



Extrapolation-Aware Nonparametric Statistical Inference

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Extrapolation occurs in many data analysis applications and can invalidate the resulting conclusions if not taken into account. Formally, extrapolation refers to any type of statistical inference on a conditional function (e.g., a conditional expectation or conditional quantile) evaluated outside of the support of the conditioning variable. While extrapolation is straightforward in parametric models, it becomes challenging in nonparametric models. In this talk, we extend the nonparametric statistical model to explicitly allow for extrapolation and introduce a class of extrapolating assumptions that can be combined with existing inference techniques to raw extrapolation-aware conclusions. The proposed class of extrapolation assumptions stipulate that the conditional function of interest attains its minimal and maximal directional derivative in each direction within the observed support. We illustrate how the framework can be applied to several statistical applications including out-of-support prediction and extrapolation-aware uncertainty quantification.

