House Prices near Outstanding London Schools

IBM DATA SCIENCE CAPSTONE PROJECT

MARCH 2020

Problem for working Parents in London

- When the time comes for first child to go to school, parents are concerned for their primary education

- The education is detrimental to success in life. There is a clear proven correlation

- Not all schools are great

- The catchment is most important criteria for admission into any State School

- Buying a House is a one of the most important investment in life

- Buying within the catchment of Outstanding rated School can be very beneficial for their child(ren)'s future

- Another important factor to consider is the kind of area, parents would like to live in

Approach to Problem

- Data Science methodology to find a balance of all the requirements

- The below data sources to be used for the problem:

  - Ofsted Rating Report from a Government website: https://reports.ofsted.gov.uk

  - London Area for enhanced information for the area: https://en.wikipedia.org/wiki/List_of_areas_of_London

  - Property Prices Portal grouped by Postcodes: https://propertydata.co.uk/cities/london

- Foursquare Developer API to explore venues in the areas that may help clustering different locations based on venue categories

Outstanding State Primary Schools in London

- Finalised 62 Postcode across London where Ofsted rated Outstanding Primary Schools reside


```
No. of Schools that had assessment in 2018, 2019 or 2020:  1116
ONLY Primary Schools out of those:  771
ONLY Outstanding Schools out of those:  75
Grouping by PostCode:  62
```

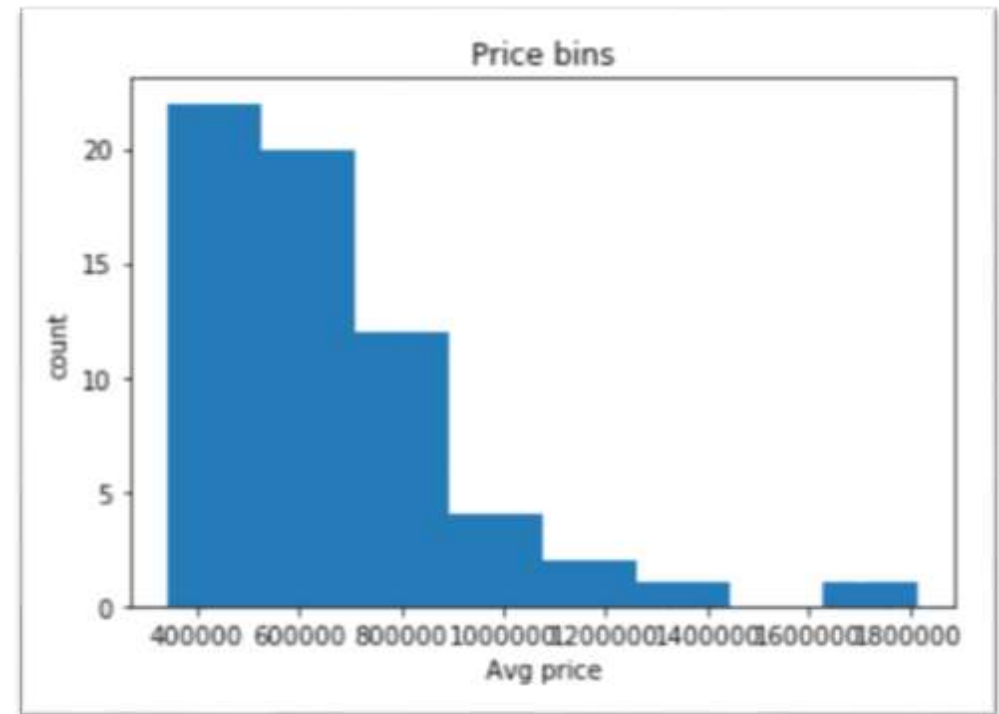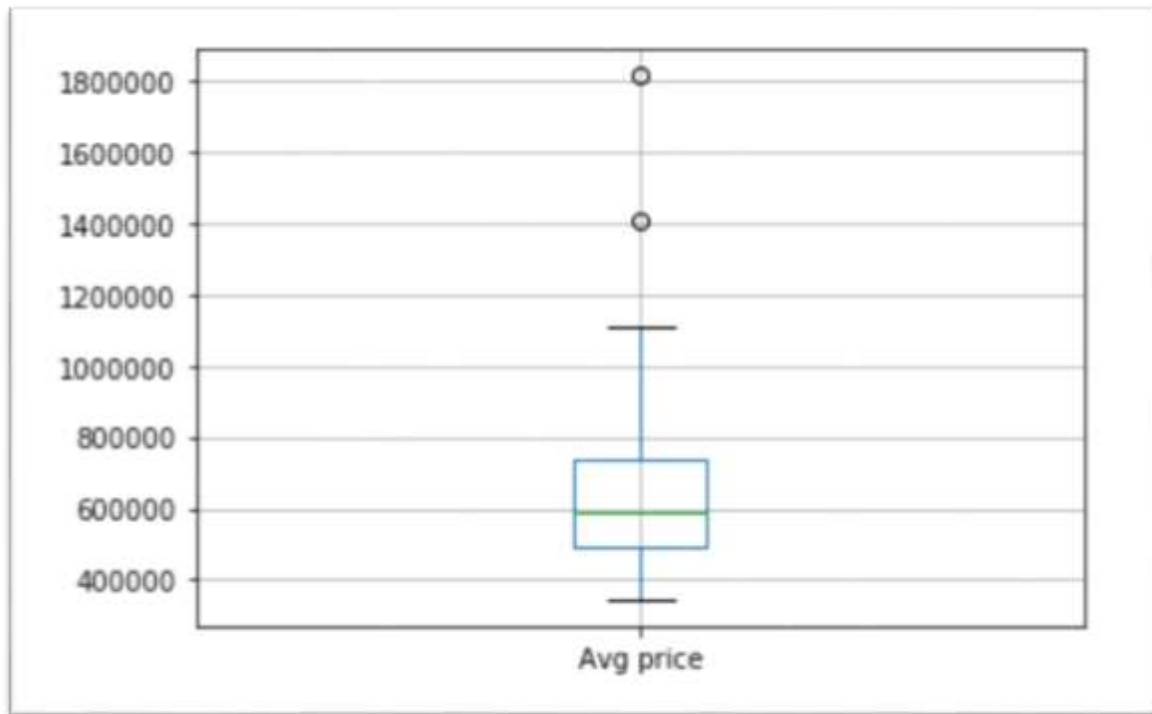|	PostCode	Rating	Type	Name
0	BR1	Outstanding	Primary	Burnt Ash Primary School
1	BR3	Outstanding	Primary	Clare House Primary School,Harris Primary Acad...
2	BR5	Outstanding	Primary	Crofton Junior School
3	CR0	Outstanding	Primary	Chestnut Park Primary School,Harris Primary Ac...
4	CR5	Outstanding	Primary	Woodcote Primary School

- Need to merge this with House Prices and London areas for further analysis

London Area and House Prices

Original data table joined with additional London areas and average house prices (included premium of 20%)

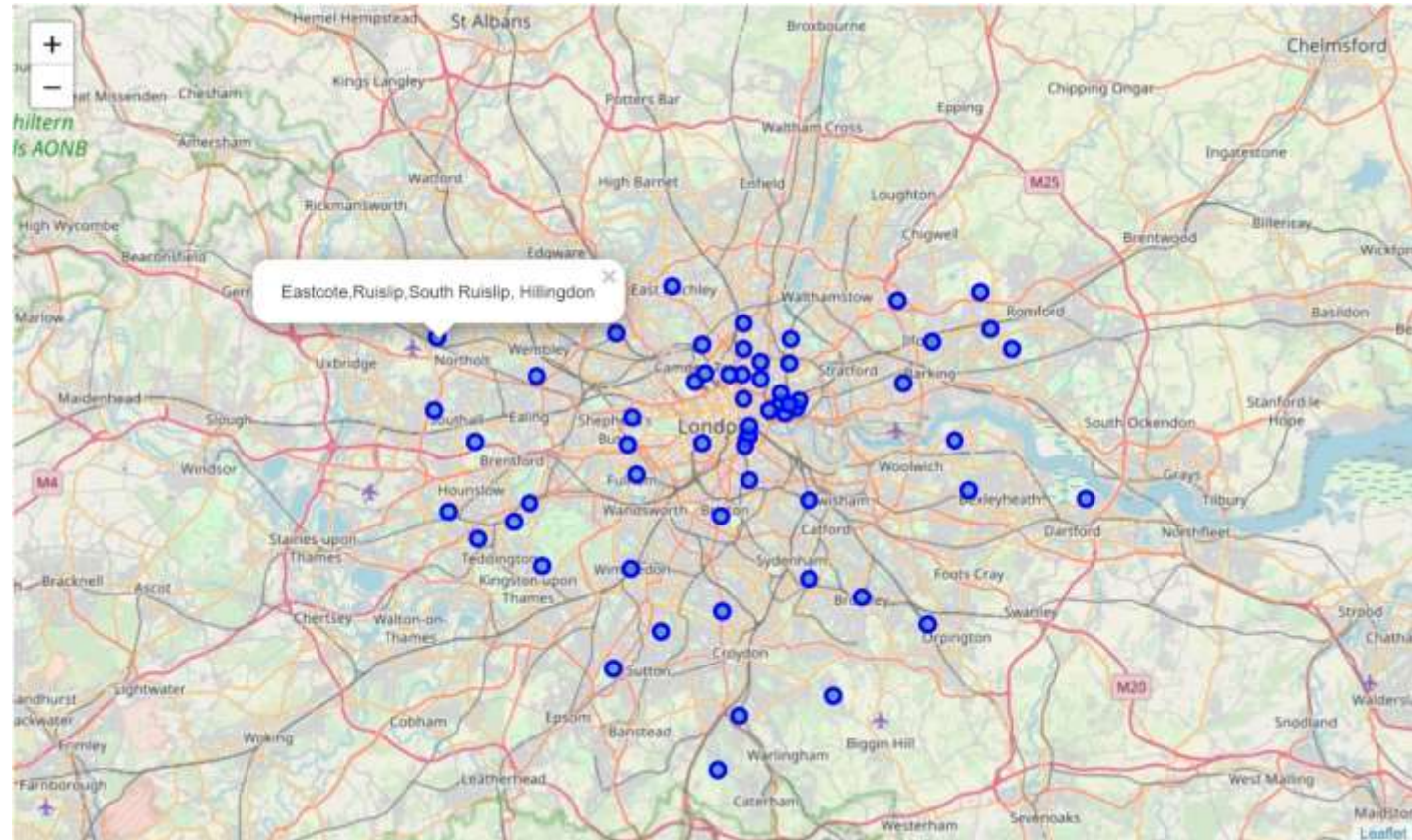|	PostCode	Rating	Type	Name	Location	Borough	Avg price
0	BR1	Outstanding	Primary	Burnt Ash Primary School	Bromley,Plaistow,Sundridge,Widmore (also Widmo...	Bromley/Lewisham	447159
1	BR3	Outstanding	Primary	Clare House Primary School,Harris Primary Acad...	Beckenham,Bickley,Bromley Common,Eden Park,Elm...	Bromley	456224
2	BR5	Outstanding	Primary	Crofton Junior School	Ruxley,Upper Ruxley,Derry Downs,Orpington,Pett...	Bexley/Bromley	436613
3	CR0	Outstanding	Primary	Chestnut Park Primary School,Harris Primary Ac...	Addington,Addiscombe,Coombe,Croydon,Forestdale...	Croydon/Sutton	343852
4	CR5	Outstanding	Primary	Woodcote Primary School	Coulsdon,Old Coulsdon	Croydon	510381

Boxplot & Bins for House Prices

Location Latitude and Longitude

▪Added location coordinates for exploring venues via Foursquare API

	PostCode	Rating	Type	Name	Location	Borough	Avg price	Latitude	Longitude
0	BR1	Outstanding	Primary	Burnt Ash Primary School	Bromley,Plaistow,Sundridge,Widmore (also Widmo...	Bromley/Lewisham	447159	51.404240	0.015425
1	BR3	Outstanding	Primary	Clare House Primary School,Harris Primary Acad...	Beckenham,Bickley,Bromley Common,Eden Park,Elm...	Bromley	456224	51.415095	-0.035403
2	BR5	Outstanding	Primary	Crofton Junior School	Ruxley,Upper Ruxley,Derry Downs,Orpington,Pett...	Bexley/Bromley	436613	51.388315	0.078482

London map with targeted locations

- London map

- Locations superimposed

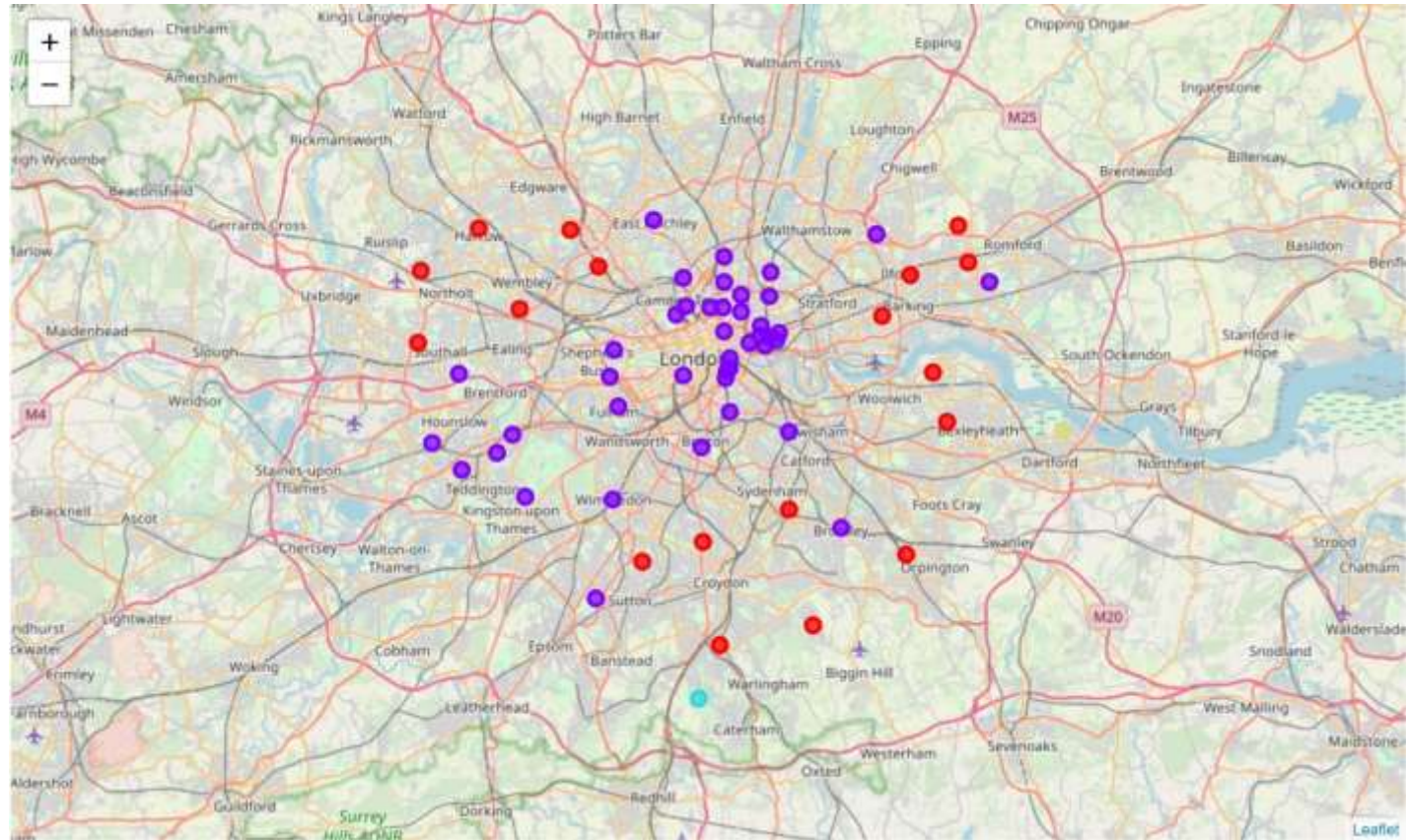# Foursquare API

▪Used Foursquare API to find nearest venues within 1000m of each postcode and selected most common venues for those that will help clustering them

	PostCode	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	BR1	Pub	Clothing Store	Coffee Shop	Gym / Fitness Center	Café	Pizza Place	Indian Restaurant	Bar	Burger Joint	Supermarket
1	BR3	Grocery Store	Coffee Shop	Train Station	Pizza Place	Park	Bar	Tram Station	Pub	Tapas Restaurant	Bookstore
2	BR5	Supermarket	Pub	Mediterranean Restaurant	Coffee Shop	Indian Restaurant	American Restaurant	Fish & Chips Shop	Train Station	Thai Restaurant	Sushi Restaurant
3	CR0	Tram Station	Convenience Store	Grocery Store	Supermarket	Home Service	Furniture / Home Store	Gas Station	Farm	Entertainment Service	Ethiopian Restaurant
4	CR5	Fish & Chips Shop	Construction & Landscaping	Restaurant	Café	Filipino Restaurant	Ethiopian Restaurant	Event Space	Falafel Restaurant	Farm	Farmers Market

K-means Clustering (k = 4)

- Used K-means clustering

- Unsupervised learning

- Selected k following elbow method

- Superimposed them on map
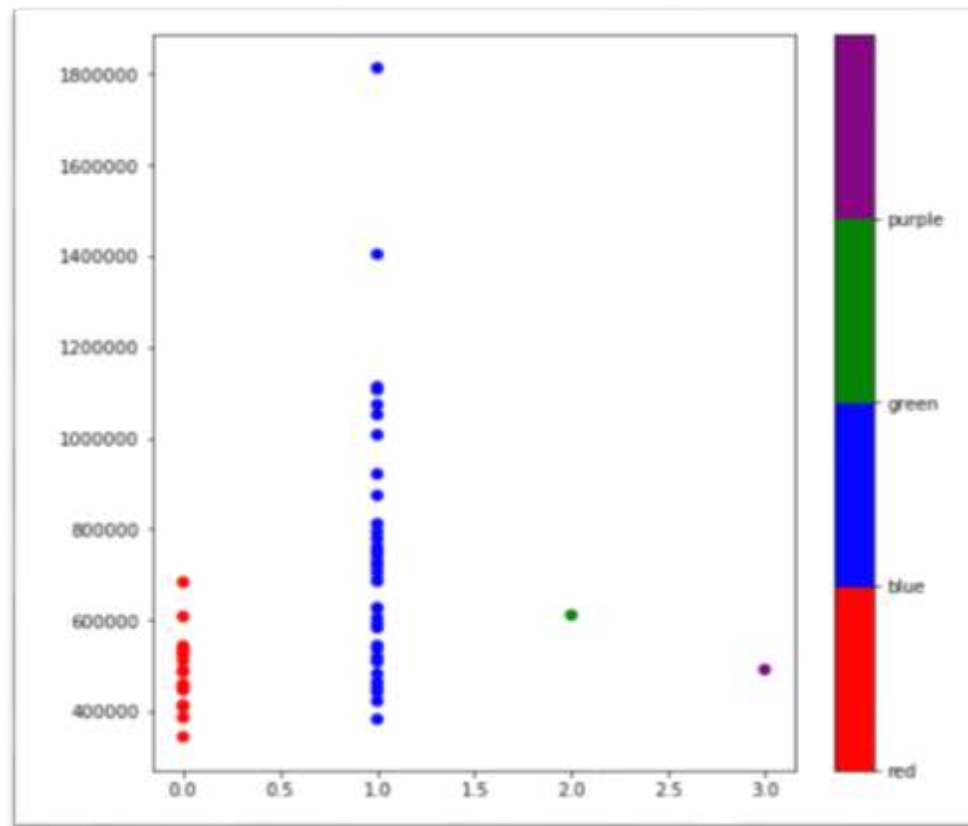
House Prices in each Cluster

- Each Cluster of area choice for parents is

  shown with price range for houses

  1st Cluster: £300 – 700k

  2nd Cluster: £400 – 1.8M

  3rd Cluster: £650k

  4th Cluster: £500k

London offers enough options to balance between affordability, outstanding primary education for children and preference over certain kind of areas

CONCLUSION