A few properties of error rate estimation of learning algorithms

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Vortrag im Rahmen des Institutskolloquiums

24. Juli 2013, 17:15 Uhr

Seminarraum, Ludwigstraße 33 I

It is well-known that a variety of subsampling procedures can be elegantly recast in the language of U-statistics. In particular, this applies to variations of cross-validation.

We review the definition and basic properties of U-statistics, and show how to apply them to obtain an unbiased variance estimator of a learning algorithm's unconditional error rate estimator. In particular, we look at the case of logistic lasso-penalized regression, together with possible applications.