Laverny, Oskar; Masiello, Esterina; Maume-Deschamps, Véronique; Rullière, Didier
Dependence structure estimation using copula recursive trees. (English) [Zbl 1470.62066]

Summary: We construct the COpula Recursive Tree (CORT) estimator: a flexible, consistent, piecewise
linear estimator of a copula, leveraging the patchwork copula formalization and various piecewise constant
density estimators. While the patchwork structure imposes a grid, the CORT estimator is data-driven
and constructs the (possibly irregular) grid recursively from the data, minimizing a chosen distance
on the copula space. The addition of the copula constraints makes usual density estimators unusable,
whereas the CORT estimator is only concerned with dependence and guarantees the uniformity of margins.
Refinements such as localized dimension reduction and bagging are developed, analyzed, and tested
through simulated data.

MSC:
62H12 Estimation in multivariate analysis
62H05 Characterization and structure theory for multivariate probability distributions; copulas
62E17 Approximations to statistical distributions (nonasymptotic)
62G05 Nonparametric estimation

Keywords:
bagging; CORT; density estimation trees; nonparametric estimation; patchwork copula; piecewise linear
copula; quadratic program

Software:
CopulaModel; glasso

Full Text: DOI arXiv

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