

Coursera - IBM Data Science Capstone Project

Where should I open an pizza place in Melbourne, Australia?

Steps:

- 1) Scrape a wikipedia page and make Pandas dataframe of Melbourne suburbs.**
- 2) Get the latlongs of each suburb.**
- 3) Get neighbourhoods' venue data using Foursquare API**
- 4) Find and explore clusters**
- 5) Select the most suitable cluster**

In [1]:

```
import pandas as pd
pd.set_option("display.max_columns", None)
pd.set_option("display.max_rows", None)

import numpy as np

import json

!pip install --upgrade geocoder
from geopy.geocoders import Nominatim
import geocoder

import requests
from bs4 import BeautifulSoup

from pandas.io.json import json_normalize

import matplotlib.cm as cm
import matplotlib.colors as colors

from sklearn.cluster import KMeans

!pip install folium
import folium

print('DONE!!!')
```

Collecting geocoder

Downloading <https://files.pythonhosted.org/packages/4f/6b/13166c909ad2f2d76b929a4227c952630ebaf0d729f6317eb09cbceccbab/geocoder-1.38.1-py2.py3-none-any.whl> (98kB)

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Collecting ratelim (from geocoder)

Downloading <https://files.pythonhosted.org/packages/f2/98/7e6d147fd16a10a5f821db6e25f192265d6ecca3d82957a4fdd592cad49c/ratelim-0.1.6-py2.py3-none-any.whl>

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Installing collected packages: ratelim, geocoder

Successfully installed geocoder-1.38.1 ratelim-0.1.6

Collecting folium

Downloading <https://files.pythonhosted.org/packages/72/ff/004bfe344150a064e558cb2aedeaa02ecbf75e60e148a55a9198f0c41765/folium-0.10.0-py2.py3-none-any.whl> (91kB)

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Collecting branca>=0.3.0 (from folium)

Downloading <https://files.pythonhosted.org/packages/63/36/1c93318e9653f4e414a2e0c3b98fc898b4970e939afeedee6075dd3b703/branca-0.3.1-py3-none-any.whl>

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Installing collected packages: branca, folium

Successfully installed branca-0.3.1 folium-0.10.0
DONE!!!

Scrape a wikipedia page and make Pandas dataframe of Melbourne suburbs.

In [2]:

```
df = pd.read_html('https://en.wikipedia.org/wiki/List_of_Melbourne_suburbs')
```

In [3]:

```
df = df[0]
```

In [4]:

```
df = df['Suburb']
```

In [5]:

```
df = df.to_frame()
```

In [6]:

```
df = df.drop_duplicates()
```

In []:

In [7]:

```
df = df.sort_values(['Suburb'], ascending = True)
```

In [8]:

```
df.head()
```

Out[8]:

	Suburb
478	Abbotsford
341	Aberfeldie
297	Aintree
342	Airport West
46	Albanvale

Get the latlongs of each suburb

In [9]:

```
# Function to get coordinates
def get_latlng(suburb):
    lat_lng_coords = None
    while(lat_lng_coords is None):
        g = geocoder.arcgis('{},{},Melbourne,Australia'.format(suburb))
        lat_lng_coords = g.latlng
    return lat_lng_coords
```

In [10]:

```
mel_coor = [get_latlng(suburb) for suburb in df['Suburb'].tolist()]  
mel_coor
```

Out[10]:

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```

In [11]:

```
mel_coor_df = pd.DataFrame(mel_coor, columns=['Latitude', 'Longitude'])
```

In [12]:

```
df['Latitude'] = mel_coor_df['Latitude']  
df['Longitude'] = mel_coor_df['Longitude']
```

In []:

In [13]:

```
df = df.dropna()
```

In [14]:

```
df.shape
```

Out[14]:

```
(539, 3)
```

Create a map of Melbourne (incl. all suburbs)

In [15]:

```
address = 'Melbourne,Australia'  
  
geolocator = Nominatim(user_agent="my-application")  
location = geolocator.geocode(address)  
latitude = location.latitude  
longitude = location.longitude  
print('The geograpical coordinate of Melbourne, Australia is {}, {}'.format(latitude,  
longitude))
```

The geographical coordinate of Melbourne, Australia is -37.8142176, 144.9631608.

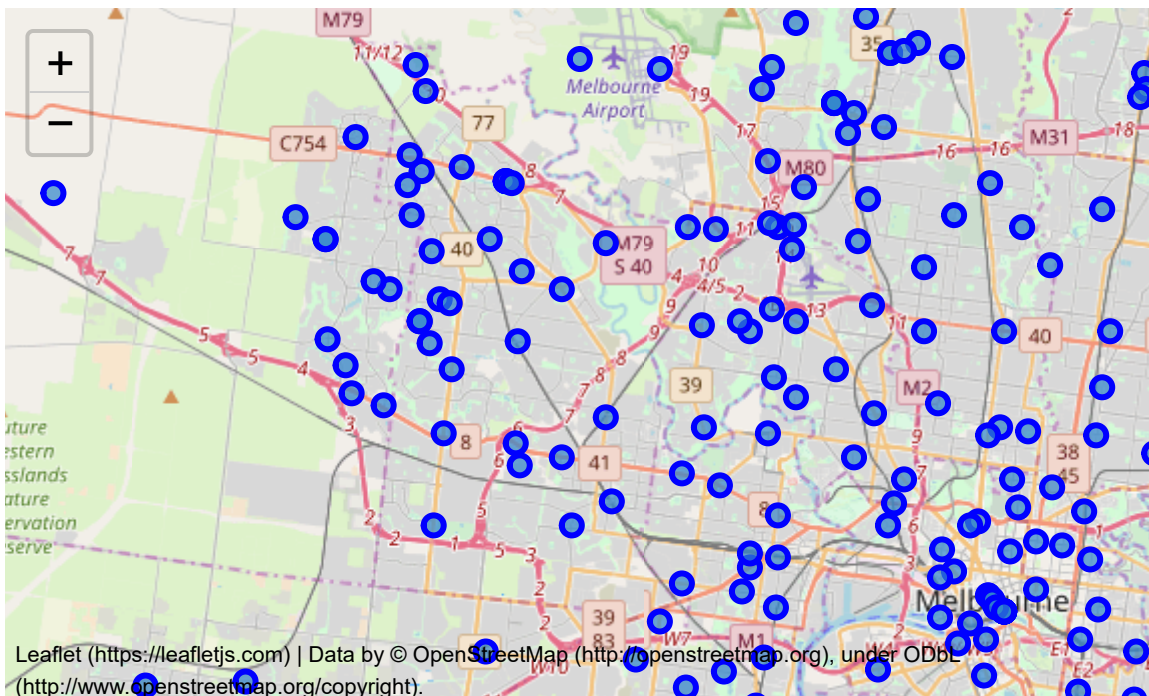
In [16]:

```
map_melb = folium.Map(location=[latitude, longitude], zoom_start=11)

# add markers to map
for lat, lng, Suburb in zip(df['Latitude'], df['Longitude'], df['Suburb']):
    label = '{}'.format(Suburb)
    label = folium.Popup(label, parse_html=True)
    folium.CircleMarker(
        [lat, lng],
        radius=5,
        popup=label,
        color='blue',
        fill=True,
        fill_color='#3186cc',
        fill_opacity=0.7).add_to(map_melb)

map_melb
```

Out[16]:



In [19]:

```
CLIENT_ID = '5AECJKA5IT2CP1TT0V4ZWFC0LGD522GOXBNFBZKKZRIFRI4' # your Foursquare ID
CLIENT_SECRET = 'DKNYUPAE43AB0QABOOH0TXWF3ARJQ0KGYHPAXY1TZWQ3QOBS' # your Foursquare Secret
VERSION = '20190822'
```

Top 100 venues that are within a radius of 5000 meters

In [20]:

```
radius = 5000
LIMIT = 50

venues = []

for lat, long, suburb in zip(df['Latitude'], df['Longitude'], df['Suburb']):

    # create the API request URL
    url = "https://api.foursquare.com/v2/venues/explore?client_id={}&client_secret={}&v={}&ll={},{}&radius={}&limit={}".format(
        CLIENT_ID,
        CLIENT_SECRET,
        VERSION,
        lat,
        long,
        radius,
        LIMIT)

    # make the GET request
    results = requests.get(url).json()['response']['groups'][0]['items']

    # return only relevant information for each nearby venue
    for venue in results:
        venues.append((
            suburb,
            lat,
            long,
            venue['venue']['name'],
            venue['venue']['location']['lat'],
            venue['venue']['location']['lng'],
            venue['venue']['categories'][0]['name']))
```

In [23]:

```
# converting the venues list into new DataFrame
venues_df = pd.DataFrame(venues)

# define the column names
venues_df.columns = ['Suburb', 'Latitude', 'Longitude', 'Venue_Name', 'Venue_Latitude',
'Venue_Longitude', 'Venue_Category']

print(venues_df.shape)
venues_df.head()
```

(23471, 7)

Out[23]:

	Suburb	Latitude	Longitude	Venue_Name	Venue_Latitude	Venue_Longitude	Venue
0	Abbotsford	-37.776843	145.029515	Mr Wednesday	-37.778989	145.024190	
1	Abbotsford	-37.776843	145.029515	Fifteen Pounds	-37.779379	145.017205	
2	Abbotsford	-37.776843	145.029515	Dan Murphy's	-37.779862	145.032971	L
3	Abbotsford	-37.776843	145.029515	Ora Cafe	-37.795988	145.036023	
4	Abbotsford	-37.776843	145.029515	Paladarr Thai Issan Restaurant	-37.778499	145.032466	Thai

In [24]:

```
# Venues per suburb
```

```
venues_df.groupby(['Suburb']).count()
```

Out[24]:

	Latitude	Longitude	Venue_Name	Venue_Latitude	Venue_Longitude	Venue_
Suburb						
Abbotsford	50	50	50	50	50	
Aberfeldie	35	35	35	35	35	
Aintree	50	50	50	50	50	
Airport West	23	23	23	23	23	
Albanvale	50	50	50	50	50	
Albert Park	50	50	50	50	50	
Albion	11	11	11	11	11	
Alphington	50	50	50	50	50	
Altona	50	50	50	50	50	
Altona Meadows	25	25	25	25	25	
Altona North	50	50	50	50	50	
Ardeer	50	50	50	50	50	
Armadale	50	50	50	50	50	
Arthurs Seat	50	50	50	50	50	
Ascot Vale	24	24	24	24	24	
Ashburton	43	43	43	43	43	
Ashwood	50	50	50	50	50	
Aspendale	50	50	50	50	50	
Aspendale Gardens	50	50	50	50	50	
Attwood	50	50	50	50	50	
Avondale Heights	7	7	7	7	7	
Avonsleigh	50	50	50	50	50	
Badger Creek	50	50	50	50	50	
Balaclava	50	50	50	50	50	
Balnarring	44	44	44	44	44	
Balnarring Beach	50	50	50	50	50	
Balwyn	39	39	39	39	39	
Balwyn North	6	6	6	6	6	
Bangholme	50	50	50	50	50	
Baxter	50	50	50	50	50	
Bayles	46	46	46	46	46	
Bayswater	43	43	43	43	43	
Bayswater North	50	50	50	50	50	

	Latitude	Longitude	Venue_Name	Venue_Latitude	Venue_Longitude	Venue_
Suburb						
Beaconsfield	50	50	50	50	50	
Beaconsfield Upper	46	46	46	46	46	
Beaumaris	50	50	50	50	50	
Beenak	10	10	10	10	10	
Belgrave	50	50	50	50	50	
Belgrave Heights	50	50	50	50	50	
Belgrave South	50	50	50	50	50	
Bellfield	50	50	50	50	50	
Bend of Islands	50	50	50	50	50	
Bentleigh	50	50	50	50	50	
Bentleigh East	14	14	14	14	14	
Berwick	50	50	50	50	50	
Beveridge	50	50	50	50	50	
Big Pats Creek	15	15	15	15	15	
Bittern	50	50	50	50	50	
Black Rock	50	50	50	50	50	
Blackburn	50	50	50	50	50	
Blackburn North	50	50	50	50	50	
Blackburn South	50	50	50	50	50	
Blairgowrie	50	50	50	50	50	
Blind Bight	8	8	8	8	8	
Bonbeach	50	50	50	50	50	
Boneo	50	50	50	50	50	
Bonnie Brook	17	17	17	17	17	
Boronia	50	50	50	50	50	
Botanic Ridge	40	40	40	40	40	
Box Hill	50	50	50	50	50	
Box Hill North	43	43	43	43	43	
Box Hill South	50	50	50	50	50	
Braeside	50	50	50	50	50	
Braybrook	50	50	50	50	50	
Briar Hill	50	50	50	50	50	
Brighton	50	50	50	50	50	
Brighton East	50	50	50	50	50	
Broadmeadows	50	50	50	50	50	
Brookfield	50	50	50	50	50	

	Latitude	Longitude	Venue_Name	Venue_Latitude	Venue_Longitude	Venue_
Suburb						
Brooklyn	50	50	50	50	50	
Brunswick	50	50	50	50	50	
Brunswick East	50	50	50	50	50	
Brunswick West	50	50	50	50	50	
Bulla	50	50	50	50	50	
Bulleen	6	6	6	6	6	
Bundoora	50	50	50	50	50	
Bunyip	50	50	50	50	50	
Bunyip North	50	50	50	50	50	
Burnley	4	4	4	4	4	
Burnside	50	50	50	50	50	
Burnside Heights	50	50	50	50	50	
Burwood	50	50	50	50	50	
Burwood East	11	11	11	11	11	
Cairnlea	50	50	50	50	50	
Calder Park	50	50	50	50	50	
Caldermeade	50	50	50	50	50	
Cambarville	50	50	50	50	50	
Camberwell	50	50	50	50	50	
Campbellfield	50	50	50	50	50	
Cannons Creek	50	50	50	50	50	
Canterbury	50	50	50	50	50	
Cape Schanck	50	50	50	50	50	
Capel Sound	40	40	40	40	40	
Cardinia	50	50	50	50	50	
Carlton	25	25	25	25	25	
Carlton North	48	48	48	48	48	
Carnegie	50	50	50	50	50	
Caroline Springs	42	42	42	42	42	
Carrum	50	50	50	50	50	
Carrum Downs	50	50	50	50	50	
Catani	50	50	50	50	50	
Caulfield	50	50	50	50	50	
Caulfield East	50	50	50	50	50	
Caulfield North	50	50	50	50	50	
Caulfield South	50	50	50	50	50	

	Latitude	Longitude	Venue_Name	Venue_Latitude	Venue_Longitude	Venue_
Suburb						
Chadstone	50	50	50	50	50	
Chelsea	18	18	18	18	18	
Chelsea Heights	50	50	50	50	50	
Cheltenham	50	50	50	50	50	
Chirnside Park	50	50	50	50	50	
Christmas Hills	28	28	28	28	28	
Chum Creek	50	50	50	50	50	
Clarinda	14	14	14	14	14	
Clarkefield	50	50	50	50	50	
Clayton	50	50	50	50	50	
Clayton South	50	50	50	50	50	
Clematis	50	50	50	50	50	
Clifton Hill	50	50	50	50	50	
Clyde	39	39	39	39	39	
Clyde North	50	50	50	50	50	
Cobblebank	50	50	50	50	50	
Coburg	50	50	50	50	50	
Coburg North	50	50	50	50	50	
Cockatoo	48	48	48	48	48	
Cocoroc	50	50	50	50	50	
Coldstream	50	50	50	50	50	
Collingwood	50	50	50	50	50	
Coolaroo	50	50	50	50	50	
Cora Lynn	5	5	5	5	5	
Cottles Bridge	48	48	48	48	48	
Craigieburn	36	36	36	36	36	
Cranbourne	50	50	50	50	50	
Cranbourne East	9	9	9	9	9	
Cranbourne North	50	50	50	50	50	
Cranbourne South	31	31	31	31	31	
Cremorne	50	50	50	50	50	
Crib Point	50	50	50	50	50	
Croydon	50	50	50	50	50	
Croydon Hills	5	5	5	5	5	
Croydon North	5	5	5	5	5	
Croydon South	50	50	50	50	50	

	Latitude	Longitude	Venue_Name	Venue_Latitude	Venue_Longitude	Venue_
Suburb						
Dallas	50	50	50	50	50	
Dandenong	50	50	50	50	50	
Dandenong North	50	50	50	50	50	
Dandenong South	50	50	50	50	50	
Deanside	50	50	50	50	50	
Deepdene	31	31	31	31	31	
Deer Park	45	45	45	45	45	
Delahey	27	27	27	27	27	
Derrimut	40	40	40	40	40	
Devon Meadows	50	50	50	50	50	
Dewhurst	50	50	50	50	50	
Diamond Creek	50	50	50	50	50	
Diggers Rest	15	15	15	15	15	
Dingley Village	50	50	50	50	50	
Dixons Creek	50	50	50	50	50	
Docklands	50	50	50	50	50	
Don Valley	50	50	50	50	50	
Doncaster	29	29	29	29	29	
Doncaster East	27	27	27	27	27	
Donvale	50	50	50	50	50	
Doreen	42	42	42	42	42	
Doveton	50	50	50	50	50	
Dromana	50	50	50	50	50	
Eaglemont	50	50	50	50	50	
East Melbourne	50	50	50	50	50	
Eden Park	50	50	50	50	50	
Edithvale	36	36	36	36	36	
Elsternwick	50	50	50	50	50	
Eltham	50	50	50	50	50	
Eltham North	50	50	50	50	50	
Elwood	50	50	50	50	50	
Emerald	50	50	50	50	50	
Endeavour Hills	50	50	50	50	50	
Epping	50	50	50	50	50	
Essendon	50	50	50	50	50	
Essendon Fields	50	50	50	50	50	

	Latitude	Longitude	Venue_Name	Venue_Latitude	Venue_Longitude	Venue_
Suburb						
Essendon North	50	50	50	50	50	
Essendon West	50	50	50	50	50	
Eumemmerring	50	50	50	50	50	
Exford	50	50	50	50	50	
Eynesbury	50	50	50	50	50	
Fairfield	47	47	47	47	47	
Fawkner	50	50	50	50	50	
Fernshaw	15	15	15	15	15	
Ferntree Gully	50	50	50	50	50	
Ferny Creek	26	26	26	26	26	
Fieldstone	50	50	50	50	50	
Fingal	50	50	50	50	50	
Fitzroy	43	43	43	43	43	
Fitzroy North	45	45	45	45	45	
Flemington	50	50	50	50	50	
Flinders	34	34	34	34	34	
Footscray	50	50	50	50	50	
Forest Hill	50	50	50	50	50	
Frankston	45	45	45	45	45	
Frankston North	50	50	50	50	50	
Frankston South	50	50	50	50	50	
Fraser Rise	50	50	50	50	50	
Gardenvale	50	50	50	50	50	
Garfield	50	50	50	50	50	
Garfield North	50	50	50	50	50	
Gembrook	50	50	50	50	50	
Gilderoy	50	50	50	50	50	
Gladstone Park	35	35	35	35	35	
Gladysdale	50	50	50	50	50	
Glen Huntly	50	50	50	50	50	
Glen Iris	25	25	25	25	25	
Glen Waverley	50	50	50	50	50	
Glenroy	19	19	19	19	19	
Gowanbrae	50	50	50	50	50	
Grangefields	50	50	50	50	50	
Greensborough	50	50	50	50	50	

	Latitude	Longitude	Venue_Name	Venue_Latitude	Venue_Longitude	Venue_
Suburb						
Greenvale	35	35	35	35	35	
Gruyere	50	50	50	50	50	
Guys Hill	50	50	50	50	50	
HMAS Cerberus	1	1	1	1	1	
Hadfield	50	50	50	50	50	
Hallam	19	19	19	19	19	
Hampton	50	50	50	50	50	
Hampton East	37	37	37	37	37	
Hampton Park	50	50	50	50	50	
Harkaway	50	50	50	50	50	
Harkness	50	50	50	50	50	
Hastings	50	50	50	50	50	
Hawthorn	20	20	20	20	20	
Hawthorn East	50	50	50	50	50	
Healesville	50	50	50	50	50	
Heath Hill	49	49	49	49	49	
Heatherton	50	50	50	50	50	
Heathmont	50	50	50	50	50	
Heidelberg	50	50	50	50	50	
Heidelberg Heights	49	49	49	49	49	
Heidelberg West	50	50	50	50	50	
Highett	50	50	50	50	50	
Hillside	50	50	50	50	50	
Hoddles Creek	50	50	50	50	50	
Hoppers Crossing	19	19	19	19	19	
Hughesdale	50	50	50	50	50	
Humevale	50	50	50	50	50	
Huntingdale	50	50	50	50	50	
Hurstbridge	50	50	50	50	50	
Iona	42	42	42	42	42	
Ivanhoe	50	50	50	50	50	
Ivanhoe East	50	50	50	50	50	
Jacana	3	3	3	3	3	
Junction Village	38	38	38	38	38	
Kalkallo	50	50	50	50	50	

	Latitude	Longitude	Venue_Name	Venue_Latitude	Venue_Longitude	Venue_
Suburb						
Kallista	28	28	28	28	28	
Kalorama	50	50	50	50	50	
Kangaroo Ground	35	35	35	35	35	
Kealba	17	17	17	17	17	
Keilor	50	50	50	50	50	
Keilor Downs	16	16	16	16	16	
Keilor East	50	50	50	50	50	
Keilor Lodge	50	50	50	50	50	
Keilor North	50	50	50	50	50	
Keilor Park	50	50	50	50	50	
Kensington	32	32	32	32	32	
Kew	6	6	6	6	6	
Kew East	50	50	50	50	50	
Keysborough	50	50	50	50	50	
Kilsyth	50	50	50	50	50	
Kilsyth South	38	38	38	38	38	
Kinglake	6	6	6	6	6	
Kinglake West	17	17	17	17	17	
Kings Park	50	50	50	50	50	
Kingsbury	50	50	50	50	50	
Kingsville	50	50	50	50	50	
Knoxfield	50	50	50	50	50	
Koo Wee Rup	50	50	50	50	50	
Koo Wee Rup North	50	50	50	50	50	
Kooyong	34	34	34	34	34	
Kurunjang	50	50	50	50	50	
Lalor	50	50	50	50	50	
Lang Lang	50	50	50	50	50	
Lang Lang East	36	36	36	36	36	
Langwarrin	41	41	41	41	41	
Langwarrin South	50	50	50	50	50	
Launching Place	50	50	50	50	50	
Laverton	47	47	47	47	47	
Laverton North	50	50	50	50	50	
Lilydale	50	50	50	50	50	
Little River	50	50	50	50	50	

	Latitude	Longitude	Venue_Name	Venue_Latitude	Venue_Longitude	Venue_
Suburb						
Longwarry	46	46	46	46	46	
Lower Plenty	50	50	50	50	50	
Lynbrook	46	46	46	46	46	
Lyndhurst	39	39	39	39	39	
Lysterfield	50	50	50	50	50	
Lysterfield South	50	50	50	50	50	
Macclesfield	50	50	50	50	50	
Macleod	50	50	50	50	50	
Maidstone	50	50	50	50	50	
Main Ridge	50	50	50	50	50	
Malvern	50	50	50	50	50	
Malvern East	50	50	50	50	50	
Mambourin	50	50	50	50	50	
Manor Lakes	50	50	50	50	50	
Maribyrnong	50	50	50	50	50	
Maryknoll	30	30	30	30	30	
Matlock	50	50	50	50	50	
McCrae	50	50	50	50	50	
McKinnon	50	50	50	50	50	
McMahons Creek	50	50	50	50	50	
Meadow Heights	50	50	50	50	50	
Melbourne Airport	50	50	50	50	50	
Melbourne CBD	36	36	36	36	36	
Melbourne CBD (St Kilda Road area)	50	50	50	50	50	
Melton	50	50	50	50	50	
Melton South	33	33	33	33	33	
Melton West	15	15	15	15	15	
Mentone	50	50	50	50	50	
Menzies Creek	50	50	50	50	50	
Mernda	50	50	50	50	50	
Merricks	50	50	50	50	50	
Merricks Beach	50	50	50	50	50	
Merricks North	50	50	50	50	50	
Mickleham	31	31	31	31	31	

	Latitude	Longitude	Venue_Name	Venue_Latitude	Venue_Longitude	Venue_
Suburb						
Middle Park	50	50	50	50	50	
Mill Park	50	50	50	50	50	
Millgrove	50	50	50	50	50	
Mitcham	50	50	50	50	50	
Modella	50	50	50	50	50	
Monash University	50	50	50	50	50	
Monbulk	50	50	50	50	50	
Monomeith	50	50	50	50	50	
Mont Albert	50	50	50	50	50	
Mont Albert North	50	50	50	50	50	
Montmorency	50	50	50	50	50	
Montrose	50	50	50	50	50	
Moonee Ponds	4	4	4	4	4	
Moorabbin	50	50	50	50	50	
Moorabbin Airport	50	50	50	50	50	
Moorooduc	50	50	50	50	50	
Mooroolbark	50	50	50	50	50	
Mordialloc	50	50	50	50	50	
Mornington	50	50	50	50	50	
Mount Burnett	50	50	50	50	50	
Mount Cottrell	42	42	42	42	42	
Mount Dandenong	50	50	50	50	50	
Mount Eliza	34	34	34	34	34	
Mount Evelyn	50	50	50	50	50	
Mount Martha	7	7	7	7	7	
Mount Toolebewong	4	4	4	4	4	
Mount Waverley	29	29	29	29	29	
Mulgrave	50	50	50	50	50	
Murrumbeena	50	50	50	50	50	
Nangana	50	50	50	50	50	
Nar Nar Goon	50	50	50	50	50	
Nar Nar Goon North	47	47	47	47	47	
Narre Warren	50	50	50	50	50	

	Latitude	Longitude	Venue_Name	Venue_Latitude	Venue_Longitude	Venue_
Suburb						
Narre Warren East	6	6	6	6	6	
Narre Warren North	22	22	22	22	22	
Narre Warren South	50	50	50	50	50	
Newport	44	44	44	44	44	
Niddrie	2	2	2	2	2	
Noble Park	50	50	50	50	50	
Noble Park North	50	50	50	50	50	
North Melbourne	50	50	50	50	50	
North Warrandyte	50	50	50	50	50	
Northcote	50	50	50	50	50	
Notting Hill	50	50	50	50	50	
Nunawading	50	50	50	50	50	
Nutfield	31	31	31	31	31	
Nyora	49	49	49	49	49	
Oak Park	50	50	50	50	50	
Oaklands Junction	50	50	50	50	50	
Oakleigh	50	50	50	50	50	
Oakleigh East	4	4	4	4	4	
Oakleigh South	30	30	30	30	30	
Officer	12	12	12	12	12	
Officer South	50	50	50	50	50	
Olinda	50	50	50	50	50	
Ormond	44	44	44	44	44	
Pakenham	50	50	50	50	50	
Pakenham South	48	48	48	48	48	
Pakenham Upper	50	50	50	50	50	
Panton Hill	50	50	50	50	50	
Park Orchards	40	40	40	40	40	
Parkdale	50	50	50	50	50	
Parkville	6	6	6	6	6	
Parwan	42	42	42	42	42	
Pascoe Vale	50	50	50	50	50	

	Latitude	Longitude	Venue_Name	Venue_Latitude	Venue_Longitude	Venue_
Suburb						
Pascoe Vale South	50	50	50	50	50	
Patterson Lakes	50	50	50	50	50	
Pearcedale	50	50	50	50	50	
Plenty	37	37	37	37	37	
Plumpton	42	42	42	42	42	
Point Cook	41	41	41	41	41	
Point Leo	50	50	50	50	50	
Port Melbourne	50	50	50	50	50	
Portsea	31	31	31	31	31	
Powelltown	50	50	50	50	50	
Prahran	44	44	44	44	44	
Preston	50	50	50	50	50	
Princes Hill	50	50	50	50	50	
Quandong	50	50	50	50	50	
Ravenhall	31	31	31	31	31	
Red Hill	50	50	50	50	50	
Red Hill South	45	45	45	45	45	
Reefton	50	50	50	50	50	
Research	50	50	50	50	50	
Reservoir	44	44	44	44	44	
Richmond	50	50	50	50	50	
Ringwood	37	37	37	37	37	
Ringwood East	39	39	39	39	39	
Ringwood North	50	50	50	50	50	
Ripponlea	27	27	27	27	27	
Rockbank	50	50	50	50	50	
Rosanna	50	50	50	50	50	
Rosebud	50	50	50	50	50	
Rowville	50	50	50	50	50	
Roxburgh Park	50	50	50	50	50	
Rye	39	39	39	39	39	
Rythdale	50	50	50	50	50	
Safety Beach	5	5	5	5	5	
Sandhurst	50	50	50	50	50	
Sandringham	50	50	50	50	50	
Sassafras	50	50	50	50	50	

	Latitude	Longitude	Venue_Name	Venue_Latitude	Venue_Longitude	Venue_
Suburb						
Scoresby	6	6	6	6	6	
Seabrook	50	50	50	50	50	
Seaford	44	44	44	44	44	
Seaholme	50	50	50	50	50	
Seddon	34	34	34	34	34	
Selby	50	50	50	50	50	
Seville	30	30	30	30	30	
Seville East	28	28	28	28	28	
Sherbrooke	50	50	50	50	50	
Shoreham	43	43	43	43	43	
Silvan	5	5	5	5	5	
Skye	50	50	50	50	50	
Smiths Gully	46	46	46	46	46	
Somers	50	50	50	50	50	
Somerton	50	50	50	50	50	
Somerville	50	50	50	50	50	
Sorrento	50	50	50	50	50	
South Kingsville	50	50	50	50	50	
South Melbourne	50	50	50	50	50	
South Morang	18	18	18	18	18	
South Wharf	50	50	50	50	50	
South Yarra	50	50	50	50	50	
Southbank	50	50	50	50	50	
Spotswood	50	50	50	50	50	
Springvale	31	31	31	31	31	
Springvale South	31	31	31	31	31	
St Albans	50	50	50	50	50	
St Andrews	50	50	50	50	50	
St Andrews Beach	5	5	5	5	5	
St Helena	50	50	50	50	50	
St Kilda	8	8	8	8	8	
St Kilda East	50	50	50	50	50	
St Kilda West	50	50	50	50	50	
Steels Creek	50	50	50	50	50	
Strathewen	50	50	50	50	50	
Strathmore	50	50	50	50	50	

	Latitude	Longitude	Venue_Name	Venue_Latitude	Venue_Longitude	Venue_
Suburb						
Strathmore Heights	5	5	5	5	5	
Strathtulloh	50	50	50	50	50	
Sunbury	50	50	50	50	50	
Sunshine	50	50	50	50	50	
Sunshine North	50	50	50	50	50	
Sunshine West	42	42	42	42	42	
Surrey Hills	25	25	25	25	25	
Sydenham	50	50	50	50	50	
Tarneit	50	50	50	50	50	
Tarrawarra	50	50	50	50	50	
Taylors Hill	50	50	50	50	50	
Taylors Lakes	50	50	50	50	50	
Tecoma	50	50	50	50	50	
Templestowe	50	50	50	50	50	
Templestowe Lower	50	50	50	50	50	
The Basin	50	50	50	50	50	
The Patch	50	50	50	50	50	
Thomastown	42	42	42	42	42	
Thornbury	4	4	4	4	4	
Thornhill Park	50	50	50	50	50	
Three Bridges	50	50	50	50	50	
Tonimbuk	50	50	50	50	50	
Toolangi	50	50	50	50	50	
Toolern Vale	50	50	50	50	50	
Tooradin	50	50	50	50	50	
Tooradin North	50	50	50	50	50	
Toorak	50	50	50	50	50	
Toorong	50	50	50	50	50	
Tootgarook	50	50	50	50	50	
Tottenham	34	34	34	34	34	
Travancore	50	50	50	50	50	
Tremont	50	50	50	50	50	
Truganina	50	50	50	50	50	
Tuerong	50	50	50	50	50	
Tullamarine	50	50	50	50	50	
Tyabb	50	50	50	50	50	
Tynong	50	50	50	50	50	

	Latitude	Longitude	Venue_Name	Venue_Latitude	Venue_Longitude	Venue_
Suburb						
Tynong North	50	50	50	50	50	
Upper Ferntree Gully	50	50	50	50	50	
Upwey	50	50	50	50	50	
Vermont	44	44	44	44	44	
Vermont South	50	50	50	50	50	
Vervale	16	16	16	16	16	
Viewbank	50	50	50	50	50	
Wandin East	21	21	21	21	21	
Wandin North	50	50	50	50	50	
Wantirna	50	50	50	50	50	
Wantirna South	22	22	22	22	22	
Warburton	50	50	50	50	50	
Warburton East	50	50	50	50	50	
Warneet	50	50	50	50	50	
Warrandyte	44	44	44	44	44	
Warrandyte South	50	50	50	50	50	
Warranwood	50	50	50	50	50	
Waterways	50	50	50	50	50	
Watsonia	50	50	50	50	50	
Watsonia North	50	50	50	50	50	
Watsons Creek	50	50	50	50	50	
Wattle Glen	50	50	50	50	50	
Weir Views	19	19	19	19	19	
Werribee	50	50	50	50	50	
Werribee South	50	50	50	50	50	
Wesburn	34	34	34	34	34	
West Footscray	50	50	50	50	50	
West Melbourne	50	50	50	50	50	
Westmeadows	50	50	50	50	50	
Wheelers Hill	34	34	34	34	34	
Whittlesea	50	50	50	50	50	
Wildwood	27	27	27	27	27	
Williams Landing	28	28	28	28	28	
Williamstown	50	50	50	50	50	
Williamstown North	50	50	50	50	50	

	Latitude	Longitude	Venue_Name	Venue_Latitude	Venue_Longitude	Venue_
Suburb						
Windsor	50	50	50	50	50	
Wollert	50	50	50	50	50	
Wonga Park	50	50	50	50	50	
Woodstock	41	41	41	41	41	
Wyndham Vale	50	50	50	50	50	
Yallambie	50	50	50	50	50	
Yan Yean	22	22	22	22	22	
Yannathan	50	50	50	50	50	
Yarrambat	7	7	7	7	7	
Yarraville	50	50	50	50	50	
Yuroke	4	4	4	4	4	

No. of unique categories from venues

In [25]:

```
print('There are {} unique categories.'.format(len(venues_df['Venue_Category'].unique())))
```

There are 281 unique categories.

List of categories

In [26]:

```
venues_df['Venue_Category'].unique()[:50]
```

Out[26]:

```
array(['Café', 'Liquor Store', 'Thai Restaurant', 'Lebanese Restaurant',
      'Park', 'Pizza Place', 'Indian Restaurant', 'Bar', 'Movie Theater',
      'Gourmet Shop', 'Golf Course', 'Vietnamese Restaurant', 'Bakery',
      'Ice Cream Shop', 'Rock Club', 'Falafel Restaurant',
      'Greek Restaurant', 'Vegetarian / Vegan Restaurant', 'Farm',
      'Gastropub', 'Climbing Gym', 'Cultural Center', 'Grocery Store',
      'Japanese Restaurant', 'French Restaurant',
      'Australian Restaurant', 'Music Venue', 'Italian Restaurant',
      'Restaurant', 'Scenic Lookout', 'Beach',
      'Middle Eastern Restaurant', 'Hotel Bar', 'Burger Joint',
      'Dumpling Restaurant', 'Supermarket', 'Theater', 'Gas Station',
      'Deli / Bodega', 'Fast Food Restaurant', 'Pharmacy',
      'Other Great Outdoors', 'Farmers Market', 'Field', 'Garden',
      'Asian Restaurant', 'Zoo', 'Exhibit', 'Pub', 'Pool'], dtype=object)
```

Analyzing each suburb

In [27]:

```
# one hot encoding
melb_onehot = pd.get_dummies(venues_df[['Venue_Category']], prefix="", prefix_sep="")

# add neighborhood column back to dataframe
melb_onehot['Suburb'] = venues_df['Suburb']

# move neighborhood column to the first column
fixed_columns = [melb_onehot.columns[-1]] + list(melb_onehot.columns[:-1])
melb_onehot = melb_onehot[fixed_columns]

print(melb_onehot.shape)
melb_onehot.head()
```

(23471, 282)

Out[27]:

	Suburb	Afghan Restaurant	African Restaurant	Airport	Airport Lounge	Airport Service	American Restaurant	Antique Shop	Arcade
0	Abbotsford	0	0	0	0	0	0	0	0
1	Abbotsford	0	0	0	0	0	0	0	0
2	Abbotsford	0	0	0	0	0	0	0	0
3	Abbotsford	0	0	0	0	0	0	0	0
4	Abbotsford	0	0	0	0	0	0	0	0

Let's group rows by suburbs and by taking the mean of the frequency of occurrence of each category

In [28]:

```
melb_grouped = melb_onehot.groupby(["Suburb"]).mean().reset_index()

print(melb_grouped.shape)
melb_grouped
```

(538, 282)

Out[28]:

	Suburb	Afghan Restaurant	African Restaurant	Airport	Airport Lounge	Airport Service	American Restaurant	Antiqu Sho
0	Abbotsford	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
1	Aberfeldie	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
2	Aintree	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
3	Airport West	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
4	Albanvale	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
5	Albert Park	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
6	Albion	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
7	Alphington	0.02	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
8	Altona	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
9	Altona Meadows	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.040000
10	Altona North	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
11	Ardeer	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
12	Armadale	0.00	0.02	0.000000	0.000000	0.000000	0.000000	0.000000
13	Arthurs Seat	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
14	Ascot Vale	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
15	Ashburton	0.00	0.00	0.000000	0.000000	0.000000	0.023256	0.000000
16	Ashwood	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
17	Aspendale	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
18	Aspendale Gardens	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
19	Attwood	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
20	Avondale Heights	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
21	Avonsleigh	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
22	Badger Creek	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
23	Balaclava	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.020000
24	Balnarring	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
25	Balnarring Beach	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
26	Balwyn	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
27	Balwyn North	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
28	Bangholme	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
29	Baxter	0.00	0.00	0.000000	0.000000	0.000000	0.020000	0.000000
30	Bayles	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
31	Bayswater	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
32	Bayswater North	0.00	0.02	0.000000	0.000000	0.000000	0.000000	0.000000

	Suburb	Afghan Restaurant	African Restaurant	Airport	Airport Lounge	Airport Service	American Restaurant	Antiqu Sho
33	Beaconsfield	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
34	Beaconsfield Upper	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
35	Beaumaris	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
36	Beenak	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
37	Belgrave	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
38	Belgrave Heights	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
39	Belgrave South	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
40	Bellfield	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
41	Bend of Islands	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
42	Bentleigh	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
43	Bentleigh East	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
44	Berwick	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
45	Beveridge	0.02	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
46	Big Pats Creek	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
47	Bittern	0.00	0.00	0.020000	0.000000	0.000000	0.000000	0.000000
48	Black Rock	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
49	Blackburn	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
50	Blackburn North	0.00	0.02	0.000000	0.000000	0.000000	0.000000	0.000000
51	Blackburn South	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
52	Blairgowrie	0.00	0.00	0.020000	0.000000	0.000000	0.000000	0.000000
53	Blind Bight	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
54	Bonbeach	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
55	Boneo	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
56	Bonnie Brook	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
57	Boronia	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
58	Botanic Ridge	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
59	Box Hill	0.00	0.00	0.020000	0.000000	0.000000	0.000000	0.000000
60	Box Hill North	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
61	Box Hill South	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
62	Braeside	0.00	0.00	0.000000	0.000000	0.000000	0.020000	0.000000
63	Braybrook	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
64	Briar Hill	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
65	Brighton	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
66	Brighton East	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
67	Broadmeadows	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000

	Suburb	Afghan Restaurant	African Restaurant	Airport	Airport Lounge	Airport Service	American Restaurant	Antiqu Sho
68	Brookfield	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
69	Brooklyn	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
70	Brunswick	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
71	Brunswick East	0.00	0.02	0.000000	0.000000	0.000000	0.000000	0.000000
72	Brunswick West	0.00	0.00	0.020000	0.000000	0.000000	0.000000	0.000000
73	Bulla	0.00	0.00	0.020000	0.000000	0.000000	0.000000	0.000000
74	Bulleen	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
75	Bundoora	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
76	Bunyip	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
77	Bunyip North	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
78	Burnley	0.00	0.00	0.250000	0.000000	0.000000	0.000000	0.000000
79	Burnside	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
80	Burnside Heights	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
81	Burwood	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
82	Burwood East	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
83	Cairnlea	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
84	Calder Park	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
85	Caldermeade	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
86	Cambarville	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
87	Camberwell	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
88	Campbellfield	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
89	Cannons Creek	0.00	0.00	0.000000	0.000000	0.000000	0.020000	0.000000
90	Canterbury	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
91	Cape Schanck	0.00	0.00	0.000000	0.000000	0.000000	0.020000	0.000000
92	Capel Sound	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
93	Cardinia	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
94	Carlton	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
95	Carlton North	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
96	Carnegie	0.02	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
97	Caroline Springs	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.023800
98	Carrum	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
99	Carrum Downs	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
100	Catani	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
101	Caulfield	0.02	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
102	Caulfield East	0.00	0.00	0.020000	0.000000	0.000000	0.000000	0.000000

	Suburb	Afghan Restaurant	African Restaurant	Airport	Airport Lounge	Airport Service	American Restaurant	Antiqu Sho
103	Caulfield North	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
104	Caulfield South	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
105	Chadstone	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
106	Chelsea	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
107	Chelsea Heights	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
108	Cheltenham	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
109	Chirnside Park	0.00	0.00	0.020000	0.000000	0.000000	0.000000	0.000000
110	Christmas Hills	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
111	Chum Creek	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
112	Clarinda	0.00	0.00	0.142857	0.000000	0.000000	0.000000	0.142857
113	Clarkefield	0.00	0.00	0.020000	0.000000	0.000000	0.000000	0.000000
114	Clayton	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
115	Clayton South	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
116	Clematis	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
117	Clifton Hill	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
118	Clyde	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
119	Clyde North	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
120	Cobblebank	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
121	Coburg	0.02	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
122	Coburg North	0.02	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
123	Cockatoo	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
124	Cocoroc	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
125	Coldstream	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
126	Collingwood	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
127	Coolaroo	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
128	Cora Lynn	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
129	Cottles Bridge	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
130	Craigieburn	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
131	Cranbourne	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
132	Cranbourne East	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
133	Cranbourne North	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
134	Cranbourne South	0.00	0.00	0.032258	0.000000	0.000000	0.000000	0.000000
135	Cremorne	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
136	Crib Point	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
137	Croydon	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000

	Suburb	Afghan Restaurant	African Restaurant	Airport	Airport Lounge	Airport Service	American Restaurant	Antiqu Sho
138	Croydon Hills	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
139	Croydon North	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
140	Croydon South	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
141	Dallas	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
142	Dandenong	0.00	0.00	0.000000	0.000000	0.000000	0.040000	0.000000
143	Dandenong North	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
144	Dandenong South	0.00	0.00	0.020000	0.000000	0.000000	0.000000	0.000000
145	Deanside	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
146	Deepdene	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
147	Deer Park	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
148	Delahey	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
149	Derrimut	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
150	Devon Meadows	0.00	0.00	0.000000	0.000000	0.000000	0.020000	0.000000
151	Dewhurst	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
152	Diamond Creek	0.00	0.00	0.000000	0.000000	0.000000	0.020000	0.000000
153	Diggers Rest	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
154	Dingley Village	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
155	Dixons Creek	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
156	Docklands	0.00	0.02	0.000000	0.000000	0.000000	0.000000	0.000000
157	Don Valley	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
158	Doncaster	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
159	Doncaster East	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
160	Donvale	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
161	Doreen	0.00	0.00	0.000000	0.000000	0.000000	0.023810	0.000000
162	Doveton	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
163	Dromana	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
164	Eaglemont	0.00	0.00	0.020000	0.000000	0.000000	0.000000	0.000000
165	East Melbourne	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
166	Eden Park	0.02	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
167	Edithvale	0.00	0.00	0.000000	0.000000	0.000000	0.027778	0.000000
168	Elsternwick	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
169	Eltham	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
170	Eltham North	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
171	Elwood	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
172	Emerald	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000

	Suburb	Afghan Restaurant	African Restaurant	Airport	Airport Lounge	Airport Service	American Restaurant	Antiqu Sho
173	Endeavour Hills	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
174	Epping	0.00	0.00	0.020000	0.000000	0.000000	0.000000	0.000000
175	Essendon	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
176	Essendon Fields	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
177	Essendon North	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
178	Essendon West	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
179	Eumemmerring	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
180	Exford	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
181	Eynesbury	0.00	0.00	0.020000	0.200000	0.020000	0.000000	0.000000
182	Fairfield	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
183	Fawkner	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
184	Fernshaw	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
185	Ferntree Gully	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
186	Ferny Creek	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
187	Fieldstone	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
188	Fingal	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
189	Fitzroy	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
190	Fitzroy North	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
191	Flemington	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
192	Flinders	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
193	Footscray	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
194	Forest Hill	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
195	Frankston	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
196	Frankston North	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
197	Frankston South	0.00	0.00	0.020000	0.000000	0.000000	0.000000	0.000000
198	Fraser Rise	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
199	Gardenvale	0.02	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
200	Garfield	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
201	Garfield North	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
202	Gembrook	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
203	Gilderoy	0.00	0.00	0.000000	0.000000	0.000000	0.020000	0.000000
204	Gladstone Park	0.00	0.00	0.000000	0.000000	0.000000	0.028571	0.000000
205	Gladysdale	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
206	Glen Huntly	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000

	Suburb	Afghan Restaurant	African Restaurant	Airport	Airport Lounge	Airport Service	American Restaurant	Antiqu Sho
207	Glen Iris	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
208	Glen Waverley	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
209	Glenroy	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
210	Gowanbrae	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
211	Grangefields	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
212	Greensborough	0.02	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
213	Greenvale	0.00	0.00	0.000000	0.000000	0.000000	0.028571	0.000000
214	Gruyere	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
215	Guys Hill	0.02	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
216	HMAS Cerberus	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
217	Hadfield	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
218	Hallam	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
219	Hampton	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
220	Hampton East	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
221	Hampton Park	0.00	0.00	0.000000	0.000000	0.000000	0.020000	0.000000
222	Harkaway	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
223	Harkness	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
224	Hastings	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
225	Hawthorn	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
226	Hawthorn East	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
227	Healesville	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
228	Heath Hill	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
229	Heatherton	0.00	0.00	0.020000	0.000000	0.000000	0.000000	0.000000
230	Heathmont	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
231	Heidelberg	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
232	Heidelberg Heights	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
233	Heidelberg West	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
234	Highett	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
235	Hillside	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
236	Hoddles Creek	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
237	Hoppers Crossing	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
238	Hughesdale	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
239	Humevale	0.02	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
240	Huntingdale	0.00	0.00	0.000000	0.000000	0.000000	0.020000	0.000000
241	Hurstbridge	0.00	0.00	0.000000	0.000000	0.000000	0.020000	0.000000

	Suburb	Afghan Restaurant	African Restaurant	Airport	Airport Lounge	Airport Service	American Restaurant	Antiqu Sho
242	Iona	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
243	Ivanhoe	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
244	Ivanhoe East	0.02	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
245	Jacana	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
246	Junction Village	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
247	Kalkallo	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
248	Kallista	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
249	Kalorama	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
250	Kangaroo Ground	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
251	Kealba	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
252	Keilor	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
253	Keilor Downs	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
254	Keilor East	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
255	Keilor Lodge	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
256	Keilor North	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
257	Keilor Park	0.00	0.00	0.020000	0.000000	0.000000	0.000000	0.000000
258	Kensington	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
259	Kew	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
260	Kew East	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
261	Keysborough	0.00	0.00	0.020000	0.000000	0.000000	0.000000	0.000000
262	Kilsyth	0.00	0.00	0.000000	0.000000	0.000000	0.040000	0.000000
263	Kilsyth South	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
264	Kinglake	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
265	Kinglake West	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.058800
266	Kings Park	0.02	0.02	0.000000	0.000000	0.000000	0.000000	0.000000
267	Kingsbury	0.02	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
268	Kingsville	0.02	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
269	Knoxfield	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
270	Koo Wee Rup	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
271	Koo Wee Rup North	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
272	Kooyong	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
273	Kurunjang	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
274	Lalor	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
275	Lang Lang	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
276	Lang Lang East	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000

	Suburb	Afghan Restaurant	African Restaurant	Airport	Airport Lounge	Airport Service	American Restaurant	Antiqu Sho
277	Langwarrin	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
278	Langwarrin South	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
279	Launching Place	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
280	Laverton	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
281	Laverton North	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
282	Lilydale	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
283	Little River	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
284	Longwarry	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
285	Lower Plenty	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
286	Lynbrook	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
287	Lyndhurst	0.00	0.00	0.000000	0.000000	0.000000	0.025641	0.000000
288	Lysterfield	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
289	Lysterfield South	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
290	Macclesfield	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
291	Macleod	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
292	Maidstone	0.00	0.00	0.000000	0.000000	0.000000	0.020000	0.000000
293	Main Ridge	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
294	Malvern	0.00	0.02	0.000000	0.000000	0.000000	0.000000	0.000000
295	Malvern East	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
296	Mambourin	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
297	Manor Lakes	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
298	Maribyrnong	0.00	0.00	0.000000	0.000000	0.000000	0.020000	0.000000
299	Maryknoll	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
300	Matlock	0.00	0.02	0.000000	0.000000	0.000000	0.000000	0.000000
301	McCrae	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
302	McKinnon	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
303	McMahons Creek	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
304	Meadow Heights	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
305	Melbourne Airport	0.00	0.00	0.040000	0.060000	0.000000	0.000000	0.000000
306	Melbourne CBD	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
307	Melbourne CBD (St Kilda Road area)	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
308	Melton	0.00	0.00	0.000000	0.000000	0.000000	0.020000	0.000000

	Suburb	Afghan Restaurant	African Restaurant	Airport	Airport Lounge	Airport Service	American Restaurant	Antiqu Sho
309	Melton South	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
310	Melton West	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
311	Mentone	0.00	0.00	0.000000	0.000000	0.000000	0.020000	0.000000
312	Menzies Creek	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
313	Mernda	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
314	Merricks	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
315	Merricks Beach	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
316	Merricks North	0.00	0.00	0.000000	0.000000	0.000000	0.020000	0.000000
317	Mickleham	0.00	0.00	0.000000	0.032258	0.000000	0.000000	0.000000
318	Middle Park	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
319	Mill Park	0.00	0.00	0.020000	0.000000	0.000000	0.000000	0.000000
320	Millgrove	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
321	Mitcham	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
322	Modella	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
323	Monash University	0.00	0.00	0.020000	0.000000	0.000000	0.020000	0.000000
324	Monbulk	0.00	0.00	0.020000	0.100000	0.000000	0.000000	0.000000
325	Monomeith	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
326	Mont Albert	0.00	0.00	0.000000	0.000000	0.000000	0.020000	0.000000
327	Mont Albert North	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
328	Montmorency	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
329	Montrose	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
330	Moonee Ponds	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
331	Moorabbin	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
332	Moorabbin Airport	0.00	0.00	0.000000	0.000000	0.000000	0.020000	0.000000
333	Moorooduc	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
334	Mooroolbark	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
335	Mordialloc	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
336	Mornington	0.00	0.00	0.000000	0.000000	0.000000	0.020000	0.000000
337	Mount Burnett	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
338	Mount Cottrell	0.00	0.00	0.023810	0.000000	0.000000	0.000000	0.000000
339	Mount Dandenong	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
340	Mount Eliza	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
341	Mount Evelyn	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
342	Mount Martha	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000

	Suburb	Afghan Restaurant	African Restaurant	Airport	Airport Lounge	Airport Service	American Restaurant	Antiqu Sho
343	Mount Toolebewong	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
344	Mount Waverley	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
345	Mulgrave	0.00	0.00	0.000000	0.000000	0.000000	0.020000	0.000000
346	Murrumbena	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
347	Nangana	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
348	Nar Nar Goon	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
349	Nar Nar Goon North	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
350	Narre Warren	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
351	Narre Warren East	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
352	Narre Warren North	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
353	Narre Warren South	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
354	Newport	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
355	Niddrie	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
356	Noble Park	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
357	Noble Park North	0.02	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
358	North Melbourne	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
359	North Warrandyte	0.00	0.00	0.000000	0.000000	0.000000	0.020000	0.000000
360	Northcote	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
361	Notting Hill	0.00	0.00	0.020000	0.000000	0.000000	0.000000	0.000000
362	Nunawading	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
363	Nutfield	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
364	Nyora	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
365	Oak Park	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
366	Oaklands Junction	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
367	Oakleigh	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
368	Oakleigh East	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
369	Oakleigh South	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
370	Officer	0.00	0.00	0.000000	0.500000	0.000000	0.000000	0.000000
371	Officer South	0.00	0.00	0.020000	0.000000	0.000000	0.020000	0.000000
372	Olinda	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
373	Ormond	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
374	Pakenham	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000

	Suburb	Afghan Restaurant	African Restaurant	Airport	Airport Lounge	Airport Service	American Restaurant	Antiqu Sho
375	Pakenham South	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
376	Pakenham Upper	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
377	Panton Hill	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
378	Park Orchards	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
379	Parkdale	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
380	Parkville	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
381	Parwan	0.00	0.00	0.023810	0.000000	0.000000	0.000000	0.000000
382	Pascoe Vale	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
383	Pascoe Vale South	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
384	Patterson Lakes	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
385	Pearcedale	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
386	Plenty	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
387	Plumpton	0.00	0.00	0.023810	0.000000	0.000000	0.000000	0.000000
388	Point Cook	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
389	Point Leo	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
390	Port Melbourne	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
391	Portsea	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
392	Powelltown	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
393	Prahran	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
394	Preston	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
395	Princes Hill	0.00	0.02	0.000000	0.000000	0.000000	0.000000	0.000000
396	Quandong	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
397	Ravenhall	0.00	0.00	0.000000	0.000000	0.000000	0.032258	0.000000
398	Red Hill	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
399	Red Hill South	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
400	Reefton	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
401	Research	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
402	Reservoir	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
403	Richmond	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
404	Ringwood	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
405	Ringwood East	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
406	Ringwood North	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
407	Ripponlea	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
408	Rockbank	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000

	Suburb	Afghan Restaurant	African Restaurant	Airport	Airport Lounge	Airport Service	American Restaurant	Antiqu Sho
409	Rosanna	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
410	Rosebud	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
411	Rowville	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
412	Roxburgh Park	0.00	0.00	0.020000	0.100000	0.000000	0.000000	0.000000
413	Rye	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
414	Rythdale	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
415	Safety Beach	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
416	Sandhurst	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
417	Sandringham	0.00	0.00	0.000000	0.000000	0.000000	0.020000	0.000000
418	Sassafras	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
419	Scoresby	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
420	Seabrook	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
421	Seaford	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
422	Seaholme	0.00	0.02	0.000000	0.000000	0.000000	0.000000	0.000000
423	Seddon	0.00	0.00	0.000000	0.000000	0.000000	0.029412	0.000000
424	Selby	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
425	Seville	0.00	0.00	0.000000	0.000000	0.000000	0.066667	0.000000
426	Seville East	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
427	Sherbrooke	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
428	Shoreham	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
429	Silvan	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
430	Skye	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
431	Smiths Gully	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
432	Somers	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
433	Somerton	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
434	Somerville	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
435	Sorrento	0.00	0.00	0.020000	0.200000	0.020000	0.000000	0.000000
436	South Kingsville	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
437	South Melbourne	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
438	South Morang	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
439	South Wharf	0.00	0.00	0.020000	0.000000	0.000000	0.000000	0.000000
440	South Yarra	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
441	Southbank	0.00	0.02	0.000000	0.000000	0.000000	0.000000	0.000000
442	Spotswood	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
443	Springvale	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000

	Suburb	Afghan Restaurant	African Restaurant	Airport	Airport Lounge	Airport Service	American Restaurant	Antiqu Sho
444	Springvale South	0.00	0.00	0.000000	0.000000	0.000000	0.064516	0.000000
445	St Albans	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
446	St Andrews	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
447	St Andrews Beach	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
448	St Helena	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
449	St Kilda	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
450	St Kilda East	0.02	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
451	St Kilda West	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
452	Steels Creek	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
453	Strathewen	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
454	Strathmore	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
455	Strathmore Heights	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
456	Strathtulloch	0.00	0.00	0.000000	0.000000	0.000000	0.020000	0.000000
457	Sunbury	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
458	Sunshine	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
459	Sunshine North	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
460	Sunshine West	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
461	Surrey Hills	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
462	Sydenham	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
463	Tarneit	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
464	Tarrawarra	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
465	Taylors Hill	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
466	Taylors Lakes	0.00	0.02	0.000000	0.000000	0.000000	0.000000	0.000000
467	Tecoma	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
468	Templestowe	0.00	0.00	0.020000	0.000000	0.000000	0.000000	0.000000
469	Templestowe Lower	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
470	The Basin	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
471	The Patch	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
472	Thomastown	0.00	0.00	0.023810	0.238095	0.02381	0.000000	0.000000
473	Thornbury	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
474	Thornhill Park	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
475	Three Bridges	0.00	0.00	0.000000	0.000000	0.000000	0.020000	0.000000
476	Tonimbuk	0.00	0.00	0.000000	0.000000	0.000000	0.020000	0.000000
477	Toolangi	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
478	Toolern Vale	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000

	Suburb	Afghan Restaurant	African Restaurant	Airport	Airport Lounge	Airport Service	American Restaurant	Antiqu Sho
479	Tooradin	0.02	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
480	Tooradin North	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
481	Toorak	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
482	Toorongo	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
483	Tootgarook	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
484	Tottenham	0.00	0.00	0.000000	0.000000	0.000000	0.029412	0.000000
485	Travancore	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
486	Tremont	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
487	Truganina	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
488	Tuerong	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
489	Tullamarine	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
490	Tyabb	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
491	Tynong	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
492	Tynong North	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
493	Upper Ferntree Gully	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
494	Upwey	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
495	Vermont	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
496	Vermont South	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
497	Vervale	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
498	Viewbank	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
499	Wandin East	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
500	Wandin North	0.00	0.02	0.000000	0.000000	0.000000	0.000000	0.000000
501	Wantirna	0.00	0.00	0.020000	0.000000	0.000000	0.000000	0.000000
502	Wantirna South	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
503	Warburton	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
504	Warburton East	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
505	Warneet	0.02	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
506	Warrandyte	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
507	Warrandyte South	0.00	0.00	0.040000	0.020000	0.000000	0.000000	0.000000
508	Warranwood	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
509	Waterways	0.00	0.00	0.000000	0.000000	0.000000	0.020000	0.000000
510	Watsonia	0.00	0.00	0.020000	0.000000	0.000000	0.000000	0.000000
511	Watsonia North	0.00	0.00	0.020000	0.100000	0.000000	0.000000	0.000000
512	Watsons Creek	0.00	0.02	0.000000	0.000000	0.000000	0.000000	0.000000
513	Wattle Glen	0.02	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
514	Weir Views	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.052600

	Suburb	Afghan Restaurant	African Restaurant	Airport	Airport Lounge	Airport Service	American Restaurant	Antiqu Sho
515	Werribee	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
516	Werribee South	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
517	Wesburn	0.00	0.00	0.000000	0.000000	0.000000	0.029412	0.000000
518	West Footscray	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
519	West Melbourne	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
520	Westmeadows	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
521	Wheelers Hill	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
522	Whittlesea	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
523	Wildwood	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
524	Williams Landing	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
525	Williamstown	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
526	Williamstown North	0.00	0.02	0.000000	0.000000	0.000000	0.000000	0.000000
527	Windsor	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
528	Wollert	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
529	Wonga Park	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
530	Woodstock	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
531	Wyndham Vale	0.00	0.00	0.000000	0.000000	0.000000	0.020000	0.000000
532	Yallambie	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
533	Yan Yean	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
534	Yannathan	0.00	0.02	0.000000	0.000000	0.000000	0.000000	0.000000
535	Yarrambat	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
536	Yarraville	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000
537	Yuroke	0.00	0.00	0.000000	0.000000	0.000000	0.000000	0.000000

In [29]:

```
len(melb_grouped[melb_grouped["Pizza Place"] > 0])
```

Out[29]:

289

In [30]:

```
melb_ital = melb_grouped[["Suburb", "Pizza Place"]]
```

In [31]:

```
melb_ital.head()
```

Out[31]:

	Suburb	Pizza Place
0	Abbotsford	0.060000
1	Aberfeldie	0.028571
2	Aintree	0.020000
3	Airport West	0.000000
4	Albanvale	0.000000

Cluster suburbs

In [32]:

```
# no. of clusters
kclusters = 3

melb_clustering = melb_ital.drop(["Suburb"], 1)

# run k-means clustering
kmeans = KMeans(n_clusters=kclusters, random_state=0).fit(melb_clustering)

# check cluster labels generated for each row in the dataframe
kmeans.labels_[0:10]
```

Out[32]:

```
array([1, 2, 2, 0, 0, 2, 0, 0, 0, 0], dtype=int32)
```

In [33]:

```
# Create new dataframe including the cluster label

melb_merged = melb_ital.copy()

# add clustering labels
melb_merged["Cluster Labels"] = kmeans.labels_
```


In [34]:

```
melb_merged.set_index(['Suburb'])
melb_merged.head()
```

Out[34]:

	Suburb	Pizza Place	Cluster Labels
0	Abbotsford	0.060000	1
1	Aberfeldie	0.028571	2
2	Aintree	0.020000	2
3	Airport West	0.000000	0
4	Albanvale	0.000000	0

In [35]:

```
# Merge with the neighborhood dataframe to get Latitude/Longitude for each neighborhood
melb_merged = melb_merged.join(df.set_index("Suburb"), on="Suburb")
```

In [36]:

```
melb_merged.shape
melb_merged.head()
```

Out[36]:

	Suburb	Pizza Place	Cluster Labels	Latitude	Longitude
0	Abbotsford	0.060000	1	-37.776843	145.029515
1	Aberfeldie	0.028571	2	-38.182980	145.090250
2	Aintree	0.020000	2	-37.899664	144.649732
3	Airport West	0.000000	0	-37.786250	145.381630
4	Albanvale	0.000000	0	-37.875150	145.306296

In [37]:

```
melb_merged.sort_values(["Cluster Labels"], inplace=True)  
melb_merged
```

Out[37]:

	Suburb	Pizza Place	Cluster Labels	Latitude	Longitude
268	Kingsville	0.000000	0	-37.992340	145.175440
311	Mentone	0.000000	0	-37.954040	145.084310
310	Melton West	0.000000	0	-37.587310	145.103130
309	Melton South	0.000000	0	-37.923180	145.401180
308	Melton	0.000000	0	-37.980420	145.065760
307	Melbourne CBD (St Kilda Road area)	0.000000	0	-37.925050	145.284910
304	Meadow Heights	0.000000	0	-37.817500	144.967120
303	McMahons Creek	0.000000	0	-37.890805	145.218888
301	McCrae	0.000000	0	-37.901440	145.114130
300	Matlock	0.000000	0	-37.801540	144.879900
295	Malvern East	0.000000	0	-37.834470	144.960250
293	Main Ridge	0.000000	0	-37.850970	144.993500
285	Lower Plenty	0.000000	0	-37.855510	145.020890
280	Laverton	0.000000	0	-37.875180	145.342920
278	Langwarrin South	0.000000	0	-37.763010	145.173260
277	Langwarrin	0.000000	0	-37.618184	145.103905
269	Knoxfield	0.000000	0	-37.900190	145.080850
536	Yarraville	0.000000	0	-37.715640	145.040890
313	Mernda	0.000000	0	-37.734580	144.922040
266	Kings Park	0.000000	0	-37.780210	144.856490
316	Merricks North	0.000000	0	-37.675907	145.016394
318	Middle Park	0.000000	0	-37.959112	145.145133
343	Mount Toolebewong	0.000000	0	-37.511090	145.118200
342	Mount Martha	0.000000	0	-38.111740	145.427030
341	Mount Evelyn	0.000000	0	-37.901960	145.329820
340	Mount Eliza	0.000000	0	-38.059220	145.405250
339	Mount Dandenong	0.000000	0	-37.905590	145.189310
338	Mount Cottrell	0.000000	0	-37.679682	144.909245
337	Mount Burnett	0.000000	0	-37.869120	145.025370
336	Mornington	0.000000	0	-37.918320	145.102200
334	Mooroolbark	0.000000	0	-37.893390	145.307310
332	Moorabbin Airport	0.000000	0	-37.829070	145.245400
330	Moonee Ponds	0.000000	0	-38.084500	145.569550
328	Montmorency	0.000000	0	-37.775460	144.915560
326	Mont Albert	0.000000	0	-37.922450	145.069360
323	Monash University	0.000000	0	-37.969950	145.092640
322	Modella	0.000000	0	-37.879950	145.022620

	Suburb	Pizza Place	Cluster Labels	Latitude	Longitude
321	Mitcham	0.000000	0	-37.858080	144.980320
319	Mill Park	0.000000	0	-37.712430	144.895140
317	Mickleham	0.000000	0	-37.635940	144.889620
346	Murrumbeena	0.000000	0	-37.882390	144.984260
264	Kinglake	0.000000	0	-38.134554	145.450862
262	Kilsyth	0.000000	0	-37.671310	145.015550
216	HMAS Cerberus	0.000000	0	-37.866470	145.762940
215	Guys Hill	0.000000	0	-37.980348	145.252859
214	Gruyere	0.000000	0	-37.708630	145.083080
213	Greenvale	0.000000	0	-37.574513	144.929677
209	Glenroy	0.000000	0	-37.717190	145.225800
207	Glen Iris	0.000000	0	-37.924800	145.349590
204	Gladstone Park	0.000000	0	-37.574513	144.929677
201	Garfield North	0.000000	0	-37.875150	145.306296
198	Fraser Rise	0.000000	0	-37.854576	144.982364
197	Frankston South	0.000000	0	-37.981470	145.134200
193	Footscray	0.000000	0	-37.798710	145.052010
188	Fingal	0.000000	0	-37.833010	144.924340
186	Ferny Creek	0.000000	0	-37.760710	145.234210
184	Fernshaw	0.000000	0	-37.747290	145.235480
176	Essendon Fields	0.000000	0	-37.917570	145.158940
174	Epping	0.000000	0	-37.741475	144.880424
172	Emerald	0.000000	0	-37.760990	144.944460
218	Hallam	0.000000	0	-38.133072	145.322398
263	Kilsyth South	0.000000	0	-37.612242	145.097847
219	Hampton	0.000000	0	-37.793890	145.077900
227	Healesville	0.000000	0	-37.690460	145.083550
261	Keysborough	0.000000	0	-37.738720	144.896020
259	Kew	0.000000	0	-37.696070	145.280940
255	Keilor Lodge	0.000000	0	-37.801880	145.126820
254	Keilor East	0.000000	0	-37.817460	145.124040
253	Keilor Downs	0.000000	0	-38.142520	145.255780
252	Keilor	0.000000	0	-37.862210	145.285580
251	Kealba	0.000000	0	-37.602821	145.116148
247	Kalkallo	0.000000	0	-37.704460	145.102150
245	Jacana	0.000000	0	-37.998320	145.527109
242	Iona	0.000000	0	-38.038051	145.365094
241	Hurstbridge	0.000000	0	-37.808210	145.250910
240	Huntingdale	0.000000	0	-37.942520	145.060040

	Suburb	Pizza Place	Cluster Labels	Latitude	Longitude
238	Hughesdale	0.000000	0	-37.763520	144.922650
237	Hoppers Crossing	0.000000	0	-38.083772	145.210563
236	Hoddles Creek	0.000000	0	-37.875150	145.306296
230	Heathmont	0.000000	0	-37.817500	144.967120
229	Heatherton	0.000000	0	-37.988122	145.084395
225	Hawthorn	0.000000	0	-37.930200	145.358970
347	Nangana	0.000000	0	-37.895390	145.013220
348	Nar Nar Goon	0.000000	0	-37.881100	145.096950
351	Narre Warren East	0.000000	0	-37.637680	145.194320
486	Tremont	0.000000	0	-37.850989	144.894780
485	Travancore	0.000000	0	-37.980140	145.299790
484	Tottenham	0.000000	0	-37.584208	144.912391
483	Tootgarook	0.000000	0	-37.779000	145.217860
482	Toorongo	0.000000	0	-37.850989	144.894780
481	Toorak	0.000000	0	-37.825910	144.951510
479	Tooradin	0.000000	0	-37.985270	145.217940
478	Toolern Vale	0.000000	0	-37.817500	144.967120
476	Tonimbuk	0.000000	0	-37.941220	145.102690
473	Thornbury	0.000000	0	-38.176355	145.309029
471	The Patch	0.000000	0	-37.668334	145.123625
468	Templestowe	0.000000	0	-37.739800	144.863600
466	Taylors Lakes	0.000000	0	-37.820180	144.849270
464	Tarrawarra	0.000000	0	-37.728840	145.095380
463	Tarneit	0.000000	0	-37.756470	145.130410
462	Sydenham	0.000000	0	-37.844210	144.994640
461	Surrey Hills	0.000000	0	-37.743462	145.217197
490	Tyabb	0.000000	0	-37.741250	144.939870
460	Sunshine West	0.000000	0	-37.686040	144.926100
491	Tynong	0.000000	0	-37.907460	145.131970
496	Vermont South	0.000000	0	-37.856870	144.974220
535	Yarrambat	0.000000	0	-37.771740	145.458380
533	Yan Yean	0.000000	0	-37.912360	145.368320
532	Yallambie	0.000000	0	-37.767190	144.864110
531	Wyndham Vale	0.000000	0	-37.677850	145.014310
527	Windsor	0.000000	0	-37.839130	144.992730
526	Williamstown North	0.000000	0	-37.791330	144.889950
524	Williams Landing	0.000000	0	-37.893730	145.404250
522	Whittlesea	0.000000	0	-37.825230	145.097390
521	Wheelers Hill	0.000000	0	-37.845430	145.360790

	Suburb	Pizza Place	Cluster Labels	Latitude	Longitude
517	Wesburn	0.000000	0	-37.630885	144.891526
516	Werribee South	0.000000	0	-37.855500	145.315380
515	Werribee	0.000000	0	-37.763730	145.110210
514	Weir Views	0.000000	0	-37.876060	145.409010
512	Watsons Creek	0.000000	0	-37.802890	144.890080
505	Warneet	0.000000	0	-37.954210	145.214020
503	Warburton	0.000000	0	-37.817500	144.967120
497	Vervale	0.000000	0	-37.932475	145.419342
492	Tynong North	0.000000	0	-37.941590	145.126820
459	Sunshine North	0.000000	0	-37.906460	145.018230
456	Strathtulloh	0.000000	0	-37.657180	145.075350
455	Strathmore Heights	0.000000	0	-37.961090	145.360700
391	Portsea	0.000000	0	-37.841350	145.358620
390	Port Melbourne	0.000000	0	-37.722440	145.073470
388	Point Cook	0.000000	0	-37.906080	145.338160
387	Plumpton	0.000000	0	-37.679682	144.909245
386	Plenty	0.000000	0	-37.862850	145.351580
382	Pascoe Vale	0.000000	0	-37.817500	144.967120
381	Parwan	0.000000	0	-37.679682	144.909245
380	Parkville	0.000000	0	-37.862911	145.440387
378	Park Orchards	0.000000	0	-37.717310	144.830780
371	Officer South	0.000000	0	-37.967610	145.073900
370	Officer	0.000000	0	-37.636380	144.807380
368	Oakleigh East	0.000000	0	-37.978241	145.532664
363	Nutfield	0.000000	0	-38.081540	145.214010
359	North Warrandyte	0.000000	0	-37.787470	145.237720
356	Noble Park	0.000000	0	-37.753820	144.888660
355	Niddrie	0.000000	0	-38.033430	145.558450
353	Narre Warren South	0.000000	0	-37.825220	144.993700
395	Princes Hill	0.000000	0	-37.809730	144.856520
396	Quandong	0.000000	0	-37.817500	144.967120
397	Ravenhall	0.000000	0	-37.569290	144.891050
401	Research	0.000000	0	-37.876530	144.994950
451	St Kilda West	0.000000	0	-37.719808	145.073897
450	St Kilda East	0.000000	0	-37.978140	145.257560
449	St Kilda	0.000000	0	-38.161696	145.261684
447	St Andrews Beach	0.000000	0	-38.008300	145.513830
446	St Andrews	0.000000	0	-37.891860	145.233000
441	Southbank	0.000000	0	-37.783140	144.869640

	Suburb	Pizza Place	Cluster Labels	Latitude	Longitude
439	South Wharf	0.000000	0	-37.738480	144.876598
430	Skye	0.000000	0	-37.770440	145.132240
171	Elwood	0.000000	0	-37.817500	144.967120
423	Seddon	0.000000	0	-37.584208	144.912391
419	Scoresby	0.000000	0	-37.637640	145.194250
418	Sassafras	0.000000	0	-37.717713	145.075356
417	Sandringham	0.000000	0	-37.840980	145.265910
415	Safety Beach	0.000000	0	-38.133800	145.489120
414	Rythdale	0.000000	0	-37.875150	145.306296
411	Rowville	0.000000	0	-37.902360	145.105190
408	Rockbank	0.000000	0	-37.849430	144.961650
403	Richmond	0.000000	0	-37.781490	144.932850
421	Seaford	0.000000	0	-37.741478	145.340509
170	Eltham North	0.000000	0	-37.844040	144.951260
537	Yuroke	0.000000	0	-38.381232	145.198306
139	Croydon North	0.000000	0	-38.136946	145.488481
141	Dallas	0.000000	0	-37.895900	145.004990
50	Blackburn North	0.000000	0	-37.829660	144.885170
78	Burnley	0.000000	0	-37.607360	144.590230
49	Blackburn	0.000000	0	-37.825240	144.960930
48	Black Rock	0.000000	0	-37.875150	145.306296
143	Dandenong North	0.000000	0	-37.751530	144.909510
47	Bittern	0.000000	0	-37.990780	145.081070
46	Big Pats Creek	0.000000	0	-37.778910	145.427270
145	Deanside	0.000000	0	-37.875150	145.306296
43	Bentleigh East	0.000000	0	-37.588030	145.139680
146	Deepdene	0.000000	0	-37.908650	145.355750
80	Burnside Heights	0.000000	0	-37.924344	145.170918
39	Belgrave South	0.000000	0	-37.817500	144.967120
37	Belgrave	0.000000	0	-37.891500	145.317850
36	Beenak	0.000000	0	-37.812400	145.455030
71	Brunswick East	0.000000	0	-37.842600	144.881950
32	Bayswater North	0.000000	0	-37.805540	144.880020
106	Chelsea	0.000000	0	-37.987850	145.352390
138	Croydon Hills	0.000000	0	-38.136946	145.488481
137	Croydon	0.000000	0	-37.876020	145.253020
51	Blackburn South	0.000000	0	-37.947520	145.153150
122	Coburg North	0.000000	0	-37.947460	145.191800
73	Bulla	0.000000	0	-37.705380	144.920570

	Suburb	Pizza Place	Cluster Labels	Latitude	Longitude
68	Brookfield	0.000000	0	-37.769120	144.886420
128	Cora Lynn	0.000000	0	-38.244070	145.541920
63	Braybrook	0.000000	0	-37.807240	145.034110
74	Bulleen	0.000000	0	-37.530620	144.947730
75	Bundoora	0.000000	0	-37.939104	145.186912
59	Box Hill	0.000000	0	-37.978550	145.147250
152	Diamond Creek	0.000000	0	-37.815690	145.227500
76	Bunyip	0.000000	0	-37.828250	145.012760
133	Cranbourne North	0.000000	0	-37.817500	144.967120
134	Cranbourne South	0.000000	0	-37.729660	145.382980
57	Boronia	0.000000	0	-37.875150	145.306296
121	Coburg	0.000000	0	-37.966970	145.189980
120	Cobblebank	0.000000	0	-37.911140	145.039180
135	Cremorne	0.000000	0	-37.841460	145.012080
53	Blind Bight	0.000000	0	-38.352510	145.202976
52	Blairstown	0.000000	0	-37.716690	144.916980
132	Cranbourne East	0.000000	0	-37.925944	145.508090
86	Cambarville	0.000000	0	-37.848110	145.229070
82	Burwood East	0.000000	0	-38.420081	144.831265
27	Balwyn North	0.000000	0	-37.974230	145.381080
99	Carrum Downs	0.000000	0	-37.817500	144.967120
101	Caulfield	0.000000	0	-37.987700	145.239710
113	Clarkefield	0.000000	0	-37.702140	144.898830
160	Donvale	0.000000	0	-37.767339	144.966055
102	Caulfield East	0.000000	0	-37.713410	144.889590
161	Doreen	0.000000	0	-37.622000	144.932640
105	Chadstone	0.000000	0	-37.801120	145.110230
12	Armadale	0.000000	0	-37.812114	144.877308
10	Altona North	0.000000	0	-37.882520	145.295000
87	Camberwell	0.000000	0	-37.985890	145.051770
9	Altona Meadows	0.000000	0	-37.880515	145.408241
7	Alphington	0.000000	0	-38.012330	145.205950
6	Albion	0.000000	0	-38.336788	145.169228
163	Dromana	0.000000	0	-37.899220	145.093580
110	Christmas Hills	0.000000	0	-38.373722	144.913594
164	Eaglemont	0.000000	0	-37.711870	144.886970
109	Chirnside Park	0.000000	0	-37.713560	144.868700
4	Albanvale	0.000000	0	-37.875150	145.306296
3	Airport West	0.000000	0	-37.786250	145.381630

	Suburb	Pizza Place	Cluster Labels	Latitude	Longitude
167	Edithvale	0.000000	0	-37.595496	144.911785
8	Altona	0.000000	0	-37.701350	144.962750
159	Doncaster East	0.000000	0	-37.817890	145.366780
72	Brunswick West	0.000000	0	-37.735560	144.887950
21	Avonsleigh	0.000000	0	-37.701080	145.069700
25	Balnarring Beach	0.000000	0	-37.666050	145.124200
20	Avondale Heights	0.000000	0	-37.705410	145.560960
94	Carlton	0.000000	0	-37.828300	144.789520
95	Carlton North	0.000000	0	-37.757530	145.351010
22	Badger Creek	0.000000	0	-37.729010	145.096290
96	Carnegie	0.000000	0	-37.972847	145.186540
24	Balnarring	0.000000	0	-37.682179	144.915547
158	Doncaster	0.000000	0	-37.898430	145.391240
26	Balwyn	0.000000	0	-38.045540	145.367970
15	Ashburton	0.000000	0	-37.825230	145.290460
153	Diggers Rest	0.000000	0	-37.703810	144.641530
157	Don Valley	0.000000	0	-37.817500	144.967120
376	Pakenham Upper	0.060000	1	-37.768261	145.027638
372	Olinda	0.040000	1	-37.857400	144.737880
350	Narre Warren	0.040000	1	-38.074640	145.275620
85	Caldermeade	0.040000	1	-37.730080	144.756250
352	Narre Warren North	0.045455	1	-38.124550	145.248570
369	Oakleigh South	0.066667	1	-38.061570	145.258174
349	Nar Nar Goon North	0.106383	1	-38.048110	145.113960
360	Northcote	0.040000	1	-37.769230	144.775060
168	Elsternwick	0.040000	1	-38.036750	145.114380
362	Nunawading	0.040000	1	-37.730070	144.815710
333	Moorooduc	0.040000	1	-37.758390	144.743480
103	Caulfield North	0.040000	1	-37.764210	145.067560
366	Oaklands Junction	0.040000	1	-37.780441	145.065299
97	Caroline Springs	0.047619	1	-38.355948	144.932519
98	Carrum	0.040000	1	-38.033900	145.265750
77	Bunyip North	0.040000	1	-37.761280	144.754800
324	Monbulk	0.040000	1	-37.675900	144.884480
314	Merricks	0.060000	1	-37.741440	145.003440
364	Nyora	0.061224	1	-38.045140	145.136810
169	Eltham	0.040000	1	-37.744600	144.770250
70	Brunswick	0.060000	1	-38.063060	145.299530
28	Bangholme	0.040000	1	-37.774510	145.018870

	Suburb	Pizza Place	Cluster Labels	Latitude	Longitude
480	Tooradin North	0.040000	1	-37.846915	144.677040
493	Upper Ferntree Gully	0.040000	1	-37.772640	145.057980
495	Vermont	0.045455	1	-38.072769	145.127340
18	Aspendale Gardens	0.040000	1	-38.007240	145.279020
498	Viewbank	0.040000	1	-38.026660	145.102020
499	Wandin East	0.047619	1	-37.629290	145.153350
502	Wantirna South	0.045455	1	-38.134280	145.294840
30	Bayles	0.043478	1	-37.716441	144.734597
506	Warrandyte	0.045455	1	-37.668940	144.765690
510	Watsonia	0.040000	1	-38.018220	145.113590
511	Watsonia North	0.040000	1	-37.669910	144.887920
14	Ascot Vale	0.041667	1	-38.275481	145.030648
513	Wattle Glen	0.040000	1	-37.777647	144.801120
13	Arthurs Seat	0.040000	1	-38.074090	145.145210
523	Wildwood	0.037037	1	-38.020610	145.385470
528	Wollert	0.060000	1	-37.701810	144.762890
530	Woodstock	0.048780	1	-37.837700	144.672900
508	Warranwood	0.040000	1	-37.862310	144.769760
379	Parkdale	0.060000	1	-37.752820	145.050470
470	The Basin	0.080000	1	-37.766360	145.045400
34	Beaconsfield Upper	0.043478	1	-37.716441	144.734597
384	Patterson Lakes	0.040000	1	-37.747920	145.041670
69	Brooklyn	0.040000	1	-37.817780	145.154140
394	Preston	0.040000	1	-37.719780	144.770630
61	Box Hill South	0.040000	1	-38.057919	145.286615
405	Ringwood East	0.051282	1	-38.182590	145.185000
407	Ripponlea	0.037037	1	-38.102720	145.198840
412	Roxburgh Park	0.040000	1	-37.657517	144.896149
56	Bonnie Brook	0.058824	1	-37.869210	144.602730
469	Templestowe Lower	0.040000	1	-37.700970	144.798450
55	Boneo	0.040000	1	-37.895500	144.754140
426	Seville East	0.035714	1	-37.735820	145.271570
429	Silvan	0.200000	1	-37.778400	145.531370
431	Smiths Gully	0.065217	1	-37.878300	144.757640
435	Sorrento	0.040000	1	-37.667610	144.822063
438	South Morang	0.055556	1	-37.726540	144.598150
42	Bentleigh	0.040000	1	-37.801920	145.178160
38	Belgrave Heights	0.040000	1	-37.852090	144.723990
35	Beaumaris	0.040000	1	-37.767494	145.253364

	Suburb	Pizza Place	Cluster Labels	Latitude	Longitude
420	Seabrook	0.040000	1	-37.798350	144.978600
312	Menzies Creek	0.040000	1	-37.728087	144.751125
0	Abbotsford	0.060000	1	-37.776843	145.029515
234	Highett	0.040000	1	-38.185380	145.163420
131	Cranbourne	0.040000	1	-37.723720	144.983110
224	Hastings	0.040000	1	-37.750590	144.741121
130	Craigieburn	0.055556	1	-37.710570	144.724220
265	Kinglake West	0.058824	1	-38.315381	145.000140
223	Harkness	0.040000	1	-37.700529	144.796350
258	Kensington	0.062500	1	-38.053030	145.253120
118	Clyde	0.076923	1	-37.713510	144.588660
147	Deer Park	0.044444	1	-38.368539	144.772244
148	Delahey	0.037037	1	-38.086965	145.182051
284	Longwarry	0.043478	1	-38.074270	145.133910
283	Little River	0.040000	1	-37.724888	144.801844
281	Laverton North	0.060000	1	-37.710000	144.764060
149	Derrimut	0.050000	1	-38.062920	145.119510
274	Lalor	0.060000	1	-37.693471	144.763637
273	Kurunjang	0.040000	1	-37.700529	144.796350
272	Kooyong	0.058824	1	-38.344627	144.741961
205	Gladysdale	0.040000	1	-38.014510	145.133100
210	Gowanbrae	0.040000	1	-37.769400	144.999000
123	Cockatoo	0.062500	1	-37.676380	144.769180
211	Grangefields	0.040000	1	-37.700529	144.796350
124	Cocoroc	0.040000	1	-37.756670	145.000920
185	Ferntree Gully	0.040000	1	-37.863910	144.703980
250	Kangaroo Ground	0.057143	1	-38.385267	144.812166
257	Keilor Park	0.040000	1	-38.008290	145.112590
226	Hawthorn East	0.060000	1	-37.750220	145.037820
233	Heidelberg West	0.040000	1	-37.871770	144.777600
231	Heidelberg	0.060000	1	-37.779420	145.025030
112	Clarinda	0.071429	1	-38.297193	145.184979
107	Chelsea Heights	0.060000	1	-37.698218	144.767325
228	Heath Hill	0.040816	1	-38.372249	144.874088
179	Eumemmerring	0.040000	1	-37.855652	144.780896
244	Ivanhoe East	0.040000	1	-37.772050	144.799970
297	Manor Lakes	0.040000	1	-37.696680	144.781380
212	Greensborough	0.040000	1	-37.775560	144.815610
182	Fairfield	0.063830	1	-37.875330	144.759332

	Suburb	Pizza Place	Cluster Labels	Latitude	Longitude
248	Kallista	0.035714	1	-37.664200	145.182150
116	Clematis	0.060000	1	-37.751710	144.778070
45	Beveridge	0.020000	2	-37.787590	144.832470
31	Bayswater	0.023256	2	-37.688570	144.745180
474	Thornhill Park	0.020000	2	-37.815060	145.193560
443	Springvale	0.032258	2	-38.106234	145.187910
442	Spotswood	0.020000	2	-38.138795	145.158694
453	Strathewen	0.020000	2	-38.113100	145.137420
475	Three Bridges	0.020000	2	-37.770353	145.280355
151	Dewhurst	0.020000	2	-37.836300	145.062510
477	Toolangi	0.020000	2	-37.867780	144.843770
29	Baxter	0.020000	2	-37.597396	144.936400
440	South Yarra	0.020000	2	-37.852490	145.036550
232	Heidelberg Heights	0.020408	2	-37.863820	144.824820
437	South Melbourne	0.020000	2	-37.642940	144.947850
472	Thomastown	0.023810	2	-37.642799	144.824657
150	Devon Meadows	0.020000	2	-37.774300	145.274790
444	Springvale South	0.032258	2	-37.618605	145.000409
217	Hadfield	0.020000	2	-37.902980	145.142540
40	Bellfield	0.020000	2	-37.803060	144.997180
457	Sunbury	0.020000	2	-37.882980	145.165140
222	Harkaway	0.020000	2	-37.768700	145.298030
448	St Helena	0.020000	2	-37.866910	145.102920
221	Hampton Park	0.020000	2	-37.599500	144.945480
220	Hampton East	0.027027	2	-38.032650	145.177390
458	Sunshine	0.020000	2	-37.909370	144.997460
44	Berwick	0.020000	2	-37.815003	144.963977
465	Taylors Hill	0.020000	2	-38.058383	145.340501
144	Dandenong South	0.020000	2	-37.718950	144.894660
452	Steels Creek	0.020000	2	-37.883840	144.623650
467	Tecoma	0.020000	2	-37.856600	145.184300
33	Beaconsfield	0.020000	2	-37.768500	144.975740
454	Strathmore	0.020000	2	-38.020370	145.306210
41	Bend of Islands	0.020000	2	-37.742730	145.065280
445	St Albans	0.020000	2	-37.699910	145.115000
108	Cheltenham	0.020000	2	-37.738888	144.766601
154	Dingley Village	0.020000	2	-37.830280	145.055520
189	Fitzroy	0.023256	2	-37.836230	144.707230
187	Fieldstone	0.020000	2	-37.814260	144.963070

	Suburb	Pizza Place	Cluster Labels	Latitude	Longitude
162	Doveton	0.020000	2	-37.799280	144.987550
183	Fawkner	0.020000	2	-37.800540	144.946090
11	Ardeer	0.020000	2	-37.968930	145.030700
518	West Footscray	0.020000	2	-37.733850	144.777050
519	West Melbourne	0.020000	2	-37.875290	145.048310
520	Westmeadows	0.020000	2	-37.854750	145.052220
181	Eynesbury	0.020000	2	-37.670060	144.849340
180	Exford	0.020000	2	-37.638850	144.914820
190	Fitzroy North	0.022222	2	-38.377768	144.850169
178	Essendon West	0.020000	2	-37.886616	145.072316
177	Essendon North	0.020000	2	-37.897700	145.069940
5	Albert Park	0.020000	2	-37.732711	144.774018
175	Essendon	0.020000	2	-37.883970	145.127490
529	Wonga Park	0.020000	2	-37.794210	144.927540
173	Endeavour Hills	0.020000	2	-37.663220	144.937780
165	East Melbourne	0.020000	2	-38.019663	145.323610
166	Eden Park	0.020000	2	-37.764800	144.831030
2	Aintree	0.020000	2	-37.899664	144.649732
534	Yannathan	0.020000	2	-37.790260	144.994810
1	Aberfeldie	0.028571	2	-38.182980	145.090250
525	Williamstown	0.020000	2	-37.820871	144.955427
208	Glen Waverley	0.020000	2	-37.813890	145.332500
509	Waterways	0.020000	2	-37.948600	145.040830
507	Warrandyte South	0.020000	2	-37.713220	144.858820
206	Glen Huntly	0.020000	2	-37.714350	145.148500
436	South Kingsville	0.020000	2	-37.788140	144.929650
487	Truganina	0.020000	2	-37.816130	144.964310
488	Tuerong	0.020000	2	-37.816990	144.999450
489	Tullamarine	0.020000	2	-37.769470	144.961710
155	Dixons Creek	0.020000	2	-37.813266	144.961666
203	Gilderoy	0.020000	2	-37.773990	145.248290
19	Attwood	0.020000	2	-37.842810	145.171110
202	Gembrook	0.020000	2	-37.825220	145.080830
494	Upwey	0.020000	2	-37.712934	144.973614
191	Flemington	0.020000	2	-37.729630	145.123390
156	Docklands	0.020000	2	-37.837830	144.858112
17	Aspendale	0.020000	2	-37.710150	144.950340
199	Gardenvale	0.020000	2	-37.811500	145.081590
196	Frankston North	0.020000	2	-37.751076	145.337112

	Suburb	Pizza Place	Cluster Labels	Latitude	Longitude
500	Wandin North	0.020000	2	-37.816490	144.889280
501	Wantirna	0.020000	2	-37.687360	144.913510
195	Frankston	0.022222	2	-37.674240	145.157070
16	Ashwood	0.020000	2	-37.774021	145.307438
504	Warburton East	0.020000	2	-37.758886	145.306490
194	Forest Hill	0.020000	2	-37.690020	145.131490
192	Flinders	0.029412	2	-38.322679	144.700158
200	Garfield	0.020000	2	-37.666750	144.949700
23	Balaclava	0.020000	2	-37.886860	145.369890
425	Seville	0.033333	2	-37.612650	145.020540
433	Somerton	0.020000	2	-37.889310	145.041390
292	Maidstone	0.020000	2	-37.802650	145.315000
344	Mount Waverley	0.034483	2	-38.203955	145.120740
345	Mulgrave	0.020000	2	-37.783440	145.311280
291	Macleod	0.020000	2	-37.856677	144.871231
84	Calder Park	0.020000	2	-37.839130	145.146520
83	Cairnlea	0.020000	2	-37.800370	145.144670
290	Macclesfield	0.020000	2	-37.912110	144.681690
289	Lysterfield South	0.020000	2	-37.665210	144.933100
288	Lysterfield	0.020000	2	-37.656233	144.920069
287	Lyndhurst	0.025641	2	-37.813530	145.288020
286	Lynbrook	0.021739	2	-38.095040	145.293400
354	Newport	0.022727	2	-38.082799	145.323804
79	Burnside	0.020000	2	-37.847095	145.038094
357	Noble Park North	0.020000	2	-37.999180	145.249980
358	North Melbourne	0.020000	2	-37.943320	145.244070
361	Notting Hill	0.020000	2	-38.001170	145.093700
282	Lilydale	0.020000	2	-37.806912	145.133989
119	Clyde North	0.020000	2	-37.741290	144.967070
365	Oak Park	0.020000	2	-37.819100	145.175810
279	Launching Place	0.020000	2	-37.903190	144.660540
367	Oakleigh	0.020000	2	-38.230292	145.060074
117	Clifton Hill	0.020000	2	-37.665629	144.928221
88	Campbellfield	0.020000	2	-38.117920	145.159330
89	Cannons Creek	0.020000	2	-37.798750	145.280190
90	Canterbury	0.020000	2	-37.920269	145.016491
111	Chum Creek	0.020000	2	-37.871900	145.244620
315	Merricks Beach	0.020000	2	-37.781560	144.970130
306	Melbourne CBD	0.027778	2	-38.063160	145.244340

	Suburb	Pizza Place	Cluster Labels	Latitude	Longitude
104	Caulfield South	0.020000	2	-37.811320	144.977990
305	Melbourne Airport	0.020000	2	-37.695060	144.886000
320	Millgrove	0.020000	2	-37.806710	144.950380
302	McKinnon	0.020000	2	-37.689330	145.142770
100	Catani	0.020000	2	-37.850100	145.149110
114	Clayton	0.020000	2	-37.717590	145.120770
115	Clayton South	0.020000	2	-37.822850	145.035300
276	Lang Lang East	0.027778	2	-37.743750	144.735450
325	Monomeith	0.020000	2	-37.878150	145.044640
327	Mont Albert North	0.020000	2	-38.030560	145.346820
298	Maribyrnong	0.020000	2	-37.818180	145.316530
329	Montrose	0.020000	2	-37.806912	145.133989
331	Moorabbin	0.020000	2	-37.794216	144.955790
296	Mambourin	0.020000	2	-38.141775	145.123042
294	Malvern	0.020000	2	-37.833660	144.871460
335	Mordialloc	0.020000	2	-37.757900	145.069390
93	Cardinia	0.020000	2	-37.849500	145.120170
92	Capel Sound	0.025000	2	-38.069939	145.456574
91	Cape Schanck	0.020000	2	-37.637323	145.066151
299	Maryknoll	0.033333	2	-38.100930	145.182910
434	Somerville	0.020000	2	-37.723990	144.939710
275	Lang Lang	0.020000	2	-37.889310	145.057050
374	Pakenham	0.020000	2	-37.755850	145.092040
406	Ringwood North	0.020000	2	-37.716360	144.790810
256	Keilor North	0.020000	2	-37.837830	145.120170
409	Rosanna	0.020000	2	-37.863100	145.077160
410	Rosebud	0.020000	2	-37.903870	145.039960
58	Botanic Ridge	0.025000	2	-38.090970	145.332400
413	Rye	0.025641	2	-38.071510	145.481470
249	Kalorama	0.020000	2	-37.848609	145.043601
416	Sandhurst	0.020000	2	-37.819220	144.945610
54	Bonbeach	0.020000	2	-37.939000	145.002230
246	Junction Village	0.026316	2	-38.080820	145.266140
136	Crib Point	0.020000	2	-37.792740	144.958250
422	Seaholme	0.020000	2	-37.783480	144.983680
243	Ivanhoe	0.020000	2	-37.830470	144.841340
424	Selby	0.020000	2	-37.836150	145.195240
239	Humevale	0.020000	2	-37.794130	144.818760
427	Sherbrooke	0.020000	2	-37.868780	145.242620

	Suburb	Pizza Place	Cluster Labels	Latitude	Longitude
428	Shoreham	0.023256	2	-37.703560	145.180360
140	Croydon South	0.020000	2	-37.844210	145.035010
142	Dandenong	0.020000	2	-37.646200	145.026180
235	Hillside	0.020000	2	-37.878909	144.625285
432	Somers	0.020000	2	-37.708150	145.000700
404	Ringwood	0.027027	2	-38.144900	145.204210
60	Box Hill North	0.023256	2	-37.744250	144.800210
402	Reservoir	0.022727	2	-37.794150	144.771480
400	Reefton	0.020000	2	-37.851640	144.867870
375	Pakenham South	0.020833	2	-37.760150	145.328610
271	Koo Wee Rup North	0.020000	2	-37.789180	144.971880
377	Panton Hill	0.020000	2	-37.951690	145.003830
270	Koo Wee Rup	0.020000	2	-37.801010	144.969520
267	Kingsbury	0.020000	2	-37.810990	145.066080
383	Pascoe Vale South	0.020000	2	-37.808073	144.945572
125	Coldstream	0.020000	2	-37.813266	144.961666
385	Pearcedale	0.020000	2	-37.908232	145.218038
126	Collingwood	0.020000	2	-37.665629	144.928221
127	Coolaroo	0.020000	2	-38.171060	145.120950
373	Ormond	0.022727	2	-37.638189	145.093212
67	Broadmeadows	0.020000	2	-38.141180	145.121760
66	Brighton East	0.020000	2	-37.738888	144.766601
65	Brighton	0.020000	2	-37.869030	144.995650
392	Powelltown	0.020000	2	-37.860800	144.902350
393	Prahran	0.022727	2	-37.637050	145.095670
260	Kew East	0.020000	2	-37.917920	145.034500
64	Briar Hill	0.020000	2	-37.759290	144.895800
129	Cottles Bridge	0.020833	2	-37.926560	145.245000
62	Braeside	0.020000	2	-37.933030	145.033880
398	Red Hill	0.020000	2	-35.319348	149.114516
399	Red Hill South	0.022222	2	-37.633865	145.085623
389	Point Leo	0.020000	2	-35.319348	149.114516
81	Burwood	0.020000	2	-37.816190	145.109210

Visualizing

In [38]:

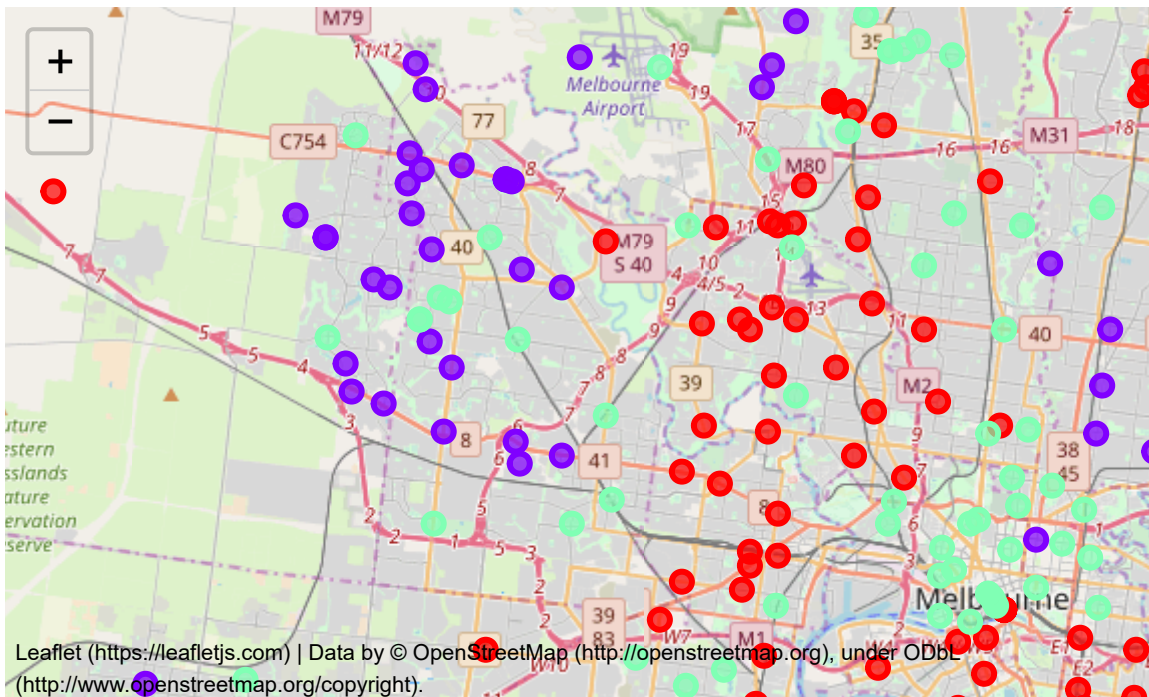
```
# create map
map_clusters = folium.Map(location=[latitude, longitude], zoom_start=11)

# set color scheme for the clusters
x = np.arange(kclusters)
ys = [i+x+(i*x)**2 for i in range(kclusters)]
colors_array = cm.rainbow(np.linspace(0, 1, len(ys)))
rainbow = [colors.rgb2hex(i) for i in colors_array]

# add markers to the map
markers_colors = []
for lat, lon, poi, cluster in zip(melb_merged['Latitude'], melb_merged['Longitude'], melb_merged['Suburb'], melb_merged['Cluster Labels']):
    label = folium.Popup(str(poi) + ' - Cluster ' + str(cluster), parse_html=True)
    folium.CircleMarker(
        [lat, lon],
        radius=5,
        popup=label,
        color=rainbow[cluster-1],
        fill=True,
        fill_color=rainbow[cluster-1],
        fill_opacity=0.7).add_to(map_clusters)

map_clusters
```

Out[38]:



Understanding clusters

In [39]:

```
# Cluster 0  
melb_merged.loc[melb_merged['Cluster Labels'] == 0]
```

Out[39]:

	Suburb	Pizza Place	Cluster Labels	Latitude	Longitude
268	Kingsville	0.0	0	-37.992340	145.175440
311	Mentone	0.0	0	-37.954040	145.084310
310	Melton West	0.0	0	-37.587310	145.103130
309	Melton South	0.0	0	-37.923180	145.401180
308	Melton	0.0	0	-37.980420	145.065760
307	Melbourne CBD (St Kilda Road area)	0.0	0	-37.925050	145.284910
304	Meadow Heights	0.0	0	-37.817500	144.967120
303	McMahons Creek	0.0	0	-37.890805	145.218888
301	McCrae	0.0	0	-37.901440	145.114130
300	Matlock	0.0	0	-37.801540	144.879900
295	Malvern East	0.0	0	-37.834470	144.960250
293	Main Ridge	0.0	0	-37.850970	144.993500
285	Lower Plenty	0.0	0	-37.855510	145.020890
280	Laverton	0.0	0	-37.875180	145.342920
278	Langwarrin South	0.0	0	-37.763010	145.173260
277	Langwarrin	0.0	0	-37.618184	145.103905
269	Knoxfield	0.0	0	-37.900190	145.080850
536	Yarraville	0.0	0	-37.715640	145.040890
313	Mernda	0.0	0	-37.734580	144.922040
266	Kings Park	0.0	0	-37.780210	144.856490
316	Merricks North	0.0	0	-37.675907	145.016394
318	Middle Park	0.0	0	-37.959112	145.145133
343	Mount Toolebewong	0.0	0	-37.511090	145.118200
342	Mount Martha	0.0	0	-38.111740	145.427030
341	Mount Evelyn	0.0	0	-37.901960	145.329820
340	Mount Eliza	0.0	0	-38.059220	145.405250
339	Mount Dandenong	0.0	0	-37.905590	145.189310
338	Mount Cottrell	0.0	0	-37.679682	144.909245
337	Mount Burnett	0.0	0	-37.869120	145.025370
336	Mornington	0.0	0	-37.918320	145.102200
334	Mooroolbark	0.0	0	-37.893390	145.307310
332	Moorabbin Airport	0.0	0	-37.829070	145.245400
330	Moonee Ponds	0.0	0	-38.084500	145.569550
328	Montmorency	0.0	0	-37.775460	144.915560
326	Mont Albert	0.0	0	-37.922450	145.069360
323	Monash University	0.0	0	-37.969950	145.092640
322	Modella	0.0	0	-37.879950	145.022620

	Suburb	Pizza Place	Cluster Labels	Latitude	Longitude
321	Mitcham	0.0	0	-37.858080	144.980320
319	Mill Park	0.0	0	-37.712430	144.895140
317	Mickleham	0.0	0	-37.635940	144.889620
346	Murrumbeena	0.0	0	-37.882390	144.984260
264	Kinglake	0.0	0	-38.134554	145.450862
262	Kilsyth	0.0	0	-37.671310	145.015550
216	HMAS Cerberus	0.0	0	-37.866470	145.762940
215	Guys Hill	0.0	0	-37.980348	145.252859
214	Gruyere	0.0	0	-37.708630	145.083080
213	Greenvale	0.0	0	-37.574513	144.929677
209	Glenroy	0.0	0	-37.717190	145.225800
207	Glen Iris	0.0	0	-37.924800	145.349590
204	Gladstone Park	0.0	0	-37.574513	144.929677
201	Garfield North	0.0	0	-37.875150	145.306296
198	Fraser Rise	0.0	0	-37.854576	144.982364
197	Frankston South	0.0	0	-37.981470	145.134200
193	Footscray	0.0	0	-37.798710	145.052010
188	Fingal	0.0	0	-37.833010	144.924340
186	Ferny Creek	0.0	0	-37.760710	145.234210
184	Fernshaw	0.0	0	-37.747290	145.235480
176	Essendon Fields	0.0	0	-37.917570	145.158940
174	Epping	0.0	0	-37.741475	144.880424
172	Emerald	0.0	0	-37.760990	144.944460
218	Hallam	0.0	0	-38.133072	145.322398
263	Kilsyth South	0.0	0	-37.612242	145.097847
219	Hampton	0.0	0	-37.793890	145.077900
227	Healesville	0.0	0	-37.690460	145.083550
261	Keysborough	0.0	0	-37.738720	144.896020
259	Kew	0.0	0	-37.696070	145.280940
255	Keilor Lodge	0.0	0	-37.801880	145.126820
254	Keilor East	0.0	0	-37.817460	145.124040
253	Keilor Downs	0.0	0	-38.142520	145.255780
252	Keilor	0.0	0	-37.862210	145.285580
251	Kealba	0.0	0	-37.602821	145.116148
247	Kalkallo	0.0	0	-37.704460	145.102150
245	Jacana	0.0	0	-37.998320	145.527109
242	Iona	0.0	0	-38.038051	145.365094
241	Hurstbridge	0.0	0	-37.808210	145.250910
240	Huntingdale	0.0	0	-37.942520	145.060040

	Suburb	Pizza Place	Cluster Labels	Latitude	Longitude
238	Hughesdale	0.0	0	-37.763520	144.922650
237	Hoppers Crossing	0.0	0	-38.083772	145.210563
236	Hoddles Creek	0.0	0	-37.875150	145.306296
230	Heathmont	0.0	0	-37.817500	144.967120
229	Heatherton	0.0	0	-37.988122	145.084395
225	Hawthorn	0.0	0	-37.930200	145.358970
347	Nangana	0.0	0	-37.895390	145.013220
348	Nar Nar Goon	0.0	0	-37.881100	145.096950
351	Narre Warren East	0.0	0	-37.637680	145.194320
486	Tremont	0.0	0	-37.850989	144.894780
485	Travancore	0.0	0	-37.980140	145.299790
484	Tottenham	0.0	0	-37.584208	144.912391
483	Tootgarook	0.0	0	-37.779000	145.217860
482	Toorongo	0.0	0	-37.850989	144.894780
481	Toorak	0.0	0	-37.825910	144.951510
479	Tooradin	0.0	0	-37.985270	145.217940
478	Toolern Vale	0.0	0	-37.817500	144.967120
476	Tonimbuk	0.0	0	-37.941220	145.102690
473	Thornbury	0.0	0	-38.176355	145.309029
471	The Patch	0.0	0	-37.668334	145.123625
468	Templestowe	0.0	0	-37.739800	144.863600
466	Taylors Lakes	0.0	0	-37.820180	144.849270
464	Tarrawarra	0.0	0	-37.728840	145.095380
463	Tarneit	0.0	0	-37.756470	145.130410
462	Sydenham	0.0	0	-37.844210	144.994640
461	Surrey Hills	0.0	0	-37.743462	145.217197
490	Tyabb	0.0	0	-37.741250	144.939870
460	Sunshine West	0.0	0	-37.686040	144.926100
491	Tynong	0.0	0	-37.907460	145.131970
496	Vermont South	0.0	0	-37.856870	144.974220
535	Yarrambat	0.0	0	-37.771740	145.458380
533	Yan Yean	0.0	0	-37.912360	145.368320
532	Yallambie	0.0	0	-37.767190	144.864110
531	Wyndham Vale	0.0	0	-37.677850	145.014310
527	Windsor	0.0	0	-37.839130	144.992730
526	Williamstown North	0.0	0	-37.791330	144.889950
524	Williams Landing	0.0	0	-37.893730	145.404250
522	Whittlesea	0.0	0	-37.825230	145.097390
521	Wheelers Hill	0.0	0	-37.845430	145.360790

	Suburb	Pizza Place	Cluster Labels	Latitude	Longitude
517	Wesburn	0.0	0	-37.630885	144.891526
516	Werribee South	0.0	0	-37.855500	145.315380
515	Werribee	0.0	0	-37.763730	145.110210
514	Weir Views	0.0	0	-37.876060	145.409010
512	Watsons Creek	0.0	0	-37.802890	144.890080
505	Warneet	0.0	0	-37.954210	145.214020
503	Warburton	0.0	0	-37.817500	144.967120
497	Vervale	0.0	0	-37.932475	145.419342
492	Tynong North	0.0	0	-37.941590	145.126820
459	Sunshine North	0.0	0	-37.906460	145.018230
456	Strathtulloh	0.0	0	-37.657180	145.075350
455	Strathmore Heights	0.0	0	-37.961090	145.360700
391	Portsea	0.0	0	-37.841350	145.358620
390	Port Melbourne	0.0	0	-37.722440	145.073470
388	Point Cook	0.0	0	-37.906080	145.338160
387	Plumpton	0.0	0	-37.679682	144.909245
386	Plenty	0.0	0	-37.862850	145.351580
382	Pascoe Vale	0.0	0	-37.817500	144.967120
381	Parwan	0.0	0	-37.679682	144.909245
380	Parkville	0.0	0	-37.862911	145.440387
378	Park Orchards	0.0	0	-37.717310	144.830780
371	Officer South	0.0	0	-37.967610	145.073900
370	Officer	0.0	0	-37.636380	144.807380
368	Oakleigh East	0.0	0	-37.978241	145.532664
363	Nutfield	0.0	0	-38.081540	145.214010
359	North Warrandyte	0.0	0	-37.787470	145.237720
356	Noble Park	0.0	0	-37.753820	144.888660
355	Niddrie	0.0	0	-38.033430	145.558450
353	Narre Warren South	0.0	0	-37.825220	144.993700
395	Princes Hill	0.0	0	-37.809730	144.856520
396	Quandong	0.0	0	-37.817500	144.967120
397	Ravenhall	0.0	0	-37.569290	144.891050
401	Research	0.0	0	-37.876530	144.994950
451	St Kilda West	0.0	0	-37.719808	145.073897
450	St Kilda East	0.0	0	-37.978140	145.257560
449	St Kilda	0.0	0	-38.161696	145.261684
447	St Andrews Beach	0.0	0	-38.008300	145.513830
446	St Andrews	0.0	0	-37.891860	145.233000
441	Southbank	0.0	0	-37.783140	144.869640

	Suburb	Pizza Place	Cluster Labels	Latitude	Longitude
439	South Wharf	0.0	0	-37.738480	144.876598
430	Skye	0.0	0	-37.770440	145.132240
171	Elwood	0.0	0	-37.817500	144.967120
423	Seddon	0.0	0	-37.584208	144.912391
419	Scoresby	0.0	0	-37.637640	145.194250
418	Sassafras	0.0	0	-37.717713	145.075356
417	Sandringham	0.0	0	-37.840980	145.265910
415	Safety Beach	0.0	0	-38.133800	145.489120
414	Rythdale	0.0	0	-37.875150	145.306296
411	Rowville	0.0	0	-37.902360	145.105190
408	Rockbank	0.0	0	-37.849430	144.961650
403	Richmond	0.0	0	-37.781490	144.932850
421	Seaford	0.0	0	-37.741478	145.340509
170	Eltham North	0.0	0	-37.844040	144.951260
537	Yuroke	0.0	0	-38.381232	145.198306
139	Croydon North	0.0	0	-38.136946	145.488481
141	Dallas	0.0	0	-37.895900	145.004990
50	Blackburn North	0.0	0	-37.829660	144.885170
78	Burnley	0.0	0	-37.607360	144.590230
49	Blackburn	0.0	0	-37.825240	144.960930
48	Black Rock	0.0	0	-37.875150	145.306296
143	Dandenong North	0.0	0	-37.751530	144.909510
47	Bittern	0.0	0	-37.990780	145.081070
46	Big Pats Creek	0.0	0	-37.778910	145.427270
145	Deanside	0.0	0	-37.875150	145.306296
43	Bentleigh East	0.0	0	-37.588030	145.139680
146	Deepdene	0.0	0	-37.908650	145.355750
80	Burnside Heights	0.0	0	-37.924344	145.170918
39	Belgrave South	0.0	0	-37.817500	144.967120
37	Belgrave	0.0	0	-37.891500	145.317850
36	Beenak	0.0	0	-37.812400	145.455030
71	Brunswick East	0.0	0	-37.842600	144.881950
32	Bayswater North	0.0	0	-37.805540	144.880020
106	Chelsea	0.0	0	-37.987850	145.352390
138	Croydon Hills	0.0	0	-38.136946	145.488481
137	Croydon	0.0	0	-37.876020	145.253020
51	Blackburn South	0.0	0	-37.947520	145.153150
122	Coburg North	0.0	0	-37.947460	145.191800
73	Bulla	0.0	0	-37.705380	144.920570

	Suburb	Pizza Place	Cluster Labels	Latitude	Longitude
68	Brookfield	0.0	0	-37.769120	144.886420
128	Cora Lynn	0.0	0	-38.244070	145.541920
63	Braybrook	0.0	0	-37.807240	145.034110
74	Bulleen	0.0	0	-37.530620	144.947730
75	Bundoora	0.0	0	-37.939104	145.186912
59	Box Hill	0.0	0	-37.978550	145.147250
152	Diamond Creek	0.0	0	-37.815690	145.227500
76	Bunyip	0.0	0	-37.828250	145.012760
133	Cranbourne North	0.0	0	-37.817500	144.967120
134	Cranbourne South	0.0	0	-37.729660	145.382980
57	Boronia	0.0	0	-37.875150	145.306296
121	Coburg	0.0	0	-37.966970	145.189980
120	Cobblebank	0.0	0	-37.911140	145.039180
135	Cremorne	0.0	0	-37.841460	145.012080
53	Blind Bight	0.0	0	-38.352510	145.202976
52	Blairstown	0.0	0	-37.716690	144.916980
132	Cranbourne East	0.0	0	-37.925944	145.508090
86	Cambarville	0.0	0	-37.848110	145.229070
82	Burwood East	0.0	0	-38.420081	144.831265
27	Balwyn North	0.0	0	-37.974230	145.381080
99	Carrum Downs	0.0	0	-37.817500	144.967120
101	Caulfield	0.0	0	-37.987700	145.239710
113	Clarkefield	0.0	0	-37.702140	144.898830
160	Donvale	0.0	0	-37.767339	144.966055
102	Caulfield East	0.0	0	-37.713410	144.889590
161	Doreen	0.0	0	-37.622000	144.932640
105	Chadstone	0.0	0	-37.801120	145.110230
12	Armadale	0.0	0	-37.812114	144.877308
10	Altona North	0.0	0	-37.882520	145.295000
87	Camberwell	0.0	0	-37.985890	145.051770
9	Altona Meadows	0.0	0	-37.880515	145.408241
7	Alphington	0.0	0	-38.012330	145.205950
6	Albion	0.0	0	-38.336788	145.169228
163	Dromana	0.0	0	-37.899220	145.093580
110	Christmas Hills	0.0	0	-38.373722	144.913594
164	Eaglemont	0.0	0	-37.711870	144.886970
109	Chirnside Park	0.0	0	-37.713560	144.868700
4	Albanvale	0.0	0	-37.875150	145.306296
3	Airport West	0.0	0	-37.786250	145.381630

	Suburb	Pizza Place	Cluster Labels	Latitude	Longitude
167	Edithvale	0.0	0	-37.595496	144.911785
8	Altona	0.0	0	-37.701350	144.962750
159	Doncaster East	0.0	0	-37.817890	145.366780
72	Brunswick West	0.0	0	-37.735560	144.887950
21	Avonsleigh	0.0	0	-37.701080	145.069700
25	Balnarring Beach	0.0	0	-37.666050	145.124200
20	Avondale Heights	0.0	0	-37.705410	145.560960
94	Carlton	0.0	0	-37.828300	144.789520
95	Carlton North	0.0	0	-37.757530	145.351010
22	Badger Creek	0.0	0	-37.729010	145.096290
96	Carnegie	0.0	0	-37.972847	145.186540
24	Balnarring	0.0	0	-37.682179	144.915547
158	Doncaster	0.0	0	-37.898430	145.391240
26	Balwyn	0.0	0	-38.045540	145.367970
15	Ashburton	0.0	0	-37.825230	145.290460
153	Diggers Rest	0.0	0	-37.703810	144.641530
157	Don Valley	0.0	0	-37.817500	144.967120

In [40]:

```
# Cluster 1  
melb_merged.loc[melb_merged['Cluster Labels'] == 1]
```

Out[40]:

	Suburb	Pizza Place	Cluster Labels	Latitude	Longitude
376	Pakenham Upper	0.060000	1	-37.768261	145.027638
372	Olinda	0.040000	1	-37.857400	144.737880
350	Narre Warren	0.040000	1	-38.074640	145.275620
85	Caldermeade	0.040000	1	-37.730080	144.756250
352	Narre Warren North	0.045455	1	-38.124550	145.248570
369	Oakleigh South	0.066667	1	-38.061570	145.258174
349	Nar Nar Goon North	0.106383	1	-38.048110	145.113960
360	Northcote	0.040000	1	-37.769230	144.775060
168	Elsternwick	0.040000	1	-38.036750	145.114380
362	Nunawading	0.040000	1	-37.730070	144.815710
333	Moorooduc	0.040000	1	-37.758390	144.743480
103	Caulfield North	0.040000	1	-37.764210	145.067560
366	Oaklands Junction	0.040000	1	-37.780441	145.065299
97	Caroline Springs	0.047619	1	-38.355948	144.932519
98	Carrum	0.040000	1	-38.033900	145.265750
77	Bunyip North	0.040000	1	-37.761280	144.754800
324	Monbulk	0.040000	1	-37.675900	144.884480
314	Merricks	0.060000	1	-37.741440	145.003440
364	Nyora	0.061224	1	-38.045140	145.136810
169	Eltham	0.040000	1	-37.744600	144.770250
70	Brunswick	0.060000	1	-38.063060	145.299530
28	Bangholme	0.040000	1	-37.774510	145.018870
480	Tooradin North	0.040000	1	-37.846915	144.677040
493	Upper Ferntree Gully	0.040000	1	-37.772640	145.057980
495	Vermont	0.045455	1	-38.072769	145.127340
18	Aspendale Gardens	0.040000	1	-38.007240	145.279020
498	Viewbank	0.040000	1	-38.026660	145.102020
499	Wandin East	0.047619	1	-37.629290	145.153350
502	Wantirna South	0.045455	1	-38.134280	145.294840
30	Bayles	0.043478	1	-37.716441	144.734597
506	Warrandyte	0.045455	1	-37.668940	144.765690
510	Watsonia	0.040000	1	-38.018220	145.113590
511	Watsonia North	0.040000	1	-37.669910	144.887920
14	Ascot Vale	0.041667	1	-38.275481	145.030648
513	Wattle Glen	0.040000	1	-37.777647	144.801120
13	Arthurs Seat	0.040000	1	-38.074090	145.145210
523	Wildwood	0.037037	1	-38.020610	145.385470

	Suburb	Pizza Place	Cluster Labels	Latitude	Longitude
528	Wollert	0.060000	1	-37.701810	144.762890
530	Woodstock	0.048780	1	-37.837700	144.672900
508	Warranwood	0.040000	1	-37.862310	144.769760
379	Parkdale	0.060000	1	-37.752820	145.050470
470	The Basin	0.080000	1	-37.766360	145.045400
34	Beaconsfield Upper	0.043478	1	-37.716441	144.734597
384	Patterson Lakes	0.040000	1	-37.747920	145.041670
69	Brooklyn	0.040000	1	-37.817780	145.154140
394	Preston	0.040000	1	-37.719780	144.770630
61	Box Hill South	0.040000	1	-38.057919	145.286615
405	Ringwood East	0.051282	1	-38.182590	145.185000
407	Ripponlea	0.037037	1	-38.102720	145.198840
412	Roxburgh Park	0.040000	1	-37.657517	144.896149
56	Bonnie Brook	0.058824	1	-37.869210	144.602730
469	Templestowe Lower	0.040000	1	-37.700970	144.798450
55	Boneo	0.040000	1	-37.895500	144.754140
426	Seville East	0.035714	1	-37.735820	145.271570
429	Silvan	0.200000	1	-37.778400	145.531370
431	Smiths Gully	0.065217	1	-37.878300	144.757640
435	Sorrento	0.040000	1	-37.667610	144.822063
438	South Morang	0.055556	1	-37.726540	144.598150
42	Bentleigh	0.040000	1	-37.801920	145.178160
38	Belgrave Heights	0.040000	1	-37.852090	144.723990
35	Beaumaris	0.040000	1	-37.767494	145.253364
420	Seabrook	0.040000	1	-37.798350	144.978600
312	Menzies Creek	0.040000	1	-37.728087	144.751125
0	Abbotsford	0.060000	1	-37.776843	145.029515
234	Highbett	0.040000	1	-38.185380	145.163420
131	Cranbourne	0.040000	1	-37.723720	144.983110
224	Hastings	0.040000	1	-37.750590	144.741121
130	Craigieburn	0.055556	1	-37.710570	144.724220
265	Kinglake West	0.058824	1	-38.315381	145.000140
223	Harkness	0.040000	1	-37.700529	144.796350
258	Kensington	0.062500	1	-38.053030	145.253120
118	Clyde	0.076923	1	-37.713510	144.588660
147	Deer Park	0.044444	1	-38.368539	144.772244
148	Delahey	0.037037	1	-38.086965	145.182051
284	Longwarry	0.043478	1	-38.074270	145.133910
283	Little River	0.040000	1	-37.724888	144.801844

	Suburb	Pizza Place	Cluster Labels	Latitude	Longitude
281	Laverton North	0.060000	1	-37.710000	144.764060
149	Derrimut	0.050000	1	-38.062920	145.119510
274	Lalor	0.060000	1	-37.693471	144.763637
273	Kurunjang	0.040000	1	-37.700529	144.796350
272	Kooyong	0.058824	1	-38.344627	144.741961
205	Gladysdale	0.040000	1	-38.014510	145.133100
210	Gowanbrae	0.040000	1	-37.769400	144.999000
123	Cockatoo	0.062500	1	-37.676380	144.769180
211	Grangefields	0.040000	1	-37.700529	144.796350
124	Cocoroc	0.040000	1	-37.756670	145.000920
185	Ferntree Gully	0.040000	1	-37.863910	144.703980
250	Kangaroo Ground	0.057143	1	-38.385267	144.812166
257	Keilor Park	0.040000	1	-38.008290	145.112590
226	Hawthorn East	0.060000	1	-37.750220	145.037820
233	Heidelberg West	0.040000	1	-37.871770	144.777600
231	Heidelberg	0.060000	1	-37.779420	145.025030
112	Clarinda	0.071429	1	-38.297193	145.184979
107	Chelsea Heights	0.060000	1	-37.698218	144.767325
228	Heath Hill	0.040816	1	-38.372249	144.874088
179	Eumemmerring	0.040000	1	-37.855652	144.780896
244	Ivanhoe East	0.040000	1	-37.772050	144.799970
297	Manor Lakes	0.040000	1	-37.696680	144.781380
212	Greensborough	0.040000	1	-37.775560	144.815610
182	Fairfield	0.063830	1	-37.875330	144.759332
248	Kallista	0.035714	1	-37.664200	145.182150
116	Clematis	0.060000	1	-37.751710	144.778070

In [41]:

```
# Cluster 2  
melb_merged.loc[melb_merged['Cluster Labels'] == 2]
```

Out[41]:

	Suburb	Pizza Place	Cluster Labels	Latitude	Longitude
45	Beveridge	0.020000	2	-37.787590	144.832470
31	Bayswater	0.023256	2	-37.688570	144.745180
474	Thornhill Park	0.020000	2	-37.815060	145.193560
443	Springvale	0.032258	2	-38.106234	145.187910
442	Spotswood	0.020000	2	-38.138795	145.158694
453	Strathewen	0.020000	2	-38.113100	145.137420
475	Three Bridges	0.020000	2	-37.770353	145.280355
151	Dewhurst	0.020000	2	-37.836300	145.062510
477	Toolangi	0.020000	2	-37.867780	144.843770
29	Baxter	0.020000	2	-37.597396	144.936400
440	South Yarra	0.020000	2	-37.852490	145.036550
232	Heidelberg Heights	0.020408	2	-37.863820	144.824820
437	South Melbourne	0.020000	2	-37.642940	144.947850
472	Thomastown	0.023810	2	-37.642799	144.824657
150	Devon Meadows	0.020000	2	-37.774300	145.274790
444	Springvale South	0.032258	2	-37.618605	145.000409
217	Hadfield	0.020000	2	-37.902980	145.142540
40	Bellfield	0.020000	2	-37.803060	144.997180
457	Sunbury	0.020000	2	-37.882980	145.165140
222	Harkaway	0.020000	2	-37.768700	145.298030
448	St Helena	0.020000	2	-37.866910	145.102920
221	Hampton Park	0.020000	2	-37.599500	144.945480
220	Hampton East	0.027027	2	-38.032650	145.177390
458	Sunshine	0.020000	2	-37.909370	144.997460
44	Berwick	0.020000	2	-37.815003	144.963977
465	Taylors Hill	0.020000	2	-38.058383	145.340501
144	Dandenong South	0.020000	2	-37.718950	144.894660
452	Steels Creek	0.020000	2	-37.883840	144.623650
467	Tecoma	0.020000	2	-37.856600	145.184300
33	Beaconsfield	0.020000	2	-37.768500	144.975740
454	Strathmore	0.020000	2	-38.020370	145.306210
41	Bend of Islands	0.020000	2	-37.742730	145.065280
445	St Albans	0.020000	2	-37.699910	145.115000
108	Cheltenham	0.020000	2	-37.738888	144.766601
154	Dingley Village	0.020000	2	-37.830280	145.055520
189	Fitzroy	0.023256	2	-37.836230	144.707230
187	Fieldstone	0.020000	2	-37.814260	144.963070

	Suburb	Pizza Place	Cluster Labels	Latitude	Longitude
162	Doveton	0.020000	2	-37.799280	144.987550
183	Fawkner	0.020000	2	-37.800540	144.946090
11	Ardeer	0.020000	2	-37.968930	145.030700
518	West Footscray	0.020000	2	-37.733850	144.777050
519	West Melbourne	0.020000	2	-37.875290	145.048310
520	Westmeadows	0.020000	2	-37.854750	145.052220
181	Eynesbury	0.020000	2	-37.670060	144.849340
180	Exford	0.020000	2	-37.638850	144.914820
190	Fitzroy North	0.022222	2	-38.377768	144.850169
178	Essendon West	0.020000	2	-37.886616	145.072316
177	Essendon North	0.020000	2	-37.897700	145.069940
5	Albert Park	0.020000	2	-37.732711	144.774018
175	Essendon	0.020000	2	-37.883970	145.127490
529	Wonga Park	0.020000	2	-37.794210	144.927540
173	Endeavour Hills	0.020000	2	-37.663220	144.937780
165	East Melbourne	0.020000	2	-38.019663	145.323610
166	Eden Park	0.020000	2	-37.764800	144.831030
2	Aintree	0.020000	2	-37.899664	144.649732
534	Yannathan	0.020000	2	-37.790260	144.994810
1	Aberfeldie	0.028571	2	-38.182980	145.090250
525	Williamstown	0.020000	2	-37.820871	144.955427
208	Glen Waverley	0.020000	2	-37.813890	145.332500
509	Waterways	0.020000	2	-37.948600	145.040830
507	Warrandyte South	0.020000	2	-37.713220	144.858820
206	Glen Huntly	0.020000	2	-37.714350	145.148500
436	South Kingsville	0.020000	2	-37.788140	144.929650
487	Truganina	0.020000	2	-37.816130	144.964310
488	Tuerong	0.020000	2	-37.816990	144.999450
489	Tullamarine	0.020000	2	-37.769470	144.961710
155	Dixons Creek	0.020000	2	-37.813266	144.961666
203	Gilderoy	0.020000	2	-37.773990	145.248290
19	Attwood	0.020000	2	-37.842810	145.171110
202	Gembrook	0.020000	2	-37.825220	145.080830
494	Upwey	0.020000	2	-37.712934	144.973614
191	Flemington	0.020000	2	-37.729630	145.123390
156	Docklands	0.020000	2	-37.837830	144.858112
17	Aspendale	0.020000	2	-37.710150	144.950340
199	Gardenvale	0.020000	2	-37.811500	145.081590
196	Frankston North	0.020000	2	-37.751076	145.337112

	Suburb	Pizza Place	Cluster Labels	Latitude	Longitude
500	Wandin North	0.020000	2	-37.816490	144.889280
501	Wantirna	0.020000	2	-37.687360	144.913510
195	Frankston	0.022222	2	-37.674240	145.157070
16	Ashwood	0.020000	2	-37.774021	145.307438
504	Warburton East	0.020000	2	-37.758886	145.306490
194	Forest Hill	0.020000	2	-37.690020	145.131490
192	Flinders	0.029412	2	-38.322679	144.700158
200	Garfield	0.020000	2	-37.666750	144.949700
23	Balaclava	0.020000	2	-37.886860	145.369890
425	Seville	0.033333	2	-37.612650	145.020540
433	Somerton	0.020000	2	-37.889310	145.041390
292	Maidstone	0.020000	2	-37.802650	145.315000
344	Mount Waverley	0.034483	2	-38.203955	145.120740
345	Mulgrave	0.020000	2	-37.783440	145.311280
291	Macleod	0.020000	2	-37.856677	144.871231
84	Calder Park	0.020000	2	-37.839130	145.146520
83	Cairnlea	0.020000	2	-37.800370	145.144670
290	Macclesfield	0.020000	2	-37.912110	144.681690
289	Lysterfield South	0.020000	2	-37.665210	144.933100
288	Lysterfield	0.020000	2	-37.656233	144.920069
287	Lyndhurst	0.025641	2	-37.813530	145.288020
286	Lynbrook	0.021739	2	-38.095040	145.293400
354	Newport	0.022727	2	-38.082799	145.323804
79	Burnside	0.020000	2	-37.847095	145.038094
357	Noble Park North	0.020000	2	-37.999180	145.249980
358	North Melbourne	0.020000	2	-37.943320	145.244070
361	Notting Hill	0.020000	2	-38.001170	145.093700
282	Lilydale	0.020000	2	-37.806912	145.133989
119	Clyde North	0.020000	2	-37.741290	144.967070
365	Oak Park	0.020000	2	-37.819100	145.175810
279	Launching Place	0.020000	2	-37.903190	144.660540
367	Oakleigh	0.020000	2	-38.230292	145.060074
117	Clifton Hill	0.020000	2	-37.665629	144.928221
88	Campbellfield	0.020000	2	-38.117920	145.159330
89	Cannons Creek	0.020000	2	-37.798750	145.280190
90	Canterbury	0.020000	2	-37.920269	145.016491
111	Chum Creek	0.020000	2	-37.871900	145.244620
315	Merricks Beach	0.020000	2	-37.781560	144.970130
306	Melbourne CBD	0.027778	2	-38.063160	145.244340

	Suburb	Pizza Place	Cluster Labels	Latitude	Longitude
104	Caulfield South	0.020000	2	-37.811320	144.977990
305	Melbourne Airport	0.020000	2	-37.695060	144.886000
320	Millgrove	0.020000	2	-37.806710	144.950380
302	McKinnon	0.020000	2	-37.689330	145.142770
100	Catani	0.020000	2	-37.850100	145.149110
114	Clayton	0.020000	2	-37.717590	145.120770
115	Clayton South	0.020000	2	-37.822850	145.035300
276	Lang Lang East	0.027778	2	-37.743750	144.735450
325	Monomeith	0.020000	2	-37.878150	145.044640
327	Mont Albert North	0.020000	2	-38.030560	145.346820
298	Maribyrnong	0.020000	2	-37.818180	145.316530
329	Montrose	0.020000	2	-37.806912	145.133989
331	Moorabbin	0.020000	2	-37.794216	144.955790
296	Mambourin	0.020000	2	-38.141775	145.123042
294	Malvern	0.020000	2	-37.833660	144.871460
335	Mordialloc	0.020000	2	-37.757900	145.069390
93	Cardinia	0.020000	2	-37.849500	145.120170
92	Capel Sound	0.025000	2	-38.069939	145.456574
91	Cape Schanck	0.020000	2	-37.637323	145.066151
299	Maryknoll	0.033333	2	-38.100930	145.182910
434	Somerville	0.020000	2	-37.723990	144.939710
275	Lang Lang	0.020000	2	-37.889310	145.057050
374	Pakenham	0.020000	2	-37.755850	145.092040
406	Ringwood North	0.020000	2	-37.716360	144.790810
256	Keilor North	0.020000	2	-37.837830	145.120170
409	Rosanna	0.020000	2	-37.863100	145.077160
410	Rosebud	0.020000	2	-37.903870	145.039960
58	Botanic Ridge	0.025000	2	-38.090970	145.332400
413	Rye	0.025641	2	-38.071510	145.481470
249	Kalorama	0.020000	2	-37.848609	145.043601
416	Sandhurst	0.020000	2	-37.819220	144.945610
54	Bonbeach	0.020000	2	-37.939000	145.002230
246	Junction Village	0.026316	2	-38.080820	145.266140
136	Crib Point	0.020000	2	-37.792740	144.958250
422	Seaholme	0.020000	2	-37.783480	144.983680
243	Ivanhoe	0.020000	2	-37.830470	144.841340
424	Selby	0.020000	2	-37.836150	145.195240
239	Humevale	0.020000	2	-37.794130	144.818760
427	Sherbrooke	0.020000	2	-37.868780	145.242620

	Suburb	Pizza Place	Cluster Labels	Latitude	Longitude
428	Shoreham	0.023256	2	-37.703560	145.180360
140	Croydon South	0.020000	2	-37.844210	145.035010
142	Dandenong	0.020000	2	-37.646200	145.026180
235	Hillside	0.020000	2	-37.878909	144.625285
432	Somers	0.020000	2	-37.708150	145.000700
404	Ringwood	0.027027	2	-38.144900	145.204210
60	Box Hill North	0.023256	2	-37.744250	144.800210
402	Reservoir	0.022727	2	-37.794150	144.771480
400	Reefton	0.020000	2	-37.851640	144.867870
375	Pakenham South	0.020833	2	-37.760150	145.328610
271	Koo Wee Rup North	0.020000	2	-37.789180	144.971880
377	Panton Hill	0.020000	2	-37.951690	145.003830
270	Koo Wee Rup	0.020000	2	-37.801010	144.969520
267	Kingsbury	0.020000	2	-37.810990	145.066080
383	Pascoe Vale South	0.020000	2	-37.808073	144.945572
125	Coldstream	0.020000	2	-37.813266	144.961666
385	Pearcedale	0.020000	2	-37.908232	145.218038
126	Collingwood	0.020000	2	-37.665629	144.928221
127	Coolaroo	0.020000	2	-38.171060	145.120950
373	Ormond	0.022727	2	-37.638189	145.093212
67	Broadmeadows	0.020000	2	-38.141180	145.121760
66	Brighton East	0.020000	2	-37.738888	144.766601
65	Brighton	0.020000	2	-37.869030	144.995650
392	Powelltown	0.020000	2	-37.860800	144.902350
393	Prahran	0.022727	2	-37.637050	145.095670
260	Kew East	0.020000	2	-37.917920	145.034500
64	Briar Hill	0.020000	2	-37.759290	144.895800
129	Cottles Bridge	0.020833	2	-37.926560	145.245000
62	Braeside	0.020000	2	-37.933030	145.033880
398	Red Hill	0.020000	2	-35.319348	149.114516
399	Red Hill South	0.022222	2	-37.633865	145.085623
389	Point Leo	0.020000	2	-35.319348	149.114516
81	Burwood	0.020000	2	-37.816190	145.109210

In [42]:

```
cluster_0 = melb_merged.loc[melb_merged['Cluster Labels'] == 0]
len_cluster_0 = len(cluster_0)

cluster_1 = melb_merged.loc[melb_merged['Cluster Labels'] == 1]
len_cluster_1 = len(cluster_1)

cluster_2 = melb_merged.loc[melb_merged['Cluster Labels'] == 2]
len_cluster_2 = len(cluster_2)

print('Total suburbs in cluster 0 =', len_cluster_0)
print('Total suburbs in cluster 1 =', len_cluster_1)
print('Total suburbs in cluster 2 =', len_cluster_2)
```

```
Total suburbs in cluster 0 = 249
Total suburbs in cluster 1 = 102
Total suburbs in cluster 2 = 187
```

Observations and analysis:

The results from the k-means clustering shows we can categorize suburbs in 3 clusters based on the frequency of occurrence for “Italian restaurant”:

- Cluster 0 (red in map): Suburbs with low concentration of pizza places; around 46%
- Cluster 1 (blue in map): Suburbs with high concentration of pizza places; around 19%
- Cluster 2 (green in map): Suburbs with medium pizza places; around 35%

Analysis shows that most pizza places are clustered around mid city. This is just where the commercial areas end and the residential areas begin. One exception to that is Brunswick, where there is the famous Lygon street full of Italian restaurants and pizza places.

If a person were to open a pizza place in Melbourne, according to me the place should be somewhere in cluster 1, where there is a high concentration on pizza places. A high concentration of pizza places suggests that there is a high demand for pizza in those areas. However, a high concentration also means high competition. So one must open a pizza place where there is a high demand and then differentiate the product offering in a way that is able to beat the competition and stand out. So, I would suggest that a person should open a pizza place on Lygon street in Brunswick with a highly differentiated and competitive product offering.

In []:

In []: