

Bogazici University Computer Engineering Department
CMPE 58H Team Project

Druggy Drug - Adverse Effect Website

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Abstract

We use social media everyday for different reasons. The variety is astonishing, people can share pictures, meet with like-minded people, share videos and so on. In this project we are creating a social semantic website that users search for adverse effects of drugs and also enter such information themselves.

1 Introduction & Motivation

We have done a project named Druggy for the term project which is a requirement of Cmpe58H Social Semantic Web course. Drugs have been used for years to heal people's illnesses. They are produced and manufactured by companies in many different names. Even countries have different drugs for the same purpose. For example Majezik in Turkey which is for head ache is named as Ocufen in United States. Since they have many different names, it is hard to search for adverse effects online. Prospectuses of drugs are obligated to contain information about adverse effects. However, this info is often hard to understand. Also the experienced effects by real users might differ according the features of a user.

In addition, information providers are increasingly inclined to give false information or exaggerated information to gain popularity in the internet environment. Due to this, the difficulty of obtaining accurate information on drugs is increasing day by day. In our Druggy project, we have set up a platform to provide both formal and informal information on drugs to the people who use drugs or want to learn about them. With its social and semantic features, this platform is both a social area for drug users and a platform for accurate information about drugs. Druggy is a self-improving platform that increases its knowledge every time by using the data from the user input. In Druggy project, users are allowed to search drugs, see the adverse effects from both formally approved information and the data that is generated from user inputs.

2 General Framework

2.1 Formal Semantic Data From Sider

As we mentioned in introduction, Druggy is a platform that brings together formal information. In order to provide this feature, Sider [3], a fully approved medication platform with formal information, was used. Our goal here is to provide information about the drugs together with all the details. For this reason, the side effects of the drugs, the parts that they affect on the body and their ingredients are taken from the Sider platform. A sample taken data is as follows.

In order to be able to test the platform in the first place, approximately 20 drugs were added to the system in full detail. The added drugs were selected among the most commonly used drugs in the society.

In addition to the taken data, a description has been added for each adverse effect in order to allow users to have system's suggestions when they are looking for a drug, adverse effect, ingredient or body part.

Table 1: Information Adding From SIDER

Drug Name	Ingredient	Adverse Effect	Body Part
Parol	Acetominophen	Diarrhoea Dizziness Headache	Bowel Eyes Head Stomach

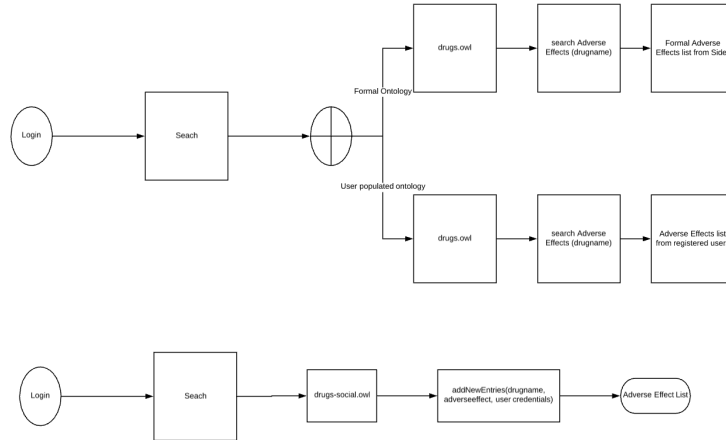


Figure 1: Diagram for User Interactions

2.2 Functionality

The diagram for search and adding new entries can be seen in Figure 1.

- **search.py** : The class for extracting data from the formal ontology. It uses ontologyHandler for getting data from the ontology. Ontology manipulation is done with owlready2 [1] in this class. It gets adverse effects for drugs and vice-versa. Also if you give it a phrase, it can return the most possible adverse effects that match that phrase.
- **search_social.py** : The ontology handler for user-generated ontology. It considers the credentials of the user when searching the ontology. The search is done with rdflib [2] using SPARQL queries.
- **addEntries.py** : As the name suggests, this class gets drug, adverse effect and user credentials and creates a new entry for the user-generated ontology. This also uses [1] for ontology handling.
- **recommendTags.py** : After a user enters a blog, this class is called for smart tag recommendation. User might not enter the tags correctly. This class takes a string and returns possible tags from the formal ontology.

username	userid	age	sex	height	weight	credibility	drugusage
Brew	1	46	male	168	63	7	Voltaire/Diclofenac->Diarrhoea, Ear_pain, Migraine, EpiPen->Dizziness, Sweating
David	2	39	male	173	60	7	Zovirax/Acyclovir->Vomiting, Shock, Redness, EpiPen->Anxiety
Jente	3	48	male	160	86	5	Paral->Yrmer, Sweating, Ulcer, Baclofen->Sweating, Ulcer
Chase	4	58	male	154	56	8	Voltaire/Diclofenac->Malaise, Hypertension, Diarrhoea, EpiPen->Asthma
Jallum	7	65	male	180	88	10	Nitroglycerin->Hypersensitivity, Diarrhoea, Sweating, Insulin->Redness
Lucian	9	31	male	198	95	7	Nitroglycerin->Shock, Migraine, Vertigo, Aspirin->Hypertension

Figure 2: Simulation Data

3 Simulation Data

A simulation data set was created to test the platform features efficiently. All data in this dataset has been generated. This dataset allowed us to model the results according to the user’s age, gender, height, weight etc. An example of the data is as follows;

The data shown in the above table represents the following information of the users.

- Username: The username that user chooses to login the platform
- Userid: The id given automatically by the system to the user.
- Age: User’s age
- Sex: User’s gender
- Height: User’s height
- Weight: User’s weight
- Drugusage: User’s drug history
- Credibility: User’s trust score

Drugusage column indicates which drug user is using and side effects from that drug. For example for user David, he uses Zovirax/Acyclovir which has Vomiting, Shock, Redness as adverse effects and EpiPen which has Asthma as adverse effect. This column helps us to model the data and show more accurate data according to the user’s information. In addition to that we have added “credibility” column which shows user’s trust score. Simulation data contains information of more than 100 individuals in total. This is a sufficient data for the system to work and to test every feature.

4 Example

Dilara has been suffering from cramping occasionally in her footsteps she thinks that might be because of aspirin and Xanax drugs that she has been using for a month. Dilara wants to satisfy their curiosity, decides to search the side effects of aspirin and Xanax on Druggo. Dilara did not see the cramp in side effects when she searched Aspirin on the platform. That was not surprising. Because her mother swore that aspirin could not cause cramps. When she searched for Xanax, Dilara saw that cramp was a side effect of Xanax, even if it was really low. After seeing this, Dilara decided to add cramps as a side effect of Xanax because she knew that Druggo is an user a populated platform. After doing the insert, Dilara saw what she wrote in Xanax’s results in the user contributions section.

Druggy

[Home](#)[Add Adverse Effect](#)[Search Drugs](#)[Blog](#)[Sign out](#)

Successfully Created

Drug

Diazepam

Name

Headache

Bodypart

Head

Submit

Relevant Adverse Effects

Empty Result

Druggy

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Druggy

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Search adverse effects

You can search a drug's adverse effects here

Search active ingredients

You can search the active ingredients of a drug here

Suggest an adverse effect

You can suggest an adverse effect for a drug here.

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Adverse Effects

Diazepam

The Adverse Effects for **Diazepam** are: Dizziness, Headache, Sweating, Vomiting

The Adverse Effects for **Diazepam** are: Coma, Vertigo, Hypertension, Asthma, Diabetic, Redness, Headache, Dizziness, Ulcer

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Druggy

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First name

Last name

Age

Sex

Height

Weight

Credibility

Username

Required. 150 characters or fewer. Letters, digits and @/./+/-/_ only.

Email address

Password

Password

Password

Repeat Password

Register

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Bibliography

- [1] Owlready2 web site. <http://pythonhosted.org/Owlready2/>. Accessed at December 2017.
- [2] RdfLib web site. <https://github.com/RDFLib/rdfLib>. Accessed at December 2017.
- [3] Sider. <http://sideeffects.embl.de/>. Accessed at December 2017.