

Detection of Important Biological Elements in Drug-Drug Interaction Occurrence

Authors : Reza Ferdousi, Reza Safdari, Yadollah Omid

Abstract : Drug-drug interactions (DDIs) are main cause of the adverse drug reactions and nature of the functional and molecular complexity of drugs behavior in human body make them hard to prevent and treat. With the aid of new technologies derived from mathematical and computational science the DDIs problems can be addressed with minimum cost and efforts. Market basket analysis is known as powerful method to identify co-occurrence of thing to discover patterns and frequency of the elements. In this research, we used market basket analysis to identify important bio-elements in DDIs occurrence. For this, we collected all known DDIs from DrugBank. The obtained data were analyzed by market basket analysis method. We investigated all drug-enzyme, drug-carrier, drug-transporter and drug-target associations. To determine the importance of the extracted bio-elements, extracted rules were evaluated in terms of confidence and support. Market basket analysis of the over 45,000 known DDIs reveals more than 300 important rules that can be used to identify DDIs, CYP 450 family were the most frequent shared bio-elements. We applied extracted rules over 2,000,000 unknown drug pairs that lead to discovery of more than 200,000 potential DDIs. Analysis of the underlying reason behind the DDI phenomena can help to predict and prevent DDI occurrence. Ranking of the extracted rules based on strangeness of them can be a supportive tool to predict the outcome of an unknown DDI.

Keywords : drug-drug interaction, market basket analysis, rule discovery, important bio-elements

Conference Title : ICSRD 2020 : International Conference on Scientific Research and Development

Conference Location : Chicago, United States

Conference Dates : December 12-13, 2020