

Student Experience - Identifying Hidden Drug-Drug Interactions in FDA AERS

“When you fall in love with data, it will reveal lot of hidden insights”.

ISB’s Certification Program in Business Analytics’ experience bridged our fascination with analytics and our quest in solving real time problems by applying machine learning techniques.

Our date with the data started with a project on *“Identifying Hidden Drug-Drug Interactions in FDA AERS”* thus enabling us to apply most of the techniques we learnt in the class to a real time problem in Health Care domain.

Drug-drug interactions (DDIs) occur when the effect of a particular drug is altered when it is taken with another drug and can be fatal and life-threatening. DDIs approximately account for up to 30% of unexpected adverse drug events.

The date with the data was not easy unfortunately, as drug interactions are difficult to study. We analyzed more than 57,000 adverse event reports filed with the FDA in 2012 and started with supervised learning approach. As our selected data set consisted of more than 4,500 branded drugs, collecting drug labeled data was tedious. Thus, we went ahead with unsupervised learning, where we defined edge strength between a pair of drugs say, A and B. This denotes either presence or absence of a drug. Based on edge strength, we identified serious drug interactions which are significantly contributing along with known drug interactions.

While evaluating the results with domain experts, we realized the need to consider domain specific attributes that could often mislead the inferences. For example, patients using medications for cholesterol related indications are more likely to be older, which may cause these drugs to be associated with blood pressure (age bias).

Finally, we would like to thank ISB for this opportunity and we extend our heartfelt gratitude to our professor **Dr. Shailesh Kumar**, for his valuable insights and support during our project discussions.

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