Best London Borough for an Indian Restaurant

Background

▶ The client, Mr Roy, would like to start up an Indian Restaurant in one of the London Boroughs. He is unfamiliar with the London Boroughs and which one would be best suited to set up his third restaurant.

▶ The restaurant:

  ▶ Open 7 days a week in the evening only

  ▶ Passing trade would be welcomed

  ▶ Take-away service and he would offer free delivery within a 3-mile radius.

▶ Mr Roy would like to understand the make-up of the London boroughs and would like a recommendation on which ones best meet his criteria.

Data

▶ The following wiki page will be used to obtain the London Boroughs, the geo data and area.

https://en.wikipedia.org/wiki/List_of_London_boroughs

▶ The following CSV document shows the business success for each of the London Boroughs.

https://data.london.gov.uk/dataset/business-demographics-and-survival-rates-borough

▶ The Foursquare API will be used to show venue categories for the London Boroughs. The London Borough central geo data will be used as the central search point.

Data cleansing

▶ After scraping the wiki, cleaning the data and merging with the business survival rates, the data looks like this

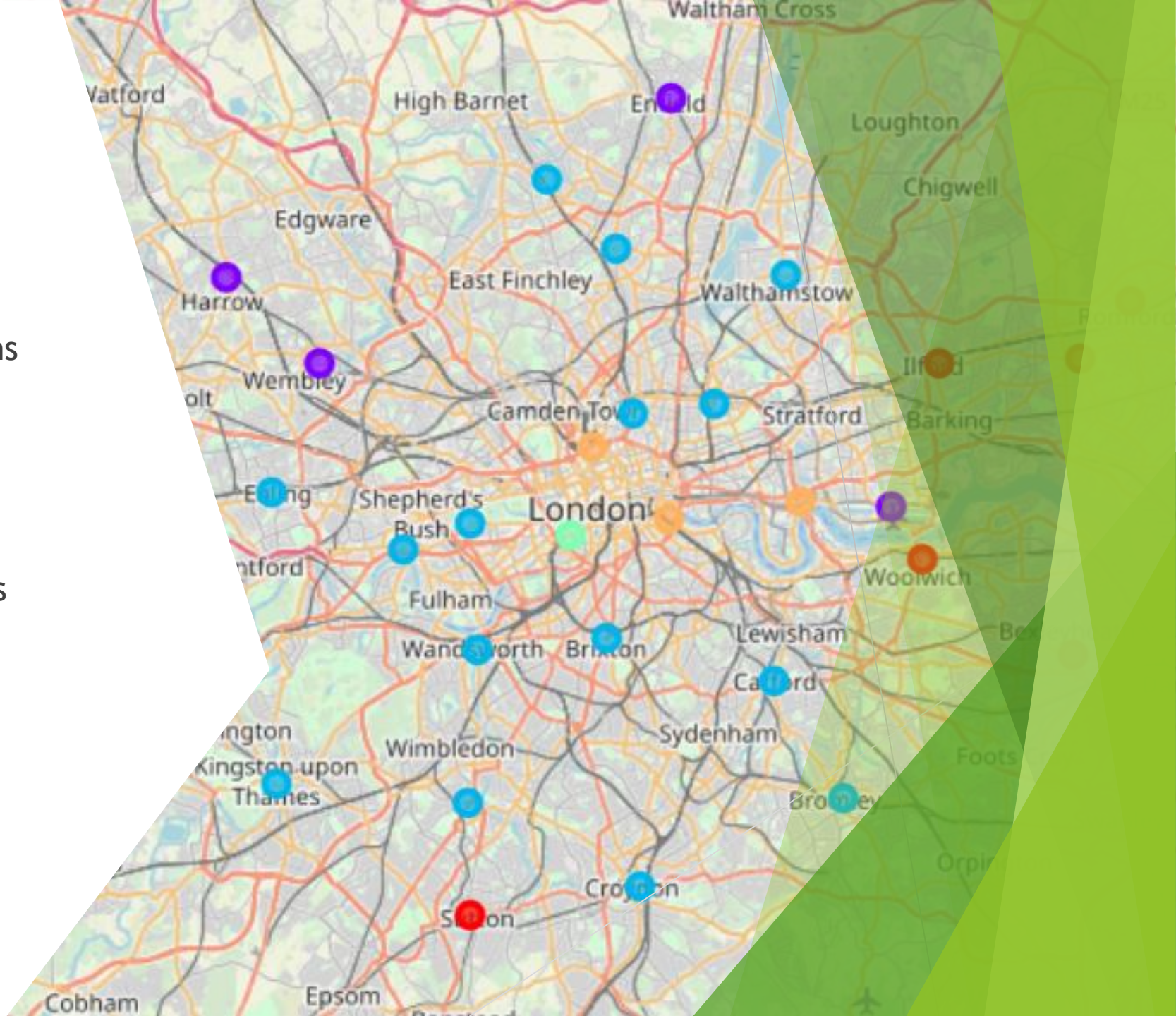|	Borough	Area	Latitude	Longitude	Radius	5_year_survival_rate
0	Barking and Dagenham	13.93	51.5607	0.1557	3003	39.6
1	Barnet	33.49	51.6252	-0.1517	4656	40.9
2	Bexley	23.38	51.4549	0.1505	3890	44.1
3	Brent	16.70	51.5588	-0.2817	3288	39.2
4	Bromley	57.97	51.4039	0.0198	6126	44.6

▶ Using the borough data, the Foursquare API is used pull all venue within a defined radius. In total there were 3099 venue entries for 263 venue categories

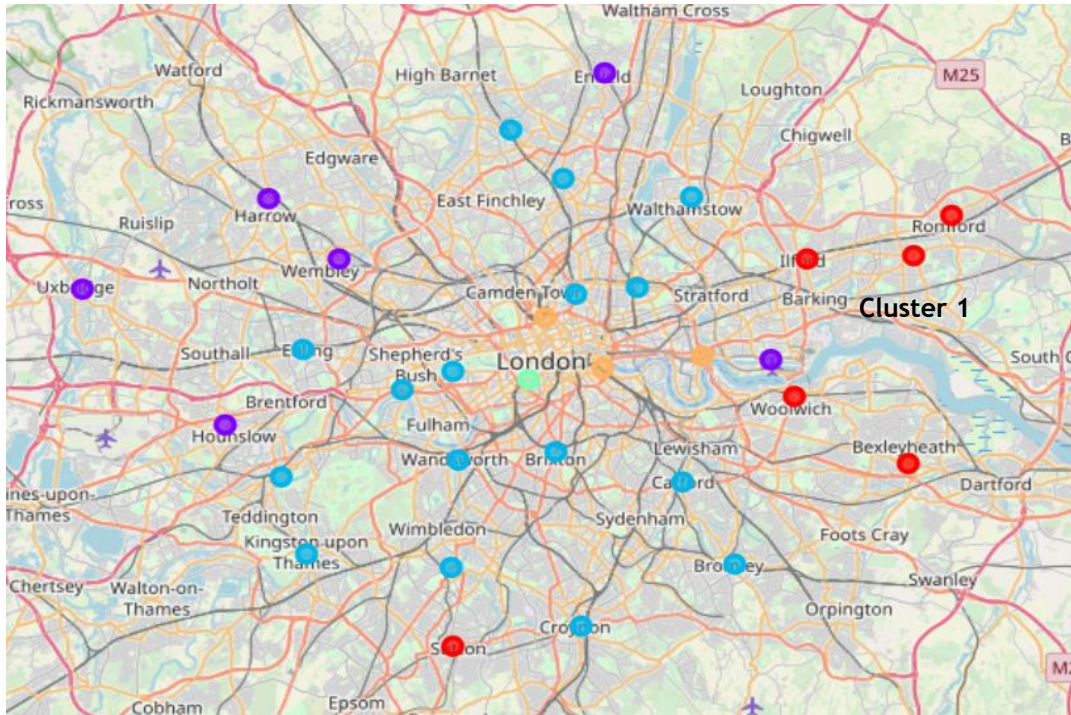|	Borough	Latitude	Longitude	Radius	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Barking and Dagenham	51.5607	0.1557	3003	Central Park	51.559560	0.161981	Park
1	Barking and Dagenham	51.5607	0.1557	3003	The Range	51.575550	0.180254	Furniture / Home Store
2	Barking and Dagenham	51.5607	0.1557	3003	Hylands Park	51.572074	0.191155	Park
3	Barking and Dagenham	51.5607	0.1557	3003	Costa Coffee	51.576890	0.179497	Coffee Shop
4	Barking and Dagenham	51.5607	0.1557	3003	Harrow Lodge Park	51.555648	0.197926	Park
...	...	...	...	...	...	...	...	...

K-Mean Clustering

▶ The venue data for all boroughs was one hot coded

▶ The average venue incidence was found for each borough

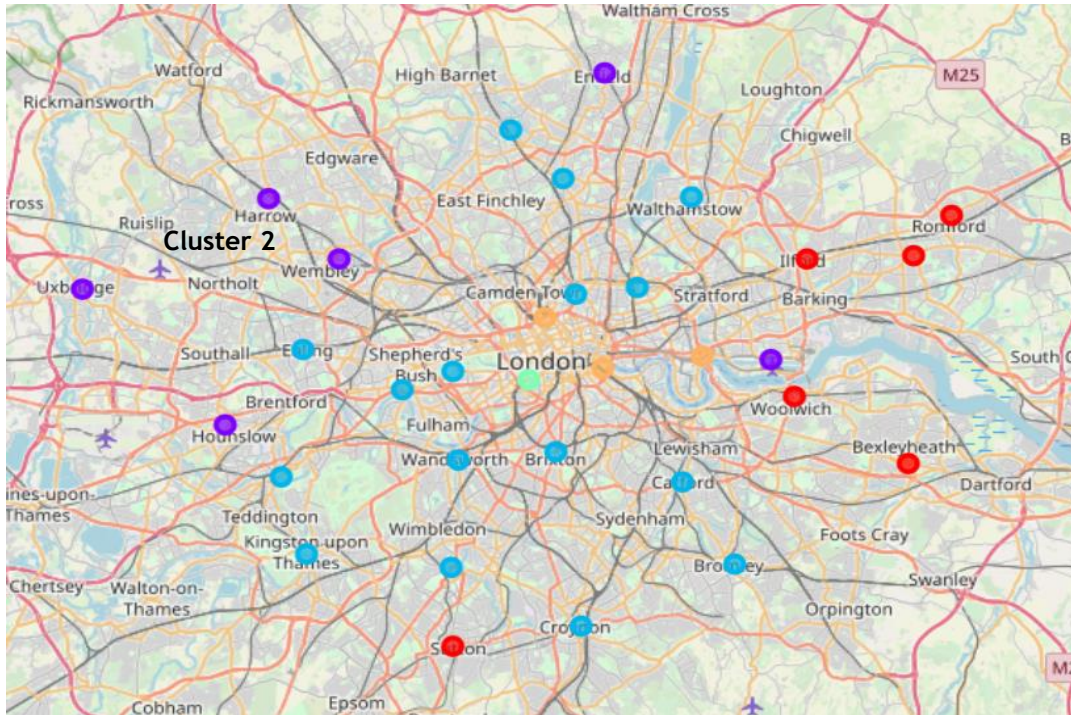▶ This data was fed into the k-means model and the boroughs were clustered into 5 clusters

Cluster 1

Cluster 1

- Cluster 1 (Red)

- High incidence of grocery stores and pubs indicating residential areas.

- Good mix of venues, such as parks, restaurants, shops and coffee shops.

- Busy during the day, but night life is limited to pubs and a few restaurants.

- Cluster name: Residential

	Borough	Area	5_year_survival_rate	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
0	Barking and Dagenham	13.93	39.6	0	Grocery Store	Coffee Shop	Park	Supermarket	Furniture / Home Store	Restaurant	Pub	Clothing Store	Fast Food Restaurant	Multiplex
2	Bexley	23.38	44.1	0	Grocery Store	Pub	Supermarket	Train Station	Italian Restaurant	Fast Food Restaurant	Coffee Shop	Pizza Place	Clothing Store	Convenience Store
9	Greenwich	18.28	40.0	0	Pub	Grocery Store	Clothing Store	Coffee Shop	Hotel	Supermarket	Gym / Fitness Center	Park	Furniture / Home Store	Fast Food Restaurant
14	Havering	43.35	45.2	0	Coffee Shop	Pub	Grocery Store	Park	Furniture / Home Store	Supermarket	Italian Restaurant	Fast Food Restaurant	Café	Clothing Store
24	Redbridge	21.78	39.9	0	Park	Grocery Store	Indian Restaurant	Supermarket	Pub	Bakery	Coffee Shop	Fast Food Restaurant	Clothing Store	Train Station
27	Sutton	16.93	45.1	0	Pub	Grocery Store	Coffee Shop	Park	Supermarket	Italian Restaurant	Sandwich Place	Café	Train Station	Clothing Store

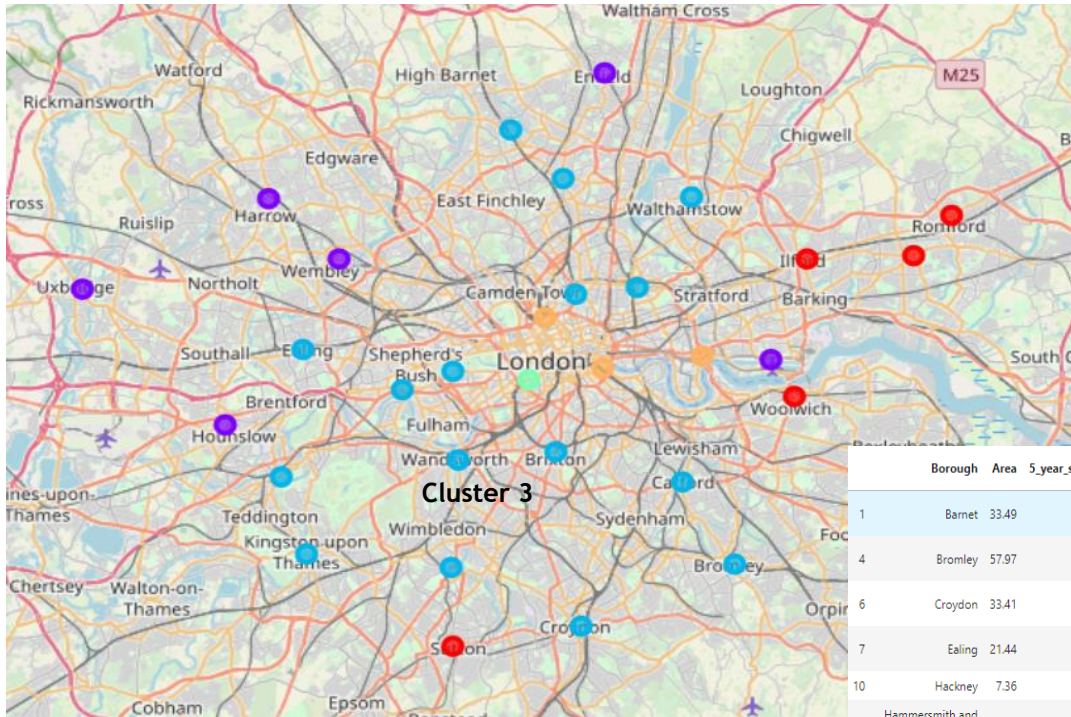# Cluster 2

- Cluster 2 (Purple)
- High incidence of Indian restaurants, along with coffee shops, pubs and hotels.
- Residential area but livelier in the evening.
- Cluster name: Residential with love of Indian food

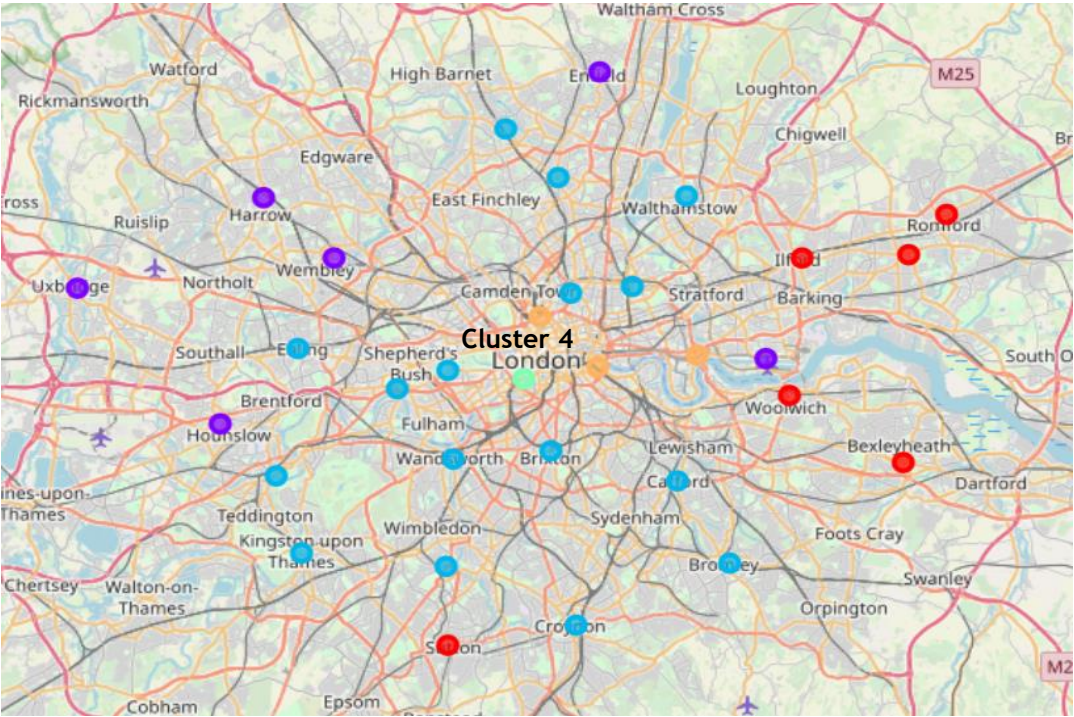|	Borough	Area	5_year_survival_rate	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
3	Brent	16.70	39.2	1	Indian Restaurant	Coffee Shop	Hotel	Clothing Store	Sandwich Place	Gym / Fitness Center	Grocery Store	Pizza Place	Café	Portuguese Restaurant
8	Enfield	31.74	43.7	1	Coffee Shop	Pub	Gym / Fitness Center	Garden Center	Supermarket	Turkish Restaurant	Hotel	Grocery Store	Greek Restaurant	Café
13	Harrow	19.49	43.4	1	Indian Restaurant	Coffee Shop	Pub	Gym / Fitness Center	Grocery Store	Supermarket	Park	Café	Italian Restaurant	Pizza Place
15	Hillingdon	44.67	44.3	1	Pub	Indian Restaurant	Coffee Shop	Gym / Fitness Center	Park	Golf Course	Hotel	Grocery Store	Supermarket	Bar
16	Hounslow	21.61	43.4	1	Pub	Indian Restaurant	Coffee Shop	Hotel	Park	Rugby Stadium	Pizza Place	Grocery Store	Gym	Gym / Fitness Center
23	Newham	13.98	36.8	1	Hotel	Coffee Shop	Pub	Park	Gym / Fitness Center	Clothing Store	Grocery Store	Supermarket	Thai Restaurant	Toy / Game Store

Cluster 3

Cluster 3

- Cluster 3 (Blue)
- Dominated pubs and coffee shops and restaurants.
- Very few grocery stores, indicating the local people enjoy eating out during the day and night.
- Cluster Name: Pub and café society

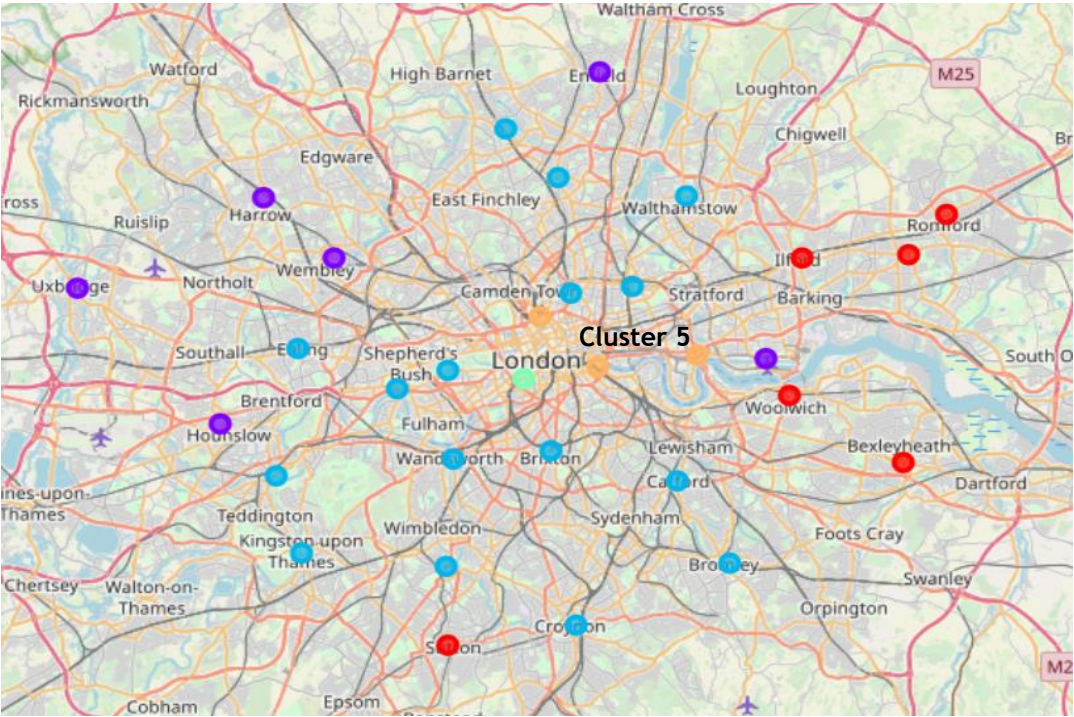|	Borough	Area	5_year_survival_rate	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
1	Barnet	33.49	40.9	2	Café	Coffee Shop	Turkish Restaurant	Park	Pub	Grocery Store	Gym / Fitness Center	Greek Restaurant	Bakery	Italian Restaurant
4	Bromley	57.97	44.6	2	Pub	Coffee Shop	Park	Gym / Fitness Center	Pizza Place	Italian Restaurant	Indian Restaurant	Gastropub	Supermarket	Mediterranean Restaurant
6	Croydon	33.41	39.4	2	Pub	Coffee Shop	Grocery Store	Park	Indian Restaurant	Pizza Place	Café	Clothing Store	Mediterranean Restaurant	Caribbean Restaurant
7	Ealing	21.44	42.5	2	Pub	Park	Coffee Shop	Hotel	Grocery Store	Pizza Place	Gastropub	Gym / Fitness Center	Brewery	Italian Restaurant
10	Hackney	7.36	43.5	2	Pub	Café	Coffee Shop	Bakery	Yoga Studio	Brewery	Bookstore	Cocktail Bar	Pizza Place	Farmers Market
11	Hammersmith and Fulham	6.33	35.5	2	Pub	Café	Coffee Shop	Gastropub	Park	Indian Restaurant	Hotel	Thai Restaurant	French Restaurant	Pizza Place
12	Haringey	11.42	40.7	2	Café	Turkish Restaurant	Coffee Shop	Pub	Park	Bakery	Pizza Place	Mediterranean Restaurant	Indian Restaurant	Greek Restaurant
17	Islington	5.74	38.1	2	Pub	Café	Coffee Shop	Bakery	Mediterranean Restaurant	Indian Restaurant	Theater	Pizza Place	Park	Music Venue
18	Kensington and Chelsea	4.68	38.9	2	Restaurant	Pub	Italian Restaurant	Café	Gym / Fitness Center	Bakery	Hotel	English Restaurant	Garden	Indian Restaurant
19	Kingston upon Thames	14.38	50.0	2	Pub	Café	Coffee Shop	Park	Garden	Gastropub	Hotel	Italian Restaurant	Thai Restaurant	Sushi Restaurant
20	Lambeth	10.36	25.0	2	Coffee Shop	Pub	Park	Pizza Place	Market	Brewery	Café	Restaurant	Tapas Restaurant	Caribbean Restaurant
21	Lewisham	13.57	42.4	2	Pub	Coffee Shop	Café	Gastropub	Park	Italian Restaurant	Indian Restaurant	Supermarket	Turkish Restaurant	Food Truck
22	Merton	14.52	42.5	2	Park	Pub	Sushi Restaurant	Supermarket	Café	Theater	Fast Food Restaurant	Italian Restaurant	Coffee Shop	Lebanese Restaurant
25	Richmond upon Thames	22.17	45.8	2	Pub	Park	Italian Restaurant	Café	Garden	Coffee Shop	Rugby Stadium	Hotel	Bakery	Restaurant
29	Waltham Forest	14.99	37.5	2	Pub	Coffee Shop	Café	Pizza Place	Park	Brewery	Restaurant	Bakery	Turkish Restaurant	Supermarket
30	Wandsworth	13.23	39.9	2	Park	Pub	Coffee Shop	Pizza Place	Café	Bakery	Supermarket	French Restaurant	Thai Restaurant	Breakfast Spot

Cluster 4

Cluster 4

▶ Cluster 4 (Green)

▶ Unique, dominated by hotels and theatres, and cultural venues during the day.

▶ Cluster name: Cultural

	Borough	Area	5_year_survival_rate	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
31	Westminster	8.29	35.6	3	Hotel	Boutique	Theater	Clothing Store	Garden	Plaza	Park	Art Gallery	Art Museum	Burger Joint

Cluster 5

Cluster 5

- ▶ Cluster 5 (Orange)

- ▶ Dominated by coffee shops but would be quieter in the evening. Less residential but more for tourists with its plentiful hotels.

- ▶ Cluster name: Coffee shop and tourist.

	Area	5_year_survival_rate	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
5	8.40	39.5	4	Coffee Shop	Bookstore	Hotel	Pizza Place	Theater	Seafood Restaurant	Bakery	Steakhouse	Canal	Grocery Store
26	11.14	39.8	4	Coffee Shop	Hotel	Cocktail Bar	Italian Restaurant	Scenic Lookout	Theater	Street Food Gathering	Steakhouse	Café	Grocery Store
28	7.63	35.9	4	Coffee Shop	Burger Joint	Hotel	Bar	Plaza	Park	Lounge	Italian Restaurant	Pub	Gym / Fitness Center

Results

- **The question is, what is the best borough for Mr. Roy to open his new Indian restaurant?**

- Cluster 2, residential with a love of Indian food, would be the most obvious suggestion.

  - Numerous Indian restaurants.

  - Newham not having many Indian restaurants but has the other characteristics of areas that do.

  - There are hotels in this area so passing trade.

  - The downside would be that the 5-year survival rate is lower.

  - Residential cluster so opportunity for the take away business.

- The second, riskier option would be cluster 1, residential.

  - Careful needed to select a borough with more night life.

  - Sutton would be a suggested area, as it has a high business survival rate but many pubs.

Conclusion

▶ The London boroughs have been split into 5 different clusters based on K-means.

▶ Each cluster has been interpreted and 2 options have been put forward as suitable boroughs.

▶ Cluster 2 would be the safest option. Newham doesn't have many Indian restaurants but there are hotels and pubs in the area.

▶ Cluster 1 would be a riskier option as there isn't much night life in these areas and the business may be more reliant on the take away business but in a borough such as Sutton, with lots of pubs it might do well.