

PBOOST is a GPU based tool for parallel permutation tests in genome-wide association studies.

Environment configuration

It can be compiled and run in Windows and Linux environments. 64-bit environment is preferred. Please refer to <http://docs.nvidia.com/cuda/cuda-getting-started-guide-for-linux> for the supported Linux distributions.

NVIDIA CUDA Toolkit is necessary, which is available at <http://developer.nvidia.com/cuda-downloads>. CUDA toolkit 5.5 or above is recommended.

Compiling

In Windows, we use Visual studio 2010 to compile and build the executable file. Put the 4 files: gpmMain.cpp, perm_kernel_MT32.cu, permUtility.cpp, permUtility.h in the Visual Studio project and we will be able to build it.

In Linux, we use gcc to compile the project.

1. Put the 4 source files along with the 'makefile' file in the same path.
2. Change directory to the path and type 'make' in the command line.
3. `chmod +x ./PERMUTE`

The executable file will be generated.

Usage

Command line execution

Type `./PERMUTE`, the program will output the help information. Following is an example to permute on the example data:

```
./PERMUTE -i filenamelist.txt -x index.txt -o result -p 1000000
```

Please refer to the sample data files for data format. There are 3 input files for the example data.

data.txt: the input data. The column 0 is the phenotypes. The other columns are the genotypes.

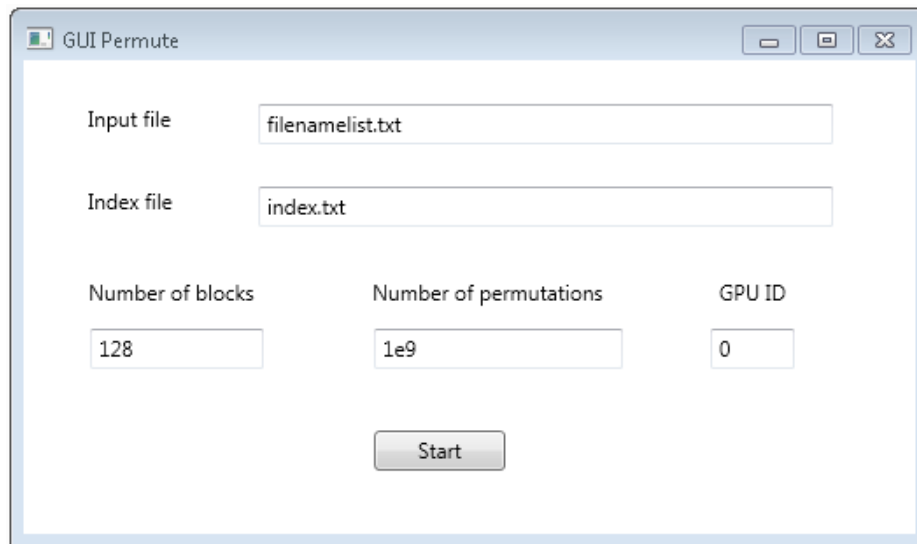
filenamelist.txt: the list of the data files. If the genotypes are divided to multiple files, we list the file names in this file.

index.txt: the index file. The columns of the content are: SNP index 1, SNP index 2, statistic value, p-value. Each row represents a SNP pair. The SNP indices are the SNP indices in the data.txt.

GUI version

There is a GUI version of PBOOST for Windows in the 'GUI version' folder. The executable file is 'GUI_Permute.exe'. .NET framework 4.0 or above is required for this version. Please refer to <http://www.microsoft.com/en-hk/download/details.aspx?id=17851> for installation instructions.

Following is the interface of the GUI version.



Build the PBOOST project and put the GPUPermute.exe file under the same path as the GUI_Permute.exe. The input file and index file should be also under the same path.

The parameters here are the same as the command line version. The permutation test will be launched by simply filling in the blanks and clicking the 'Start' button.