ID de Contribution: **50** Type: **Non spécifié**

Learning general purpose physical simulators

mardi 19 avril 2022 15:00 (1 heure)

Simulations are central to modeling complex physical systems in many disciplines across science and engineering. However, high-dimensional scientific simulations can be very expensive to run, and require specialized solvers. In this talk, we will review some of our recent work on a general purpose framework for learning grid-based, particle-based, and mesh-based simulations using convolutional neural networks and graph neural networks. We will show how learned simulators built with the same design principles can accurately predict the dynamics of a wide range of physical systems including fluids/turbulence, granular materials, aerodynamics, structural mechanics, and cloth, often leading to speed ups of 1-2 orders of magnitude compared to the simulation on which they are trained. Furthermore, we will show how the models are able to generalize to larger and more complex systems than those seen during training, and even can be used for inverse design. Our work broadens the range of problems on which neural network simulators can operate and promises to improve the efficiency of complex, scientific modeling tasks.

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Classification de Session: Representation Learning workshop