Housing Sales Prices & Venues Data Analysis of Manchester

APPLIED DATA SCIENCE CAPSTONE – FINAL ASSIGNMENT
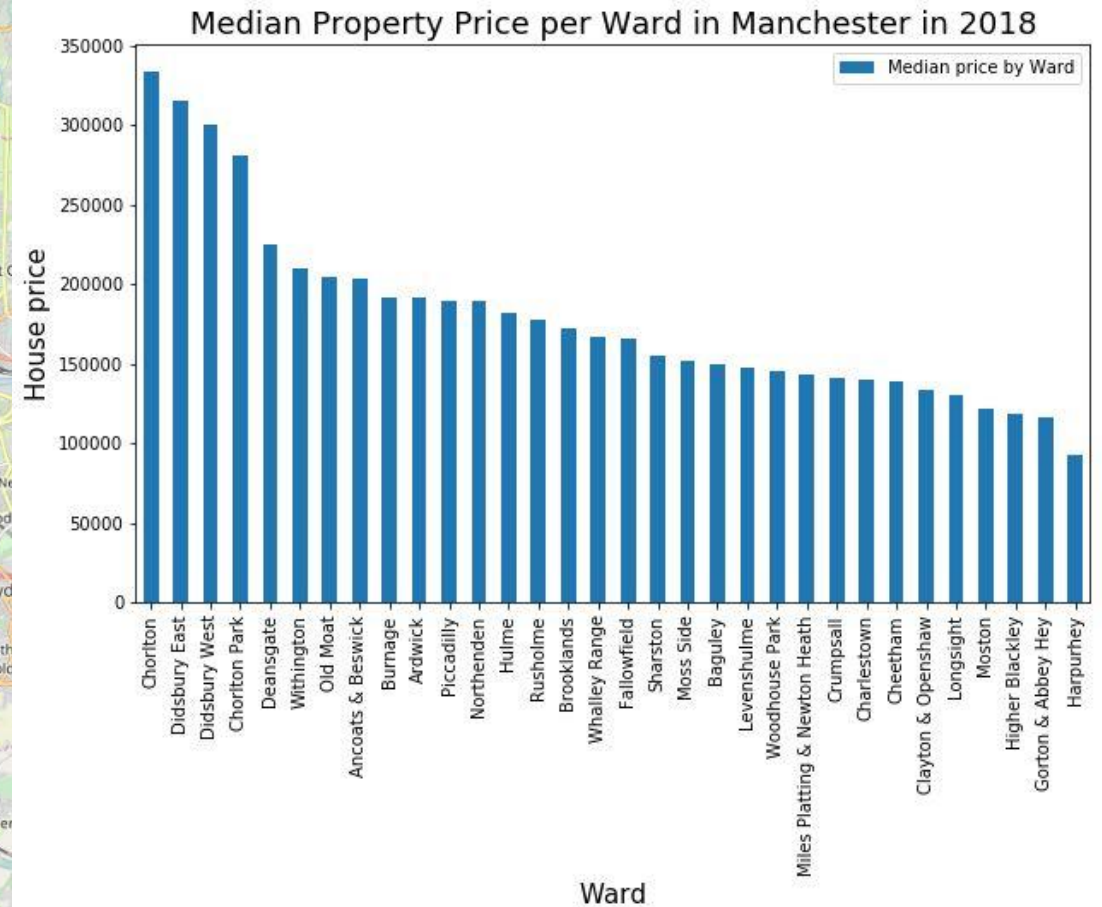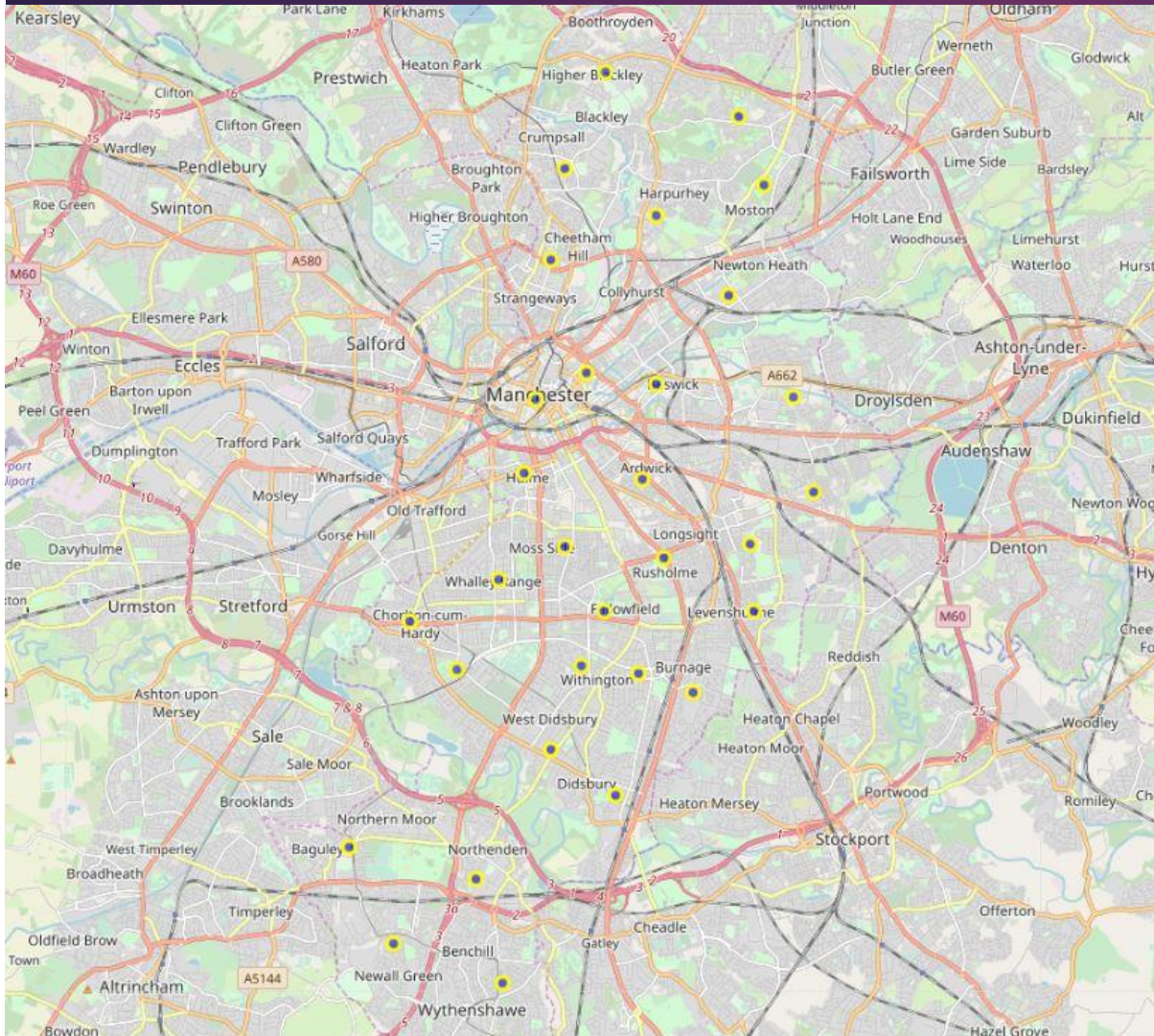
Analysis of Manchester

- Many young people are flocking to Manchester because of the wide range of opportunities as well as economic and cultural diversity.

- The city attracts students, graduates, young professionals as well as investors.

- The investors need to find a place where the real estate values are lower and the type of business they are interest in is not very intense. And the people a place with low real estate values and surrounded by venues of their preference.

- This study aims to help people that want to move to Manchester make more informed decisions about which neighbourhood to live in.
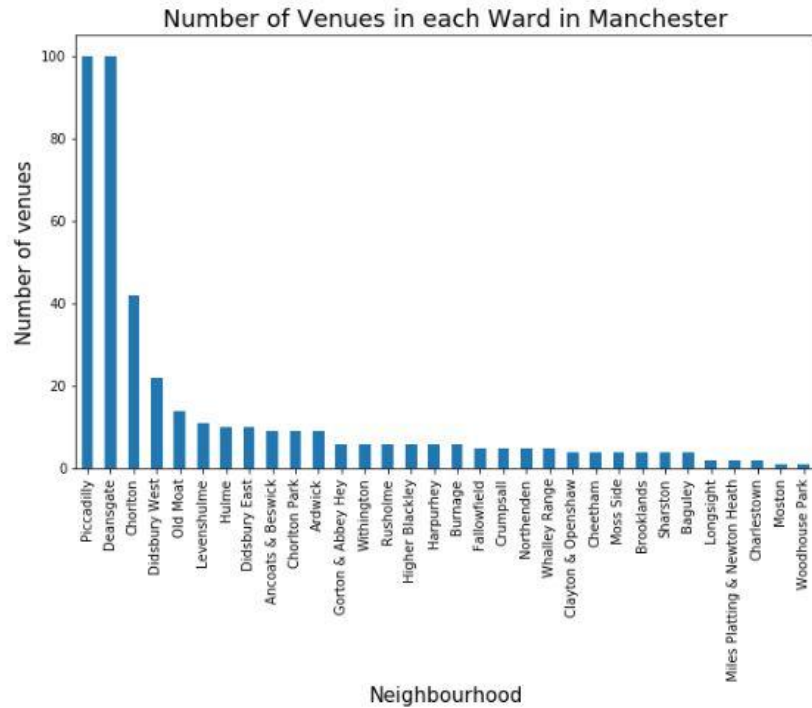
Data sources

- Neighbourhood's names, postcode, latitude and longitude coordinates from the 'Postcodes in Manchester' dataset from doogal.co.uk/AdministrativeAreas

- Median house sale price paid by neighbourhood in England in 2018 from the 'HPSSA dataset 37' from Office for National Statistics

- Most common venues in Manchester, their name, neighbourhood, location and category from Foursquare API.

- Neighbourhood boundaries from the Manchester City Council website.

Manchester neighbourhoods

Median Property Price per Ward in Manchester in 2018
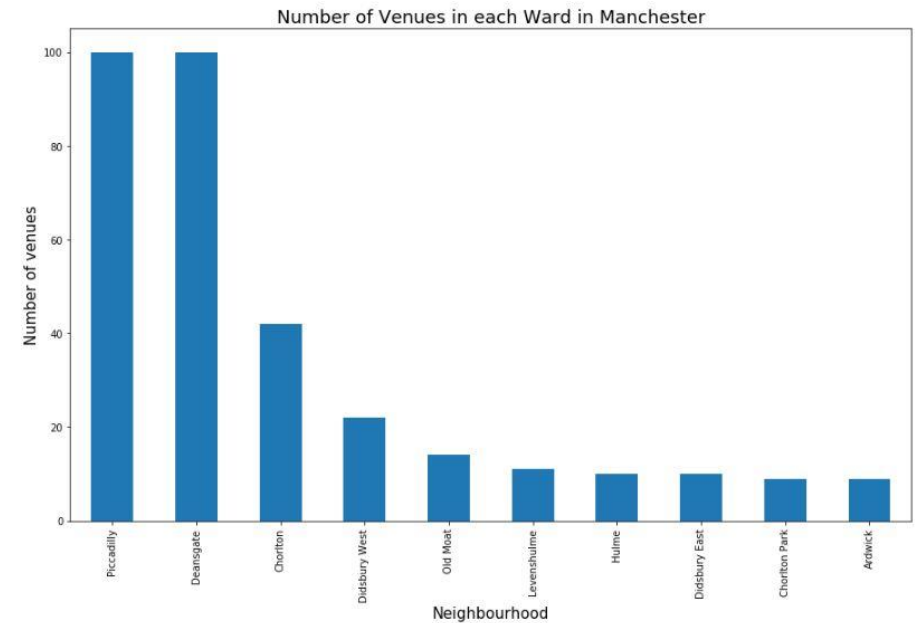
▶ Chorlton, Didsbury East, Didsbury West and Chorlton Park are the most expensive neighbourhoods.

Number of venues

Number of Venues in each Ward in Manchester

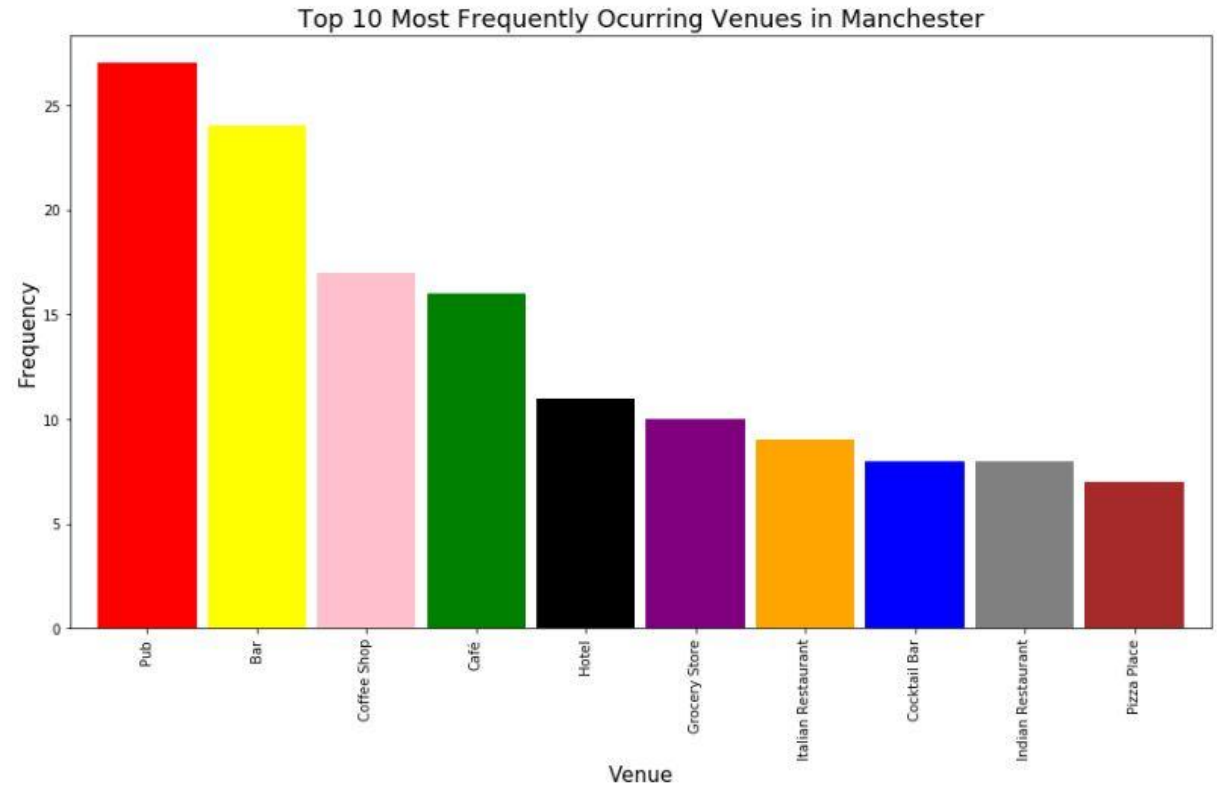▶ As some of the neighbourhoods have such a small number of venues, only the top 10 areas with the most venues will be considered in this analysis.

Number of Venues in each Ward in Manchester

Most frequently occurring venues in Manchester

- Considering the top 10 neighbourhoods, 106 unique venue categories were returned by Foursquare.
- Pubs & bars top the charts.

Top 10 Most Ocurring Venues in Manchester

10 Most Common venues per neighbourhood
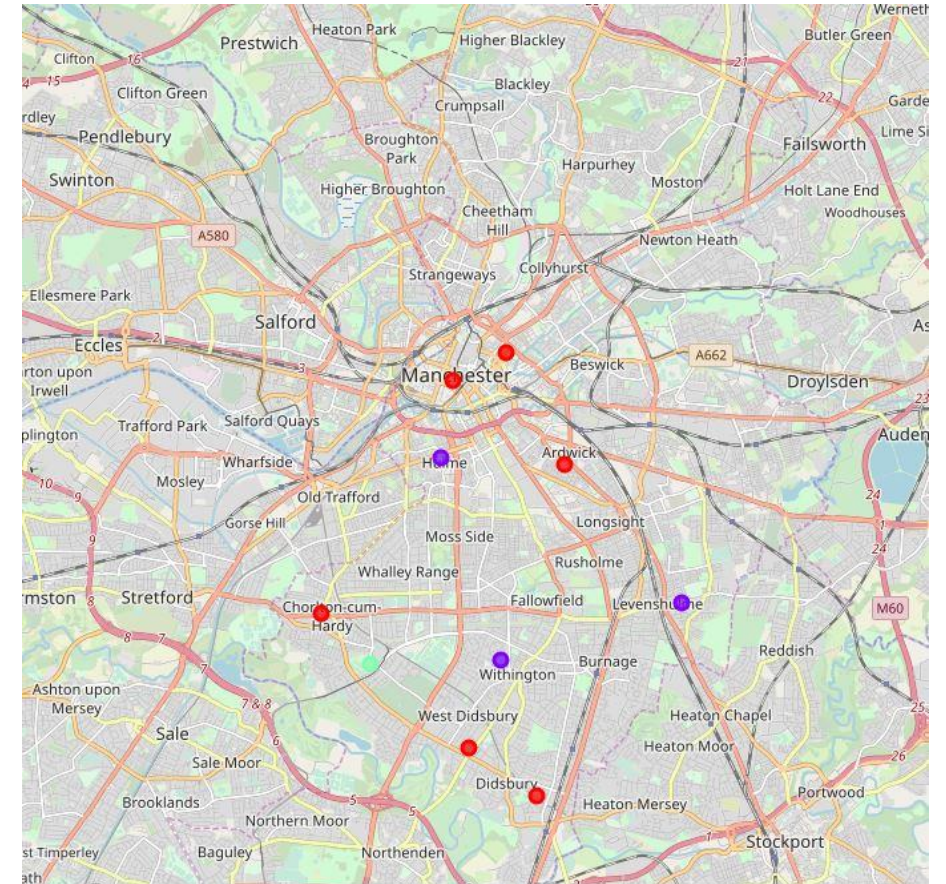
	Ward	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
0	Ardwick	Pub	Warehouse Store	Chinese Restaurant	Pet Store	Bakery	Sandwich Place	Fast Food Restaurant	Bus Station	Park	Donut Shop
1	Chorlton	Pub	Bar	Café	Grocery Store	Pizza Place	Turkish Restaurant	Gastropub	Pharmacy	Mediterranean Restaurant	Deli / Bodega
2	Chorlton Park	Grocery Store	Convenience Store	Tram Station	Gas Station	Fish & Chips Shop	Park	Fabric Shop	Falafel Restaurant	Comic Shop	Concert Hall
3	Deansgate	Italian Restaurant	Hotel	Coffee Shop	Pub	Asian Restaurant	Bar	Plaza	Burger Joint	Cocktail Bar	Thai Restaurant
4	Didsbury East	Pub	Supermarket	Hotel	Fish & Chips Shop	Park	Coffee Shop	Chinese Restaurant	Gym / Fitness Center	Bakery	Fast Food Restaurant

▶ Table produced using one-hot encoding process.

▶ Shows the frequency of occurrence of venue categories in each neighbourhood.
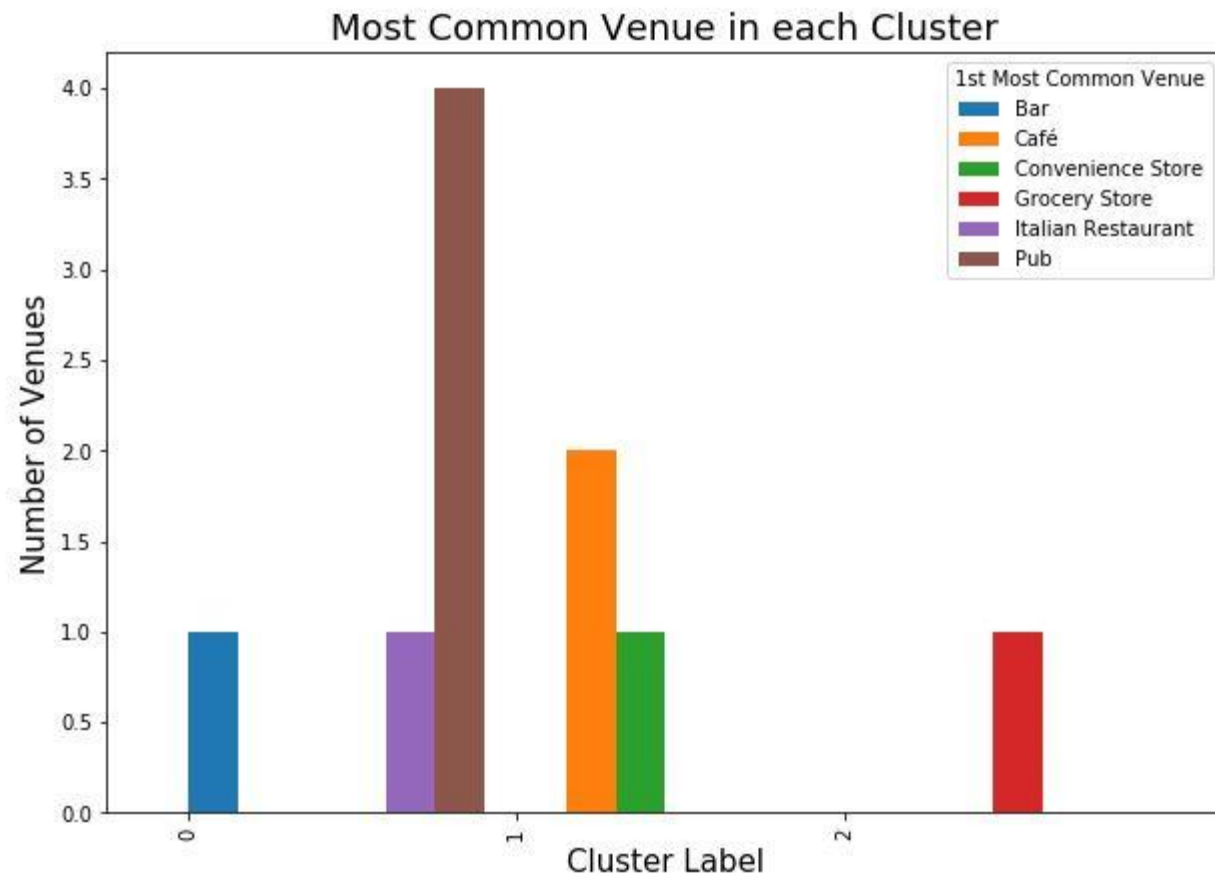
Neighbourhood segmentation – venue category

▶ Because there are some common venue categories in the areas, we will use the unsupervised machine learning K-means algorithm to cluster the neighbourhoods.

	Ward	Median price by Ward	Latitude	Longitude	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	Ardwick	191995	53.465800	-2.217067	0	Pub	Warehouse Store	Chinese Restaurant	Pet Store	Bakery	Sandwich Place	Fast Food Restaurant	Bus Station	Park	Donut Shop
1	Chorlton	334000	53.442839	-2.279974	0	Pub	Bar	Café	Grocery Store	Pizza Place	Turkish Restaurant	Gastropub	Pharmacy	Mediterranean Restaurant	Deli / Bodega
2	Chorlton Park	280650	53.435050	-2.267282	2	Grocery Store	Convenience Store	Tram Station	Gas Station	Fish & Chips Shop	Park	Fabric Shop	Falafel Restaurant	Comic Shop	Concert Hall
3	Deansgate	224975	53.478579	-2.246147	0	Italian Restaurant	Hotel	Coffee Shop	Pub	Asian Restaurant	Bar	Plaza	Burger Joint	Cocktail Bar	Thai Restaurant
4	Didsbury East	315000	53.414762	-2.224512	0	Pub	Supermarket	Hotel	Fish & Chips Shop	Park	Coffee Shop	Chinese Restaurant	Gym / Fitness Center	Bakery	Fast Food Restaurant

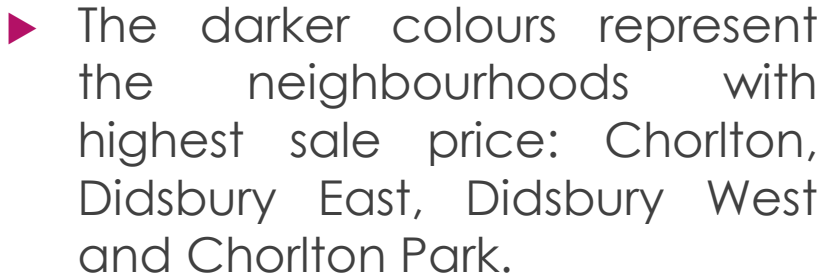# Analyzing each cluster

Most Common Venue in each Cluster

- ▶ Cluster 0: "Drinking cluster"
- ▶ Cluster 1: "Eating cluster"
- ▶ Cluster 2: "Residential cluster"

House sale price in Manchester (2018)

Median House Sale Price (HSP) by neighbourhood in Manchester

Median Property Price in Manchester

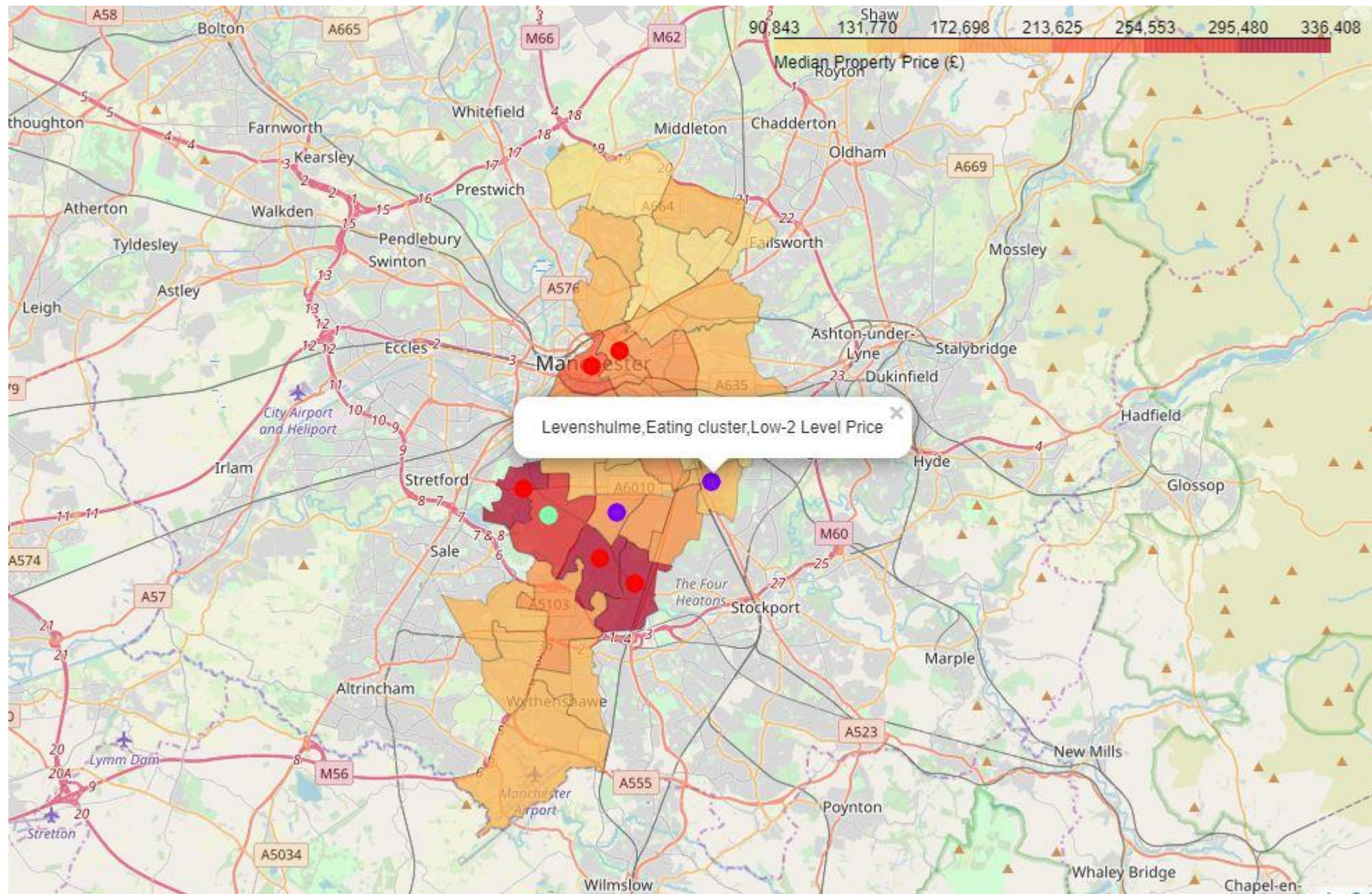- Up to £140k: Low-1 Level House Price
- £140k-£190k: Low-2 Level House Price
- £190k-£240k: Mid-Level House Price
- £240k-£290k: High-1 Level House Price
- More than £290k: High-2 Level House Price

House sale price – Choropleth map

▶ The darker colours represent the neighbourhoods with highest sale price: Chorlton, Didsbury East, Didsbury West and Chorlton Park.

Legend: Median Property Price (£)
90,843 | 131,770 | 172,698 | 213,625 | 254,553 | 295,480 | 336,408

Levenshulme,Eating cluster,Low-2 Level Price

Results & Discussion

- The top venues in Manchester are pubs and bars.

- Chorlton, Didsbury East, Didsbury West and Chorlton Park have the highest house sale price and are also among the neighbourhood with the most venues in Manchester.

- Ardwick, Chorlton, Deansgate, Didsbury East, Didsbury West and Piccadilly are dominated by pubs and bars as the most common venue whereas Hulme, Levenshulme and Old Moat are dominated by cafes and restaurants as most common venues.

- Chorlton Park was separated from both of these clusters as grocery stores stand out as the most common venue - residential area.

Conclusion & future directions

- Analyzed the results of segmentation of the neighbourhoods into clusters based on the most common venues using k-means algorithm.

- Built a *choropleth* map, which contains name of neighbourhood, name of cluster and house sale price range.

- Not the only considerations when buying a property or opening a business, but it certainly gives us some very important preliminary information about the neighbourhoods and serving as guidance for the next step.

- Ideas include: the median house sale price data from the years 1995 to 2018 to predict the values for 2019 using regression.

Thanks!