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NITheP Colloquium

Monday, 20 July 2020, 16h00

Prof Robert de Mello Koch
University of Witwatersrand

Is Deep Learning an RG Flow?

Abstract: Although there is an enormous list of impressive practical applications of deep learning, theoretical explanations of how deep learning works are still in their infancy. Deep learning performs a sophisticated coarse graining. Since coarse graining is a key ingredient of the renormalization group (RG), RG may provide a useful theoretical framework directly relevant to deep learning. In this talk we pursue this possibility. The Ising model, is used to train an unsupervised restricted Boltzmann machine (RBM). The patterns generated by the trained RBM are compared to the configurations generated through an RG treatment of the Ising model. The statistical properties of coefficients entering into the coarse graining of the RG and the RBM show remarkable agreement, lending support for the connection.

Bio: Robert De Mello Koch is a Professor at the University of the Witwatersrand where he holds the DST/NRF Research Chair in Fundamental Physics and String Theory and is a Distinguished Professor at South China Normal University.

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