Package ‘caviarpd’

July 17, 2023

Type Package

Title Cluster Analysis via Random Partition Distributions

Version 0.3.9

Description Cluster analysis is performed using pairwise distance information and a random partition distribution. The method is implemented for two random partition distributions. It draws samples and then obtains and plots clustering estimates. An implementation of a selection algorithm is provided for the mass parameter of the partition distribution. Since pairwise distances are the principal input to this procedure, it is most comparable to the hierarchical and k-medoids clustering methods. The method is Dahl, Andros, Carter (2022+) <doi:10.1002/sam.11602>.

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URL https://github.com/dbdahl/caviarpd

BugReports https://github.com/dbdahl/caviarpd/issues

Depends R (>= 4.2.0)

Suggests salso (>= 0.3.0)

SystemRequirements Cargo (Rust’s package manager), rustc (>= 1.65)

Encoding UTF-8

RoxygenNote 7.2.3

NeedsCompilation yes

topics documented:

unicode-ident.),
David Schultz [cph] (Rust crates: libm.),
DutchGhost [cph] (Rust crate: matrixmultiply.),
Enthought, Inc. [cph] (Rust crate: ndarray.),
Gilad Naaman [cph] (Rust crate: memoffset.),
Jim Turner [cph] (Rust crate: ndarray.),
Jorge Aparicio [cph] (Rust crate: libm.),
Josh Stone [cph] (Rust crate: autocfg.),
Melissa O'Neill [cph] (Rust crate: rand_pcg.),
Mikhail Vorotilov [cph] (Rust crate: roots.),
Paul Dicker [cph] (Rust crate: rand_pcg.),
PCG Project contributors [cph] (Rust crate: rand_pcg.),
Ralf Jung [cph] (Rust crate: memoffset.),
rawpointer developers [cph] (Rust crate: rawpointer.),
R. Janis Goldschmidt [cph] (Rust crate: matrixmultiply.),
SciPy Developers [cph] (Rust crate: ndarray.),
Sean McArthur [cph] (Rust crate: num_cpus.),
Sun Microsystems, Inc. [cph] (Rust crate: libm.),
Stefan Lankes [cph] (Rust crate: hermit-abi.),
The Cranelift Project Developers [cph] (Rust crate: wasi.),
The Crossbeam Project Developers [cph] (Rust crates: crossbeam,
crossbeam-channel, crossbeam-deque, crossbeam-epoch,
crossbeam-queue, crossbeam-utils.),
The CryptoCorrosion Contributors [cph] (Rust crates: ppv-lite86,
rand_chacha.),
The Go Authors [cph] (Rust crate: crossbeam-channel.),
The PCG Project Contributors [cph] (Rust crate: rand_pcg.),
The matrixmultiply Authors [cph] (Rust crate: matrixmultiply.),
The ndarray Developers [cph] (Rust crate: ndarray.),
The Rand Project Developers [cph] (Rust crates: rand_core, rand_chacha,
rand_pcg, rand, getrandom, rand_distr.),
The Rust Project Developers [cph] (Rust crates: crossbeam-channel,
rand_chacha, num-integer, rand_core, num-complex, libc, num-traits,
rand.),
The scopeguard Developers [cph] (Rust crates: scopeguard.),
Unicode, Inc. [cph] (Rust crate: unicode-ident.)

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Repository  CRAN

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R topics documented:

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Cluster Analysis via Random Partition Distributions

Description

Returns a clustering estimate given pairwise distances using the CaviarPD method.

Usage

caviarpd(
  distance,
  nClusters,
  mass = NULL,
  nSamples = 200,
  gridLength = 5,
  loss = "binder",
  temperature = 100,
  similarity = c("exponential", "reciprocal")[1],
  maxNClusters = 0,
  nRuns = 4,
  nCores = nRuns
)

Arguments

distance An object of class 'dist' or a pairwise distance matrix.
nClusters A numeric vector that specifies the range for the number of clusters to consider in the search for a clustering estimate.
mass The mass value to use for sampling. If NULL, the mass value is found by inverting values from nClusters.
nSamples The number of samples drawn per candidate estimate.
gridLength The number of candidate estimates to consider. The final estimate is obtained from nSamples \times gridLength total samples.
loss The SALSO method (Dahl, Johnson, Müller, 2021) tries to minimize this expected loss when searching the partition space for an optimal estimate. This must be either "binder" or "VI".
temperature A positive number that accentuates or dampens distance between observations.
similarity Either "exponential" or "reciprocal" to indicate the desired similarity function.
maxNClusters The maximum number of clusters that can be considered by the SALSO method.
nRuns The number of runs of the SALSO algorithm.
nCores The number of CPU cores to use. A value of zero indicates to use all cores on the system.
Details

A range for the number of clusters to be considered is supplied using the `nClusters` argument.

Value

A object of class `salso.estimate`, which provides a clustering estimate (a vector of cluster labels) that can be displayed and plotted.

References


Examples

```r
# To reduce load on CRAN servers, limit the number of samples, grid length, and CPU cores.
set.seed(34)
iris.dis <- dist(iris[, -5])
est <- caviarpd(distance=iris.dis, nClusters=c(2, 4), nSamples=20, nCores=1)
if (require("salso")) {
  summ <- summary(est, orderingMethod=2)
  plot(summ, type="heatmap")
  plot(summ, type="mds")
}
```
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