Exploring “Pharmacy Errand Runs” in NYC Neighborhoods using Foursquare’s Places API

Antonio Miceli

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1. Introduction

1.1. Background

Despite the growing use of drugstore and convenience store delivery services such as Amazon Pillpack and Prime, Postmates, Doordash and local mail-order pharmacies, approximately 69% of voters still go on “pharmacy runs” at least once a month.[1]

Not only do seven out of ten Americans regularly take a prescription medication, but forty-five percent of them (119 million in 2016) also take controlled medications, several of which majority of which cannot be shipped by mail-order pharmacies because they are scheduled as “Controlled Substances” by the DEA (Drug Enforcement Administration). Moreover, according to J.D. Power’s 2019 U.S. Pharmacy Study, respondents still vastly prefer their brick-and-mortar pharmacy to currently available digital options.[2]

Unless the federal government relaxes regulations on the delivery of controlled medications, and, until the consumers readily adopt mail-order pharmacies, there will still be plenty of people regularly visiting their brick-and-mortar drugstore, and potentially purchasing plenty of other goods and services on their way home.

1.2. Opportunity

While drugstore companies can run internal product mix and consumer profile analyses on what non-prescription drug goods are being sold at their own locations, an interesting question remains: if not home, where do their customers go after? Is it for something they are not offering but could offer?

At the same time, the convenience retail landscape is experiencing a paradigm shift— cashier and cashless options such are opening in dozens of city centers. These operators are quickly iterating their offerings based on internal data on nearby users and competitor offerings. Apart from being able to implement pharmacies onsite (and automating them is another interesting question,) are these stores offering their neighborhood customers what they are looking for on their regular pharmacy errand run?

This short study explores potential answers to this question in Manhattan neighborhoods by mapping consumer location data and employing machine-learning algorithms to discover interesting relationships that could be extended to predictive models for other cities and metropolitan areas.

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[1] cvshealth.com/thought-leadership/by-the-numbers-how-do-consumers-interact-with-pharmacists

[2] jdpower.com/business/press-releases/2019-us-pharmacy-study

1.3. Interest

As initially presented in the previous questions, this study is of primary interest to (1) drugstores with pharmacies, (2) automated retailers such as Amazon Go, who is rapidly expanding its validated business model.[3] It can also be of interest to (3) marketing and consumer research firms, (4) existing brick-and-mortar neighborhood services looking to adapt their business model, as well as (5) other startups of various categories with innovative business models.

2. Data and Methodology

2.1. Sources

For this short study, the following sources and uses are employed:

i. Neighborhood coordinate data from NYU's Spatial Data Repository[4]
ii. Venue location and user check-in data from Foursquare's Places API[5]
iii. Open source neighborhood demographics from the City of New York[6]

2.2. Preparation

2.3. Feature selection and processing methods (see below for overview, full written version on forthcoming report—description below satisfies week one requirements)

i. Set neighborhood centroids
ii. Use 4S API explore query with parameters:
    a. Category: "pharmacy"
    b. "Most visited" in each neighborhood
    c. Limit to five in each neighborhood
iii. For each, run "nextvenues" query in 4S, which by default returns five "most visited" venues= 25 nextvenues for each neighborhood
iv. Consolidate category names for each neighborhood, apply values and normalize
v. Run KMeans unsupervised clustering
vi. Examine clusters for relationship and apply supervised K-Nearest Neighbor analysis via demographic data to find any interesting relationships for further model refinement and application to other cities

[3] forbes.com/sites/andriacheng/2019/06/26/amazon-gos-even-bigger-rollout-is-not-a-matter-of-if-but-when/#2fd32aa16f52
[4] geo.nyu.edu/catalog/nyu_2451_34572
[5] developer.foursquare.com/docs/places-api/
[6] data.cityofnewyork.us/City-Government/Demographics-and-profiles-at-the-Neighborhood-Tabu/hyuz-tij8