Library for advanced functions in algorithms, data structures and AI implemented in C/C++ - Olib
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Developers of one of most popular languages used for scientific computations which is C, have a lot of libraries at their disposal. Many of those allows usage of modern platforms equipped with advanced multicore processors. Among them is BLAS (Basic Linear Algebra Subprograms) and LAPACK (Linear Algebra PACKage). They contain mainly high performance procedures operating on matrix and vectors.

A lot of high quality functions have been implemented in FORTRAN language, which, despite its age, is still used by developers in many science facilities. completly new direction in informatics are graphic accelerators which can by fully programmed and use for any computation, not limited to rendering tasks. Support for GPUs is provided by CUBLAS (CUDA Basic Linear Algebra Subroutines) library, which supports nVidia GPUs. Optimized for modern GPUs is also LINPAC benchmark, which measures the speed of solving dense system of linear equations. It is being used to test fastest computers on Earth and to classify them on the TOP500 list. The following work presents conception of Olib library binding together capabilities of BLAS, CUBLAS and LAPACK and also allows usage of wide spectrum of implemented algorithms both from cryptography and genetic algorithms. It is completely free and provided on GNU GPL license, it also allows to use classic and multicore CPUs and GPUs.

Olib is a library written primarily for Linux OS. In other systems (eg. Windows, BSD, Solaris) minor compatibility issues with the code may occur. efficient methods was implemented that can be divided on:

- Linear algebra,
- Discrete Mathematics,
- Cryptography,
- Numerical methods,
- Artificial intelligence

In the field of cryptography both historical ciphers (among others. Caesar cipher, płotkowy, Vigenère'a) as well as those recent (RSA, DES, 3DES, AES, SHA, MD5) were implemented. Artificial intelligence is related mainly to Genetic Engine, which gives it the possibility to use genetic algorithms to solve the unsolvable equations in an analytical way. Genetic Engine has great possibilities of defining crossover and mutation operators, and also other characteristics such as methods of selection or type of initial population.

Whole, for several computing architectures, was optimized . This division is presented in Figure 1. In one program, the programmer can use both functions

- using multi-core processors, as well as those which supports graphics accelerators. In the test phase, is also handling CELL processors that are integrated in the PlayStation 3 consoles and IBM Blade computing stations. These processors have a very large computing capabilities, IBM officially announced the discontinuation of its development. How easily can guess few people will try to learn a technology that has no future.
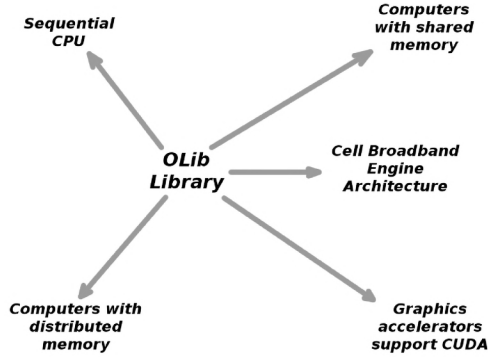

Fig. 1. Architectures supported by Olib Library.

With this library, in some cases, a significant reduction in run-time is possible. Example of acceleration achieved with the GPU while multiplication of matrix is presented in Figure 2.
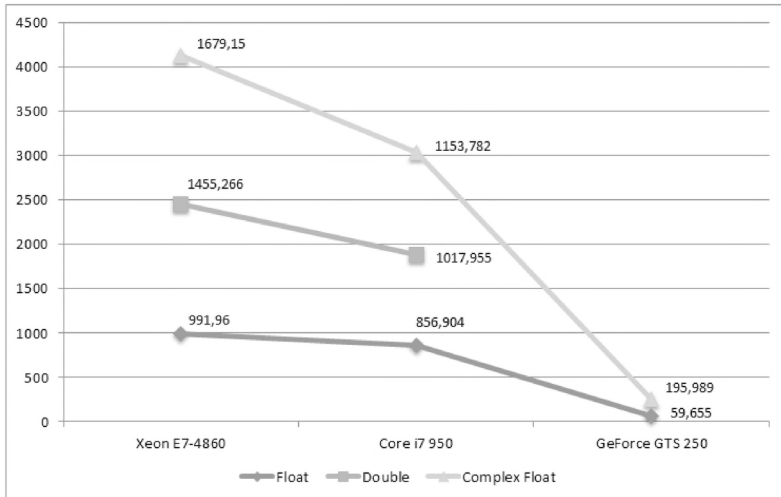

Fig. 2. *Achieved performance increase (decrease in execution time measured in seconds) during matrix multiplication using GPU compared to CPU*

Presented library does not have the capacity as large as any other software of this type, which are often developed for many years. In many cases, a very good results can be achieved - especially when a programmable graphics accelerator or a multi-core processor are available. More information about Olib can be found on the homepage [5].

References:

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2. *http://en.wikipedia.org/wiki/Genetic_algorithm*
3. *Zbigniew Czech (2010). Wprowadzenie do obliczeń równoległych. Wydawnictwo Naukowe PWN*
4. *Jason Sanders, Edward Kandrot (2011). CUDA by Example: An Introduction to General-Purpose GPU Programming. Addison-Wesley*
5. *http://www.goldbach.pl/olib*

Досвід впровадження відкритого програмного забезпечення в стартапах компанії Медіа-Ключ

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Experience of implementing open source software company startups Media Key. The issue of introducing open source software. Open source software in Ukraine. Solutions based on open source software.

Проблематика впровадження будь-якого програмного забезпечення в тому числі і ВПЗ актуальна практично завжди для різного роду систем. Зазвичай в процесі впровадження розв'язуються не тільки технічні завдання, а й ряд специфічних завдань, пов'язаних з учасниками переходу і майбутніми користувачами програмного продукту. Більш того, враховуючи існуючу ситуацію з легалізацією ВПЗ в Україні, особливої уваги потребує питання про юридичне оформлення переходу на ВПЗ і про розробку супутньої документації. Перед інженерами у компанії «Медіа-Ключ» стояли всі перераховані вище завдання з урахуванням специфіки одного з стартапів. Робота в проекті вимагала роботи з графічними редакторами, 3D-моделями та програмним забезпеченням, пов'язаних з генерацією звітів та моніторингом проектів. Враховуючи задані вимоги, був проведений економічний розрахунок і порівняльний