Package 'PDFEstimator'

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Title Nonparametric Probability Density Estimator

Author Jenny Farmer <jfarmer6@uncc.edu> and Donald Jacobs <djacobs1@uncc.ecu>

Maintainer Jenny Farmer <jfarmer6@uncc.edu>

Description Farmer, J., D. Jacobs (2108) <DOI:10.1371/journal.pone.0196937>. A nonparametric density estimator based on the maximum-entropy method. Accurately predicts a probability density function (PDF) for random data using a novel iterative scoring function to determine the best fit without overfitting to the sample.

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estimatePDF   *Nonparametric Density Estimation*

Description

Estimates the probability density function for a data sample.

Usage

```
estimatePDF(sample, pdfLength = NULL, lowerBound = NULL, upperBound = NULL)
```

Arguments

`sample`	the data sample from which to calculate the density estimate
`pdfLength`	the desired length of the estimate returned. Default value is calculated based on sample length. Overriding this calculation can increase or decrease the resolution of the estimate.
`lowerBound`	the lower bound of the PDF, if known. Default value is calculated based on the range of the data sample.
`upperBound`	the upper bound of the PDF, if known. Default value is calculated based on the range of the data sample.

Details

A nonparametric density estimator based on the maximum-entropy method. Accurately predicts a probability density function (PDF) for random data using a novel iterative scoring function to determine the best fit without overfitting to the sample.

Value

`x`	estimated range of density data
`pdf`	estimated probability density function
`cdf`	estimated cummulative density function
`sqr`	scaled quantile residual. Provides a sample-size invariant measure of the fluctuations in the estimate.
`lagrange`	lagrange multipliers. Can be used to reproduce the expansions for an analytical solution.
`failedSolution`	returns true if the pdf calculated is not considered an acceptable estimate of the data according to the scoring function.

Author(s)

Jenny Farmer, Donald Jacobs

References

Farmer, J. and D. Jacobs (2018). "High throughput nonparametric probability density estimation." PloS one 13(5): e0196937.

Examples

```
#Estimates a normal distribution with 100 sample points using default parameters

sampleSize = 1000
sample = rnorm(sampleSize, 0, 1)
dist = estimatePDF(sample)
plot(dist$x, dist$pdf)
```

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