Locations for Chinese Restaurant Startup in London

TAN KOK PENG
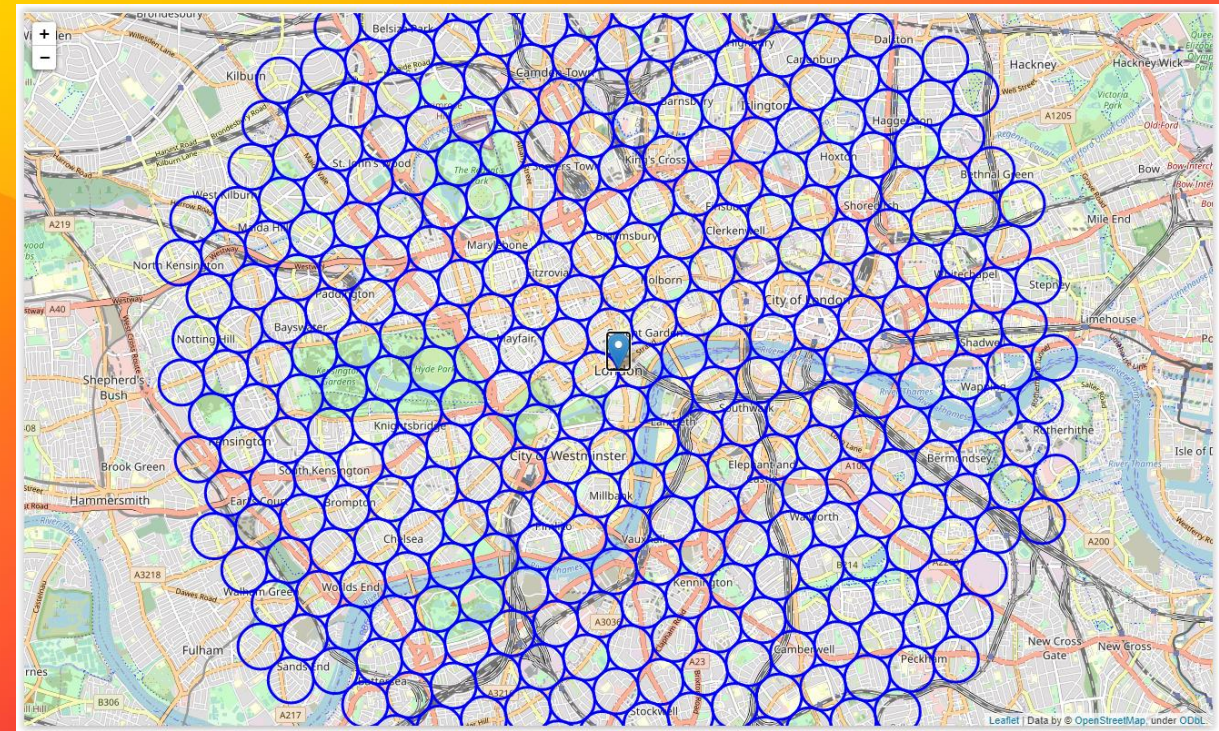
Finding Locations Using Geolocation Data

- To find optimal locations for Chinese restaurant in London
- Stakeholders who are interested in operating and starting a Chinese restaurant business in the vicinity of London
- Using geolocation data and data science approach to easily identify region in London for stakeholder consideration:
  - Google Maps Geocoding API
  - Foursquare API (venue category)
- Region for consideration must be low restaurant density – prime consideration for stakeholders

Low Density Chinese Restaurant Region

- Number of existing restaurants in the neighborhood (any types of restaurant)

- Number of and distance to Chinese restaurants in the neighborhood, if any

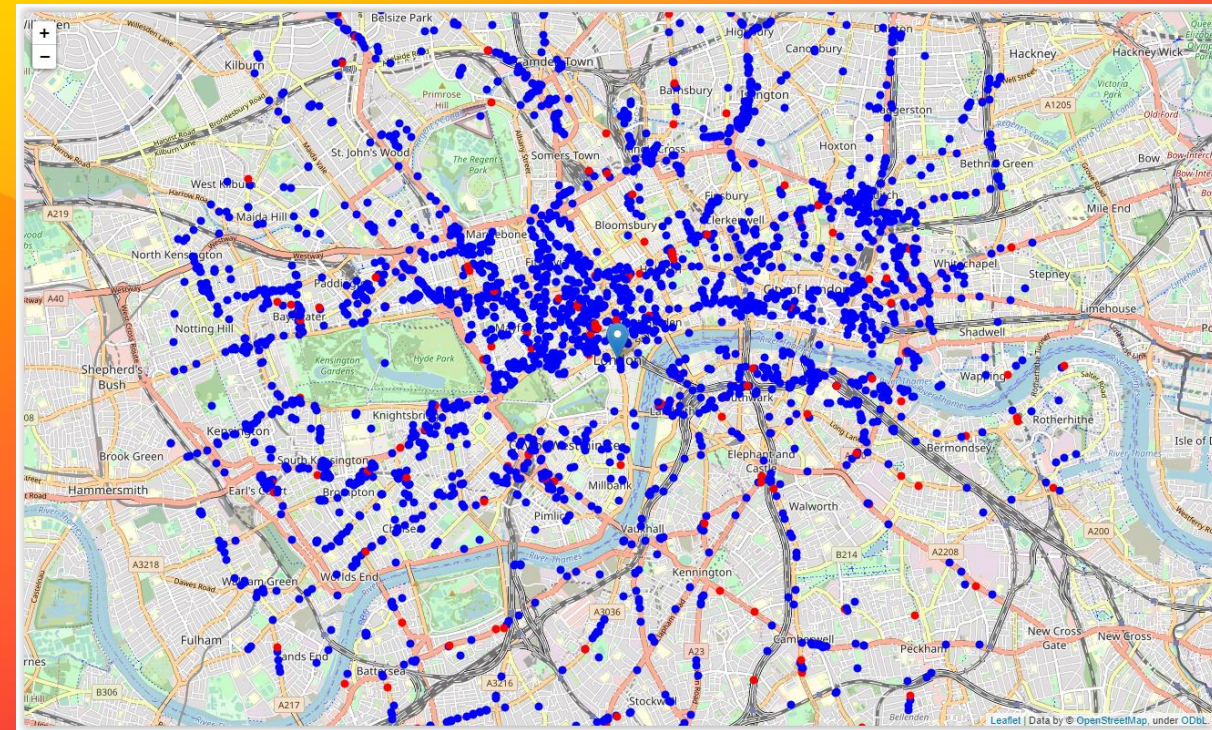- Distance of neighborhood from city center of London

Neighbourhoods Candidates

- 12 x 12 km grid centered around London

- 364 candidate neighbourhoods 600m apart between centers of neighbourhoods

- Used geolocation data from Google Maps Geocoding API to build dataframe containing latitude, longitude, X Y distances and distances from city center of each neighbourhood
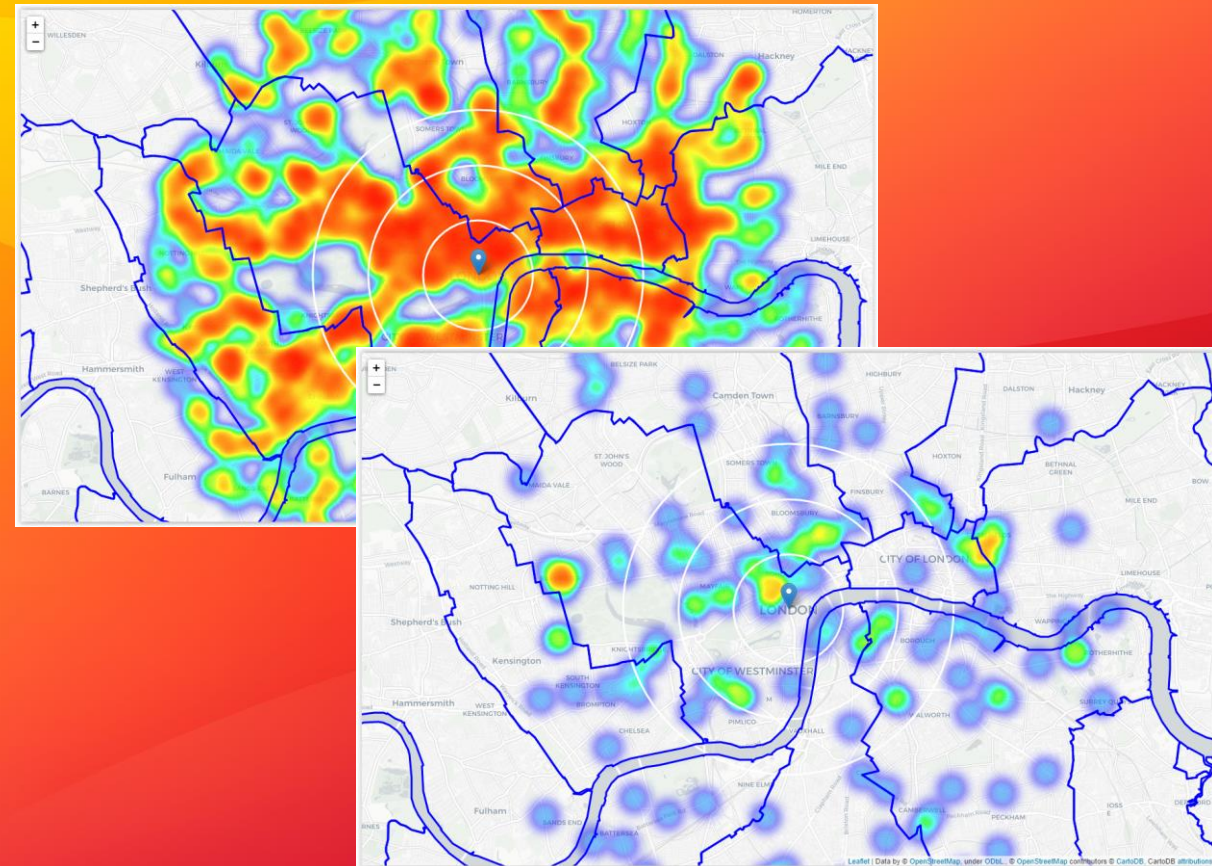
Foursquare Venue Category Data

- Using Foursquare API to query all venue category data of restaurants and Chinese restaurants of the neighbourhoods

- 350m from neighbourhood center

- Total restaurants: 2946

- Chinese restaurant: 152 or 5.16%

- Folium plot of restaurant locations
  - Red = Chinese
  - Blue = Others

Density of Restaurants using Heatmap Plot

	Address	Latitude	Longitude	X	Y	Distance from center	Restaurants in area	Distance to Chinese restaurant
0	Warley House, 91 Elms Cres, Clapham Common, Lo...	51.454434	-0.135968	-548819.423256	5.809846e+06	5992.495307	4	758.153624
1	4 Prague Pl, Brixton, London SW2 5ED, UK	51.455536	-0.127632	-548219.423256	5.809846e+06	5840.376700	0	868.522156
2	56 Brixton Hill, Brixton, London SW2 1QS, UK	51.456637	-0.119296	-547619.423256	5.809846e+06	5747.173218	2	763.749781
3	57 Rattray Rd, Coldharbour, London SW2 1BB, UK	51.457737	-0.110959	-547019.423256	5.809846e+06	5715.767665	0	386.255432
4	18, Bessemer Park, 250 Milkwood Rd, Herne Hill...	51.458837	-0.102622	-546419.423256	5.809846e+06	5747.173218	0	659.600478
5	Denmark Hill, Herne Hill, London SE5 8DX, UK	51.459936	-0.094284	-545819.423256	5.809846e+06	5840.376700	0	1023.679291
6	67 Green Dale, London SE5 8JZ, UK	51.461035	-0.085946	-545219.423256	5.809846e+06	5992.495307	0	477.670768
7	Mount Pond, 8A Windmill Dr, London SW4 9DE, UK	51.457290	-0.149999	-549719.423256	5.810366e+06	5855.766389	1	1073.897656
8	Brook House, 47-48 Clapham Common South Side, ...	51.458393	-0.141664	-549119.423256	5.810366e+06	5604.462508	1	502.782254
9	137 Clapham Park Rd, Ferndale, London SW4 7BH, UK	51.459495	-0.133327	-548519.423256	5.810366e+06	5408.326913	4	268.930870

- Dataframe manipulation to provide restaurant count of each neighbourhood + distance from center + distance to Chinese restaurant

- Visualizing the density of restaurants using Folium's Heatmap Overlay plot
  - 1, 2 and 3 km from center of the city
  - All restaurants' location plot
  - Chinese restaurants' location plot

- Low Chinese restaurant density positioned south-west, south, south-east and east from city center
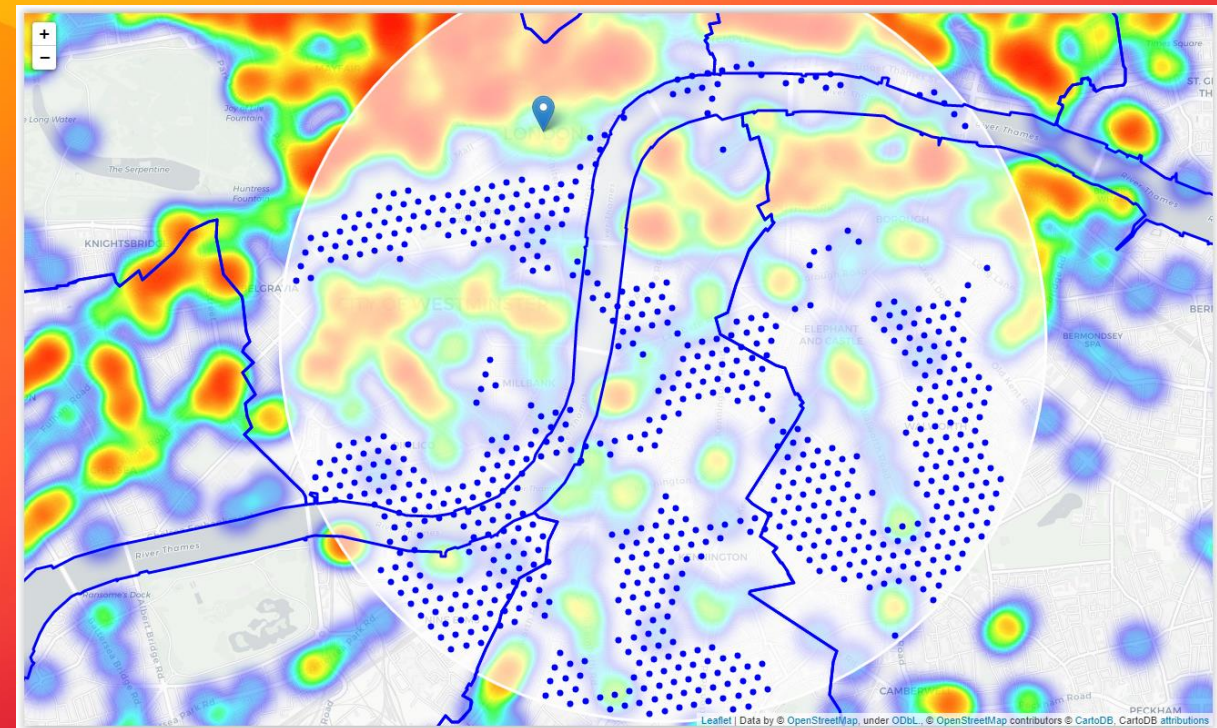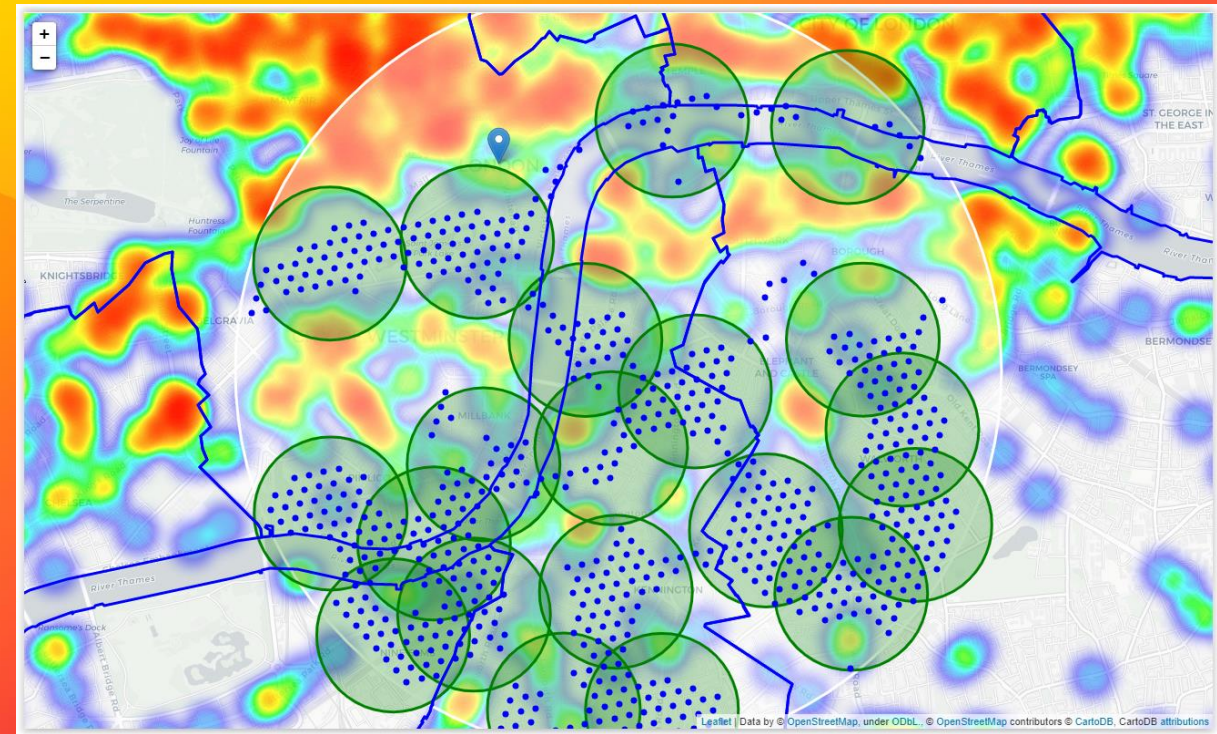
New Neighbourhood Region

- Low restaurant count region is 2.5 km offset from center of city, 5 x 5 km grid

- 2261 new candidate location each 100m apart

- Low Chinese restaurant density positioned south-west, south, south-east and east from city center

- Region identified:
  - Locations with no more than two restaurants in radius of 250 meters
  - No Chinese restaurants in radius of 400 meters

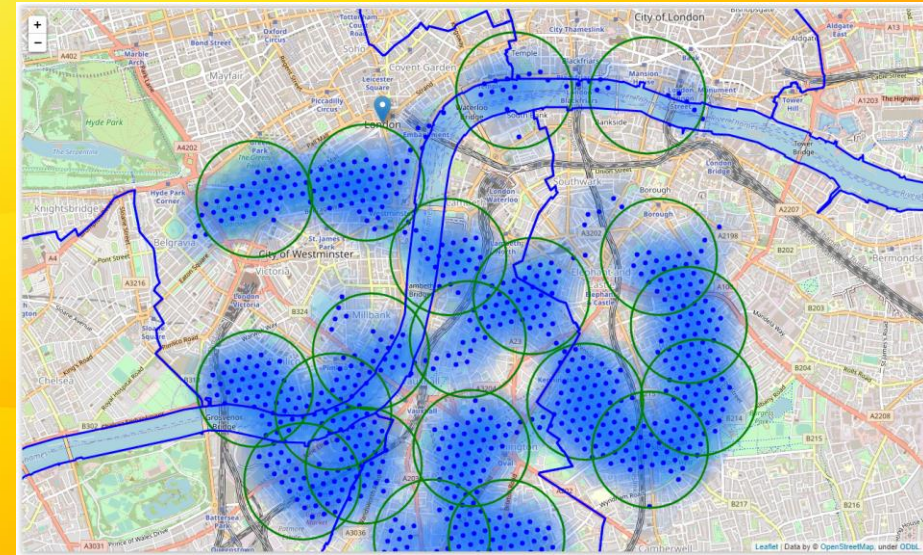|	Latitude	Longitude	X	Y	Restaurants nearby	Distance to Chinese restaurant
0	51.473456	-0.109742	-546569.423256	5.811562e+06	0	686.600667
1	51.473639	-0.108352	-546469.423256	5.811562e+06	0	626.334159
2	51.473199	-0.117641	-547119.423256	5.811648e+06	1	1030.317092
3	51.473382	-0.116251	-547019.423256	5.811648e+06	0	953.944447
4	51.473566	-0.114861	-546919.423256	5.811648e+06	1	882.307603
5	51.473749	-0.113471	-546819.423256	5.811648e+06	1	816.653784
6	51.473933	-0.112081	-546719.423256	5.811648e+06	1	758.538134
7	51.474116	-0.110691	-546619.423256	5.811648e+06	0	709.814623
8	51.474299	-0.109301	-546519.423256	5.811648e+06	0	653.141337
9	51.474483	-0.107911	-546419.423256	5.811648e+06	0	563.511506

K-Means Clustering on Region

- Applying K-Means clustering, K = 20, on the locations to group them into zones

- Obtained 20 geographical coordinates of the centers of each zone

- Locations fall into Westminster, Lambeth and Southwark boroughs

- Clusters in Wandsworth and City of London

Reverse Geocoding to Obtain Locations

- Using Google Maps Geocoding API reverse geocoding to obtain locations

- Locations satisfy low density restaurants region criteria

- Starting point for stakeholders' review and lay ground work for further analysis

Addresses of centers of areas recommended for further analysis	Distance from London center (km)
28 Walcot Square, Prince's, London SE11 4TZ, UK	2.0
A Rd, Nine Elms, London SW8 5AL, UK	3.2
6 Walnut Road, Westminster, Manchester M30 8LE, UK	1.3
51 Westcott Rd, London SE17 3QY, UK	3.0
21A Ponsonby Pl, Westminster, London SW1P 4PS, UK	2.0
78a Ashmole St, Oval, London SW8 1NE, UK	2.9
91 Rodney Rd, London SE17 1RF, UK	3.2
H.Q.S. Wellington, Victoria Embankment, London WC2R 2PN, UK	1.2
69 Horse Guards Rd, Westminster, London SW1A 2AG, UK	0.5
62 Wandsworth Rd, Oval, London SW8 2FA, UK	3.0
12 Villa St, London SE17 2EJ, UK	3.7
Wedgwood House, Pimlico, London SW1V 3BT, UK	2.6
Vintners Place, 68 Upper Thames St, Queenhithe, London EC4V 2AF, UK	2.3
Garlinge House, Gosling Way, Vassal, London SW9 6LU, UK	3.8
Falmouth Road Group Practice, 78 Falmouth Rd, London SE1 4JW, UK	2.7
A3036, South Bank, London SE1 7EH, UK	1.3
Sullivan House, Black Prince Rd, Vauxhall, London SE11 6JH, UK	2.0
7141 Albany Rd, London SE5 0DQ, UK	3.7
112 Portland Grove, Stockwell, London SW8 1JJ, UK	3.6
136 Grosvenor Rd, London SW1V 3JY, UK	2.5

Conclusion and Future Directions

- Use geolocation and proximity data to identify areas close to center of London with low number of restaurants (particularly Chinese restaurants)

- Provide insight to stakeholders in narrowing down the search for optimal location for a new Chinese restaurant

- Locations to be used for further analysis and exploration for final consideration:
  - Attractiveness of each location (proximity to park or water)
  - levels of noise, proximity to major roads
  - real estate availability, prices, legislation
  - Social and economic dynamics of every neighborhood etc.