



Séminaires scientifiques de NeuroDiderot

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Machine learning for interpretability in systems biology

L'apprentissage statistique au service de l'interprétation en biologie des systèmes.

Drug development is known to be a costly and time-consuming process, which is prone to high failure rates. Drug repurposing allows drug discovery by reusing already approved compounds.

The outcomes of past clinical trials can be used to predict novel drug-disease associations by leveraging drug- and disease-related similarities. A machine learning method called collaborative filtering has become popular to solve this prediction problem. It can handle large imbalances between the number of reported failed and successful clinical trials, and between known and unknown drug-disease associations.

Moreover, interpretability is a topical question to guide the follow-up analysis of predicted drug-disease pairs. An interpretable classifier quantifies the importance of each drug and disease feature for the predicted pair in a non-ambiguous fashion. To solve this problem, we introduce the novel Joint Embedding Learning-classifier for improved Interpretability (JELI). JELI predicts new drug-disease pairs based on jointly learned drug and disease representations while providing feature-wise importance scores. Moreover, JELI flexibly allows the introduction of biological priors on the connections between drugs, diseases and genes.

Jeudi 13 mars 2025, 11h00

Salle du 6^{ème}

et Visio conférence par ZOOM

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