Package ‘BufferedMatrix’

January 30, 2017

Version 1.38.0
Title A matrix data storage object held in temporary files
Author Benjamin Milo Bolstad <bmb@bmbolstad.com>
Maintainer Benjamin Milo Bolstad <bmb@bmbolstad.com>
Depends R (>= 2.6.0), methods
Description A tabular style data object where most data is stored outside main memory. A buffer is used to speed up access to data.
License LGPL (>= 2)
URL https://github.com/bmbolstad/BufferedMatrix


LazyLoad yes
bioCViews Infrastructure

NeedsCompilation yes

R topics documented:

as.BufferedMatrix ......................................................... 1
BufferedMatrix-class .................................................... 2
createBufferedMatrix .................................................... 5

Index

as.BufferedMatrix Check or Coerce object to BufferedMatrix

Description
‘as.BufferedMatrix’ will coerce the supplied object into a BufferedMatrix. ‘is.BufferedMatrix’ checks whether the supplied argument is a BufferedMatrix.

Usage
as.BufferedMatrix(x, bufferrows=1, buffercols=1,directory=getwd())
is.BufferedMatrix(x)
BufferedMatrix-class

Arguments

- `x`: an R object
- `bufferrows`: number of rows to be buffered if the row buffer is activated
- `buffercols`: number of columns to be buffered
- `directory`: path to directory where temporary files should be stored

Details

These functions are useful for converting between R matrix objects and BufferedMatrix objects.

Author(s)

B. M. Bolstad <bmb@bmbolstad.com>

Description

This is a class representation of a buffered matrix (of numeric data). In this case data is primarily stored outside main memory in temporary files.

Objects from the Class

Objects can be created using the function `createBufferedMatrix`

Slots

- `rawBufferedMatrix`: a pointer to an external structure used to access and store the matrix data.
- `rownames`: rownames for the matrix.
- `colnames`: colnames for the matrix.

Methods

- `ncol` signature(object = "BufferedMatrix"): Returns the number of columns in the matrix
- `nrow` signature(object = "BufferedMatrix"): Returns the number of rows in the matrix
- `dim` signature(object = "BufferedMatrix"): Returns the dimensions of the matrix
- `buffer.dim` signature(object = "BufferedMatrix"): Returns the number of columns and the number of rows to be stored in the buffer
- `set.buffer.dim` signature(object = "BufferedMatrix"): Set the buffer size or resize it
- `[ signature(object = "BufferedMatrix"): matrix accessor
- `[<`- signature(object = "BufferedMatrix"): matrix replacer
- `show` signature(object = "BufferedMatrix"): prints basic information about the BufferedMatrix out to screen
- `is.RowMode` signature(object = "BufferedMatrix"): returns TRUE if the row buffer is active and FALSE otherwise.
**BufferedMatrix-class**

**is.ColMode** signature(object = "BufferedMatrix"): returns TRUE if the row buffer is inactive and FALSE otherwise.

**RowMode** signature(object = "BufferedMatrix"): Activate the row buffer.

**ColMode** signature(object = "BufferedMatrix"): Deactivate the row buffer

**duplicate** signature(object = "BufferedMatrix"): Make a copy of the BufferedMatrix

**prefix** signature(object = "BufferedMatrix"): return the initial part of the string used for temporary files

**directory** signature(object = "BufferedMatrix"): return the location where temporary files are stored

**filenames** signature(object = "BufferedMatrix"): return the fully pathed filenames for each column in the matrix

**ewApply** signature(object = "BufferedMatrix"): apply a function elementwise

**exp** signature(object = "BufferedMatrix"): Compute the exponential elementwise of the matrix

**sqrt** signature(object = "BufferedMatrix"): Compute the square-root elementwise of the matrix

**pow** signature(object = "BufferedMatrix"): Compute $x^{power}$ elementwise of the matrix

**log** signature(object = "BufferedMatrix"): Compute logarithm elementwise of the matrix

**colMax** signature(object = "BufferedMatrix"): Returns a vector containing maximums by column

**rowMax** signature(object = "BufferedMatrix"): Returns a vector containing maximums by row

**colMeans** signature(object = "BufferedMatrix"): Returns a vector containing means by column

**rowMeans** signature(object = "BufferedMatrix"): Returns a vector containing means by row

**colMin** signature(object = "BufferedMatrix"): Returns a vector containing minimums by column

**rowMin** signature(object = "BufferedMatrix"): Returns a vector containing minimums by row

**colVars** signature(object = "BufferedMatrix"): Returns a vector containing sample variances by column

**rowVars** signature(object = "BufferedMatrix"): Returns a vector containing sample variances by row

**colSd** signature(object = "BufferedMatrix"): Returns a vector containing sample standard deviations by column

**rowSd** signature(object = "BufferedMatrix"): Returns a vector containing sample standard deviations by row

**colSums** signature(object = "BufferedMatrix"): Returns a vector containing sum by column

**rowSums** signature(object = "BufferedMatrix"): Returns a vector containing sum by row

**colMedians** signature(object = "BufferedMatrix"): Returns a vector containing medians by column

**rowMedians** signature(object = "BufferedMatrix"): Returns a vector containing medians by row. Best only used when the matrix is in RowMode (otherwise it is extremely slow)
Max signature(object = "BufferedMatrix"): Returns the maximum of all elements in the matrix
Min signature(object = "BufferedMatrix"): Returns the minimum of all elements in the matrix
Var signature(object = "BufferedMatrix"): Returns the sample variance of all elements in the matrix
Sd signature(object = "BufferedMatrix"): Returns the sample standard deviations of all elements in the matrix
Sum signature(object = "BufferedMatrix"): Returns the sum of all elements in the matrix
mean signature(object = "BufferedMatrix"): Returns the mean of all elements in the matrix
colApply signature(object = "BufferedMatrix"): apply a function columnwise. Returns either a vector or BufferedMatrix.
rowApply signature(object = "BufferedMatrix"): apply a function row-wise. Returns either a vector or BufferedMatrix.
as.matrix signature(object = "BufferedMatrix"): coerce BufferedMatrix into a regular R matrix
subBufferedMatrix signature(object = "BufferedMatrix"): gets data from BufferedMatrix and returns it in another BufferedMatrix
rownames signature(object = "BufferedMatrix"): access the row names
colnames signature(object = "BufferedMatrix"): access the column names
rownames<- signature(object = "BufferedMatrix"): replace the row names
colnames<- signature(object = "BufferedMatrix"): replace the column names
dimnames signature(object = "BufferedMatrix"): Access the row and column names
dimnames signature(object = "BufferedMatrix"): Replace the row and column names
ReadOnlyMode signature(object = "BufferedMatrix"): Toggles the Read Only mode on and off
is.ReadOnlyMode signature(object = "BufferedMatrix"): Finds out if it is in Read Only Mode
memory.usage signature(object = "BufferedMatrix"): Give amount of RAM currently in use by BufferedMatrix object
disk.usage signature(object = "BufferedMatrix"): Give amount of disk space currently in use by BufferedMatrix object
as(matrix,BufferedMatrix): Coerce matrix to BufferedMatrix.
as(BufferedMatrix,matrix): Coerce the Buffered to matrix.
AddColumn: Add an additional column to the matrix. Will be all empty (set to 0)
MoveStorageDirectory: Move the temporary files used to store the matrix from one location to another

Author(s)

B. M. Bolstad <bmb@bmbolstad.com>
Description

Creates a Buffered Matrix object

Usage

```r
createBufferedMatrix(rows, cols=0, bufferrows=1, buffercols=1, prefix="BM", directory=getwd())
```

Arguments

- **rows**: Number of rows in the matrix
- **cols**: Initial number of columns in the matrix
- **bufferrows**: number of rows to be buffered if the row buffer is activated
- **buffercols**: number of columns to be buffered
- **prefix**: String to be used as start of name for any temporary files
- **directory**: path to directory where temporary files should be stored

Author(s)

B. M. Bolstad <bmb@bmbolstad.com>
Index

*Topic classes
  BufferedMatrix-class, 2

*Topic manip
  as.BufferedMatrix, 1
  [,BufferedMatrix-method (BufferedMatrix-class), 2
  [<=,BufferedMatrix-method (BufferedMatrix-class), 2
  AddColumn (BufferedMatrix-class), 2
  AddColumn,BufferedMatrix-method (BufferedMatrix-class), 2
  as.BufferedMatrix, 1
  as.matrix,BufferedMatrix-method (BufferedMatrix-class), 2
  buffer.dim (BufferedMatrix-class), 2
  buffer.dim,BufferedMatrix-method (BufferedMatrix-class), 2
  BufferedMatrix, 2
  BufferedMatrix-class, 2
  coerce,BufferedMatrix,matrix-method (BufferedMatrix-class), 2
  coerce,matrix,BufferedMatrix-method (BufferedMatrix-class), 2
  colApply (BufferedMatrix-class), 2
  colApply,BufferedMatrix-method (BufferedMatrix-class), 2
  colMax (BufferedMatrix-class), 2
  colMax,BufferedMatrix-method (BufferedMatrix-class), 2
  colMeans (BufferedMatrix-class), 2
  colMeans,BufferedMatrix-method (BufferedMatrix-class), 2
  colMedians (BufferedMatrix-class), 2
  colMedians,BufferedMatrix-method (BufferedMatrix-class), 2
  colMin (BufferedMatrix-class), 2
  colMin,BufferedMatrix-method (BufferedMatrix-class), 2
  ColMode (BufferedMatrix-class), 2
  ColMode,BufferedMatrix-method (BufferedMatrix-class), 2
  colnames,BufferedMatrix-method (BufferedMatrix-class), 2
  colnames<-,BufferedMatrix-method (BufferedMatrix-class), 2
  colRanges (BufferedMatrix-class), 2
  colRanges,BufferedMatrix-method (BufferedMatrix-class), 2
  colSd (BufferedMatrix-class), 2
  colSd,BufferedMatrix-method (BufferedMatrix-class), 2
  colSums (BufferedMatrix-class), 2
  colSums,BufferedMatrix-method (BufferedMatrix-class), 2
  colVars (BufferedMatrix-class), 2
  colVars,BufferedMatrix-method (BufferedMatrix-class), 2
  createBufferedMatrix, 2
  dim,BufferedMatrix-method (BufferedMatrix-class), 2
  dimnames,BufferedMatrix-method (BufferedMatrix-class), 2
  disk.usage (BufferedMatrix-class), 2
  disk.usage,BufferedMatrix-method (BufferedMatrix-class), 2
  duplicate (BufferedMatrix-class), 2
  duplicate,BufferedMatrix-method (BufferedMatrix-class), 2
  ewApply (BufferedMatrix-class), 2
  ewApply,BufferedMatrix-method (BufferedMatrix-class), 2
  exp,BufferedMatrix-method (BufferedMatrix-class), 2
  filenames (BufferedMatrix-class), 2
  filenames,BufferedMatrix-method (BufferedMatrix-class), 2
  is.BufferedMatrix (as.BufferedMatrix), 1
INDEX

is.ColMode (BufferedMatrix-class), 2
is.ColMode,BufferedMatrix-method
(BufferedMatrix-class), 2
is.ReadOnlyMode (BufferedMatrix-class), 2
is.ReadOnlyMode,BufferedMatrix-method
(BufferedMatrix-class), 2
is.RowMode (BufferedMatrix-class), 2
is.RowMode,BufferedMatrix-method
(BufferedMatrix-class), 2
log,BufferedMatrix-method
(BufferedMatrix-class), 2
matrix, 2, 4
Max (BufferedMatrix-class), 2
Max,BufferedMatrix-method
(BufferedMatrix-class), 2
mean,BufferedMatrix-method
(BufferedMatrix-class), 2
memory.usage (BufferedMatrix-class), 2
memory.usage,BufferedMatrix-method
(BufferedMatrix-class), 2
Min (BufferedMatrix-class), 2
Min,BufferedMatrix-method
(BufferedMatrix-class), 2
MoveStorageDirectory
(BufferedMatrix-class), 2
MoveStorageDirectory,BufferedMatrix-method
(BufferedMatrix-class), 2
ncol,BufferedMatrix-method
(BufferedMatrix-class), 2
nrow,BufferedMatrix-method
(BufferedMatrix-class), 2
pow (BufferedMatrix-class), 2
pow,BufferedMatrix-method
(BufferedMatrix-class), 2
prefix (BufferedMatrix-class), 2
prefix,BufferedMatrix-method
(BufferedMatrix-class), 2
ReadOnlyMode (BufferedMatrix-class), 2
ReadOnlyMode,BufferedMatrix-method
(BufferedMatrix-class), 2
rowApply (BufferedMatrix-class), 2
rowApply,BufferedMatrix-method
(BufferedMatrix-class), 2
rowMax (BufferedMatrix-class), 2
rowMax,BufferedMatrix-method
(BufferedMatrix-class), 2
rowMeans (BufferedMatrix-class), 2
rowMeans,BufferedMatrix-method
(BufferedMatrix-class), 2
rowMedians (BufferedMatrix-class), 2
rowMedians,BufferedMatrix-method
(BufferedMatrix-class), 2
rowMin (BufferedMatrix-class), 2
rowMin,BufferedMatrix-method
(BufferedMatrix-class), 2
RowMode (BufferedMatrix-class), 2
RowMode,BufferedMatrix-method
(BufferedMatrix-class), 2
rownames,BufferedMatrix-method
(BufferedMatrix-class), 2
rownames<-,BufferedMatrix-method
(BufferedMatrix-class), 2
rowSd (BufferedMatrix-class), 2
rowSd,BufferedMatrix-method
(BufferedMatrix-class), 2
rowSums (BufferedMatrix-class), 2
rowSums,BufferedMatrix-method
(BufferedMatrix-class), 2
rowVars (BufferedMatrix-class), 2
rowVars,BufferedMatrix-method
(BufferedMatrix-class), 2
Sd (BufferedMatrix-class), 2
Sd,BufferedMatrix-method
(BufferedMatrix-class), 2
set.buffer.dim (BufferedMatrix-class), 2
set.buffer.dim,BufferedMatrix-method
(BufferedMatrix-class), 2
show,BufferedMatrix-method
(BufferedMatrix-class), 2
sqrt,BufferedMatrix-method
(BufferedMatrix-class), 2
subBufferedMatrix
(BufferedMatrix-class), 2
subBufferedMatrix,BufferedMatrix-method
(BufferedMatrix-class), 2
Sum (BufferedMatrix-class), 2
Sum,BufferedMatrix-method
(BufferedMatrix-class), 2
Var (BufferedMatrix-class), 2
Var,BufferedMatrix-method
(BufferedMatrix-class), 2