A web application to easily visualize adverse drug effect data

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# Abstract

# Adverse drug reactions (ADR) dataset is an FDA dataset started from 2004 that make drug adverse reactions open to public. There has been a lot of development by the FDA in providing tools and apps using their API to query their ADR data. However, the FDA data is not standardized and so contains redundancy and ambiguity in their data (e.g. aspirin and aspirin 81mg). In this work, we deployed an novel web app, SafeDrug, that would be another community tool to possibly clarity representing ADR data and add to their online portfolio. One of the biggest challenge to make the app is how to put the big dataset (~10 GBs) into our server and interact with it rapidly. To do that, we split the dataset into multiple feather files that could be read by python data analyzing tools and create relatively small data frames that will not consume too much RAM. More over, we set up a amazon web server with a distributed database to put the big dataset. For the user interface, we use Dash, which is a light-weighted web frame to create interactive web apps, to get data from ADR and generate informative figures with adverse drug reaction reports information based on the users’ requests. Our app is a novel online tools to retrieve data from ADR and provides plenty of realtime analysis tools that can be used to generate useful information for down stream studies.

# Keywords

# Adverse drug reactions (ADR), Dash, Jupyter notebook, plotly, AWS

# Introduction

Adverse drug reactions (ADRs) are forms of common drug side effects, e.g. elevated blood levels, overingestion, enhanced drug effect, that occur during appropriate drug use. In US, 3 % to 7 % of inpatient are cause by ADR and 10 % to 20 % of hospitalizations suffer ADRs, among which 10 % to 20 % ADRs are severe. Studies show pediatric patients are more likely to get ADRs because clinical trials have historically excluded pediatric patients.

FDA has a database collects ADR reports.

Tools retrieving data from ADR database are not perfect.

Our app is optimized to get informative data from FDA ADR database and do downstream analysis based on users’ requests.

# Methods

Jupyter notebook

Plotly

Dash

AWS

## Implementation

Retrieving data from the database

Downstream analysis

Easy to modify Jupiter notebooks

## Operation

AWS configurations

Necessary computer configuration to run the notebooks locally

workflow

# Results

Include if the paper includes novel data or analyses; should be written as a traditional results section (otherwise, include a Use Cases section).

# Use Cases

Inputs, outputs, parameters/arguments

# Conclusion and next steps

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