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## Enhancing ADR Detection through GNNs and DDIs

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**Abstract**: Adverse Drug Reactions (ADRs) caused by Drug-Drug Interactions (DDIs) pose a critical challenge in pharmacovigilance. This paper presents a deep learning-based system employing Graph Neural Networks (GNNs) and Self-Supervised Learning to effectively predict ADRs. By modeling drug interactions from DrugBank using SMILES-based molecular fingerprints and incorporating a Variational Autoencoder (VAE), the system achieves an accuracy of 97.69%. Comparative evaluations with K-Nearest Neighbors (KNN), Decision Trees, and 2D Convolutional Neural Networks (CNN2D) reveal the superior performance of deep learning methods. This work demonstrates the potential of GNNs in proactive ADR detection to enhance drug safety.

**Keywords**: 5G Signal Forecasting, Machine Learning Models, RF Signal Analysis, Stacking Ensemble, Voting Ensemble, Convolutional Neural Network, Feature Importance, Predictive Accuracy, Network Performance, Ensemble Learning

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