BATTLE OF THE NEIGHBOURHOODS

FINDING A NEW CINEMA LOCATION IN THE NOTTINGHAMSHIRE AREA

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INTRODUCTION

- The task it to find a suitable location in the Nottinghamshire area for a new cinema

- Consideration will be given to existing nearby cinema venues

- The scope of this project is to determine only which NG (Nottinghamshire) postal area is the most suitable potential location for a new cinema to be built.

- Once a potential postal area has been selected, further investigation should be made into the following:

  - SWOT analysis;

  - Funding source for the high upfront capital investment

  - Understanding of the business sector and the market;

  - Competition from streaming providers such as Netflix and Amazon

  - Types of film to be shown to minimise the high supply cost of showing new release Hollywood movies

  - The projected revenues and costs to determine the actual return on investment

DATA AND METHODOLOGY USED

1. NG Postal code data from the webpage: https://en.wikipedia.org/wiki/NG_postcode_area
2. Geopy was used to obtain the NG Postal code data latitude and longitude coordinates
3. Folium was used to map the NG Postal codes to provide a visual of the distribution
4. The Foursquare API was used to obtain existing Cinema venues around the Nottinghamshire area
5. The Foursquare API was used to obtain the most popular venues in each of the NG Postal code areas
6. The unstructured machine learning algorithm K-Means was used to cluster the NG Postal code areas according to the most popular venues
7. Folium was used to map all of the information to provide a good visual of the NG Postal codes; existing cinema venues and the clusters found
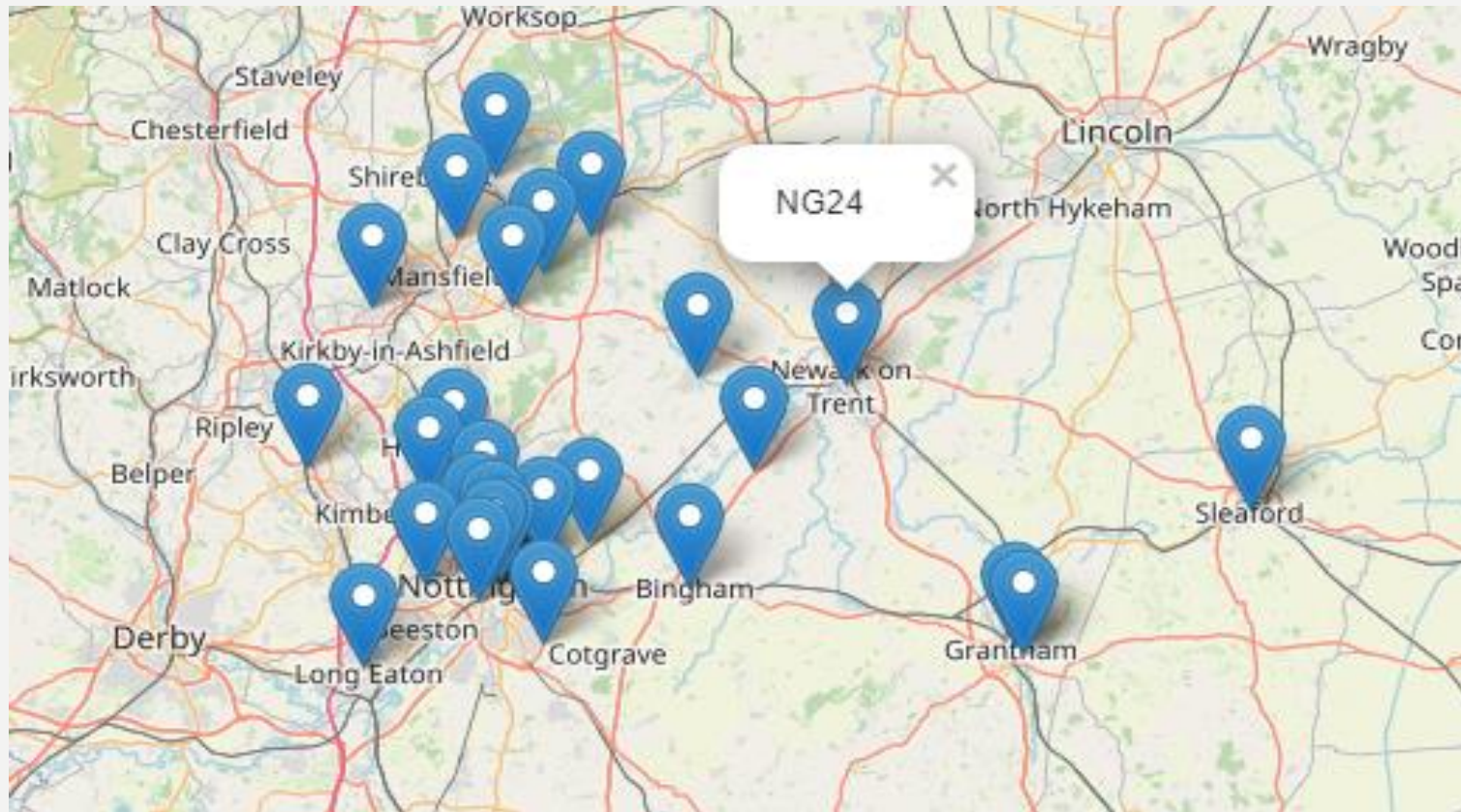
SAMPLE OF POSTAL CODE DATAFRAME

	Postcode district	Post town	Coverage	Local authority area(s)	Full address	Longitude	Latitude
0	NG1	NOTTINGHAM	Nottingham city centre	Nottingham	NG1,NOTTINGHAM	-1.141801	52.955513
1	NG2	NOTTINGHAM	Nottingham city centre, Colwick Park, Sneinton...	Nottingham, Rushcliffe	NG2,NOTTINGHAM	-1.165191	52.941864
2	NG3	NOTTINGHAM	Carlton, Sneinton, St Ann's, Mapperley	Gedling, Nottingham	NG3,NOTTINGHAM	-1.151815	52.965092
3	NG4	NOTTINGHAM	Gedling Village, Netherfield, Carlton, Colwick	Gedling	NG4,NOTTINGHAM	-1.101884	52.966431
4	NG5	NOTTINGHAM	Sherwood, Arnold, Bestwood, Carrington, Top Va...	Nottingham, Gedling	NG5,NOTTINGHAM	-1.158969	52.989743
5	NG6	NOTTINGHAM	Bestwood Village, Bulwell, Old Basford	Nottingham, Gedling	NG6,NOTTINGHAM	-1.214203	53.005101
6	NG7	NOTTINGHAM	New Basford, Forest Fields, Hyson Green, Radfo...	Nottingham	NG7,NOTTINGHAM	-1.168569	52.969543
7	NG8	NOTTINGHAM	Aspley, Wollaton, Whitemoor, Bilborough, Strelley	Nottingham, Broxtowe	NG8,NOTTINGHAM	-1.216109	52.952063
8	NG9	NOTTINGHAM	Beeston, Stapleford, Lenton Abbey, Chilwell, T...	Broxtowe, Nottingham	NG9,NOTTINGHAM	-1.149646	52.953419
9	NG10	NOTTINGHAM	Long Eaton, Sawley, Sandiacre	Erewash	NG10,NOTTINGHAM	-1.277511	52.900998
10	NG11	NOTTINGHAM	Clifton, Ruddington, Gotham, Kingston on Soar	Nottingham, Rushcliffe	NG11,NOTTINGHAM	-1.149646	52.953419
11	NG12	NOTTINGHAM	Cotgrave, Radcliffe on Trent, Keyworth, Edwalton	Rushcliffe	NG12,NOTTINGHAM	-1.149646	52.953419
12	NG13	NOTTINGHAM	Bingham, Whatton, Bottesford, Aslockton	Rushcliffe, Melton	NG13,NOTTINGHAM	-0.957896	52.950935
13	NG14	NOTTINGHAM	Calverton, Lowdham, Burton Joyce, Gunthorpe	Gedling	NG14,NOTTINGHAM	-1.058502	52.978257
14	NG15	NOTTINGHAM	Hucknall, Ravenshead, Newstead	Ashfield, Gedling	NG15,NOTTINGHAM	-1.188919	53.021228

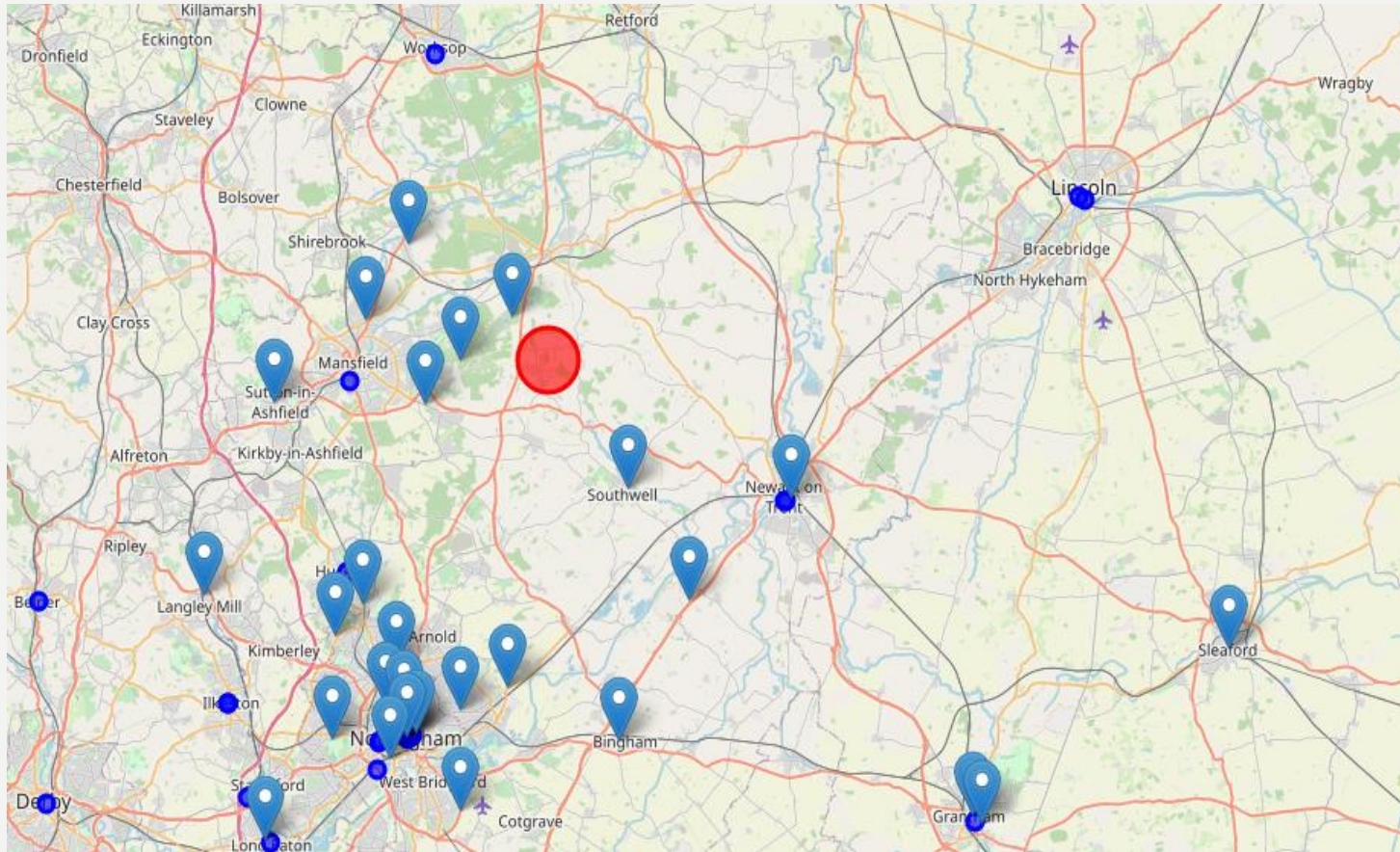There are 29 Postcode districts in total being considered in this study

The distribution of the Postcode areas can be seen on the following slide

DISTRIBUTION OF THE POSTAL CODE AREAS

DISTRIBUTION OF EXISTING CINEMAS

Existing cinemas are shown in dark blue

The red circle represents the approximate centre of the Nottinghamshire County area

There are many cinemas towards the South-West and not so many towards the East of the County
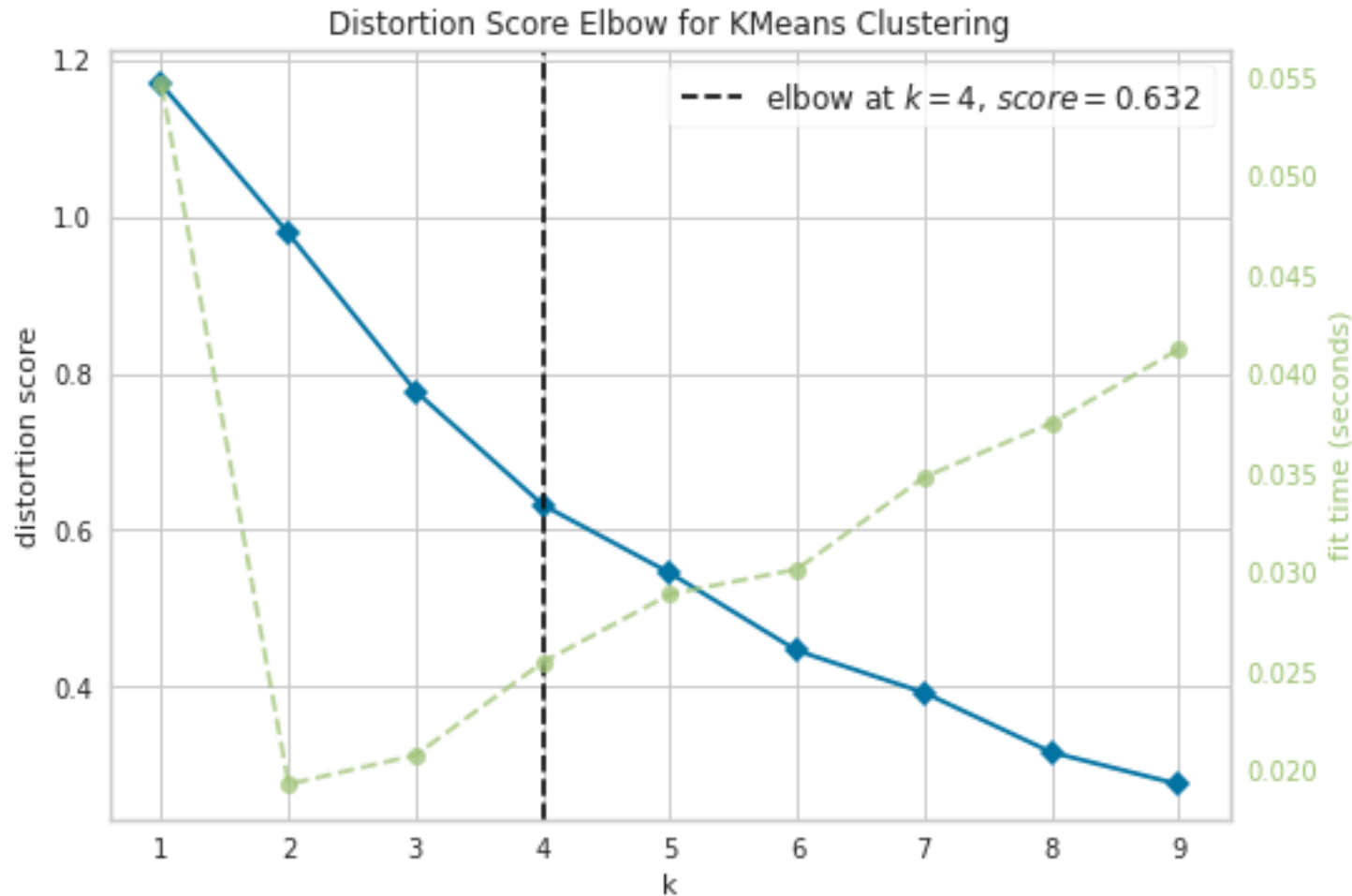
SAMPLE OF DATA USED FOR CLUSTERING

	Postal code	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	NG1	Pub	Bar	Coffee Shop	Indian Restaurant	Café	Bookstore	Italian Restaurant	Movie Theater	Seafood Restaurant	Brewery
1	NG10	Pub	Grocery Store	Supermarket	Coffee Shop	Gym / Fitness Center	Hotel	Restaurant	Discount Store	Pharmacy	Bar
2	NG11	Pub	Bar	Coffee Shop	Indian Restaurant	Café	Bookstore	Cocktail Bar	Italian Restaurant	Movie Theater	Gastropub
3	NG12	Pub	Bar	Coffee Shop	Indian Restaurant	Café	Bookstore	Cocktail Bar	Italian Restaurant	Movie Theater	Gastropub
4	NG13	Pub	Italian Restaurant	Gym	Grocery Store	Train Station	Coffee Shop	Café	Chinese Restaurant	Garden Center	Supermarket
5	NG14	Grocery Store	Pub	Supermarket	Coffee Shop	Train Station	English Restaurant	Clothing Store	Pharmacy	Pet Store	Park
6	NG15	Pub	Grocery Store	Supermarket	Hotel	Fast Food Restaurant	Warehouse Store	Tram Station	Furniture / Home Store	Italian Restaurant	Discount Store
7	NG16	Grocery Store	Pub	Fast Food Restaurant	Supermarket	Park	Discount Store	Indian Restaurant	Bar	Garden Center	Deli / Bodega
8	NG17	Grocery Store	Pub	Clothing Store	Supermarket	Gastropub	Coffee Shop	Fish & Chips Shop	Discount Store	Sandwich Place	Pizza Place
9	NG18	Grocery Store	Burger Joint	Gastropub	Resort	Coffee Shop	Creperie	Recreation Center	Pub	Pool	Pizza Place
10	NG19	Pub	Bar	Discount Store	Clothing Store	Pharmacy	Supermarket	Furniture / Home Store	Pizza Place	Coffee Shop	Performing Arts Venue
11	NG2	Bar	Pub	Indian Restaurant	Coffee Shop	Café	Italian Restaurant	Bookstore	Park	Tapas Restaurant	Gastropub
12	NG20	Sporting Goods Shop	Pub	Bar	Insurance Office	Clothing Store	Department Store	Deli / Bodega	Dessert Shop	Cricket Ground	Creperie

This data was obtained using the Foursquare API

The data was sorted by Postal code and the most common venues in the area was found

K-MEANS MACHINE LEARNING ALGORITHM

Distortion Score Elbow for KMeans Clustering

- - - elbow at $k = 4$, $score = 0.632$

The Elbow method of finding the most appropriate value for k was used and the value was found to be 4

The data will therefore be clustered into 4 distinct clusters

K-Means forms the clusters by minimizing the sum of the distance of points from their respective cluster centroids.
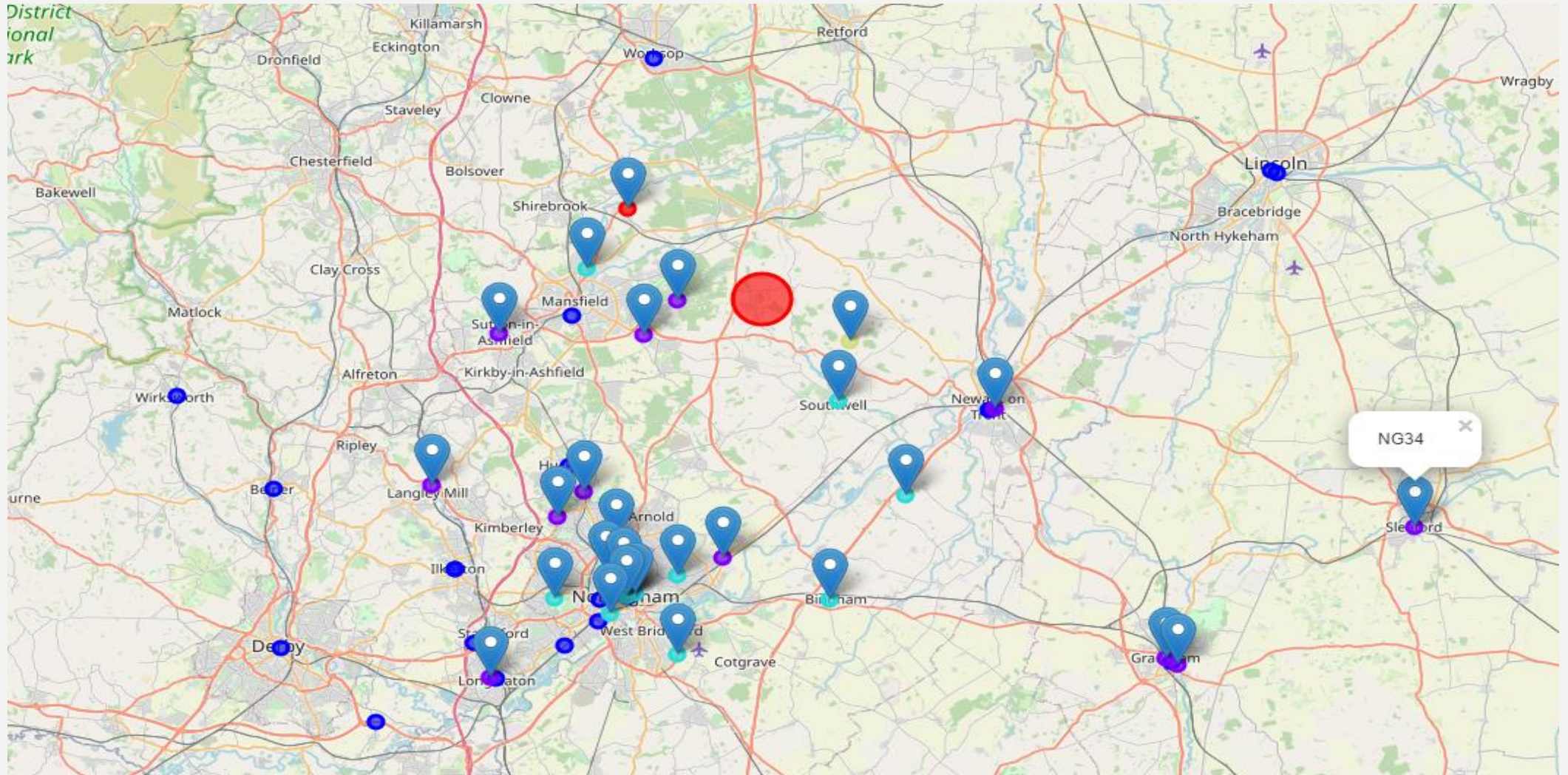
CLUSTER RESULTS

The Postal codes were clustered into 4 clusters and the 4 clusters were named by their top 5 most common venues:

● Red cluster – Sports shop area

● Purple cluster – Pubs and Grocery stores areas

● Turquoise clusters – Pubs, bars and restaurant areas

● Green cluster – Brewery and Ice cream shop area

MAPPED RESULTS

Note that the postal codes areas are marked via pop up markers, with the cluster colours at the tip of the markers. Existing cinemas are marked in dark blue and the large red circle represents the centre of the Nottinghamshire County area.

OBSERVATIONS AND CONCLUSION

- The results are limited since they use only nearby cinemas and clustering of similar Neighbourhoods to determine a suitable location

- The Postal code clusters in Nottinghamshire are fairly similar - they contain a lot of pubs!

- There are already many existing cinema venues

- The largest concentration of existing cinema venues are (as expected) in the centre of Nottingham

- Grantham (NG31 and NG32), Long Eaton (NG10) and Newark (NG24) are all found in the purple cluster which has pubs and grocery shops as being the most popular venues

- Sleaford (NG34) falls into the purple cluster but does not have a nearby cinema

- The area of Sleaford (NG34) should be explored further using methods described in the Introduction section of the report