Contribution ID: **47** Type: **Lightning talk**

Uncertainty Aware Learning for High Energy Physics With A Cautionary Tale

Wednesday, 11 May 2022 09:25 (5 minutes)

Machine learning tools provide a significant improvement in sensitivity over traditional analyses by exploiting subtle patterns in high-dimensional feature spaces. These subtle patterns may not be well-modeled by the simulations used for training machine learning methods, resulting in an enhanced sensitivity to systematic uncertainties. Contrary to the traditional wisdom of constructing an analysis strategy that is invariant to systematic uncertainties, we study the use of a classifier that is fully aware of uncertainties and their corresponding nuisance parameters. We show on two datasets that this dependence can actually enhance the sensitivity to parameters of interest compared to baseline approaches. Finally, we provide a cautionary example for situations where uncertainty mitigating techniques may serve only to hide the true uncertainties.

Primary authors: GHOSH, Aishik (University of California Irvine (US)); NACHMAN, Ben (Lawrence Berkeley National Lab. (US)); WHITESON, Daniel (University of California Irvine (US))

Presenter: GHOSH, Aishik (University of California Irvine (US))

Session Classification: Workshop