



CAPSTONE PROJECT - FINAL ASSIGNMENT

COVID-19 FINANCIAL IMPACT & VENUES DATA ANALYSIS

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COVID-19 FINANCIAL IMPACT TO DIFFERENT BUSINESSES VARIES

- The COVID-19 pandemic has had a devastating impact on a global scale with profound economic and financial consequences.
- Industries/demographics are impacted on different levels.
- Policy makers can provide targeted supports to businesses in industries most heavily affected.
- Analysis will consider a sample in Melbourne, Australia for demonstration purposes.

DATA COLLECTION AND WRANGLING

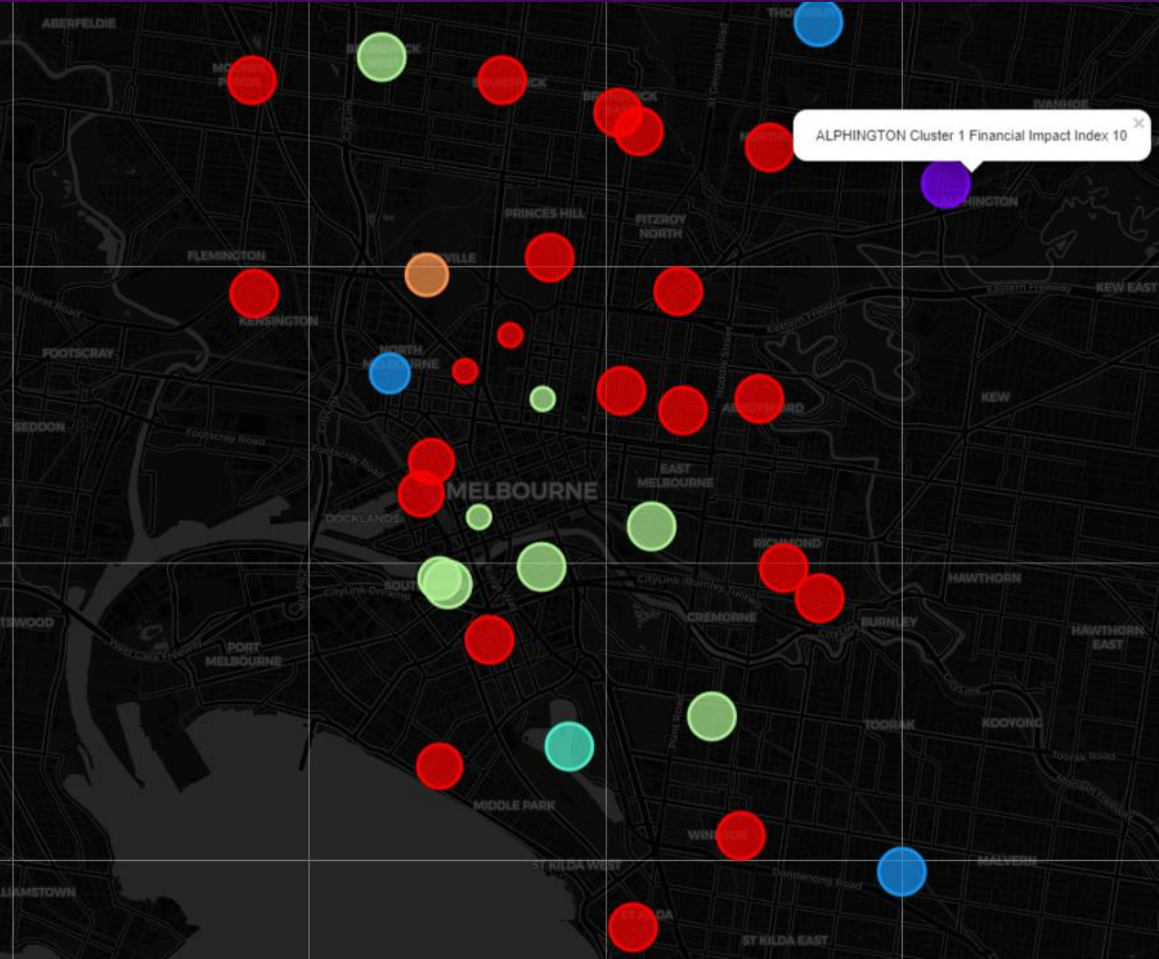
- a) Geospatial data (latitude and longitude) of inner suburbs in Melbourne, Australia
Publicly available **Free Database of Australia Postcodes** published
at https://www.matthewproctor.com/full_australian_postcodes_vic (All credits go to Matthew Proctor).
- b) Data of venues in proximity of the selected suburbs - **Foursquare API**
- c) COVID-19 Financial Impact Index
Taylor Fry COVID-19 Financial Impact Index publicly available at <https://taylorfry.com.au/articles/covid-19-financial-impact-index/> (All credits go to Taylor Fry).
- d) Median age by postcode 2016 Census Data
2016 Census data publicly available from the Australian Bureau of Statistics (ABS)
at https://quickstats.censusdata.abs.gov.au/census_services/getproduct/census/2016/quickstat/POA3000?opendocument.

Final clean data set features 36 suburbs, with 1,223 venues in proximity across 209 categories.



- Cafés, restaurants, bars, coffee shops etc.
- Expect a high degree of homogeneity among these suburbs – Melbourne is well known as ‘The coffee capital of the world’!

CLUSTERING ANALYSIS

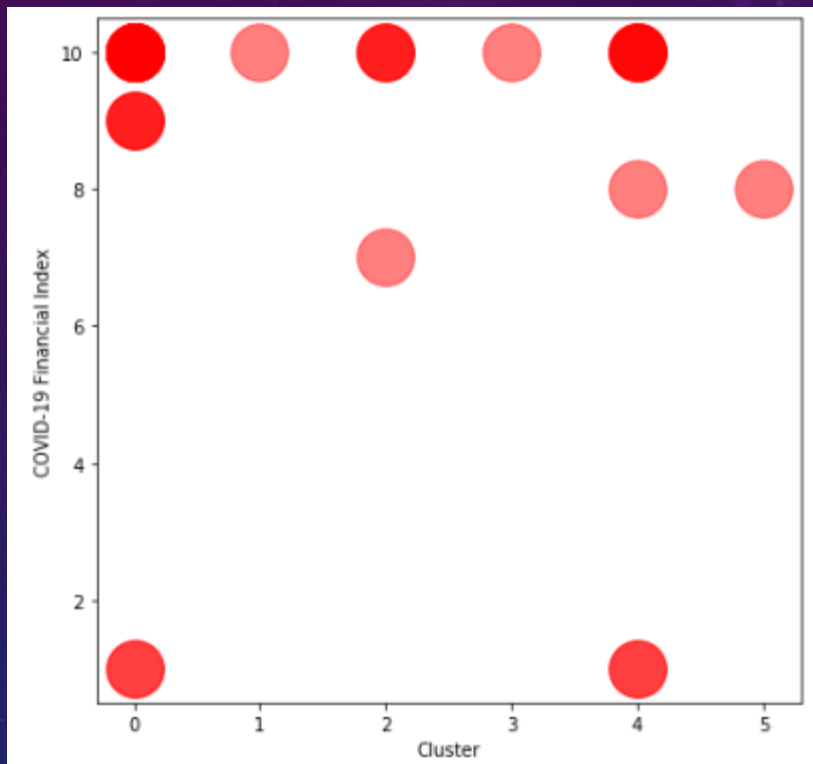


- 6 clusters were used in the algorithm.

Cluster	Number of Suburbs	Venue category feature
1	21	Cafés, bars, restaurants. Outliers are university and hospital.
2	1	Rental service
3	4	Stadium, stations, zoo
4	1	Breakfast spots
5	8	Clothing stores, hotels, arts venues
6	1	University, basketball court

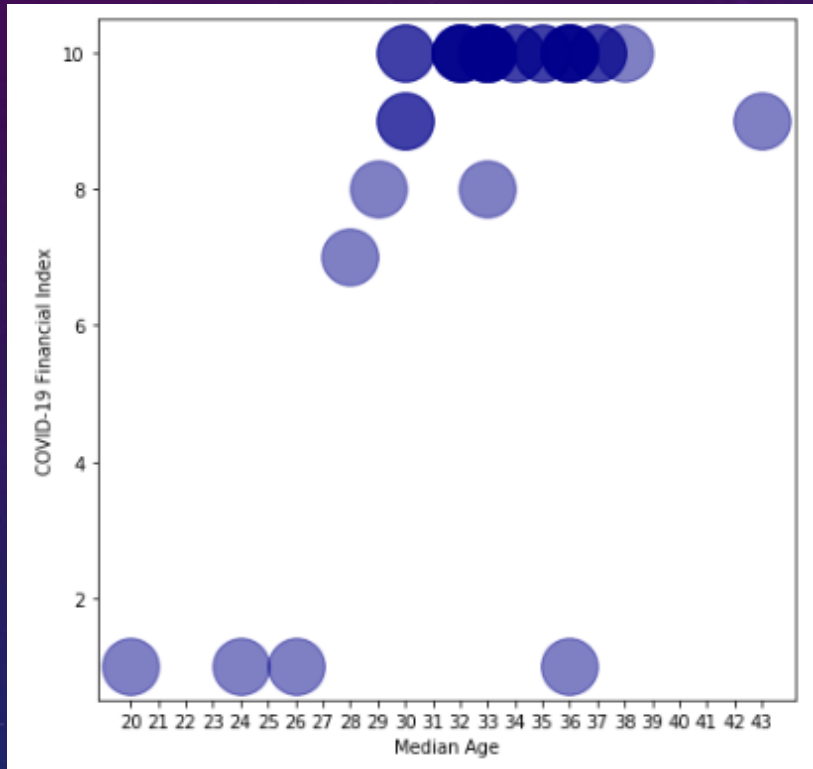
- Fairly consistent financial impact across clusters indicated by the size of the ‘bubbles’
- Exceptions were university, hospital, white-collar offices
- Suburbs with a younger population were better subsidised by government

VISUALISING THE CORRELATIONS



- Most clusters have been similarly impacted financially by COVID-19 to a severe degree. This is consistent with expectation about the degree of homogeneity in these suburbs mostly having a high concentration of hospitality businesses.
- A few outliers have been identified as noted above, such as university and hospital being subsidised by the government and therefore seeing less of an impact, or white-collar business districts operating as usual.

VISUALISING THE CORRELATIONS



- Suburbs with a younger population were less impacted financially, possibly due to heavy government support packages to young and low income people and as such their income would not have changed substantially.
- Population of people above 30 years old saw a bigger impact as they would have had higher income/expenses prior to the pandemic, and disruptions/job losses would have made a more substantial change to their financials.

DISCUSSION

- Due to a high degree of homogeneity among Melbourne inner suburbs having hospitality businesses as the most common types of business in proximity, they have been similarly heavily affected by COVID-19 from a financial perspective.
- A few outliers have been identified as either having specific types of business (i.e. university, hospital, white-collar offices) or a younger population (i.e. below the age of 30) that were better subsidised by the government support packages, or were as not affected by the restrictions imposed thanks to work-from-home arrangements for example and therefore did not see a substantial change in financials
- Limitations and factors affecting the analysis outcome include:
 - i) *Reliability of input data*
 - ii) *Sample size*
 - iii) *Foursquare API search limits*
 - iv) *k-means clustering algorithm*

CONCLUSION

- Demonstrated the financial impact of COVID-19 on different levels to selected suburbs in inner Melbourne, Australia.
- In making the final decision, local and federal authorities should consider factors such as proximity of suburbs, specific industries and demographics, their current and future outlook to provide targeted support in balance with other public health policies in response to the COVID-19 pandemic.