Invited Talk Abstract

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Orthogonalized Moment Aberration for Hyperparameter Optimization under Heterogeneity

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Time	10:30–11:00
Session	Session 1
Venue	Department of Mathematics, National Taiwan Normal University, Taipei, Taiwan

Abstract

Hyperparameter optimization often takes place under heterogeneous conditions, such as different datasets, hardware settings, and random seeds. Classical experimental designs are usually developed for homogeneous settings and may therefore lose efficiency in practice. In this talk, I will introduce a framework that applies orthogonalized moment aberration (OMA) to hyperparameter tuning. OMA was originally proposed for mixed-level multi-stratum factorial designs and provides a model-free yet statistically justified way to compare designs through kernel-based similarities while accounting for heterogeneous experimental units. By treating hyperparameters as treatment factors and tuning environments as strata, the proposed approach constructs robust and diverse hyperparameter configurations. The resulting designs are closely connected to Bayesian D-optimality and Gaussian-process-based entropy criteria, providing an efficient and principled foundation for hyperparameter experimentation under heterogeneity.