Contribution ID: **35** Type: **Abstract for poster-session**

Pareto optimization for decorrelated taggers

Thursday 23 July 2020 17:00 (9 minutes)

Jet taggers that are decorrelated from certain observables, such as mass, are of increasing interest for experimental measurements.
Several methods have been proposed to design taggers that balance discrimination power against correlation.
As a fundamentally multi-objective optimization problem, there is an infinite set of Pareto-efficient solutions, known as the Pareto frontier.
We demonstrate that while most existing methods can generally converge to some solution near this frontier, there is often limited control over the exact trade-off point achieved, even when the surrogate objective includes a tunable hyperparameter.
We also demonstrate some qualitative features of this Pareto frontier using a toy model with an analytic likelihood, allowing us to probe the exact points at which optimal discrimination and decorrelation occur.
Lastly, we discuss the use of these qualitative features as a map for locating optimal working points for real-world taggers, for which no tractable likelihood is available.

Authors: SHIMMIN, Chase Owen (Yale University (US)); ZHANG, Gang (Tsinghua University (CN)); LIU, Qibin (Tsung-Dao Lee Institute (CN) & Shanghai Jiao Tong University (CN)); HSU, Shih-Chieh (University of Washington Seattle (US))

Session Classification: Session 6

Track Classification: Taggers and performance