

# APPLIED DATA SCIENCE CAPSTONE

## Manhattan Restaurants

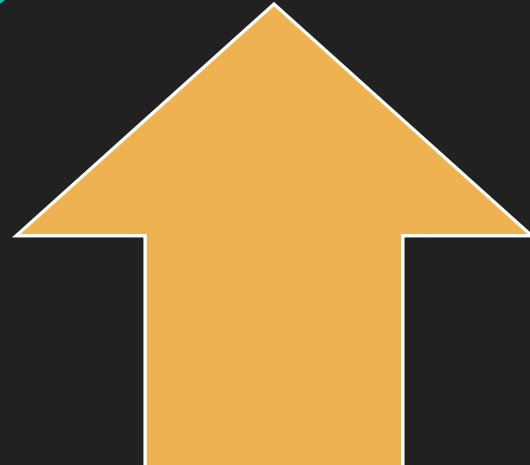
Keynon Kong

March 22, 2021

IBM Data Science Professional Certification, Coursera

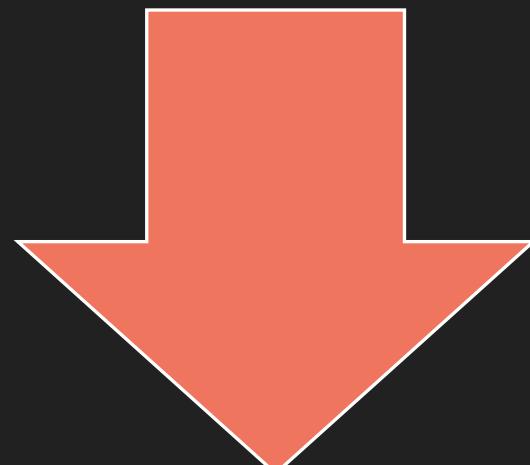
# INTRODUCTION

# Small Business Success Rates



**80%**

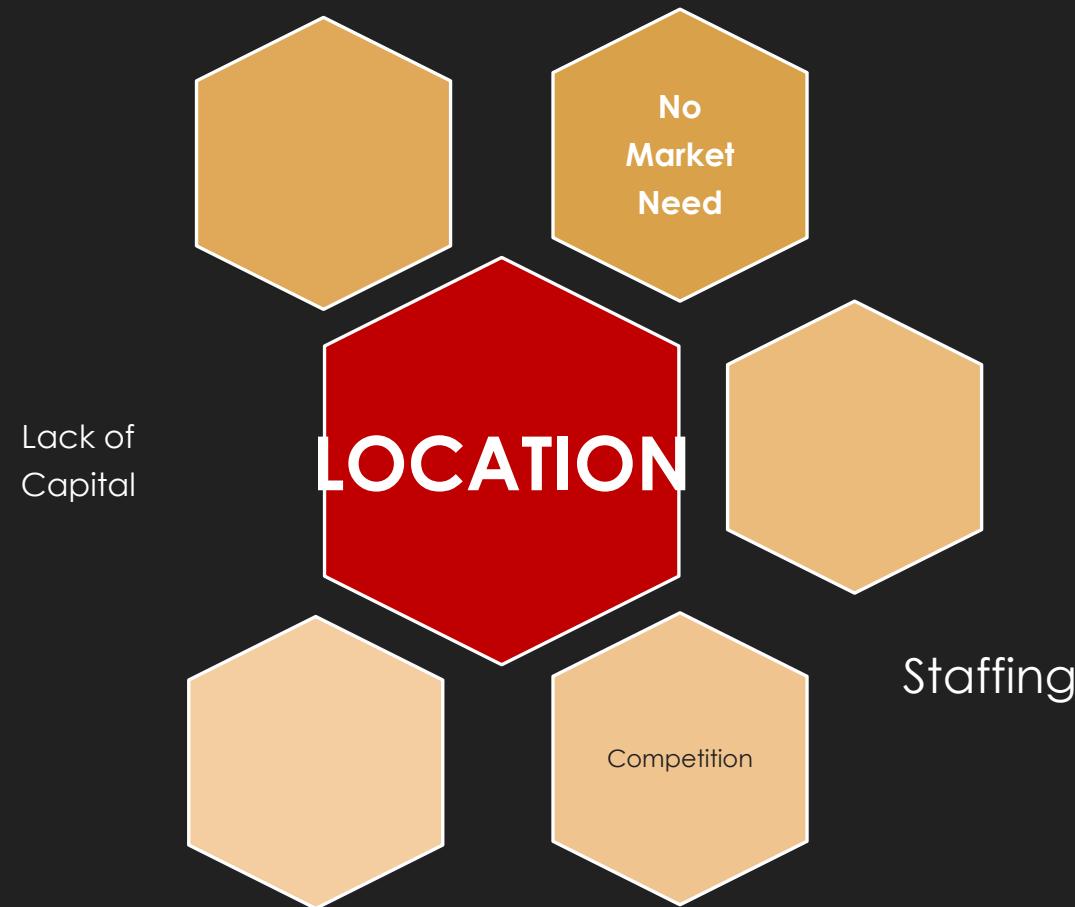
of small businesses  
survive year 1



**45.4%-51%**

of small businesses  
survive year 5

# Failure Factors



# DATA & METHODOLOGY

# Data Sourcing



**New York Location Data**

IBM Developer Skills Network JSON file



**Venue Data**

FourSquare Developer Data

# Method Process



```

CLIENT_ID = 'M2BTOCU14GBRG0CBTRN4WRXF2C2Y2FLNPQ2FPTYN4OKEK25L' # your Foursquare ID
CLIENT_SECRET = '3BANEW51DGNNNVT2RL5PJZEA4WCWQ4FBU14QP23QMIGZH' # your Foursquare Secret
VERSION = '20180605' # Foursquare API version
LIMIT = 100 # A default Foursquare API limit value

print('Your credentials:')
print('CLIENT_ID: ' + CLIENT_ID)
print('CLIENT_SECRET: ' + CLIENT_SECRET)

Your credentials:
CLIENT_ID: M2BTOCU14GBRG0CBTRN4WRXF2C2Y2FLNPQ2FPTYN4OKEK25L
CLIENT_SECRET: 3BANEW51DGNNNVT2RL5PJZEA4WCWQ4FBU14QP23QMIGZH

manhattan_data.loc[0, 'Neighborhood']

#1: 'Marble Hill'

neighborhood_latitude = manhattan_data.loc[0, 'Latitude'] # neighborhood latitude value
neighborhood_longitude = manhattan_data.loc[0, 'Longitude'] # neighborhood longitude value

neighborhood_name = manhattan_data.loc[0, 'Neighborhood'] # neighborhood name

print('Latitude and longitude values of {} are {}, {}'.format(neighborhood_name,
                                                               neighborhood_latitude,
                                                               neighborhood_longitude))

Latitude and longitude values of Marble Hill are 40.87655077879964, -73.91065965862981.

# type your answer here
LIMIT = 100 # limit of number of venues returned by Foursquare API

radius = 500 # define radius

# create URL
url = "https://api.foursquare.com/v2/venues/explore?&client_id={}&client_secret={}&v={}&ll={},{}"
CLIENT_ID,
CLIENT_SECRET,
VERSION,
neighborhood_latitude,
neighborhood_longitude,
radius,
LIMIT)
url # display URL

#2: 'https://api.foursquare.com/v2/venues/explore?&client_id=M2BTOCU14GBRG0CBTRN4WRXF2C2Y2FLNPQ2FPTYN4OKEK25L&client_secret=3BANEW51DGNNNVT2RL5PJZEA4WCWQ4FBU14QP23QMIGZH&v=20180605&ll=40.87655077879964,-73.91065965862981&radius=500&limit=100'

results = requests.get(url).json()
results

#3: {'meta': {'code': 200, 'requestId': '60585b2d5002b329ee46066c'}, 'response': {'suggestedFilters': {'header': 'Tap to show:', 'filters': [{"name": "Open now", "key": "openNow"}]}, 'headerLocation': 'Marble Hill', 'headerFullLocation': 'Marble Hill, New York', 'headerLocationGranularity': 'neighborhood', 'totalResults': 23, 'suppressedBounds': {'ne': {'lat': 40.88105078329964, 'lng': -73.90471933917806}, 'sw': {'lat': 40.87205077429964, 'lng': -73.91659997808156}}, 'groups': [{"type": "Recommended Places", "name": "recommended", "items": [{"reasons": {"count": 0, "items": [{"summary": "This spot is popular", "type": "general", "reasonName": "globalInteractionReason"}]}, "venue": {"id": "454429ab9f64a52037f22563", "name": "Asturo's", "location": {"address": "5198 Broadway", "crossStreet": "at 235th St."}}]}]}
```

# RESULTS & DISCUSSION

# Highest Opportunity Areas

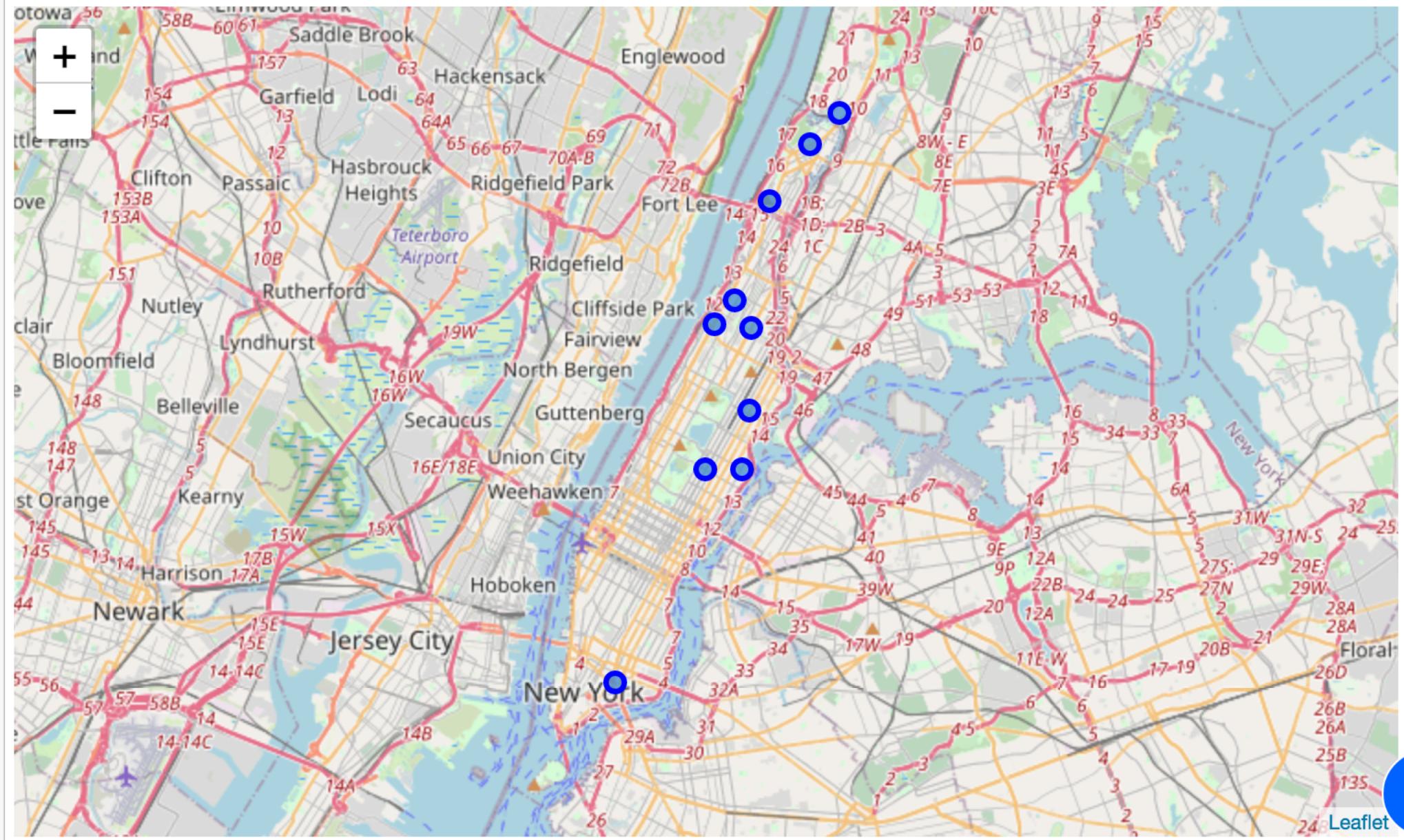
Neighbors with the lowest number of restaurants

```
In [56]: manhattan_grouped_totals.tail(10)
```

	Neighborhood	All Restaurants	Accessories Store	Adult Boutique	Food Court
14	Hudson Yards	17	0	0	0
2	Central Harlem	15	0	0	0
19	Lower East Side	14	0	0	0
17	Lincoln Square	14	0	0	0
7	East Harlem	14	0	0	0
25	Morningside Heights	10	0	0	0
0	Battery Park City	7	0	0	0
28	Roosevelt Island	2	0	0	0

- Stuyvesant Town
- Marble Hill
- Roosevelt Island
- Battery Park
- Morningside Heights
- East Harlem
- Lincoln Square
- Lower East Side
- Central Harlem
- Hudson Yards

Out[61]:



# Lowest Opportunity Areas

Neighborhoods with the highest number of restaurants

```
manhattan_grouped_totals = manhattan_onehot.groupby('Neighborhood').sum().reset_index()
manhattan_grouped_totals.sort_values(by=[ 'All Restaurants'], inplace=True, ascending=False)

col = manhattan_grouped_totals.pop("All Restaurants")
manhattan_grouped_totals.insert(1, col.name, col)

manhattan_grouped_totals.head(10)
```

	Neighborhood	All Restaurants	Accessories Store	Adult Boutique	Afghan Restaurant	African Restaurant	American Restaurant	Antique Shop	Arepas Restaurant	Argentinian Restaurant
12	Greenwich Village	43	1	0	0	0	3	0	0	0
4	Chinatown	41	0	0	0	0	4	0	0	0
36	Upper West Side	39	1	0	0	0	2	0	0	0
8	East Village	37	0	0	0	0	2	0	0	0
38	West Village	35	1	0	0	0	5	0	0	0
10	Flatiron	35	0	0	0	0	5	0	0	0
34	Turtle Bay	34	0	0	0	0	1	0	0	0
27	Noho	34	0	0	0	0	2	0	0	0
24	Midtown South	31	0	0	0	0	3	0	0	0
34	Midtown North	31	0	0	0	0	3	0	0	0
51	Union Square	31	0	0	0	0	5	0	0	0
34	Flatiron	31	0	0	0	0	1	0	0	0
40	Gramercy Park	30	0	0	0	0	2	0	0	0
38	Gramercy Park	30	0	0	0	0	2	0	0	0

- 1 • Greenwich Village
- 2 • Chinatown
- 3 • Upper West Side
- 4 • East Village
- 5 • West Village
- 6 • Flatiron
- 7 • Turtle Bay
- 8 • Noho
- 9 • Midtown South
- 10 • Murray Hill

# Category Discrepancies

\*FourSquare data limitations on categories  
 \*Definition of “Restaurant” up to discretion of analyst

Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue	11th Most Common Venue	12th Most Common Venue
Battery Park City	All Restaurants	Park	Coffee Shop	Gym	Hotel	Clothing Store	Memorial Site	Beer Garden	BBQ Joint	Sandwich Place	Boat or Ferry	Gourmet Shop
Carnegie Hill	All Restaurants	Coffee Shop	Café	Bar	Cosmetics Shop	Wine Shop	Yoga Studio	Gym	Bookstore	Pizza Place	Cocktail Bar	Gym / Fitness Center
Central Harlem	All Restaurants	Art Gallery	Gym / Fitness Center	Cosmetics Shop	Bar	Public Art	Cafeteria	Café	Spa	Cocktail Bar	Cycle Studio	Dessert Shop
Chelsea	All Restaurants	Coffee Shop	Bakery	Art Gallery	Wine Shop	Ice Cream Shop	Market	Bar	Park	Cupcake Shop	Cocktail Bar	Cycle Studio
Chinatown	All Restaurants	Bakery	Dessert Shop	Cocktail Bar	Spa	Salon / Barbershop	Sandwich Place	Optical Shop	Coffee Shop	Bubble Tea Shop	Boutique	Ice Cream Shop
Civic Center	All Restaurants	Coffee Shop	Gym / Fitness Center	Spa	Cocktail Bar	Hotel	Park	Yoga Studio	Hotel Bar	Gym	Bakery	Dance Studio
Clinton	All Restaurants	Theater	Gym / Fitness Center	Cocktail Bar	Coffee Shop	Spa	Hotel	Gym	Sandwich Place	Bar	Wine Shop	Wine Bar
East Harlem	All Restaurants	Deli / Bodega	Sandwich Place	Steakhouse	Bakery	Beer Bar	Dance Studio	Playground	Performing Arts Venue	Cocktail Bar	Park	Café
East Village	All Restaurants	Bar	Pizza Place	Wine Bar	Speakeasy	Coffee Shop	Cocktail Bar	Ice Cream Shop	Juice Bar	Bagel Shop	Dessert Shop	Jazz Club

# CONCLUSION

# Closing Remarks

## Accomplished:

- Identified high and low opportunity neighborhoods
- Plotted to show distance from each other
- Gathered other venue data for supported evidence

## Next Steps:

- Research other areas for further analysis
  - Crime rates
  - Demographic
  - Income
  - Venue popularity
  - Restaurant type breakdown
  - Transportation



Let's hear it for

**NEW YORK**  
**NEW YORK**  
**NEW YORK**

**THANK YOU**  
**THANK YOU**  
**THANK YOU**  
**THANK YOU**  
**THANK YOU**  
**THANK YOU**