocery Store
4	MORATALAZ	Playground
4	MORATALAZ	Playground
4	PUENTE DE VALLECAS	Mediterranean Restaurant
4	SAN BLAS-CANILLEJAS	Fast Food Restaurant
4	VILLA DE VALLECAS	Grocery Store
4	VILLA DE VALLECAS	Grocery Store
4	VILLVERDE	Sports Bar

5. Results

Madrid

- Districts: 21
- Neighborhood: 106
- Uniques Categories: 242

1st. Most Common Venues:

- Cluster 0: Spanish Restaurant
- Cluster 1: Spanish Restaurant
- Cluster 2: Spanish Restaurant
- Cluster 3: Grocery Store
- Cluster 4: Bar

Madrid has the largest number of restaurants percapita by districts and neighborhoods

Price increase per square meter/year

The increase in the rental price is determined by:

1. The proximity of the district / neighborhood to the downtown area.
2. The number of venues in each district/neighborhood

6. Discussion

- a. Are the results obtained sufficient to identify and distinguish different districts and describe the correlation of the most common places registered in Foursquare?
- b. In fact, similar cities may or may not have similar places. Then, an additional step in this classification would be to find a method to extract these common places and integrate spatial correlations between different neighborhoods or districts.
- c. However, the proposed segmentation and clustering is a first approach towards a quantitative and systematic comparison of the different districts/neighborhoods

7. Conclusion

- a. We can capture data of common places all around the world using Foursquare API
- b. We can differentiate, with the results obtained, the districts and neighborhoods of Madrid and the factors that influence the increase in rental price apartment.
- c. More studies are needed to relate the acquired data and then observe them with more significant and objective results.