kaldi-blas.h

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```cpp
1  // matrix/kaldi-blas.h
2
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4
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18 // limitations under the License.
19 #ifndef KALDI_MATRIX_KALDI_BLAS_H_
20 #define KALDI_MATRIX_KALDI_BLAS_H_
21
22 // This file handles the #includes for BLAS, LAPACK and so on.
23 // It manipulates the declarations into a common format that kaldi can handle.
24 // However, the kaldi code will check whether HAVE_ATLAS is defined as that
25 // code is called a bit differently from CLAPACK that comes from other sources.
26
27 // There are three alternatives:
28 //   (i) you have ATLAS, which includes the ATLAS implementation of CBLAS
29 //   plus a subset of CLAPACK (but with clapack_ in the function declarations).
30 //   In this case, define HAVE_ATLAS and make sure the relevant directories are
31 //   in the include path.
32
33 //   (ii) you have CBLAS (some implementation thereof) plus CLAPACK.
34 //   In this case, define HAVE_CLAPACK.
35 //   [Since CLAPACK depends on BLAS, the presence of BLAS is implicit].
36
37 //   (iii) you have the MKL library, which includes CLAPACK and CBLAS.
38
39 // Note that if we are using ATLAS, no Svd implementation is supplied,
40 // so we define HAVE_Svd to be zero and this directs our implementation to
41 // supply its own "by hand" implementation which is based on TNT code.
42
43
44
45
46 #if (defined(HAVE_CLAPACK) && (defined(HAVE_ATLAS) || defined(HAVE_MKL))) \
47     || (defined(HAVE_ATLAS) && defined(HAVE_MKL))
48 #error "Do not define more than one of HAVE_CLAPACK, HAVE_ATLAS and HAVE_MKL"
49 #endif
50
51 #ifdef HAVE_ATLAS
52   extern "C" {
53     #include <cblas.h>
54     #include <clapack.h>
55   }
56 #elif defined(HAVE_CLAPACK)
57   #ifdef __APPLE__
58    #ifndef __has_extension
59    #define __has_extension(x) 0
60    #endif
61    #define vImage_Utilities_h
62    #define vImage_CVUtilities_h
63    #include <Accelerate/Accelerate.h>
64    typedef __CLPK_integer          integer;
65    typedef __CLPK_logical          logical;
66    typedef __CLPK_real             real;
67    typedef __CLPK_doublereal       doublereal;
68    typedef __CLPK_complex          complex;
```

```c
  69          typedef __CLPK_doublecomplex    doublecomplex;
  70          typedef __CLPK_ftnlen           ftnlen;
  71      #else
  72        extern "C" {
  73           // May be in /usr/[local]/include if installed; else this uses the one
  74           // from the tools/CLAPACK_include directory.
  75           #include <cblas.h>
  76           #include <f2c.h>
  77           #include <clapack.h>
  78
  79           // get rid of macros from f2c.h -- these are dangerous.
  80           #undef abs
  81           #undef dabs
  82           #undef min
  83           #undef max
  84           #undef dmin
  85           #undef dmax
  86           #undef bit_test
  87           #undef bit_clear
  88           #undef bit_set
  89        }
  90      #endif
  91  #elif defined(HAVE_MKL)
  92      extern "C" {
  93         #include <mkl.h>
  94      }
  95  #elif defined(HAVE_OPENBLAS)
  96      // getting cblas.h and lapacke.h from <openblas-install-dir>/.
  97      // putting in "" not <> to search -I before system libraries.
  98      #include "cblas.h"
  99      #include "lapacke.h"
 100      #undef I
 101      #undef complex
 102      // get rid of macros from f2c.h -- these are dangerous.
 103      #undef abs
 104      #undef dabs
 105      #undef min
 106      #undef max
 107      #undef dmin
 108      #undef dmax
 109      #undef bit_test
 110      #undef bit_clear
 111      #undef bit_set
 112  #else
 113    #error "You need to define (using the preprocessor) either HAVE_CLAPACK or
 114      HAVE_ATLAS or HAVE_MKL (but not more than one)"
 114  #endif
 115
 116  #ifdef HAVE_OPENBLAS
 117  typedef int KaldiBlasInt; // try int.
 118  #endif
 119  #ifdef HAVE_CLAPACK
 120  typedef integer KaldiBlasInt;
 121  #endif
 122  #ifdef HAVE_MKL
 123  typedef MKL_INT KaldiBlasInt;
 124  #endif
 125
 126  #ifdef HAVE_ATLAS
 127  // in this case there is no need for KaldiBlasInt-- this typedef is only needed
 128  // for Svd code which is not included in ATLAS (we re-implement it).
 129  #endif
 130
 131
 132  #endif  // KALDI_MATRIX_KALDI_BLAS_H_
```