



Department of Decision Sciences

Statistics Seminar

Shape restricted nonparametric regression with Bernstein polynomials

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Abstract

The objective of this talk is to present a computationally efficient estimator of the regression function subject to various shape constraints. In particular, nonparametric estimators of monotone and/or convex (concave) regression functions are obtained by using a nested sequence of Bernstein polynomials. One of the key distinguishing features of the proposed estimator is that a given shape constraint (e.g., monotonicity and/or convexity) is maintained for any finite sample size and satisfied over the entire support of the predictor space. Moreover, it is shown that the Bernstein polynomial based regression estimator can be obtained as a solution of a constrained least squares method and hence the estimator can be computed efficiently using a quadratic programming algorithm. Finally, the asymptotic properties (e.g., strong uniform consistency) of the estimator are established under very mild conditions, and finite sample properties are explored using several simulation studies and real data analysis. The predictive performances are compared with some of the existing methods.

The talk is based on my recently published article in CSDA:
<http://dx.doi.org/10.1016/j.csd.2012.02.018>