

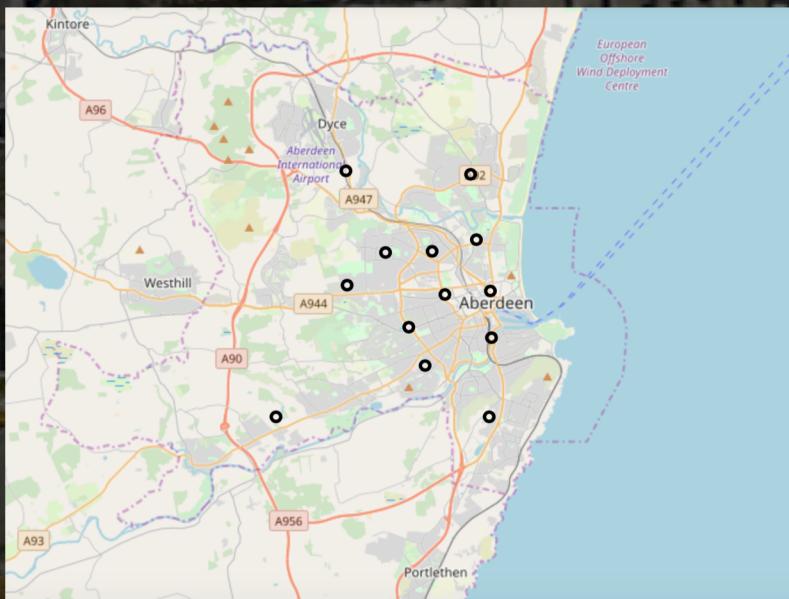
Opening a pub in Aberdeen

IBM Applied Data Science Capstone powered by
Coursera

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Introduction: Background, problem and research question



- There is an abundance of pubs in Aberdeen, Scotland. However, most of these are located around the city center with few to be found in the outskirts of the city.
- This has resulted in a business opportunity for entrepreneurs who want to open their own pub in Aberdeen.
- However, not all of Aberdeen's 13 wards (visualized on the map of Aberdeen to the left) is equally suitable for doing so. Therefore, the most suitable location must be determined through data analysis.

- Research question:

In which area of Aberdeen should an entrepreneur open a pub if they seek to minimize the number of other pubs in the area, while maximizing their reach to customers?

Data

- Geographical data on Aberdeen's wards/areas was gathered from a csv-file from readily available online sources.
- Population data on Aberdeen's wards and neighborhoods were manually scraped from a pdf-file from Aberdeen City Council.
- Other information, such as self employment rate, median income and crime rate, was also manually scraped from a pdf-file from Aberdeen City Council.
- Finally, location data and information about Aberdeen City's venues were acquired from Foursquare API.

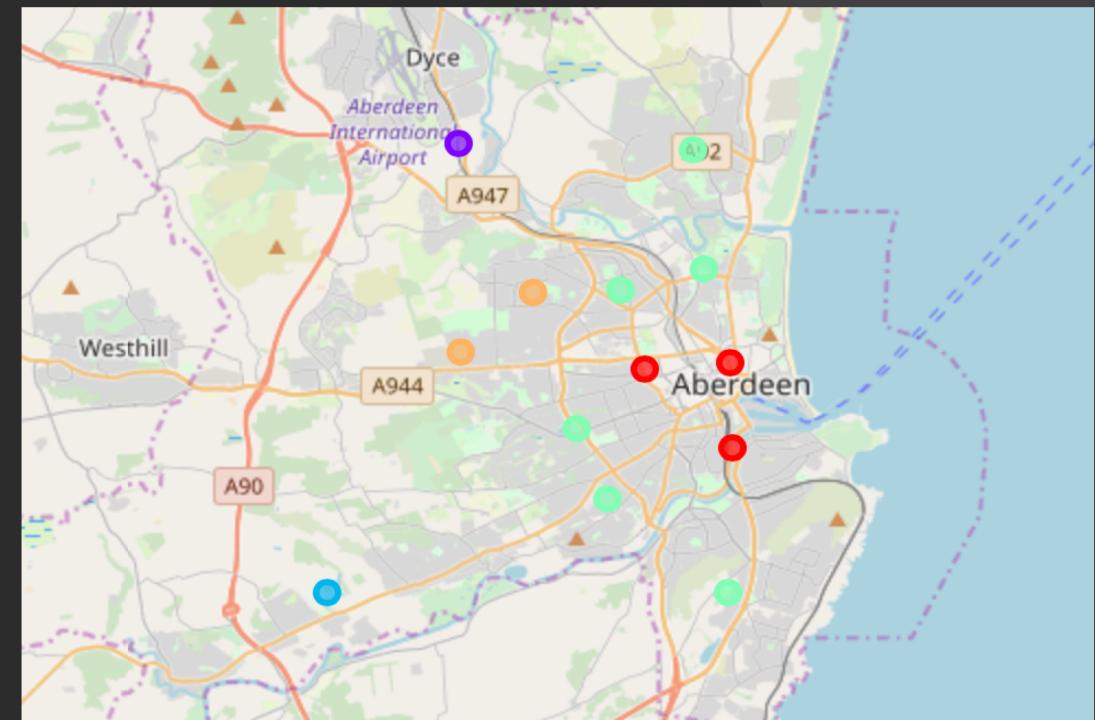
The resulting dataset, *ab_popdata*:

	Ward	District	Latitude	Longitude	Population
0	Airyhall/Broomhill/Garthdee	Aberdeen City	57.128143	-2.135057	16664
1	Bridge of Don	Aberdeen City	57.189205	-2.108137	19212
2	Dyce/Bucksburn/Danestone	Aberdeen City	57.190166	-2.181515	18827
3	George St/Harbour	Aberdeen City	57.151957	-2.096320	20461
4	Hazlehead/Queens Cross/Countesswells	Aberdeen City	57.140381	-2.144622	20562
5	Hilton/Woodside/Stockethill	Aberdeen City	57.164635	-2.130850	16008
6	Kincorth/Nigg/Cove	Aberdeen City	57.111791	-2.096876	16383
7	Kingswells/Sheddoxley/Summerhill	Aberdeen City	57.153805	-2.181091	15196
8	Lower Deeside	Aberdeen City	57.111729	-2.222704	16120
9	Midstocket/Rosemount	Aberdeen City	57.150807	-2.123160	14594
10	Northfield/Mastrick North	Aberdeen City	57.164357	-2.158188	16663
11	Tillydrone/Seaton/Old Aberdeen	Aberdeen City	57.168279	-2.104663	15066
12	Torry/Ferryhill	Aberdeen City	57.137055	-2.095906	21804

Methodology

- An exploratory analysis of the dataset revealed that many wards had a population just above 16,000.
- Using the location data from *ab_popdata* as inputs, Foursquare API was used to gather information about the different venues in each of the wards of Aberdeen City.
- K-means clustering was used to separate the wards in different clusters, according to the similarities in venues in the different wards.
- Due to necessities uncovered from the initial analysis, additional information about the wards and neighborhoods of Aberdeen were acquired.

Clusters of wards in Aberdeen City



Results

- None of the clusters were solely made up of wards without any pubs or bars.
- Two wards, *Hilton/Woodside/Stockethill* and *Kincorth/Nigg/Cove*, had neither pubs nor bars among their most common venues.
- Further examination showed that the two wards had similar populations, and that the former had a rate of self employment of 5.8%, a median income of £21,809, and a total crime rate of 52.1‰. The corresponding numbers for the latter ward was 8.2%, £31,694 and 15.5‰.
- The most populated neighborhood of *Kincorth/Nigg/Cove* is *Kincorth, Leggart & Nigg*.

Information about the two wards

	Ward	Population	Drinking %	Estimated drinking population	Self employment %	Median income	Crime rate ‰
0	Hilton/Woodside/Stockethill	16008	68.4%	10949	5.8%	21809	52.1‰
1	Kincorth/Nigg/Cove	16383	67.8%	11107	8.2%	31694	15.5‰

Discussion

- After examining the results of the data analysis, it was first found that population-wise neither of the two wards stood out as better than the other. Further analysis was therefore required.
- When also considering the self employment rates, median income and crime rates in the two wards, it was determined that *Kincorth/Nigg/Cove* is unequivocally more suitable for opening a ward in than *Hilton/Woodside/Stockethill* is.
- Lastly, when comparing the two main areas/neighborhoods of *Kincorth/Nigg/Cove*, *Kincorth*, *Leggart & Nigg* and *Cove*, it was found that the population of the former was approximately 42 percent higher than the latter's.
- The answer to the research question therefore is that *Kincorth, Leggart & Nigg* is the most suitable area for opening a pub in Aberdeen, if your goal is to minimize the number of nearby pubs and bars, and maximize your reach to potential customers.

Conclusions

- The purpose of the capstone project has been to help prospective entrepreneurs locate the ideal area of Aberdeen to open a new pub, if they want to minimize competition and maximize their reach to customers.
- Through exploratory analysis and machine learning algorithms (K-means clustering), it was determined that the area/neighborhood of Aberdeen City that best fulfills these criteria, and has the best conditions for entrepreneurship, is *Kincorth, Leggart & Nigg*, located south of the city center of Aberdeen.
- While *Kincorth, Leggart & Nigg* stands out as the most suitable location of Aberdeen to open a pub according to the data analysis performed in this project, different approaches to solving the problem may yield different results. It is therefore recommended that further analysis should be performed before deciding where to open a new pub in Aberdeen.

Conclusions (cont.)

Visualization of *Kincorth, Leggart & Nigg*'s location on a map of Aberdeen City

