Drug-Drug Interaction Prediction in Diabetes Mellitus

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Abstract : Drug-drug interactions (DDIs) can happen when two or more drugs are taken together. Today DDIs have become a serious health issue due to adverse drug effects. In vivo and in vitro methods for identifying DDIs are time-consuming and costly. Therefore, in-silico-based approaches are preferred in DDI identification. Most machine learning models for DDI prediction are used chemical and biological drug properties as features. However, some drug features are not available and costly to extract. Therefore, it is better to make automatic feature engineering. Furthermore, people who have diabetes already suffer from other diseases and take more than one medicine together. Then adverse drug effects may happen to diabetic patients and cause unpleasant reactions in the body. In this study, we present a model with a graph convolutional autoencoder and a graph decoder using a dataset from DrugBank version 5.1.3. The main objective of the model is to identify unknown interactions between antidiabetic drugs and the drugs taken by diabetic patients for other diseases. We considered automatic feature engineering and used Known DDIs only as the input for the model. Our model has achieved 0.86 in AUC and 0.86 in AP.

Keywords : drug-drug interaction prediction, graph embedding, graph convolutional networks, adverse drug effects

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