Package 'RcppBlaze'

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Type Package

Title 'Rcpp' Integration for the 'Blaze' High-Performance 'C++' Math
Library

Version 1.0.0

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URL https://github.com/Chingchuan-chen/RcppBlaze,

https://bitbucket.org/blaze-lib/blaze

BugReports https://github.com/Chingchuan-chen/RcppBlaze/issues

Description
Blaze is an open-source, high-performance 'C++' math library for dense and sparse arithmetic.
With its state-of-the-
art Smart Expression Template implementation Blaze combines the elegance and
ease of use of a domain-specific language with HPC-grade performance, making it one of the most
intuitive and fastest 'C++' math libraries available. The 'RcppBlaze' package in-
cludes the header files
from the 'Blaze' library with disabling some functionalities related to link to the thread and system
libraries which make 'RcppBlaze' be a header-only library. Therefore, users do not need to install
'Blaze'.

Depends R (>= 4.2.0)

Imports Rcpp (>= 1.0.0), Matrix (>= 1.5-0)

LinkingTo Rcpp

Suggests MatrixExtra, microbenchmark, tinytest, pkgKitten

LazyLoad yes

Encoding UTF-8

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RoxygenNote 7.3.1

NeedsCompilation yes

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R topics documented:

RcppBlaze-package   *RcppBlaze - 'Rcpp' Integration for the 'Blaze' High-Performance 'C++' Math Library*

Description

RcppBlaze constructs a bridge between **R** and **Blaze**.

Details

Blaze is an open-source, high-performance **C++** math library for dense and sparse arithmetic. With its state-of-the-art Smart Expression Template implementation **Blaze** combines the elegance and ease of use of a domain-specific language with HPC-grade performance, making it one of the most intuitive and fastest **C++** math libraries available. The **RcppBlaze** package includes the header files from the **Blaze** library with disabling some functionalities related to link to the thread and system libraries which make **RcppBlaze** be a header-only library. Therefore, users do not need to install **Blaze**.

Using RcppBlaze

To use **RcppBlaze** in your package, there are some important steps:

1. Include the 'RcppBlaze.h' header file, which also includes 'blaze/Blaze.h'.

2. Import Rcpp, LinkingTo Rcpp and RcppBlaze by adding these lines to the 'DESCRIPTION' file:

   ```
   Imports: Rcpp (>= 1.0.0)
   LinkingTo: Rcpp, RcppBlaze
   ```

3. Link against the BLAS and LAPACK libraries, by adding following two lines in the 'Makevars' and 'Makevars.win' files:

   ```
   PKG_CXXFLAGS=$(SHLIB_OPENMP_CXXFLAGS)
   PKG_LIBS = $(LAPACK_LIBS) $(BLAS_LIBS) $(FLIBS) $(SHLIB_OPENMP_CXXFLAGS)
   ```

4. Since there are conflicted definitions between **R** and **blaze** which is TRUE and FALSE. You have to write the initializing function for **C/C++** code which the function is named after R_init_YourPackageName You can refer to our another package, https://github.com/ChingChuan-Chen/RcppLbfgsBlaze for example.

Notes

1. If you would like to enable Boost threads support, you need to import **BH** package in your DESCRIPTION.

2. CompressedVector and CompressedMatrix only support int, float and double types.

Author(s)

For RcppBlaze: Ching-Chuan Chen Maintainer: Ching-Chuan Chen <zw12356@gmail.com> For blaze: Klaus Iglberger, Georg Hager, Christian Godenschwager, Tobias Scharpff

References

1. Blaze project: https://bitbucket.org/blaze-lib/blaze.

2. K. Iglberger, G. Hager, J. Treibig, and U. Ruede: Expression Templates Revisited: A Performance Analysis of Current Methodologies. SIAM Journal on Scientific Computing, 34(2): C42–C69, 2012, [doi:10.1137/110830125](doi:10.1137/110830125).

3. K. Iglberger, G. Hager, J. Treibig, and U. Ruede, High Performance Smart Expression Template Math Libraries. Proceedings of the 2nd International Workshop on New Algorithms and Programming Models for the Manycore Era (APMM 2012) at HPCS 2012, doi:10.1109/HPCSim.2012.6266939.

See Also

Useful links:

- https://github.com/Chingchuan-chen/RcppBlaze
- https://bitbucket.org/blaze-lib/blaze
- Report bugs at https://github.com/Chingchuan-chen/RcppBlaze/issues

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blaze_version	*The version of Blaze used in RcppBlaze*

Description

To return the version of Blaze used in RcppBlaze.

Usage

```
blaze_version(single)
```

Arguments

single
: A logical value indicates which type to return. If TRUE, it returns an integer. If FALSE, it returns a named vector.

Value

A number or a named vector to represent the version of `blaze` depending on the input, `single`.

See Also

Blaze header file `blaze/system/Version.h`.

Examples

```
blaze_version(FALSE)
```

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fastLmPure   *linear model fitting function based on RcppBlaze*

Description

`fastLmPure` provides the estimates of the linear model based on **RcppBlaze**.

Usage

```
fastLmPure(X, y, type)
```

Arguments

X
: A model matrix.

y
: A response vector.

type
: A integer. 0 is QR solver, 1 is LLT solver and 2 is LDLT sovler.

Details

`fastLm` estimates the linear model using the `solve`.

Value

A list containing coefficients, standard errors, rank of model matrix, degree of freedom of residuals, residuals, the standard deviation of random errors and fitted values.

Examples

```
# according to fastLm example in RcppArmadillo
data(trees, package="datasets")
flm <- fastLmPure(cbind(1, log(trees$Girth)), log(trees$Volume), 0)
print(flm)
```

Index