

APPLIED DATA SCIENCE CAPSTONE PROJECT:

BATTLE OF THE NEIGHBOURHOODS

By Terri-Lee Meyer

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1. INTRODUCTION:

Where would be the best place to open a South African restaurant in New York?

1.1 South African Cuisine:

As a South African, I have not encountered any South African restaurants in New York City (NYC) that features different aspects of South African cooking. This means there is currently a niche in the market. I know a lot of South Africans in New York alone that miss the comfort of home cooking that brings out nostalgia in customers. South African cuisine varies between areas and cultural groups. There are indigenous dishes that have been created since the Khoisan settlers that came from central Africa. However, South Africa (SA) has been influenced by colonial periods where many other nationalities inhabited South Africa including Dutch, English and Indian. The background of South African food is important because with the many cultures included in cooking, different spices and methods are used to prepare the traditional meals.

1.2 South African Immigration to USA:

As the years have progressed, South Africans have immigrated into America at a gradual pace as well as South African tourists, students and workers contributing to the increasing population of South Africans in USA, especially in New York. The diversity of South African cuisine encourages the potential for great success across different ethnic groups.

1.3 Nando's Restaurant Background

Nando's is one very popular South African restaurant that has been franchised in other African countries, Europe and USA. However, there are no restaurants located in New York City - one of the most culturally diverse cities in the country. There are people who have traveled to Maryland and Virginia in order to buy Nando's. Opening up a Nando's store in NYC will be analysed to see how much of a success it will be not only for the African population living in NYC - but for everyone who enjoys chicken in various forms with a wide variety of sides.

2. DATA:

2.1 Data Collection:

I will be collecting data to answer the following questions:

2.1.1 Are there any South African Restaurants in New York City?

2.1.2 What is the success of Nando's Peri Peri restaurant in other USA locations?

2.1.3 Where would the best place be to open a Nando's restaurants in NYC?

- I will be using Foursquare API to determine the restaurant searches
- Looking at how many South Africans reside in NYC
- Which borough and neighborhood contain the most South Africans according to 2017 statistics found online
- Projecting the amount of South Africans in NYC in 2020 to illustrate the feasibility of having a Nando's opening in NYC
- I used data scraping and json files

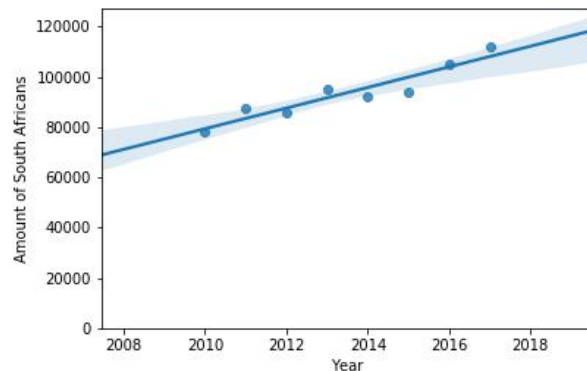
2.2 Data Cleaning:

I have used various methods in order to filter the data to be presentable and easy to use and understand including;

- Merging
- Concatenation
- Dropping unnecessary rows and columns
- Renaming columns

3. METHODOLOGY:

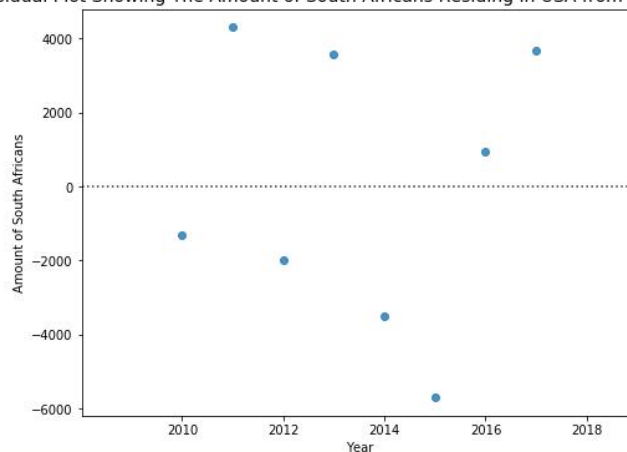
Linear Regression of the Amount of South Africans Residing in USA from 2010 to 2017



The correlation between the data is very high therefore the linear regression is the best fit for this model

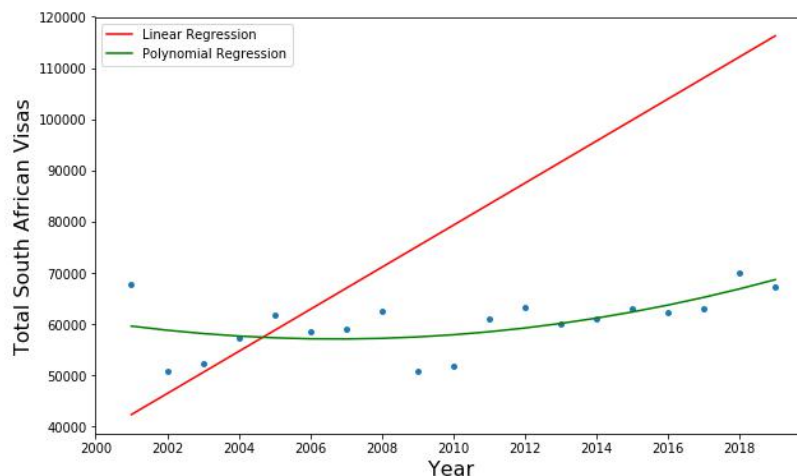
The P-value is less than 0.001 which is a great indicator for the given regression

Residual Plot Showing The Amount of South Africans Residing in USA from 2010 to 2017



- The points in the residual plot above are randomly spread out around the x-axis
- The variance is constant making the linear model is a good fit for this data

Chart Comparing the Best Fit for South African Visas Issued from 2001 to 2019



Polynomial regression provides a much better fit for the data.

TABLE SHOWING ALL EXPLORATORY AND STATISTICAL DATA FOR THE REGRESSION

MODELS USED

Test Done	South African Residents	South African Visas
Regression Used	Linear	Polynomial
Equation	$\hat{Y} = 8175125 + 4106x$	$\hat{Y} = 75(x-2002)^2 + 50776$
Mean	-12.840375125376966	-0.945590224860138
Standard Deviation	20.217012636361112	-0.945590224860138
R2-Score	0.8645329494956187	-1.9185969203612259
Training set	6	15
Testing set	2	4
Mean Absolute Error	3123.366071428638	3309.4936288088425
Mean Squared Error	11994286.066964373	22222068.30941816
Pearson Correlation Coefficient	0.9384534428165742	0.505166687139397
P-Value	0.0005562698212109472	0.027371269229226912

DATAFRAME SHOWING THE DISTRIBUTION OF AFRICAN BORN RESIDENTS IN NEW YORK CITY:

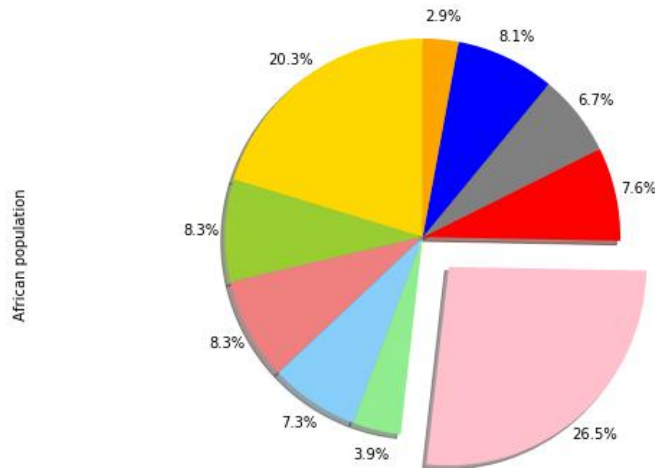
Country of Birth	Total NYC	Bronx	Brooklyn - Kings	Manhattan - New York	Queens	Staten Island - Richmond
Africa	148695	57650	34605	23243	23722	9475
Eastern Africa	10620	1304	1414	3441	4307	154
Northern Africa	28393	1548	12885	3447	6959	3554
Western Africa	92344	49993	16309	11937	9921	4184
Middle and Southern Africa	7201	1672	1575	2707	1016	231
Africa n.e.c.	10137	3133	2422	1711	1519	1352

Using the above data frame above, the borough that contains the most Africans residing in NYC is the Bronx. However, the Bronx is not at a central location to the city and Long Island so I will choose the second-largest African populated area which is Brooklyn. I will use the information to explore neighbourhoods in Brooklyn with the most prosperity for a Nando's to be opened according to the amount of Africans in the area. Looking specifically at where South Africans would be situated - Manhattan would be the best location. Looking at a Brooklyn location close to Manhattan would be best. Researching further into the top 5 restaurant neighbourhoods in Brooklyn, there were considerations for Bushwick, Crown Heights, Bed-Stuy, Greenpoint and Cobble Hill-Carroll Gardens. After filtering out data containing the

restaurants in Brooklyn separately for the neighbourhoods listed above, I found out that Greenpoint is the least restaurant dense neighbourhood.

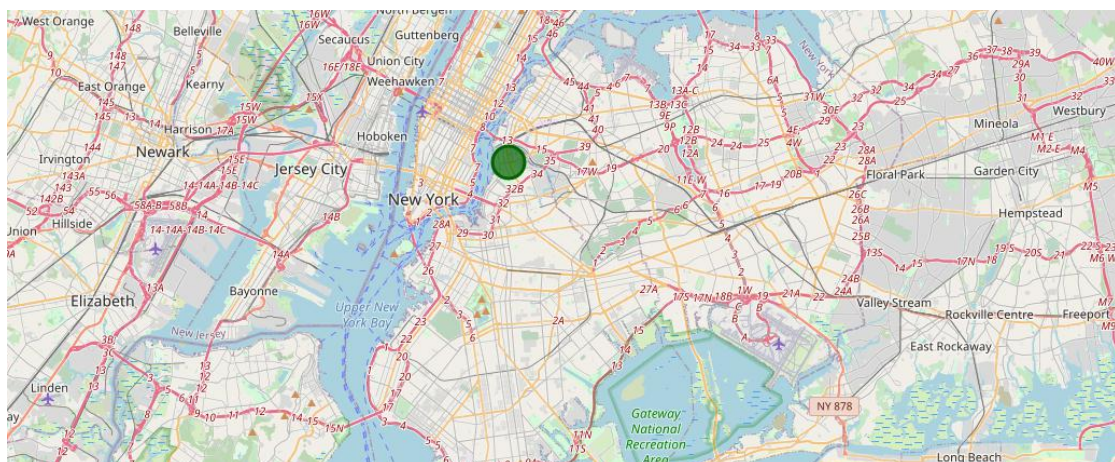
4. RESULTS:

Pie Chart Illustrating Distribution of the African Population in US cities



This provides recommendation that a Nando's restaurant should be opened in the NYC area. The amount of South African's residing in New York in 2020 is predicted to be 120364. The amount of predicted South African visas to be issued in 2020 is 75076 non-immigrant and immigrant visas. Combining these two predicted numbers gives a total of 195440 South Africans potentially going to be in New York City during 2020

MAP OF NEW YORK CITY MARKING GREENPOINT NEIGHBOURHOOD



This maps illustrates where the neighbourhood of Greenpoint is in relation to the rest of the city and Long Island. It helps when visualising where to place the restaurant.

11. DISCUSSION:

5.1 Recommendations

5.1.1 With foursquare, there was a margin of error given that there are 42 nandos locations surrounding Chicago and DMV areas. I would need to individually inspect the locations and use the exact location to find the missing restaurant location data needed.

5.1.2 Nandos is listed as a Portuguese restaurant so I had to type in 'Nando's Peri Peri' into the search to ensure the correct venues were selected. Foursquare did not respond to my call for the specific address used to locate the 8 restaurants not included in the data. Next time, I could use a different way to obtain the restaurants information

5.1.3 I could have added the data directly into the dataframe from the Nando's restaurant website.

5.1.4 More research by means of market surveys would provide better understanding about how current New York City situated South Africans (and citizens) would feel about the restaurant opening up.

5.2 Considerations

5.2.1 Given the current COVID-19 situation happening, the model will definitely be flawed.

5.2.2 More South Africans would be staying for longer periods with no flights to leave, therefore the data will need to be adjusted next year.

5.2.3 Nando's is takeaway and dine-in, personally my family in South Africa would always use it for takeaways - this makes it accessible for social distancing standards too.

5.2.4 An increasing amount of people are making use of takeaway and/or delivery for food and for families that have no time to cook and cannot shop, good quality food is always considered valuable to have in all areas.

12. CONCLUSION:

Nando's Peri Peri is a good investment into New York City's restaurant industry given the increasing amount of South Africans residing in New York City. It has been shown that the amount of Africans overall in America will be increasing too, this include permanent residents and visiting Africans with a non-immigrant or immigrant visa. There are a lot of factors to consider in this analysis. It is also a personal problem I have faced during my stay in the United States and I know that once endorsed right, it will succeed. The data and charts illustrate its viability of success within New York. The best neighbourhood is within Brooklyn at Greenpoint which has great variety but also less competition from other restaurants in its area. Brooklyn remains close enough to Manhattan as well as Long Island so it poses to be a more central location for any visitors or residents. Visitors to New York will be able to have the search for South African restaurants near by and the Nando's will be eligible to pop up and attract travelers.