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The accuracy and the computational complexity of a multivariate binned kernel density estimator. (English) Zbl 1065.62511

J. Multivariate Anal. 72, No. 2, 264-309 (2000).

Summary: The computational cost of multivariate kernel density estimation can be reduced by prebinning the data. The data are discretized to a grid and a weighted kernel estimator is computed. We report results on the accuracy of such a binned kernel estimator and discuss the computational complexity of the estimator as measured by its average number of nonzero terms.

MSC:

62G07 Density estimation

65C60 Computational problems in statistics (MSC2010)

Cited in 5 Documents

Keywords:

Kernel density estimation; binning; estimation error; computational complexity

Software:

ESTIMA; AS 176; KernSmooth

Full Text: [DOI](#)

References:

- [1] Abramowitz, M; Stegun, I.A, Handbook of mathematical functions, (1965), Dover New York · [Zbl 0515.33001](#)
- [2] Adams, R.A, Sobolev spaces, (1975), Academic Press Orlando
- [3] Breuer, K, Approximation von kernglättern durch die warping methode, (1990), Universität DortmundDiplomarbeit, Fachbereich Statistik
- [4] Bhattacharya, R.N; Rao, R.R, Normal approximation and asymptotic expansions, (1976), Wiley New York · [Zbl 0331.41023](#)
- [5] Davis, P.J; Rabinowitz, P.R, Numerical integration, (1967), Blaisdell Publishing Company Waltham
- [6] Devroye, L, A course in density estimation, (1987), Birkhäuser Boston
- [7] Fan, J.F; Marron, J.S, Fast implementations of nonparametric curve estimators, *J. comput. graphical statist.*, 3, 35-56, (1994)
- [8] Hall, P, The influence of rounding errors on some nonparametric estimators of a density and its derivatives, *SIAM J. appl. math.*, 42, 390-399, (1982) · [Zbl 0499.62036](#)
- [9] Hall, P; Wand, M.P, On the accuracy of binned kernel density estimators, *J. multivariate anal.*, 56, 165-184, (1996) · [Zbl 0863.62036](#)
- [10] Hämmäläinen, A, Self-organizing map and reduced kernel density estimation, Research reports, (1995)
- [11] Härdle, W.K; Scott, D.W, Smoothing by weighted averaging of rounded points, *Comput. statist.*, 7, 97-128, (1992) · [Zbl 0775.62096](#)
- [12] Jones, M.C, Discretized and interpolated kernel estimates, *J. amer. statist. assoc.*, 84, 733-741, (1989)
- [13] Minnotte, M.C; Scott, D.W, The mode tree: A tool for visualization of nonparametric density features, *J. comput. graphical statist.*, 2, 51-68, (1993)
- [14] Rudin, W, Real and complex analysis, (1974), McGraw-Hill New York
- [15] Scott, D.W, Averaged shifted histograms: effective nonparametric density estimators in several dimensions, *Ann. statist.*, 13, 1024-1040, (1985) · [Zbl 0589.62022](#)
- [16] Scott, D.W; Sheather, S.J, Kernel density estimation with binned data, *Comm. statist. theory methods*, 14, 1353-1359, (1985)
- [17] Scott, D.W, Multivariate density estimation: theory, practice, and visualization, (1992), John Wiley & Sons, Inc New York · [Zbl 0850.62006](#)
- [18] Silverman, B.W, Kernel density estimation using the fast Fourier transform. statistical algorithm AS 176, *Appl. statist.*, 31, 93-97, (1982) · [Zbl 0483.62032](#)
- [19] Stein, E.M, Singular integrals and differentiability properties of functions, (1970), Princeton University Press Princeton · [Zbl 0207.13501](#)

- [20] Stein, E.M; Weiss, G, Fourier analysis on Euclidean spaces, (1971), Princeton University Press Princeton
- [21] Szidarovszky, F; Yakowitz, S, Principles and procedures of numerical analysis, (1978), Plenum Press New York · [Zbl 0416.65001](#)
- [22] Wand, M.P, Fast computation of multivariate kernel estimators, J. comput. graphical statist., 3, 433-445, (1994)
- [23] Wand, M.P; Jones, M.C, Kernel smoothing, (1995), Chapman & Hall London

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