

Using OHDSI WebAPI for Semantic Representation of Drug Concepts

Joseph Finkelstein¹, Qin Ye², David Baorto¹, Maura Beaton¹, George Hripcsak¹
¹Columbia University; ²AstraZeneca, USA

Abstract

OHDSI vocabulary contains rich representation of drug-related information from different ontologies. Representing this information in the form of interactive semantic dashboard can potentially assist researchers and clinicians in gaining systematic understanding of drug-related information and save time from searching multiple resources. We built a prototype of such a dashboard using OHDSI WebAPI and D3 JavaScript library. The proposed approach can be extended to other OHDSI vocabulary domains and warrants further evaluation.

Introduction

In the process of scientific inquiry, researchers use multiple sources of facts and knowledge to understand drug-

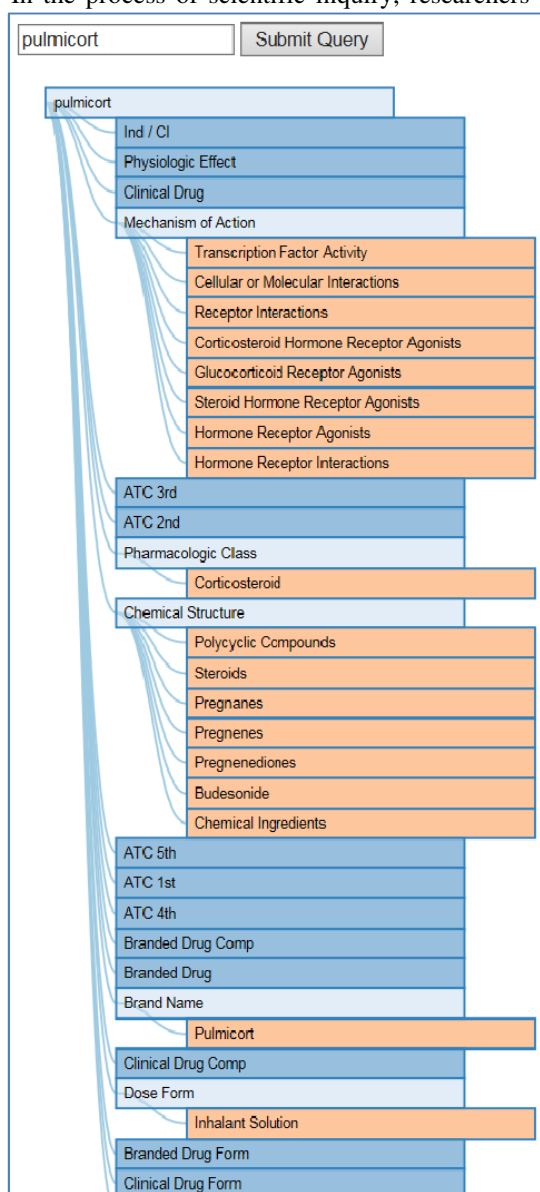


Figure 1. Interactive Semantic Dashboard

related concepts. OHDSI vocabulary was compiled from a large array of different source ontologies of different structures, design principles and formats with the intention of its exploitation in a uniform way. Extracting and visualizing semantic information about a particular drug allows representation of this drug in a systematic way. The goal of this project was to build a prototype exploring this approach.

Methods

OHDSI v5 vocabulary and WebAPI were used to build interactive semantic dashboard representing drug concepts. The following algorithm was implemented in the prototype:

- (1) Loads results from the WebAPI query of <http://api.ohdsi.org/WebAPI/CS1/vocabulary/search/> + search item;
- 2) Finds the first standard concept's id;
- 3) Uses the id associated with this standard concept to query OHDSI vocabulary for related concepts using: <http://api.ohdsi.org/WebAPI/CS1/vocabulary/concept/> + concept_id+"/related"
- 4) Creates relationship graph with first level listed as the search query, second level is the Concept Class ID, third level is the Concept Name listed in order of Relationship distance under each respective Concept Class ID.

The graphical interface is built using D3.js which is a JavaScript library for data visualization.

Results

The prototype dashboard is presented in Figure 1. Each blue box represents a concept class. Number of concept classes is defined by their availability in the ontology and may differ from drug to drug. By clicking on each blue box a user can access next level of related concepts.

Discussion

Using WebAPI, third party applications can generate comprehensive overview of drug-related concepts in OHDSI vocabulary. Representing drug concepts using interactive semantic dashboard can save researchers' time in gaining systematic information about drugs under investigation. The proposed approach may be applicable to other vocabulary domains and warrants further consideration.