THE BATTLE OF THE NEIGHBORHOODS

Melbourne, Victoria, Australia

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Section 1 - Context and Problem Nature

Problem Background

Melbourne is the capital of Victoria, Australia. The Economist Intelligence Unit's 2017 Global Liveability Index awarded Melbourne as the world's top city for seven years running. Currently Melbourne is the second most liveable city, toppled by Vienna (Austria) to be the top liveable city in the world.

Melbourne is very academic and a creative city home to world-class academics and an exciting entrepreneurial spirit, if you study in Melbourne you will soon be thinking outside the box (and around it, above it and below it, too). Melbourne's winding alleyways are magical; they will probably make you feel as though you have stepped into a real-life Wonderland. Melbourne is a melting pot of communities and is home to many different cultural celebrations. Currently, 3500 to 4000 people enter Victoria each year under the Humanitarian Program for refugees and others in refugee-like situations.

This means that Melbourne's market is highly competitive. For someone moving to Melbourne or Victoria, it is important to understand safe and comfortable places to live. Or, even for people moving within Victoria, having the insights around crime and safety would mean a good and comfortable move.

10 Facts about Melbourne/Victoria

- Melbourne is officially the fox capital of the world
- Melbourne used to have a history if public bathing
- Melbourne's tramway system is the largest outside Europe and the fourth largest in the world
- World's first feature film, was filmed and made in Melbourne in 1906 (Ned Kelly Gang)
- Melbourne was originally going to be named **BATMANIA**
- 38% of Melbourne's population was born overseas
- Melbourne is the first host of Olympic Games outside of Europe and North America
- The world's largest stained glass ceiling is located in Melbourne
- Melbourne has the highest number of cafes and restaurants per number of people than any other city in the world.
- Melbourne has been named the world's most liveable city 7 times in a row to be beat by Vienna (Austria) last year

Problem Idea for this Project

The idea for this project is to show insights driven using venue and location data from FourSquare, backed up with open source crime data from Crime Statistics Victoria (https://www.crimestatistics.vic.gov.au/). We can enable the users of this project to not only choose the safest suburb, but also the safest suburb with the right amenities. We will use maps from Folium to present the findings.

In short, we will do this by

1. Extracting venue (Hotel, Restaurant, Playground, Grocery Stores, etc.,) data from FourSquare for top venues in Melbourne/Victoria
2. Augment this data with crime data around those venues
3. Maps are presented to users and suburbs/venues can be used to filter and zoom in

The idea is to use Python to prepare the data, analyse the data, visualise the data and model the data for us to find the right outcomes. Various plugins/packages are used in Python to enable us to get the perform the above operations

Targeted Audience

This project is targeted for specific types of people

1. Young couples who enjoy the city life
2. Migrants to Victoria
3. Families moving within Victoria

This project will enable the above families/categories to understand the crime statistics and also the life in Victorian suburbs to make a decision on which suburb to move into or start their life in Victoria.

Section 2 - Data Used

Crime Statistics Data - Victoria

The Crime statistics data for victoria can be downloaded from https://www.crimestatistics.vic.gov.au/crime-statisticslatest-crime-data/download-data-0.

We have downloaded data which holds

1. Crime data for Year 2019
2. Contains Region, postcode, and suburb information
3. Contains Offence along with the number of incidents

We will use this data to mainly align with foursquare data. Using the above data, we should be able to understand the number of criminal incidents occurring within a specific locality (Suburb name).

We can also use the data to understand the type of criminal events occurring, along with the top 10 types of events for a specific suburb.

The crimes along with the types will be pivoted to get total incidents per Suburb/Postcode

1. Our initial subset had 34038 rows across 8 columns (Year, Area, Postcode, Suburb, Offence Division, Offence Subdivision, Offence Subgroup, and Incidents Recorded). A sample of the subset is shown below

	Year	Area	Postcode	Suburb	Offence Division	Offence Subdivision	Offence Subgroup	Incidents Recorded
0	2019	Alpine	3691	Dederang	A Crimes against the person	A20 Assault and related offences	A212 Non-FV Serious assault	1
1	2019	Alpine	3691	Dederang	A Crimes against the person	Other crimes against the person	Other crimes against the person	1
2	2019	Alpine	3691	Dederang	B Property and deception offences	B20 Property damage	B21 Criminal damage	1
3	2019	Alpine	3691	Dederang	B Property and deception offences	B30 Burglary/Break and enter	B321 Residential non-aggravated burglary	1
4	2019	Alpine	3691	Dederang	B Property and deception offences	B40 Theft	B49 Other theft	1

2. After analysis 5 columns were not really necessary and are removed. We know the data is for year 2019, the area is too big to consider and will not be of relevance, details around the offence's subgroup and subdivision isn't really necessary.
3. Once the above 5 columns have been removed, we will need to convert Incidents Recorded column to integer to re-group and sum
4. This activity has resulted in 7470 records across 3 columns. See below an example subset

	Suburb	Offence	Incidents
0	Abbeyard	B Property and deception offences	1
1	Abbotsford	A Crimes against the person	137
2	Abbotsford	B Property and deception offences	891
3	Abbotsford	C Drug offences	68
4	Abbotsford	D Public order and security offences	80

Location Data for Victoria

There are multiple ways to extract the latitude and longitude data from geosites (GeoPY and Nominatim), but due to the sheer number of records/data we have we will not use the above options to extract the latitude and longitudinal information. The alternate was to download the data available online https://www.matthewproctor.com/full_australian_postcodes_vic. A sample subset is provided below

	Locality	Latitude	Longitude
0	BENNISON	-39.140761	146.360412
1	BOOLARONG	-39.140761	146.360412
2	FOSTER	-39.140761	146.360412
3	FOSTER NORTH	-39.140761	146.360412
4	GUNYAH	-39.140761	146.360412

The Victorian Crime Data once merged with the latitude and longitude data will look as follows

Suburb	Offence	Incidents	Latitude	Longitude
ABBEYARD	B Property and deception offences	1	-36.554037	146.827590
ABBOTSFORD	A Crimes against the person	137	-37.803515	144.998203
ABBOTSFORD	B Property and deception offences	891	-37.803515	144.998203
ABBOTSFORD	C Drug offences	68	-37.803515	144.998203
ABBOTSFORD	D Public order and security offences	80	-37.803515	144.998203

Suburb Data for Victoria

Domain.com.au and realestate.com.au are the top 2 real estate sites used across Australia for buying/renting various property types. Domain Liveable Melbourne study – ranks 307 suburbs in Victoria on 17 indicators to give a list of the most liveable suburbs in the state. Rather than using 3322 suburbs to find the best suburb, let's just use the 307 suburbs to find the most suitable suburb. We don't want to get our target audience to a suburb which is ranked over 300 in Victoria. For best cases, we will want our audience to stay in one of the top 100 suburbs in Victoria, but note, people using this study can ignore other suburbs and focus on top 100 if they have to. It is left to the user discretion

This information is available on Domain.com.au
https://www.domain.com.au/liveable-melbourne/melbournes-most-liveable-suburbs-2019/melbournes-307-suburbs-ranked-for-liveability-2019-898676/

This data, once downloaded and cleansed gave us the following rankings along with suburbs and was merged with Victorian Crime Data bringing our records to 1326 suburbs and offences

	Suburb	Offence	Incidents	Latitude	Longitude
0	SOUTH YARRA	A Crimes against the person	292.0	-37.840679	144.991264
1	SOUTH YARRA	B Property and deception offences	1545.0	-37.840679	144.991264
2	SOUTH YARRA	C Drug offences	91.0	-37.840679	144.991264
3	SOUTH YARRA	D Public order and security offences	108.0	-37.840679	144.991264
4	SOUTH YARRA	E Justice procedures offences	167.0	-37.840679	144.991264

Our data set has reduced from ***34K+ records to 1326 records***. It is significantly easier to analyse this data.

FourSquare Data

We can extract the top picks from FourSquare data. FourSquare does not actually provide an API that will return a list of the top venues to visit in a city. To get this list we can though use the FourSquare website directly to request the top sites in Victorian suburbs and then refine the response to extract the venue, its category and its location.

Please see a subset of venues near Melbourne

name	categories	lat	lng
Tipo 00	Italian Restaurant	-37.813527	144.961978
Brother Baba Budan	Coffee Shop	-37.813445	144.962137
Kirk's Wine Bar	Wine Bar	-37.813661	144.961351
Calia	Japanese Restaurant	-37.812724	144.963930
B'cos Brazil	Brazilian Restaurant	-37.815486	144.963085
Beneath Driver Lane	Cocktail Bar	-37.813010	144.963170
Trattoria Emilia	Italian Restaurant	-37.815220	144.962636
Whitehart	Bar	-37.812781	144.961973
Koko Black	Dessert Shop	-37.814485	144.964033
Chuckle Park	Bar	-37.815075	144.963008

We will do the same for the 307 suburbs in our list. See below a sample subset of this request

	Suburb	Latitude	Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	MEADOW HEIGHTS	-37.653917	144.923609	Morgan's SUPA IGA Meadow Heights	-37.650340	144.922540	Grocery Store
1	MEADOW HEIGHTS	-37.653917	144.923609	Centro Meadow Heights	-37.650631	144.921664	Shopping Mall
2	MEADOW HEIGHTS	-37.653917	144.923609	Bakers Boutique & Patisserie	-37.650754	144.922006	Bakery
3	MEADOW HEIGHTS	-37.653917	144.923609	My Mates Pizza	-37.650498	144.921988	Pizza Place
4	MEADOW HEIGHTS	-37.653917	144.923609	Kebab House	-37.650444	144.922156	Middle Eastern Restaurant
5	KILSYTH	-37.819364	145.313346	McDonald's	-37.819227	145.314506	Fast Food Restaurant
6	KILSYTH	-37.819364	145.313346	7 Eleven	-37.817650	145.317149	Convenience Store
7	KILSYTH	-37.819364	145.313346	Red Rooster	-37.818590	145.316260	Fast Food Restaurant
8	KILSYTH	-37.819364	145.313346	Nitro Gym	-37.818373	145.316046	Gym
9	KILSYTH	-37.819364	145.313346	Cummins Filtration	-37.816476	145.310327	Business Service
10	KINGS PARK	-37.743361	144.796693	Fresh Chilli Deli	-37.742218	144.800700	Bakery
11	KINGS PARK	-37.743361	144.796693	Quang Vinh Restaurant	-37.742100	144.801022	Vietnamese Restaurant
12	KINGS PARK	-37.743361	144.796693	St Albans SUPA IGA	-37.744413	144.799796	Grocery Store
13	KINGS PARK	-37.743361	144.796693	Song Huong Restaurant	-37.741925	144.800966	Asian Restaurant
14	KINGS PARK	-37.743361	144.796693	Nando's	-37.744576	144.800681	Portuguese Restaurant
15	KINGS PARK	-37.743361	144.796693	Ha Long	-37.743068	144.800382	Asian Restaurant
16	KINGS PARK	-37.743361	144.796693	Phi Phi Vietname and Chinese Restaurant	-37.743080	144.800489	Restaurant
17	KINGS PARK	-37.743361	144.796693	Pho Kim Long	-37.742182	144.801001	Asian Restaurant
18	KINGS PARK	-37.743361	144.796693	Il Padrino's Pizza	-37.744230	144.801210	Pizza Place
19	ATTWOOD	-37.673182	144.888492	Best Western Airport Motel	-37.673241	144.887350	Hotel
20	ATTWOOD	-37.673182	144.888492	Claudio's IGA	-37.676640	144.886583	Grocery Store
21	ATTWOOD	-37.673182	144.888492	Westmeadows Reserve	-37.674888	144.887202	Park
22	ATTWOOD	-37.673182	144.888492	Westmeadows Tavern	-37.676278	144.888306	Dive Bar
23	ATTWOOD	-37.673182	144.888492	Madison's Wood Fired Café	-37.676608	144.886250	Italian Restaurant
24	ATTWOOD	-37.673182	144.888492	Westmeadows Village	-37.676836	144.886848	Miscellaneous Shop
25	ATTWOOD	-37.673182	144.888492	Fish Eyes	-37.676678	144.886348	Fish & Chips Shop
26	ATTWOOD	-37.673182	144.888492	Westmeadows Bakery	-37.676488	144.887210	Bakery
27	ATTWOOD	-37.673182	144.888492	Noodle Sushi Bar	-37.676720	144.886200	Chinese Restaurant
28	ATTWOOD	-37.673182	144.888492	Paladinos Pizza & Pasta	-37.677060	144.886740	Pizza Place
29	ATTWOOD	-37.673182	144.888492	Cincotta Discount Chemist Westmeadows	-37.677140	144.886840	Pharmacy
30	SYDENHAM	-37.715579	144.780474	Proctor Cresent Reserve	-37.711862	144.783197	Playground
31	SYDENHAM	-37.715579	144.780474	AKA Music	-37.711250	144.780020	Music Store
32	BURNSIDE	-37.782720	144.770641	Nando's	-37.783240	144.771547	Portuguese Restaurant
33	BURNSIDE	-37.782720	144.770641	Subway	-37.783212	144.772939	Sandwich Place
34	BURNSIDE	-37.782720	144.770641	Rustique co.	-37.781772	144.773571	Pizza Place
35	BURNSIDE	-37.782720	144.770641	McDonald's	-37.783186	144.772381	Fast Food Restaurant

As you can see, the above subset has the suburbs, the location information of the suburb and the various venues in that suburb, along with the venue's latitude and longitude coordinates and category.

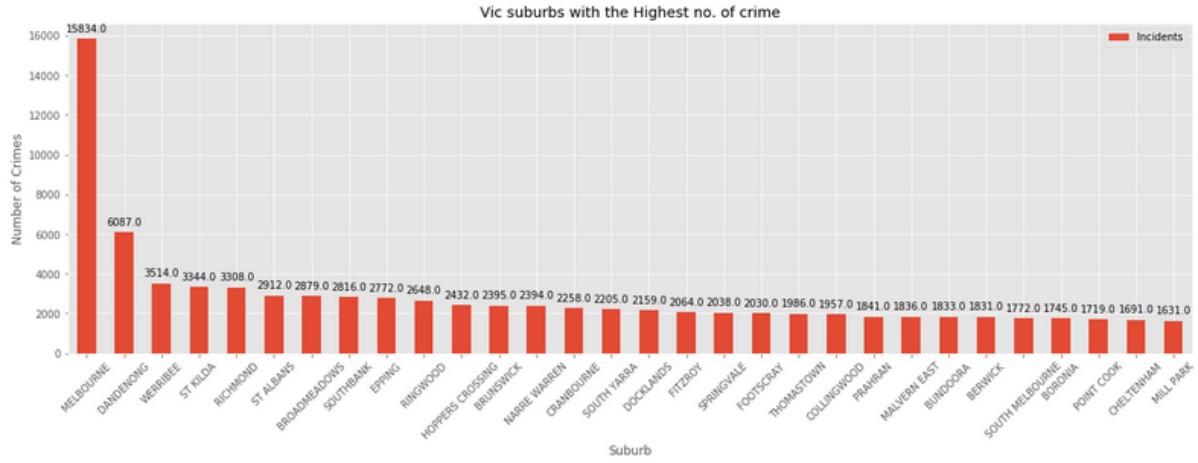
This is the final data that will be super imposed onto Folium maps. The Folium maps will show the number of incident per-suburb and the venues in that suburb. We will see more of this in the following sections

Section 3 - Data Visualisation & Analysis

Crime Data Visualisation

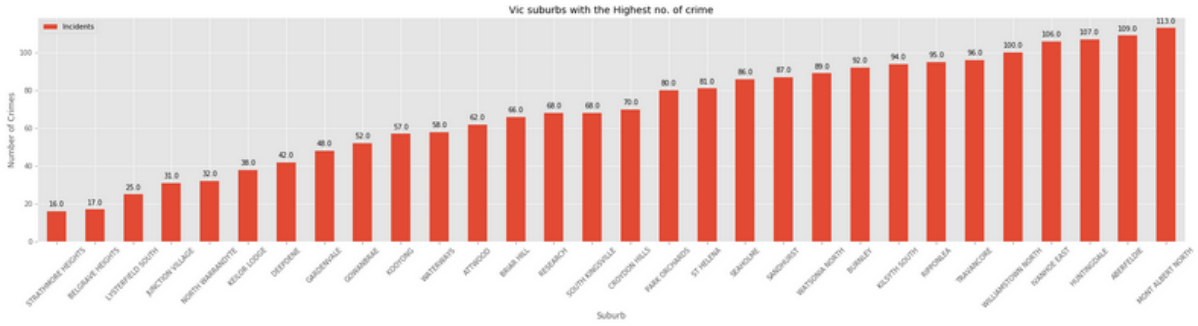
Suburbs with Highest number of Crimes

	Suburb	Incidents
149	MELBOURNE	15834.0
67	DANDENONG	6087.0
234	WERRIBEE	3514.0
206	ST KILDA	3344.0
183	RICHMOND	3308.0
204	ST ALBANS	2912.0
29	BROADMEADOWS	2879.0
200	SOUTHBANK	2816.0
87	EPPING	2772.0
184	RINGWOOD	2648.0

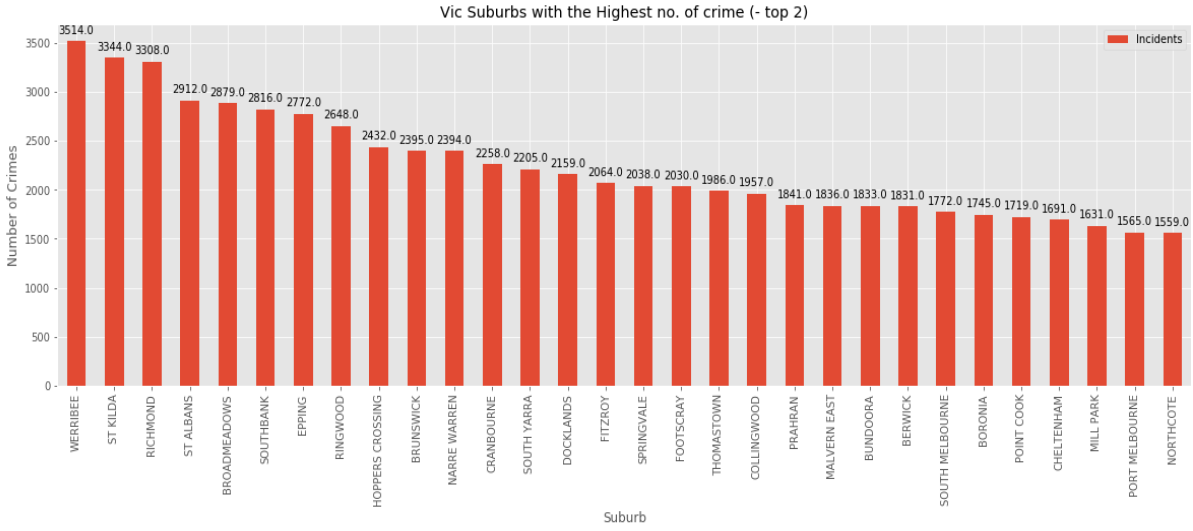


Suburbs with Lowest number of Crimes

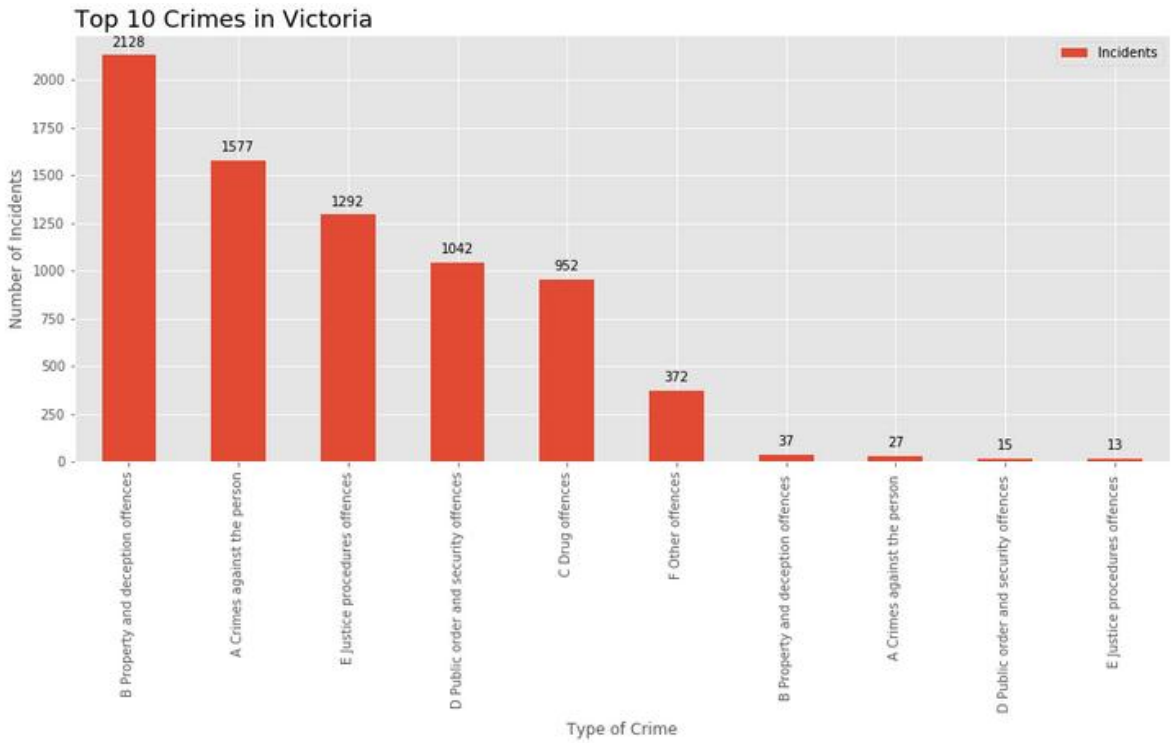
	Suburb	Incidents
208	STRATHMORE HEIGHTS	16.0
17	BELGRAVE HEIGHTS	17.0
142	LYSTERFIELD SOUTH	25.0
121	JUNCTION VILLAGE	31.0
166	NORTH WARRANDYTE	32.0
126	KEILOR LODGE	38.0
69	DEEPDENE	42.0



Suburbs with Highest number of Crimes (excl. Melbourne and Dandenong)



Top Crime Types in Victoria



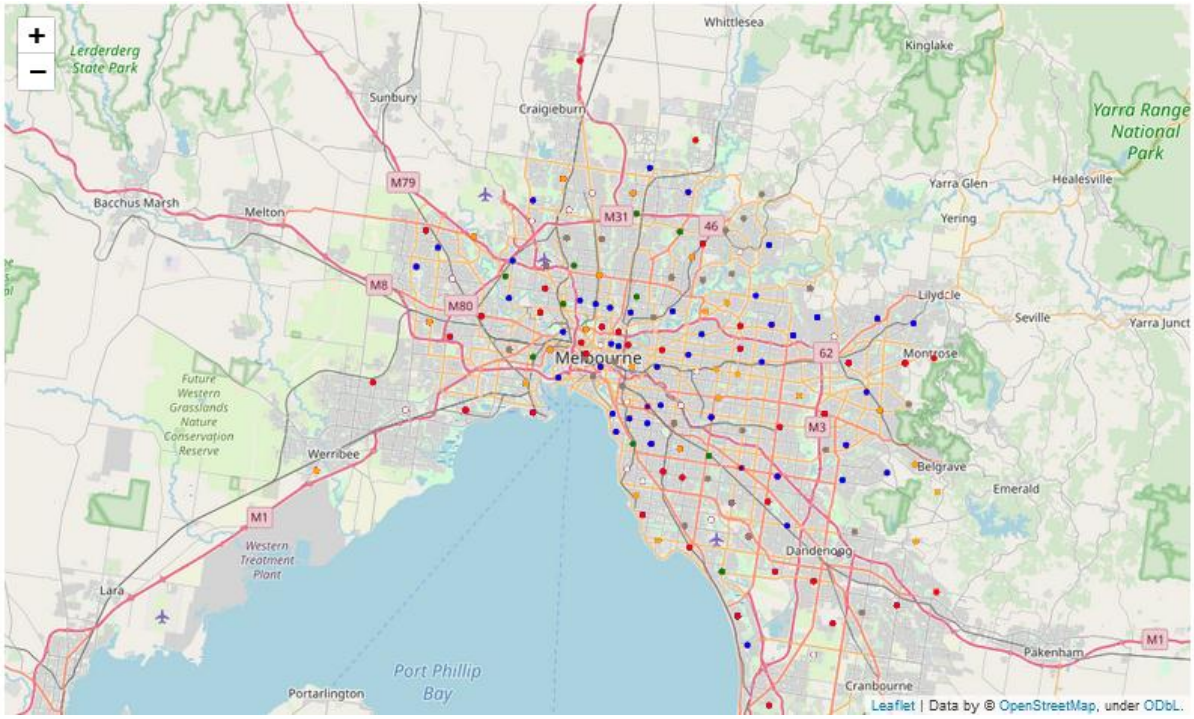
Location Mapping

Mapping crime types with different colours for 307 suburbs

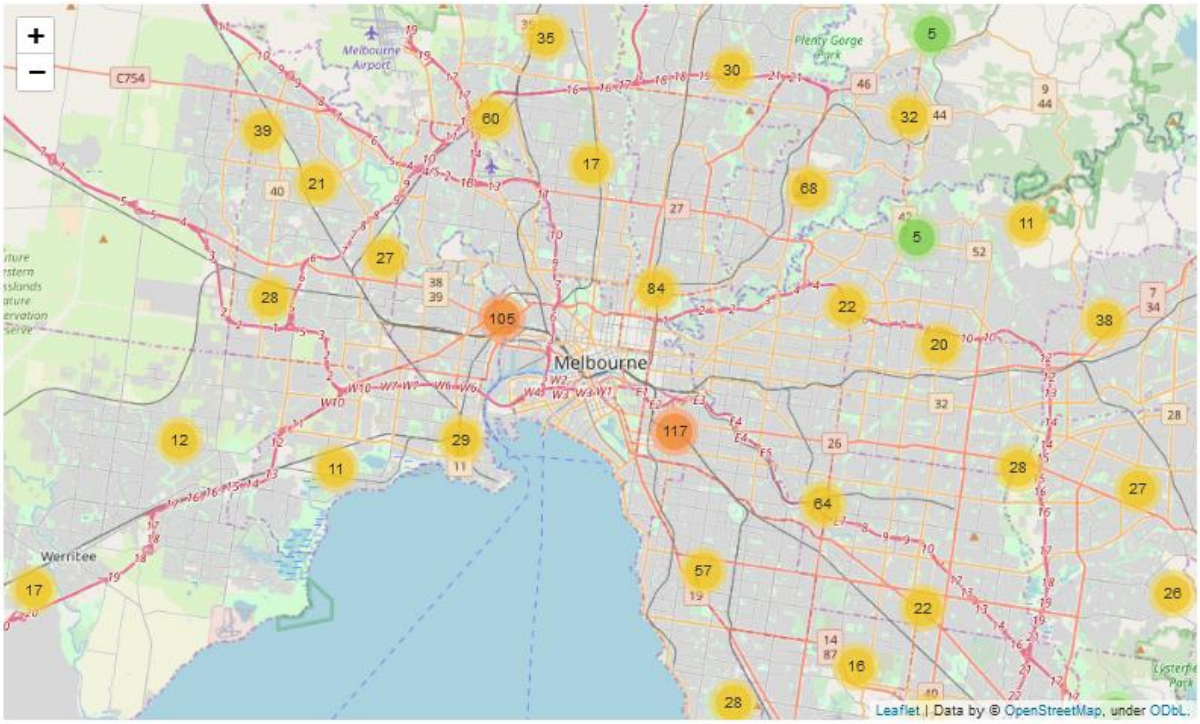
Let us assign various colours to the top 10 crimes in Victoria. This will give us a subset like below

	Suburb	Offence	Incidents	Latitude	Longitude	colour
0	SOUTH YARRA	A Crimes against the person	292.0	-37.840679	144.991264	purple
1	SOUTH YARRA	B Property and deception offences	1545.0	-37.840679	144.991264	blue
2	SOUTH YARRA	C Drug offences	91.0	-37.840679	144.991264	red
3	SOUTH YARRA	D Public order and security offences	108.0	-37.840679	144.991264	beige
4	SOUTH YARRA	E Justice procedures offences	167.0	-37.840679	144.991264	orange

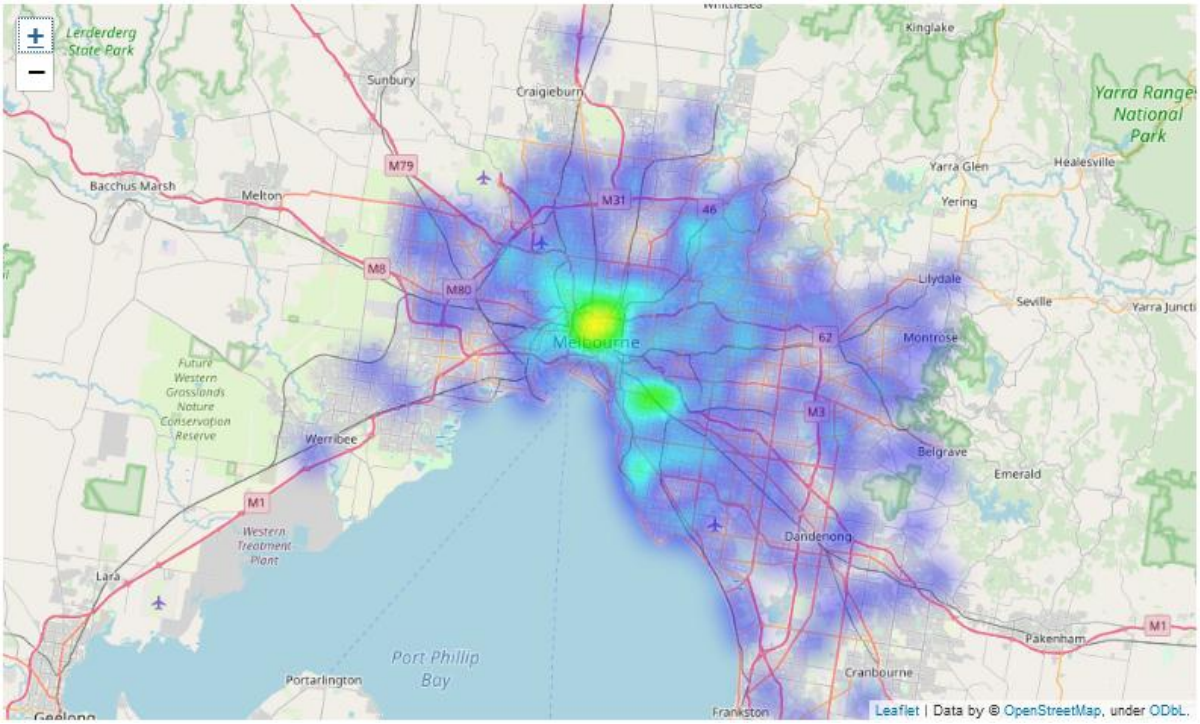
We can project this data into a FOLIUM map as below



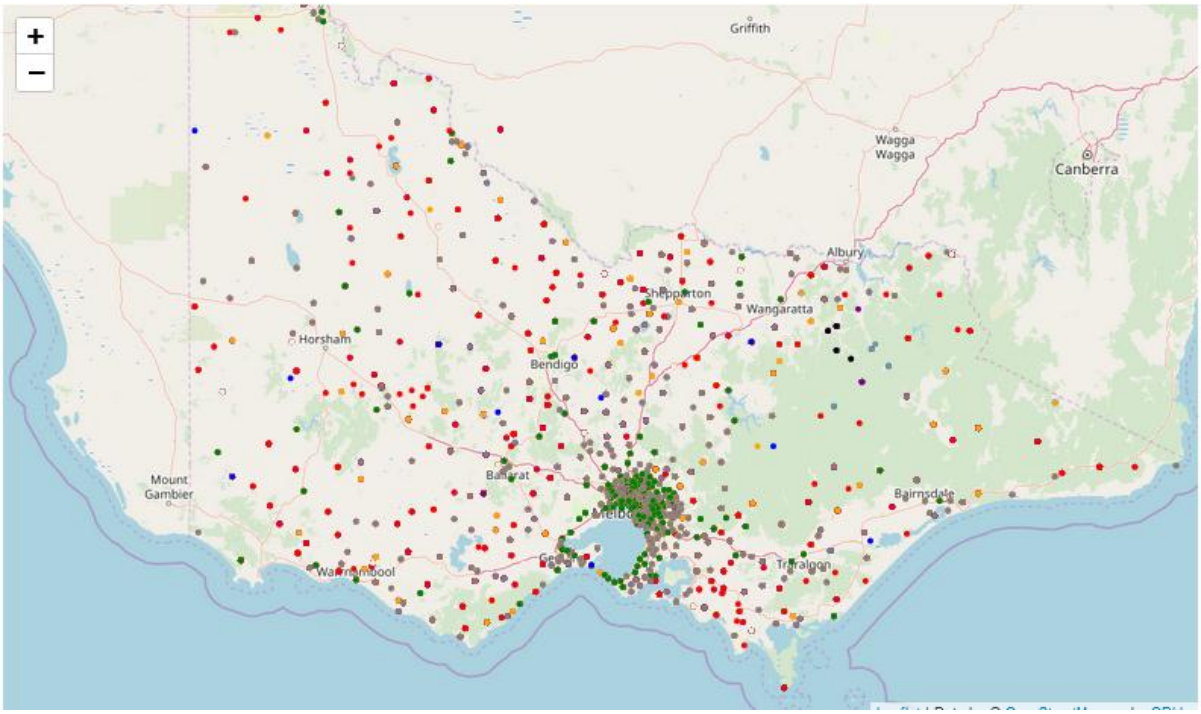
Clustering Crime Data for 307 suburbs



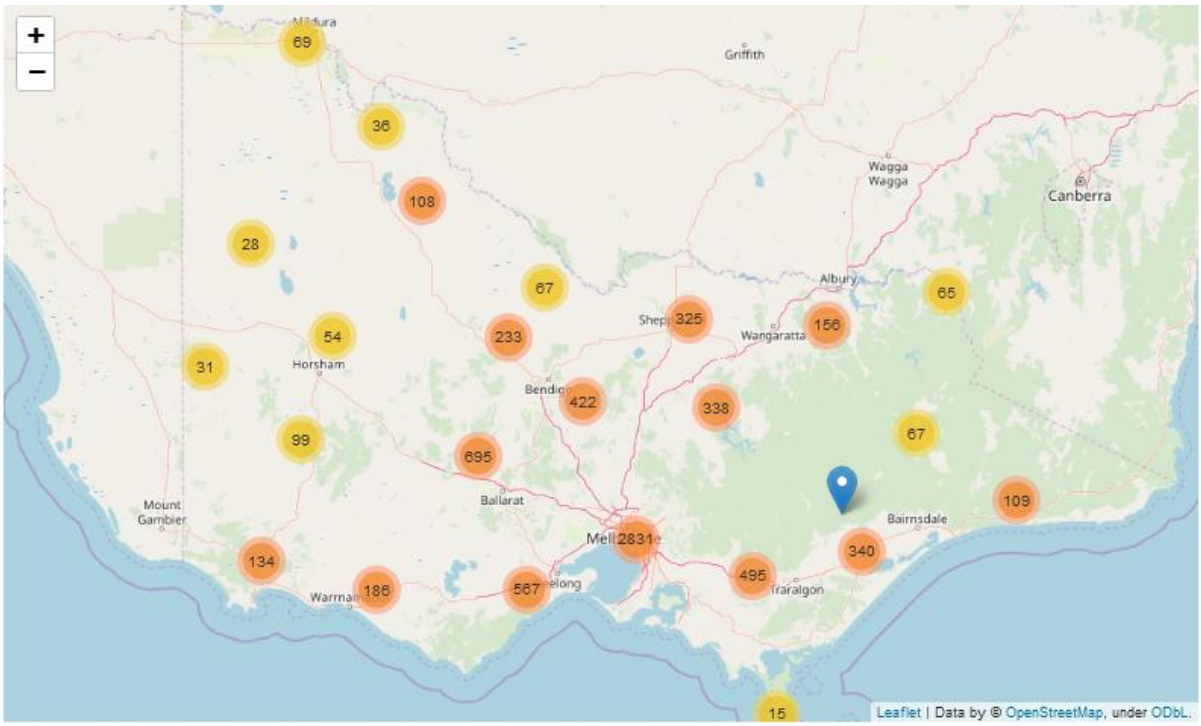
Heat map of Crime in top 307 suburbs



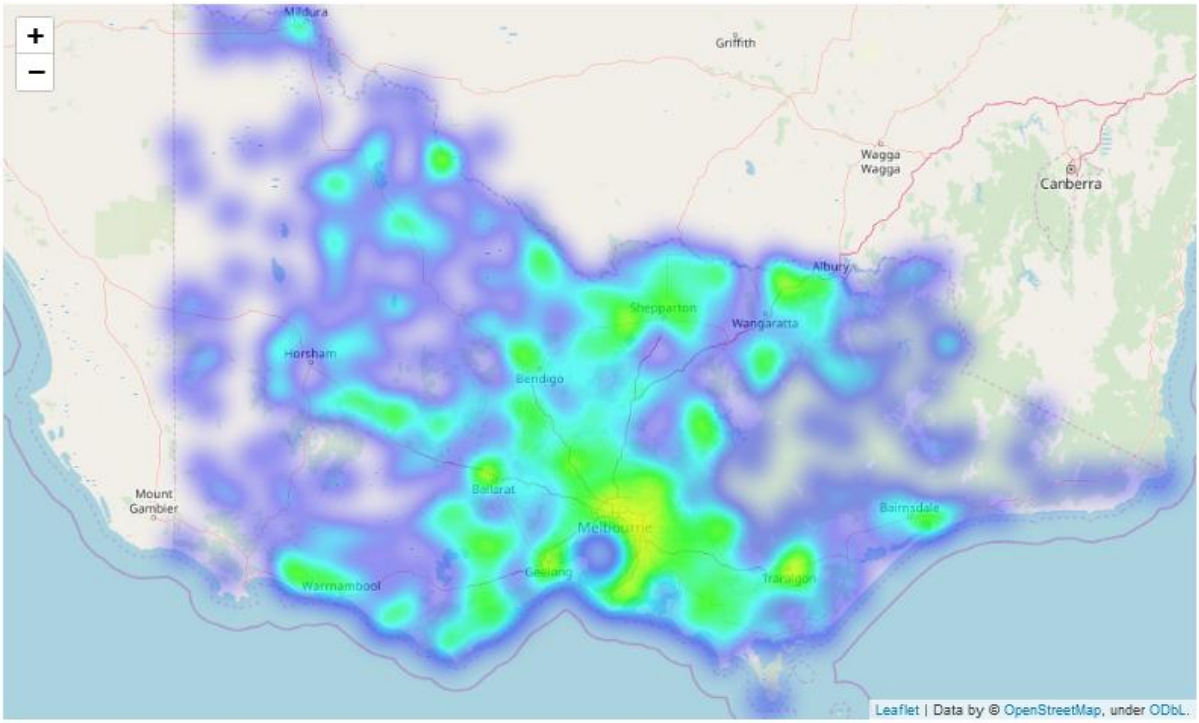
Mapping crime types with different colours for all suburbs



Clustering Crime Data for all suburbs

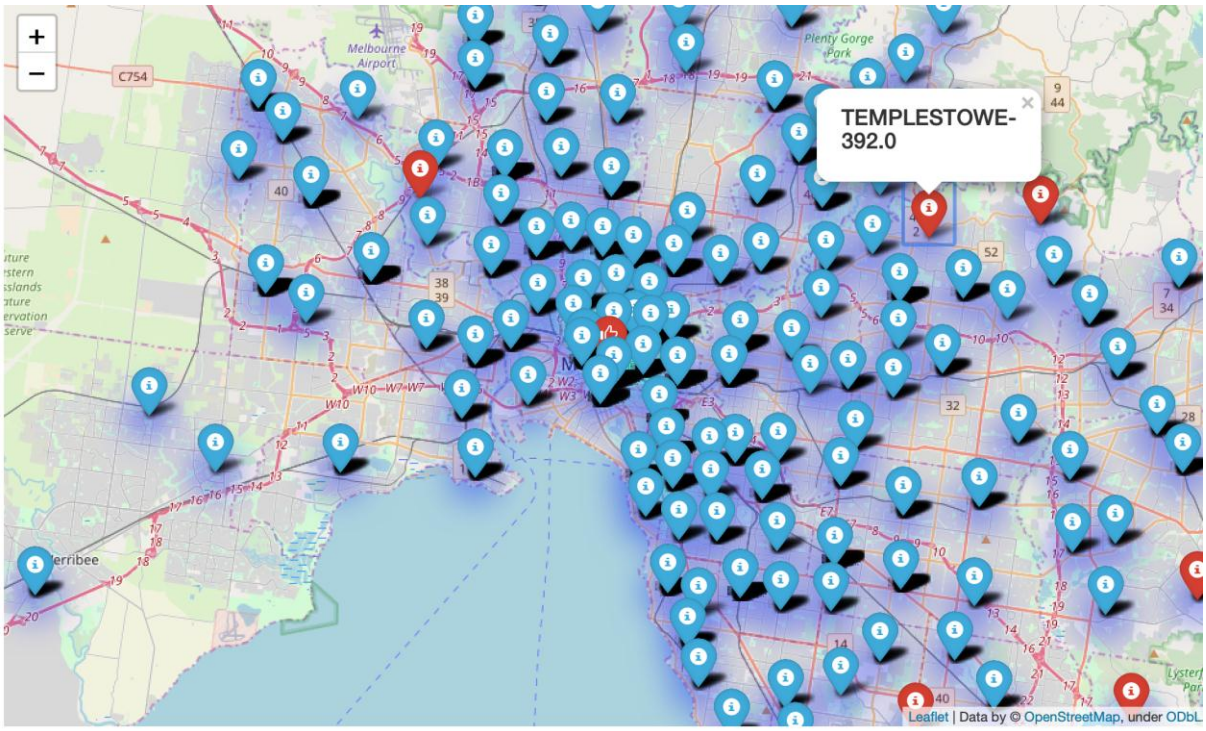


Heat map of Crime in all suburbs



Augmenting Venue Data onto Crime Data

The most important part of this project is for people to actually be abler to review the incidents in a particular suburb but also understand the venues nearby. For example, the below map shows everything in 307 suburbs, but as you select the suburb Templestowe you can see the no. of incidents in this suburb and every blue dot presents a venue



Section 4 – Model Creation and Evaluation

Data Preparation for Modelling

Let us now prepare data for each suburb to start modelling on them. We use group by and one hot encoding to find the venue categories and the count in each suburb. This is basically a subset of 2576 duplicated suburbs across 255 venue categories.

As we group by Suburb and take the mean frequency of occurrence, we get a better data set to play with. We will get 225 suburbs across 255 venue categories. But this is too much information. So, let us identify the top 10 venue categories in each suburb and pick only them. See few examples of what we get below

```
----ABBOTSFORD----
                  venue  freq
0                  Café  0.23
1                   Pub  0.14
2               Gay Bar  0.05
3  Thrift / Vintage Store  0.05
4             Dive Bar  0.05
5      Rock Climbing Spot  0.05
6       Convenience Store  0.05
7          Farmers Market  0.05
8             Coffee Shop  0.05
9                  Park  0.05


----ABERFELDIE----
                          venue  freq
0            Food & Drink Shop  0.25
1         Gym / Fitness Center  0.25
2                  Coffee Shop  0.25
3                         Café  0.25
4            Accessories Store  0.00
5             Pedestrian Plaza  0.00
6                         Park  0.00
7  Paper / Office Supplies Store  0.00
8              Paintball Field  0.00
9         Performing Arts Venue  0.00


----ALBION----
                venue  freq
0                 Gym  0.10
1         Pizza Place  0.10
2               Café  0.10
3   Convenience Store  0.05
4        Skating Rink  0.05
5           Pet Store  0.05
6       Grocery Store  0.05
7  Filipino Restaurant  0.05
8      Sandwich Place  0.05
9  Fast Food Restaurant  0.05


----ALPHINGTON----
                          venue  freq
0                Rental Service  0.25
1                Farmers Market  0.25
2                 Train Station  0.25
3                         Café  0.25
4              Paintball Field  0.00
5              Pedestrian Plaza  0.00
```

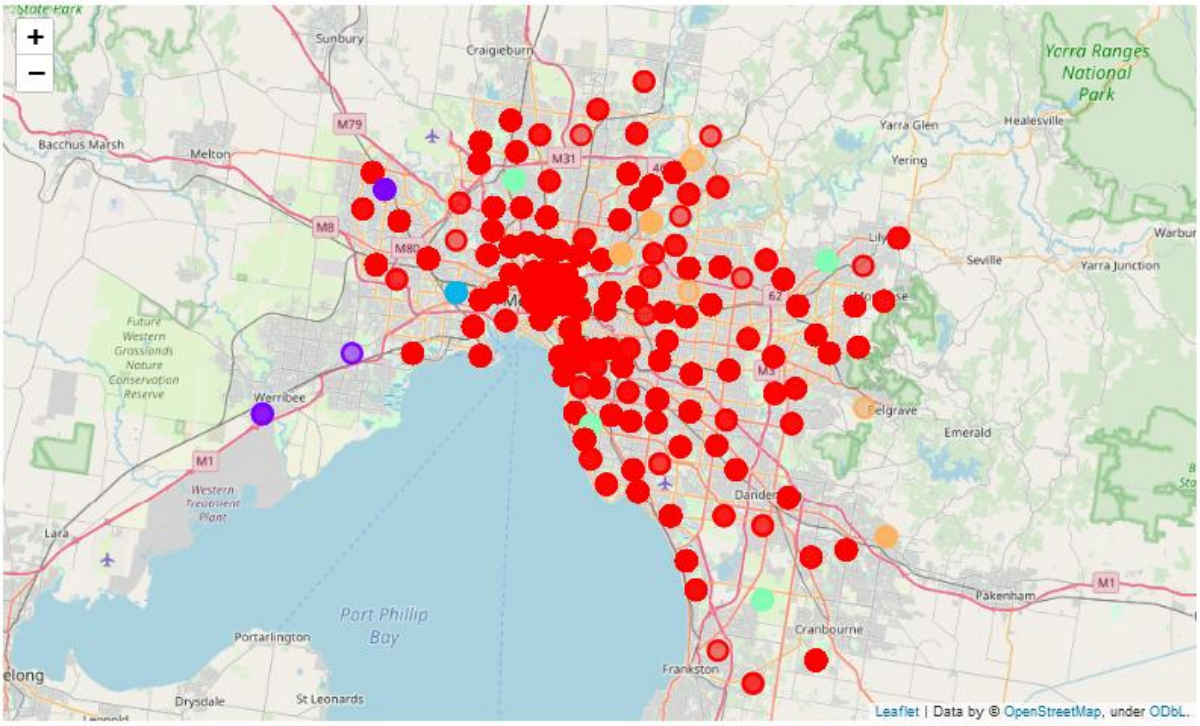
Some of my favourite suburbs

```
----BRIGHTON----
                venue  freq
0               Café  0.11
1             Bakery  0.07
2     Deli / Bodega  0.04
3  Greek Restaurant  0.04
4       Supermarket  0.04
5      Burger Joint  0.04
6  Sushi Restaurant  0.04
7    Clothing Store  0.04
8     Movie Theater  0.04
9       Coffee Shop  0.04

----BRUNSWICK----
                venue  freq
0               Café  0.26
1                Bar  0.11
2    Grocery Store  0.06
3  Thai Restaurant  0.04
4           Bakery  0.04
5      Pizza Place  0.04
6         Pharmacy  0.04
7        Nightclub  0.02
8        Bookstore  0.02
9   Breakfast Spot  0.02

----SOUTH YARRA----
                venue  freq
0               Café  0.18
1  Italian Restaurant  0.11
2  Japanese Restaurant  0.06
3               Hotel  0.05
4                 Bar  0.04
5    Thai Restaurant  0.04
6      Grocery Store  0.03
7          Juice Bar  0.03
8        Coffee Shop  0.03
9  Convenience Store  0.03
```

Loading this information onto a dataset, this is exactly what we get

	Suburb	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	ABBOTSFORD	Café	Pub	Thrift / Vintage Store	Record Shop	Rock Climbing Spot	Coffee Shop	Dive Bar	Park	Farmers Market	Sporting Goods Shop
1	ABERFELDIE	Food & Drink Shop	Coffee Shop	Café	Gym / Fitness Center	Zoo Exhibit	Fast Food Restaurant	French Restaurant	Football Stadium	Food Truck	Food Court
2	ALBION	Café	Pizza Place	Gym	Convenience Store	Donut Shop	Furniture / Home Store	Filipino Restaurant	Fast Food Restaurant	Skating Rink	General Entertainment
3	ALPHINGTON	Rental Service	Train Station	Café	Farmers Market	Food Truck	Food Court	Food & Drink Shop	Flower Shop	Falafel Restaurant	Fish Market
4	ALTONA	Furniture / Home Store	Convenience Store	Thai Restaurant	Café	Train Station	Fish Market	Field	Filipino Restaurant	Fish & Chips Shop	Zoo Exhibit
5	ARDEER	Portuguese Restaurant	Fast Food Restaurant	Zoo Exhibit	Falafel Restaurant	French Restaurant	Football Stadium	Food Truck	Food Court	Food & Drink Shop	Flower Shop
6	ARMADALE	Café	Convenience Store	Light Rail Station	Bridal Shop	Grocery Store	Train Station	Flea Market	Filipino Restaurant	Fish & Chips Shop	Fish Market
7	ASCOT VALE	Park	Golf Course	Scenic Lookout	Restaurant	River	Filipino Restaurant	Falafel Restaurant	Farmers Market	Fast Food Restaurant	Field
8	ASHBURTON	Pharmacy	Kebab Restaurant	Fish & Chips Shop	Grocery Store	Liquor Store	Sandwich Place	Fast Food Restaurant	Thai Restaurant	Supermarket	Italian Restaurant
9	ASPENDALE	Gym / Fitness Center	Breakfast Spot	Jewelry Store	Café	Fish Market	Flea Market	Field	Filipino Restaurant	Fish & Chips Shop	Zoo Exhibit
10	ASPENDALE GARDENS	Gym / Fitness Center	Breakfast Spot	Jewelry Store	Café	Fish Market	Flea Market	Field	Filipino Restaurant	Fish & Chips Shop	Zoo Exhibit
11	ATTWOOD	Bakery	Miscellaneous Shop	Grocery Store	Chinese Restaurant	Italian Restaurant	Hotel	Dive Bar	Park	Fish & Chips Shop	Pizza Place
12	AVONDALE HEIGHTS	Bakery	Zoo Exhibit	Gaming Cafe	Fried Chicken Joint	French Restaurant	Football Stadium	Food Truck	Food Court	Food & Drink Shop	Flower Shop
13	BALACLAVA	Café	Coffee Shop	Convenience Store	Train Station	Breakfast Spot	Fish & Chips Shop	Sushi Restaurant	Salad Place	Gym	Bagel Shop
14	BALWYN NORTH	Light Rail Station	Deli / Bodega	Zoo Exhibit	Flower Shop	Field	Filipino Restaurant	Fish & Chips Shop	Fish Market	Flea Market	Food & Drink Shop
15	BAYSWATER NORTH	Convenience Store	Gym	Café	Skating Rink	Sporting Goods Shop	Supermarket	Malay Restaurant	Pub	Home Service	Electronics Store
16	BEAUMARIS	Indian Restaurant	Fish & Chips Shop	Australian Restaurant	Thai Restaurant	Park	Food Court	Food & Drink Shop	Flower Shop	Farmers Market	Fish Market
17	BELLFIELD	Park	Cosmetics Shop	Playground	Flea Market	Fast Food Restaurant	Field	Filipino Restaurant	Fish & Chips Shop	Fish Market	Zoo Exhibit

Now, we have the top suburbs with top venue categories. If we cluster this data and present it on map, we will be able to see where the majority of the suburbs fit. We use K-Means clustering/modelling technique to get this outcome



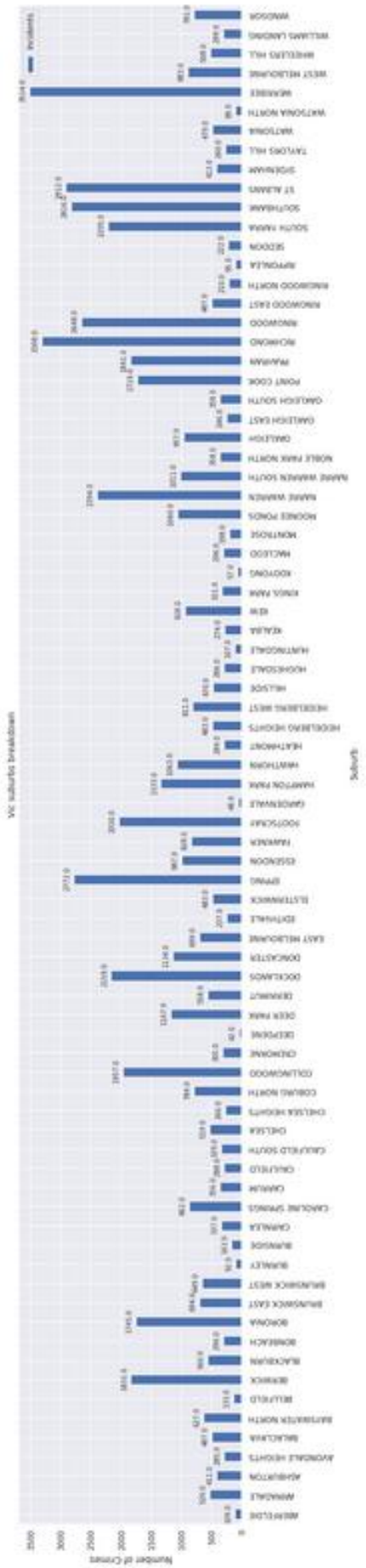
We can use another methodology to find suburbs which might be aligned to our target audience, using the below parameters/assumptions of what is important for our target audience

1. Young Couples - Pub, Pizza, Café
2. Families - Grocery Store, Pharmacy, Train Station
3. Migrants - Train Station, Playground, Bakery

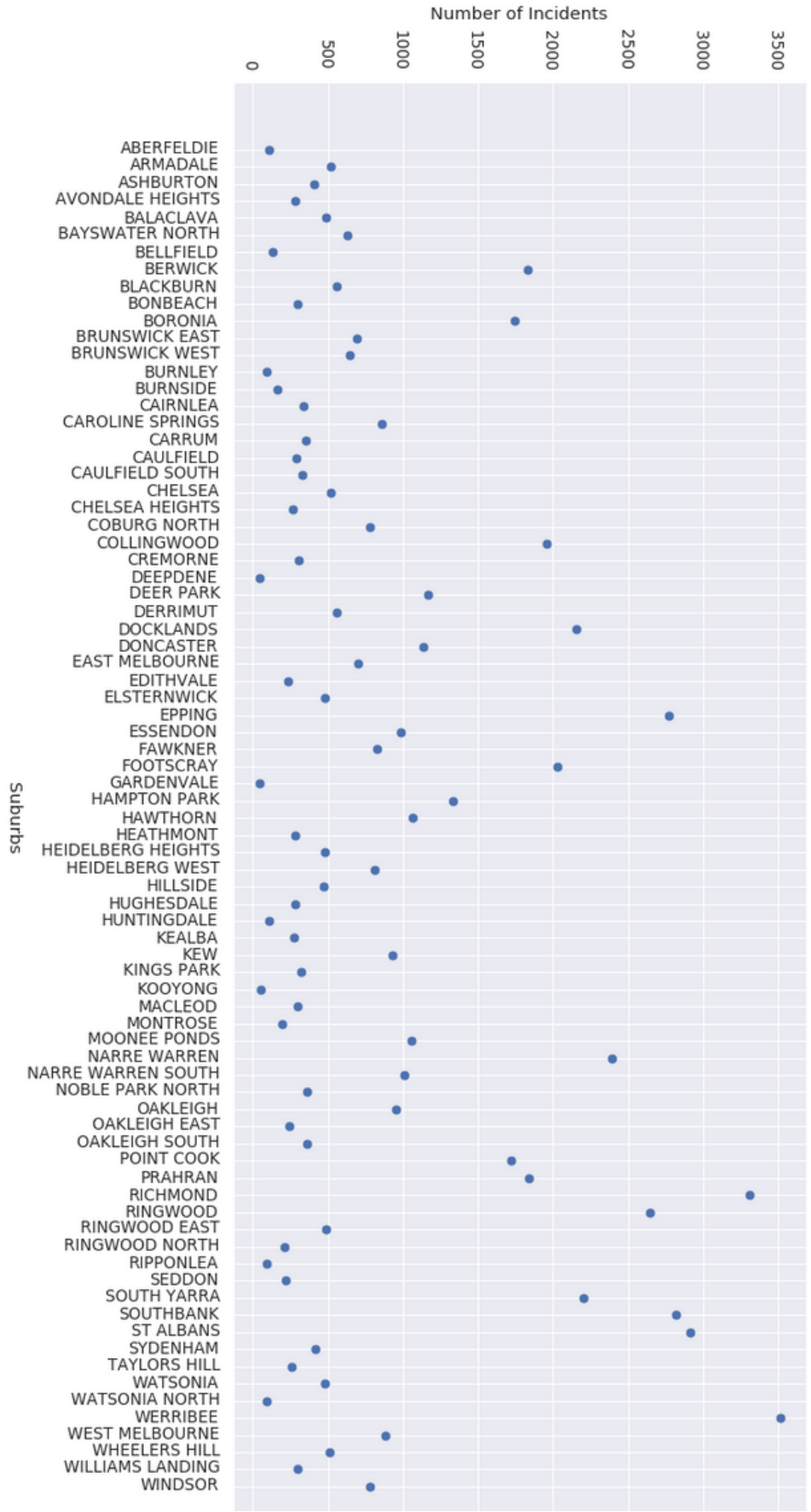
From our analysis, we can identify, there are over 79 suburbs which will fit our 3 types of target audience. A sample of that subset is below

	Suburb	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue
80	ELSTERNWICK	Pub	Zoo Exhibit	Falafel Restaurant
95	GARDENVALE	Pub	Zoo Exhibit	Falafel Restaurant
175	RIPPONLEA	Pub	Zoo Exhibit	Falafel Restaurant
219	WHEELERS HILL	Pub	Juice Bar	Furniture / Home Store
213	WATSONIA	Pizza Place	Thrift / Vintage Store	Sandwich Place
214	WATSONIA NORTH	Pizza Place	Thrift / Vintage Store	Sandwich Place
6	ARMADALE	Café	Convenience Store	Light Rail Station
13	BALACLAVA	Café	Coffee Shop	Convenience Store
21	BLACKBURN	Café	Indian Restaurant	Juice Bar
23	BORONIA	Café	Supermarket	Shopping Mall
31	BRUNSWICK EAST	Café	Italian Restaurant	Light Rail Station
35	BURNLEY	Café	Fast Food Restaurant	Greek Restaurant
57	COBURG NORTH	Café	Supermarket	Thai Restaurant
58	COLLINGWOOD	Café	Bar	Japanese Restaurant

We can visualise these suburbs in a single bar-chart with the crime data to make better decisions.


Vic suburbs breakdown
Number of Crimes
Suburb

The image is not very readable in the report, but will be usable when opened in Watson Studio or any other Python interface. A scatter plot of the same data is below



Section 5 – Results, Conclusion and Future

Results

The aim of this project is to assist young couples, new families, and migrants to come to Victoria and stay in a safe and convenient location. Say for example, as an young couple, they are looking for party life and what not, they will be focussing on cluster 1, we have also identified the possible suburbs they would be interested in using their first, second and third choice. If a family is planning to move in an area which has playgrounds and heath fitness venues, they would probably consider cluster 2, 4 and 5. While someone who is super excited about Motor bikes would actually choose a suburb in cluster 3.These are some of the findings with our specific target audience. We have also only considered suburbs which are within Melbourne's reach and have been listed in the top 300 suburbs to live in Victoria. Any one should be able to view these clusters and get the outcomes they need.

Conclusion and Further Developments

- ☐ In the current state of affairs, the most important thing for a human is to make effective decisions considering all the factors which will impact the decision
- ☐ Doing this without the help of technology is not feasible in this day and age
- ☐ The above project actually enables a person to use this project and make an informed decision based on two key factors - 1. SAFETY and 2. INTEREST
- ☐ The future of this project will include other factors like Rent, public transport ratings, school ratings and most of all age group of people living in that suburb.