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Using Dropout to Capture Uncertainty: A Novel Application to B-tagging

Tuesday, 13 July 2021 17:00 (15 minutes)

Deep learning techniques have gained tremendous attention from researchers in many fields, including particle physics. However such techniques typically do not capture model uncertainty. Bayesian models offer a solid framework to quantify the uncertainty, but they normally come with a high computational cost. A recent paper develops a new theoretical framework casting dropout in Neural Networks (NNs) as approximate Bayesian inference for Gaussian processes without changing either the models or the training.

In this talk, I will present how this method can be applied to evaluate multi-classification uncertainty using the Modified National Institute of Standards and Technology (MNIST) dataset. The results from evaluating will include both the model uncertainty, as well as uncertainties from systematic mis-modeling of the training data. I will also present preliminary results of this method applied to the ATLAS identification of jets coming from b-quarks with high momentum, and compare the difference in uncertainties between NNs trained on samples of low momentum only and those including high momentum jets.

Are you are a member of the APS Division of Particles and Fields?

No

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