Package 'LocFDRPois'

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Title Functions for Performing Local FDR Estimation when Null and
Alternative are Poisson

Version 1.0.0

Description The main idea of the Local FDR algorithm is to estimate both proportion of null observations and the ratio of null and alternative densities. In the case that there are many null observations, this can be done reliably, through maximum likelihood or generalized linear models. This package implements this in the case that the null and alternative densities are Poisson.

Depends R (>= 3.1.2)

Imports dplyr, ggplot2

License GPL-2

LazyData true

Suggests knitr

VignetteBuilder knitr

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R topics documented:

AnalyticalOptim	*Optimize lambda0 and pi0, using Poisson version of analytical approach in Efron's "Microarrays, Empirical Bayes, and the Two-Groups Model" In the paper, he derives formulas for arbitrary support. We use support [0, 1] for estimating the null. We initialize the search with lambda=0.05 and pi=0.95.*

Description

Optimize lambda0 and pi0, using Poisson version of analytical approach in Efron's "Microarrays, Empirical Bayes, and the Two-Groups Model"

In the paper, he derives formulas for arbitrary support. We use support [0, 1] for estimating the null. We initialize the search with lambda=0.05 and pi=0.95.

Usage

```
AnalyticalOptim(r0, r1, N)
```

Arguments

r0	The number of 0's in the data.
r1	The number of 1's in the data.
N	The total number of points in the data.

BuildTable	*Build a table corresponding to the histogram of data*

Description

Build a table corresponding to the histogram of data

Usage

```
BuildTable(data)
```

Arguments

data	The raw data (before histogramming) to estimate a mixture density for.

Value

X A data frame whose two columns are integer and number of times that integer appears in the data.

LLConstructor	*Return log-likelihood function giving Poisson version of equation (4.6) in "Microarrays, Empirical Bayes, and the Two-Groups model" by Efron.*

Description

Return log-likelihood function giving Poisson version of equation (4.6) in "Microarrays, Empirical Bayes, and the Two-Groups model" by Efron.

Usage

```
LLConstructor(r0, r1, N0, N)
```

Arguments

r0	The number of points equal to 0
r1	The number of points equal to 1
N0	The number of points equal to either 0 or 1
N	The total number of points

Value

LL A function of lambda0 and pi0, given the current data log likelihood

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LocfdrFuns	*Run local fdr functions*

Description

Run local fdr functions

Usage

```
LocfdrFuns(data, df, knots)
```

Arguments

data	The raw data (before histogramming) to estimate a mixture density for.
df	The number of degrees of freedom to use in the natural spline in fitting the mixture density.
knots	The positions of the knots to use in the natural spline fit.

Value

fdr The estimated local fdr function (can be called on numeric vectors).

pi0 The estimated proportion of data that lies in the poisson component

lambda0 The estimated parameter for the poisson component.

f0 The estimated null density function (can be called on numeric vectors.)

f The estimated mixture density function (can be called on numeric vectors.)

MixtureDensity	*Compute full mixture density for data, assuming exponential family model*

Description

Compute full mixture density for data, assuming exponential family model

Usage

```
MixtureDensity(data, df, knots)
```

Arguments

data	The raw data (before histogramming) to estimate a mixture density for.
df	The number of degrees of freedom to use in the natural spline in fitting the mixture density.
knots	The positions of the knots to use in the natural spline fit.

Value

f_hat The estimated mixture density function (can be called on numeric vectors.)

NullDensity	*Estimate the density for the null data*

Description

Estimate the density for the null data

Usage

```
NullDensity(data)
```

Arguments

data	The raw data (before histogramming) to estimate a mixture density for.

Value

f_hat The estimated mixture density function (can be called on numeric vectors.)

SummarizeLocfdr   *Call and summarize output to LocfdrFuns*

Description

Call and summarize output to LocfdrFuns

Usage

```
SummarizeLocfdr(x, df = 5, knots = c())
```

Arguments

x	The raw data (before histogramming) to estimate a mixture density for.
df	The number of degrees of freedom to use in the natural spline in fitting the mixture density.
knots	The positions of the knots to use in the natural spline fit.

Value

pi0 The estimated proportion of data that lies in the poisson component

lambda0 The estimated parameter for the poisson component.

locfdr_res The fdr, f0 and f functions evaluated on the support of x

locfdr_fig A plot of the estimated locfdr fit

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