



Contribution ID : 5

Type : **not specified**

Gaul-Lecture - Causality and Autoencoders in the Light of Drug Repurposing for COVID-19

Wednesday, 6 October 2021 17:00 (60)

Massive data collection holds the promise of a better understanding of complex phenomena and ultimately, of better decisions. An exciting opportunity in this regard stems from the growing availability of perturbation / intervention data (for example in genomics, advertisement, policy making, education, etc.). In order to obtain mechanistic insights from such data, a major challenge is the development of a framework that integrates observational and interventional data and allows causal transportability, i.e., predicting the effect of yet unseen interventions or transporting the effect of interventions observed in one context to another. I will propose an autoencoder framework for this problem. In particular, I will characterize the implicit bias of overparameterized autoencoders and show how this links to causal transportability and can be applied for drug repurposing in the current COVID-19 crisis.

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Session Classification : Keynotes