Flu Vaccinating Analysis Proposal

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Overview

Vaccination is especially important for individuals to protect public health and reducing the spread of the flu. In this project, we utilize the Vaccines.gov dataset to locate providers offering flu vaccines in a particular area, as well as to visualize interesting patterns based on geospatial analysis and generate a Decision Support system and a Stock Management system. Our goal is to make it easier for individuals to find healthcare providers offering flu vaccines, and to help public health officials and healthcare providers identify areas where there may be gaps in vaccination coverage which can ultimately help to prevent the spread of the flu.

Dataset Characteristics

Reference: https://data.cdc.gov/Flu-Vaccinations/Vaccines-gov-Flu-vaccinating-provider-locations/bugr-bbfr

This dataset includes information for flu vaccine provider in the U.S. Vaccines.gov, including providers' names, addresses, phone numbers, types of vaccines offered and so on. It is helpful for individuals looking to get vaccinated against the flu, as well as healthcare professionals and researchers in monitoring flu vaccination rates and trends.

Methods

1. Exploratory Data Analysis

Because of the large sizes and variety of features, we will mainly focus on the flu vaccine provider locations and vaccines information and remove the unnecessary attributes such as web_address, loc_store_no, and pre_screen. Then clean and tidy the dataset with NA/Null values, study the distribution and correlation among variables.

2. Geospatial Analysis

Interactive query system: Allow users to filter the data by city, State, or zip to get the detailed information of the nearest vaccination providers in the specific place.

Visualization:

• A map to show the density of vaccine providers in US and each State, helping identify areas where may be lack of vaccine providers before increasing access to vaccines in those areas.

• A few boxplots to inspect the outliers of the numbers of vaccine providers in each state to perform diagnostic Vaccine Availability.

• A few pie charts to show the proportions of vaccine providers filtering by State, Office Hour, types of flu shots.

3. Decision Support Systems

Recommend the most suitable healthcare providers for individuals to take the flu shot based on their preferred vaccine type, location, available time, insurance, and other factors. This system can help individuals make informed decisions about where to get vaccinated and also help to improve vaccine uptake and coverage rates.

Visualization:

• A table of recommended pharmacies to take the flu shot with relevant factors.

• A map with a proper zoom level showing the location and distribution of recommended pharmacies.

KPI Cards: The number of pharmacies available for the flu shot.

Interactive filters: the type of flu shot, location, accessible time, insurance, walk-in or not

4. Stock Management Analysis

Use these attributes to create a time-series model to analysis the flu vaccine stock to help customers find information about the flu shot they want to take beforehand. If the vaccine is in stock, they can check if walk-in is acceptable of the nearest stores. Also, if the vaccine is not in stock, they can use it to find out when they can take it in the future.

Visualization:

• A line chart to present the pharmacies flu vaccine stock over time.

• A table to show the in-stock pharmacies name, phone number, the flu shot costumer searched, the supply level and walk-in acceptability.

• A map to show the location of the nearest pharmacies.