NONPARAMETRIC BINARY REGRESSION WITH RANDOM COVARIATES

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Abstract: The performance of Bayes' estimates is studied under an assumption of conditional exchangeability. More exactly, for each subject in a data set, let ξ be a vector of binary covariates and let η be a binary response variable with $P\{\eta = 1|\xi\} = f(\xi)$. Here, f is an unknown function, to be estimated from the data; the subjects are independent, and the ξ's are iid uniform. Define a prior distribution on f as $\sum_k w_k \pi_k / \sum_k w_k$, where π_k is uniform on the set of f which only depend on the first k covariates and $w_k > 0$ for infinitely many k. Bayes' estimates are consistent at all f if w_k decreases rapidly as k increase. Otherwise, the estimates are inconsistent at $f \equiv 1/2$.

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