

Package ‘RcppXsimd’

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Type Package

Title Xsimd C++ Header-Only Library Files

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Description This header-only library provides modern, portable C++ wrappers for SIMD intrinsics and parallelized, optimized math implementations (SSE, AVX, NEON, AVX512). By placing this library in this package, we offer an efficient distribution system for Xsimd <<https://github.com/xtensor-stack/xsimd>> for R packages using CRAN.

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Imports Rcpp (>= 1.0.0)

LinkingTo Rcpp

RoxygenNote 7.3.2

Encoding UTF-8

Suggests testthat

NeedsCompilation yes

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getAVX512Flags	<i>Concatenate supported AVX512 compiler flags for system CPU</i>
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Description

Concatenate supported AVX512 compiler flags for system CPU

Usage

getAVX512Flags()

Value

String for compiler flags

getAVXFlags	<i>Concatenate supported AVX compiler flags for system CPU</i>
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Description

Concatenate supported AVX compiler flags for system CPU

Usage

getAVXFlags()

Value

String for compiler flags

`getNEONFlags`*Concatenate supported NEON compiler flags for system CPU*

Description

Concatenate supported NEON compiler flags for system CPU

Usage

```
getNEONFlags()
```

Value

String for compiler flags

`getSimdFeatures`*Poll OS and CPU for SIMD feature support*

Description

Execute CPUID to poll operating system and central processing unit for single instruction, multiple data feature support.

Usage

```
getSimdFeatures()
```

Value

List of operating system (OS) and hardware (HW) feature support; see CPUID Wiki page for flag definitions

References

<https://en.wikipedia.org/wiki/CPUID>

getSSEFlags	<i>Concatenate supported SSE compiler flags for system CPU</i>
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Description

Concatenate supported SSE compiler flags for system CPU

Usage

```
getSSEFlags()
```

Value

String for compiler flags

RcppXsimd	<i>RcppXsimd: Rcpp wrapper to Xsimd</i>
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Description

The RcppXsimd package wrappers the header-only C++ Xsimd library that provides parallelized math implementations using SIMD

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`supportsAVX`*Determine if CPU supports AVX SIMD instructions*

Description

Determine if CPU supports AVX SIMD instructions

Usage

```
supportsAVX()
```

Value

Boolean

Examples

```
## Not run:

if (supportsAVX()) {
  Sys.setenv(PKG_CPPFLAGS = getAVXFlags())
  Rcpp::sourceCpp(verbose = TRUE, code='
    // [[Rcpp::plugins(cpp14)]]
    // [[Rcpp::depends(RcppXsimd)]]

    #include <Rcpp.h>
    #include "xsimd/xsimd.hpp"

    // [[Rcpp::export]]
    void demoAVX() {
      xsimd::batch<double, 4> a(1.0);
      xsimd::batch<double, 4> b(1.0);
      Rcpp::Rcout << a << " + " << b << " = " << (a + b) << std::endl;
    }')
  demoAVX()
} else {
  message("AVX is not supported")
}

## End(Not run)
```

supportsAVX512	<i>Determine if CPU supports AVX512 SIMD instructions</i>
----------------	---

Description

Determine if CPU supports AVX512 SIMD instructions

Usage

supportsAVX512()

Value

Boolean

Examples

```
## Not run:

if (supportsAVX512()) {
  Sys.setenv(PKG_CPPFLAGS = getAVX512Flags())
  Rcpp::sourceCpp(verbose = TRUE, code='
    // [[Rcpp::plugins(cpp14)]]
    // [[Rcpp::depends(RcppXsimd)]]

    #include <Rcpp.h>
    #include "xsimd/xsimd.hpp"

    // [[Rcpp::export]]
    void demoAVX512() {
      xsimd::batch<double, 8> a(1.0);
      xsimd::batch<double, 8> b(1.0);
      Rcpp::Rcout << a << " + " << b << " = " << (a + b) << std::endl;
    }')
  demoAVX512()
} else {
  message("AVX512 is not supported")
}

## End(Not run)
```

supportsNEON	<i>Determine if CPU supports NEON SIMD instructions</i>
--------------	---

Description

Determine if CPU supports NEON SIMD instructions

Usage

```
supportsNEON()
```

Value

Boolean

Examples

```
## Not run:

if (supportsNEON()) {
  Sys.setenv(PKG_CPPFLAGS = getNEONFlags())
  Rcpp::sourceCpp(verbose = TRUE, code='
    // [[Rcpp::plugins(cpp14)]]
    // [[Rcpp::depends(RcppXsimd)]]

    #include <Rcpp.h>
    #include "xsimd/xsimd.hpp"

    // [[Rcpp::export]]
    void demoNEON() {
      xsimd::batch<double, 2> a(1.0);
      xsimd::batch<double, 2> b(1.0);
      Rcpp::Rcout << a << " + " << b << " = " << (a + b) << std::endl;
    }')
  demoNEON()
} else {
  message("NEON is not supported")
}

## End(Not run)
```

 supportsSSE

Determine if CPU supports SSE SIMD instructions

Description

Determine if CPU supports SSE SIMD instructions

Usage

```
supportsSSE()
```

Value

Boolean

Examples

```
## Not run:

if (supportsSSE()) {
  Sys.setenv(PKG_CPPFLAGS = getSSEFlags())
  Rcpp::sourceCpp(verbose = TRUE, code='
    // [[Rcpp::plugins(cpp14)]]
    // [[Rcpp::depends(RcppXsimd)]]

    #include <Rcpp.h>
    #include "xsimd/xsimd.hpp"

    // [[Rcpp::export]]
    void demoSSE42() {
      xsimd::batch<double, 2> a(1.0);
      xsimd::batch<double, 2> b(1.0);
      Rcpp::Rcout << a << " + " << b << " = " << (a + b) << std::endl;
    }')
  demoSSE42()
} else {
  message("SSE4.2 is not supported")
}

## End(Not run)
```

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