
COVID 19 Commodity Map

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Motivation

COVID 19 has made people stockpile commodities such as sanitizer, disinfectant wipes, masks and toilet paper

It became difficult to find these in the local stores especially when COVID 19 stay-at-home orders got issued

Our team wanted to see if we can map these commodities on online maps to help people locate these essential items



Photo by Kelly Sikkema on Unsplash

Process Flow

Emergency

Pandemic

People start panic buying during emergency or pandemic and commodities are hard to find

Twitter Query

Twitter

Using a Python library, it is possible to gather hundreds of tweets related to the commodities of interest.

Data Analysis

Data Filter

Filter only the useful data:

Select data with the right commodity and relevant gps location

Mapping

Google Maps

Map the collected and parsed twitter data on Google Maps. It will show the commodity and its location with a flag on the map

Approach

Twitter is the perfect social media platform

→ **Let people be our scout**

Regular people report stocked items!



Coach Davis @OSUcoachD · May 5

Walked into Walmart at 6pm and was totally blown away to see this!

#CloroxWipes 🤖👍



4



2



35





Tweets from retailers advertising restocking

Creative solutions
can be found
sometimes

Pros & Cons for Using Twitter

Pros	Cons
+ Real Time Updates	- Lots of noise
+ Pictures of Commodities	- Bots posting
+ Direct connection to person	- Business/People not posting explicitly

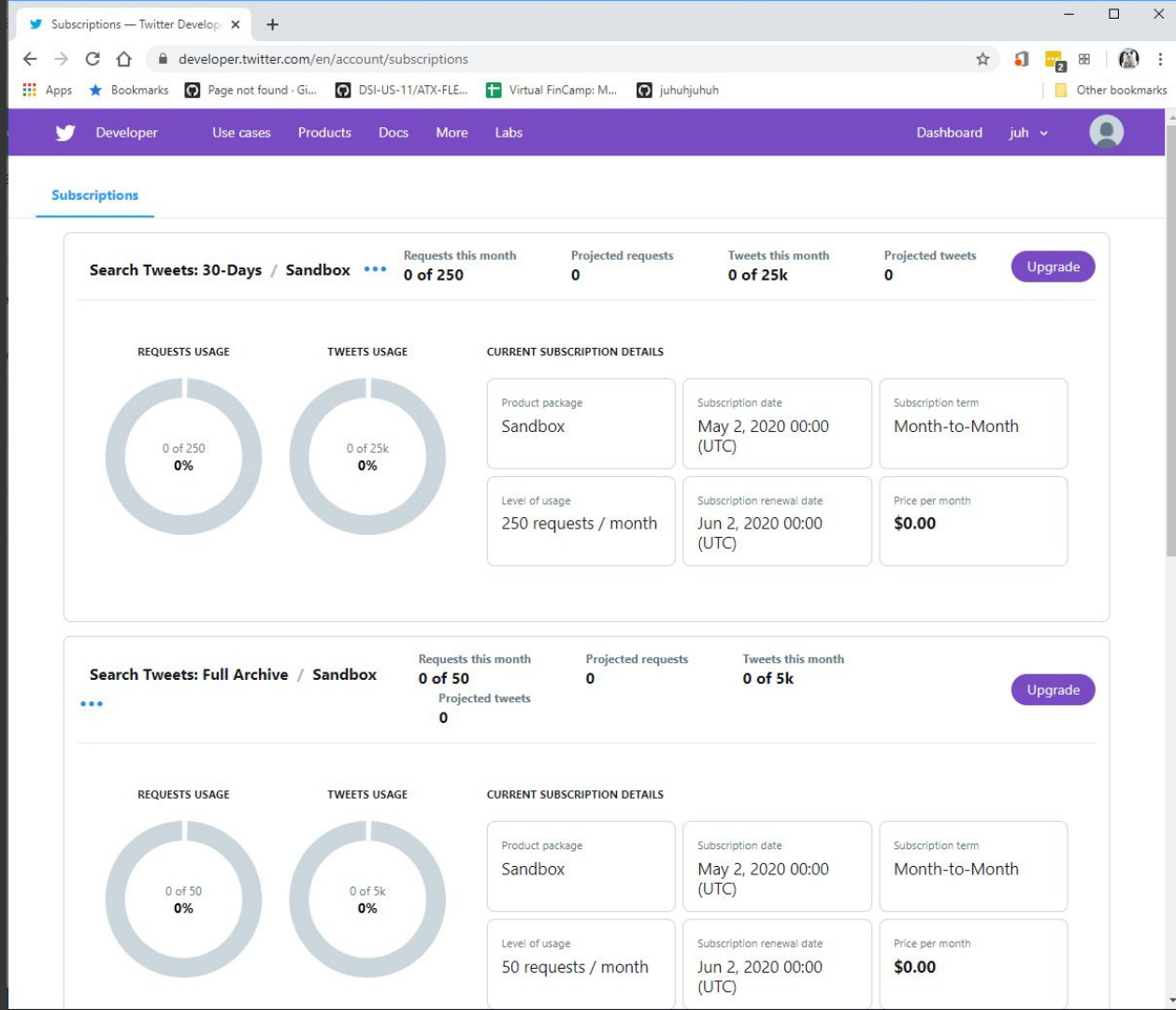
Twitter Data

Enable Developer mode

Request API key & secret

Use key to download tweets with search query such as 'mask' or 'sanitizer'

Collect corresponding tweets and format them in a DataFrame



Used Tweepy library
to pull tweets.

Tweepy

An easy-to-use Python library for accessing the Twitter API.

Twitter Data Filter

Wrote a Twitter filter in Python

Used query to filter commodities

Mask, sanitizer, clorox, lysol, toilet paper

Collect the GPS location from a string of Twitter 'place' column

GPS location is buried in a long string under 'place' & 'bounding box'

Had to parse through the actual tweets to see relevant context

Challenge

Most of the tweets are missing geolocation

Geolocation is GPS coordinate

Essential for mapping commodity on map

Only 3% of tweets have geolocation

Collecting many tweets as possible is key

Free API keys have limits on number of tweets for downloading



Tweets by the Numbers

Facts

- 2.9 % of total tweets had GPS location
- 19% of the GPS enabled tweets were talking about stocked commodities
- 69% of the commodities tweets were from businesses
- 38% of clorox/lysol tweets were political
- 40% of sanitizer tweets were from distillery

Top 10 Words by Percentage Points

CountVectorizer

Words	Percentage based on total words
Clorox	15.8%
Alcohol	12.1%
Isopropyl	10.8%
Disinfectant	10.4%
Facemask	9.3%
Isopropyl alcohol	8.8%
Toiletpaper	8.5%
Hand	8.4%
Sanitizer	7.8%
Lysol	7.5%

TFIDF

Words	Percentage based on total words
Clorox	1.6%
Alcohol	1.1%
Isopropyl	1.1%
Disinfectant	1.0%
Toiletpaper	.97%
Isopropyl alcohol	.92%
Facemask	.87%
Lyson	.80%
Hand	.78%
Sanitizer	.75%

Important Words for Modeling

- 'clorox',
- 'alcohol',
- 'isopropyl',
- 'disinfectant',
- 'face mask'
- 'isopropyl alcohol'
- 'toilet paper'
- 'hand', 'sanitizer'
- 'hand sanitizer'
- 'lysol'
- 'wipes'
- 'face'
- 'mask'
- 'bleach'
- 'masks'
- 'new'
- 'get'
- 'need'
- 'toilet'
- 'paper'
- 'today'
- 'go',
- 'toiletpaper'
- 'spray'
- 'stock'
- 'oz'
- 'us'
- 'available'
- 'handsanitizer',

Ran a DBSCAN

- Tested on whole CountVectorized dataframe
 - Silhouette score -5.34%
- Ran another test on important words
 - Silhouette score 82.8%
- Used the DBSCAN labels to see how tweets were separated by model
 - Some success
- Used to grab coordinates
 - Still by parsing manually

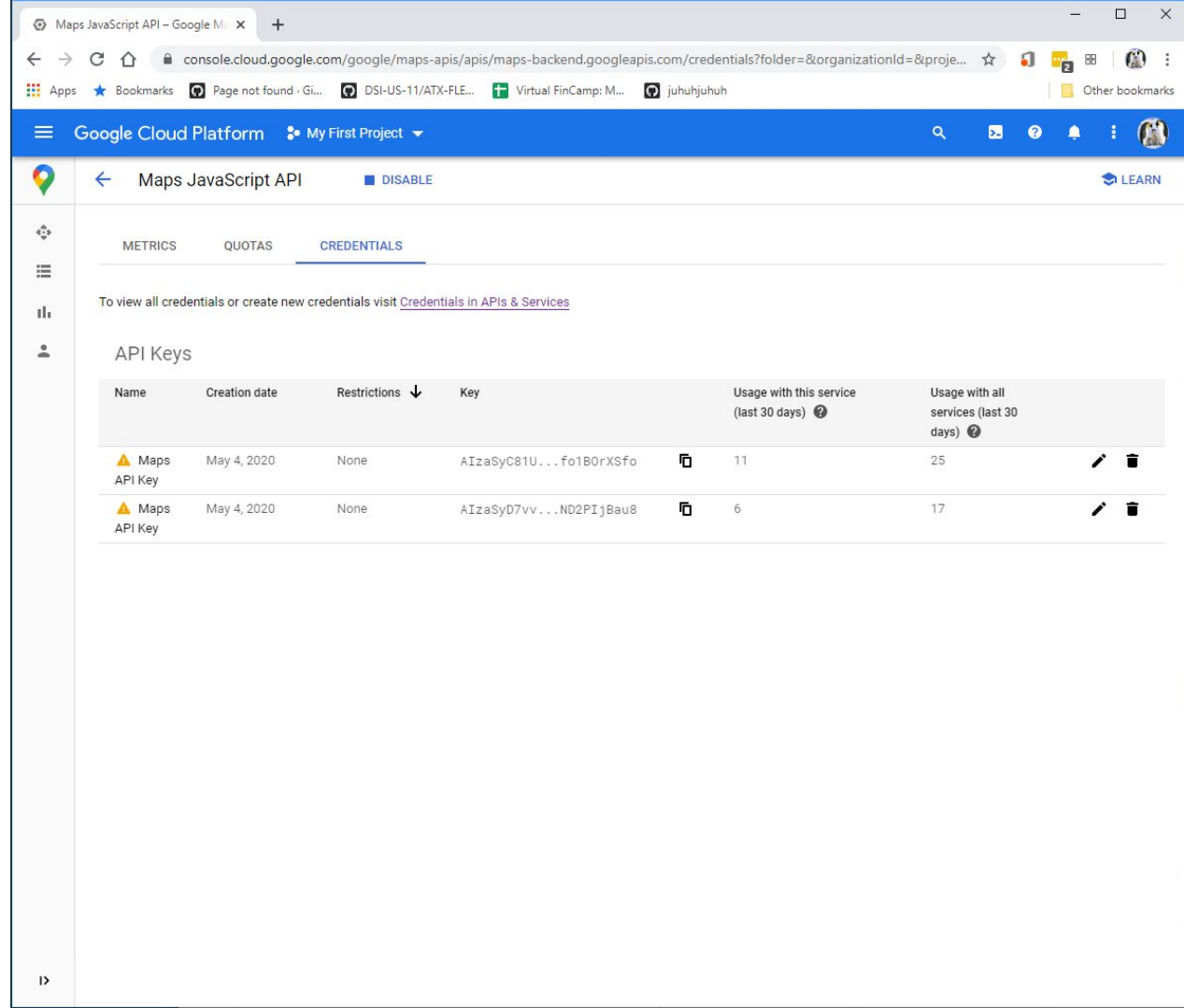
Google Maps

Open Google Cloud developer account

Enable Google Maps App and acquire API key

Allocate the gps location collected from commodities tweets

Use Python library 'gmap' to map specific location on Google Map



The screenshot shows the Google Cloud Platform console for a project named "My First Project". The "Maps JavaScript API" is selected, and the "CREDENTIALS" tab is active. The page displays a table of API keys under the heading "API Keys".

Name	Creation date	Restrictions ↓	Key	Usage with this service (last 30 days) ?	Usage with all services (last 30 days) ?
Maps API Key	May 4, 2020	None	AIzaSyC81U...fo1B0rXSfo	11	25
Maps API Key	May 4, 2020	None	AIzaSyD7vv...ND2PIj8au8	6	17



- Drops a pin on location

➔ Pop up gives the commodity name and business

Summary

Used Tweeter and Google Maps to map COVID-19 Commodities

Scarcity in tweets with GPS location was a challenge

Performed EDA on tweets text

Made a filter to screen and extract information from tweets

Filter out data with no GPS coordinates and extract GPS location

Maped commodity location on Google Maps

Type of commodity and business name where it is stocked

Future Work

How to Improve it the beyond proof-of-concept

→ Need to scrape many more tweets for city-level granularity

Free API has time and download quantity limit

Purchase a higher tier API key without limits

→ Make a smarter filter to automatically select relevant tweets

Eliminate human intervention completely to go from tweet to Google Maps