Reinventing Restaurants: A Data Based Approach
How to survive in a COVID-19 pandemic economy?

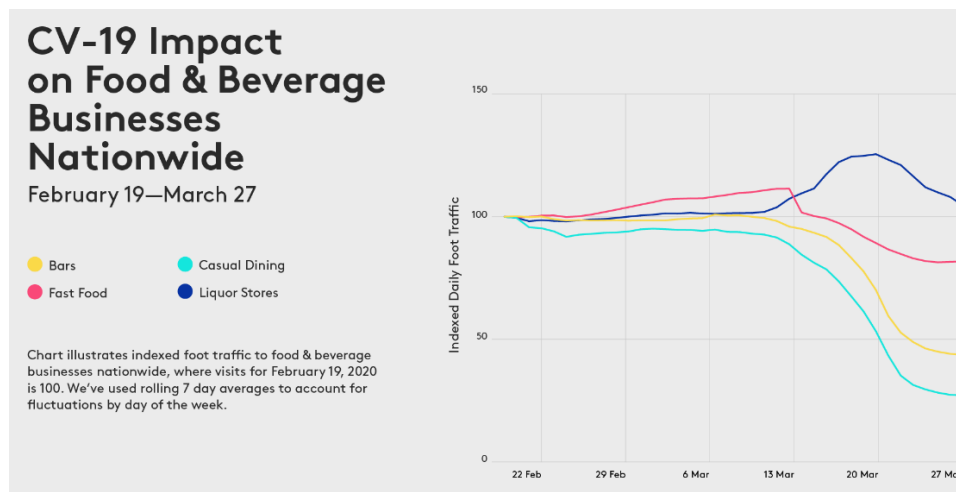## Capstone Project: The Battle of Neighborhoods

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Introduction

This project is a part of the IBM Data Science Specialization course where we learned what data scientists go through in real life when working with data. In this project we shall define a business problem, scrape data from the web and with the skills of a data scientist, create a compelling narrative from the data. Our tools for this project will be density-based clustering using K-means algorithm and other machine learning techniques. In this project, we shall provide a step-by-step description of the processes involved starting from defining the business problem, data preparation and the techniques that forge the data to create a final analysis. The project ends with a conclusion section which can be leveraged by business stakeholders to make decisions.

Business Problem:

In January 2020, a new decade started with a hopeful bang - while a coronavirus (SARS-CoV-2), born from a wet market, started gaining a foothold in China. In next two months, coronavirus pandemic (COVID-19) stretched around the world forcing countries to enforce lockdown measures like stopping air travel and closing borders. In US, a nationwide emergency was declared on March 13 and most states started enforcing stringent lockdown measures. Apart from a tragically large number of human lives being lost, millions of Americans lost their livelihood resulting in the worst economic downturn since the Great Depression. The coronavirus recession - also known as Great Lockdown - shuttered schools, businesses, and restaurants, delivering the fastest and deepest economic shock in history. Consumer behavior changed drastically since the COVID-19 outbreak began. After an initial rush for groceries and stock piling of necessary supplies, families cloistered themselves in the safety of their homes - online shopping surged as replacement for old fashioned trips to grocery stores. The following graph compiled by Foursquare shows the impact of COVID-19 on Food & Beverage Businesses in US. As we can see, Casual Dining industry suffered the most. Nationally, foot traffic to sit-down casual dining restaurants decreased more than

73%, while visits to Quick Service Restaurants (QSR) were only down by 18%. Since QSRs offer drive through and take out, consumers felt more comfortable visiting those establishments. Interestingly, people visiting QSRs are spending less time in those locations. The week ending March 27, had 10% more customers spending less than 15 mins as compared to a month earlier. Majority of the customers (91%) preferred drive through or take-out as compared to dining in. Also, they preferred visiting QSRs closer to their homes than a QSR further away. Reading this analysis, reminded me of my friend Mr. Lohanathan (LN), who owns an Indian Restaurant in Austin. Here is how our conversation went:

Me: How is your restaurant doing in these troubling times?

LN: I am devastated. Our revenues have dropped more than 90%, we are open only for take-out. But very few customers are entering through the door.

Me: Sorry to hear that, maybe you should change your strategy. Remember the phrase

Restaurant during COVID-19 times: Waiting for customers

"If the mountain will not come to Muhammad, then Muhammad must go to the mountain"

LN: I am now confused. What do you mean?

Me: If customers will not come to your shop, then the shop must go to the customers. It's time to take your restaurant mobile. Why not start a food truck?

LN: Good idea, but people are off the streets, there is no reason for food trucks to go to familiar lunch spots.

Me: What if we go directly to the neighborhoods? Being mobile has another advantage, you can source your supplies further away from the city. With food supply chain severely strained, you can now procure fresh vegetables, poultry, and meat from farms in Austin suburbs.

LN: Well, that is an advantage for sure.

Me: By traveling to residential areas, you have access to those customers who are self-quarantined but would like Indian food. You can also serve those spots that otherwise encounter difficulty with normal food delivery service.

LN: I am sold to this idea, but which neighborhoods should I visit?

Me: Let me put on my data scientist hat and help you find out the neighborhoods where your customers live.

With this background, I was motivated to solve the following business problem statement. ***Which neighborhoods in Austin are profitable for an Indian food truck to visit?***

Apart from Mr. Lohanathan, a business owner who is looking for creative solutions to save his restaurant, this analysis will also be valuable to the following people:

❖ *Business investors*, who are looking for opportunities to invest in mobile food delivery business.

❖ *Event organizers*, who can organize block parties in open venues (like a school parking lot) where the invitees can enjoy casual dining while maintaining social distancing guidelines.

❖ *City planners*, who can look at possibility of outdoor seating for mobile food vendors in shuttered streets so that citizens can safely practice social distancing during COVID-19 pandemic.

❖ *Consumers*, who will be interested in finding out a new feature (namely, access to mobile food delivery) in their neighborhood.