

The online updating approach (ONLINE) has been commonly used for the analysis of big data and online transient data. We consider in this paper how to improve its efficiency for various ONLINE kernel-based nonparametric estimators. Our findings include: (i) the optimal choice concerning the bandwidth and how it differs from that for the classical estimators; (ii) the optimal choice among a general class of sequential updating schemes; (iii) that the relative efficiencies of ONLINE Parzen-Rosenblatt density estimation or Nadaraya-Waston (N-W) regression estimation change with the dimension p of covariate in a nonlinear manner: it drops from 0.9432 for $p=1$ to 0.9186 when $p=4$, then gradually picks up with a limit of 1 as p goes to infinity; and (iv) that while the classical local-linear fitting renders the estimators design-adaptive, their ONLINE counterparts still depend on the design of covariates in its leading terms of bias, but they are still preferred over the ONLINE N-W estimators.