Introduction to Vaucanson

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Vaucanson, a C++ generic library for weighted finite state machines.

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Overview

Initiated by Jacques Sakarovitch in 2000, Vaucanson is a project developed by the École Nationale Supérieure des Télécommunications [1] and the EPITA Research and Development Laboratory (LRDE) [2].

The goal of this library is to enable the development of C++ programs in an abstract and general way with, at the same time, a large specialization power. Indeed, on the one hand, we can write algorithms working on every automaton with weights over any semirings and with words from any free monoids. And on the other hand, a particular algorithm can be specialized for a particular data structure implementing only a pseudo behaviour.

Yet, Vaucanson is an ongoing development project. Therefore algorithms, data structures and the general architecture are not totally stable and well tested.

Please send any question or comments to vaucanson@lrde.epita.fr, and report bugs to either our issue tracker http://vaucanson.lrde.org/, or to vaucanson-bugs@lrde.epita.fr.

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[1] http://www.enst.fr

[2] http://www.lrde.epita.fr

Installation

To install Vaucanson on your system, type in the classical sequence at the command prompt:

```
./configure
make
make sanity-check
make check ([1])
make install (as root)
```

Note that an installation is specific to the compiler used to install it. Indeed, the call to `./configure` enables some workarounds and, consequently, users must compile with the same compiler to avoid compatibility problems.

[1]: Optional: check the whole library. Note that this process takes about 1.5 Go of free space (memory swap included) and several hours.

Additional features

There is a Python interpreter in the package. It is disabled by default because its compilation takes several hours. If you have time to spare, use:

```
./configure --enable-vaucanswig
```

There is an XML I/O subsystem in the library. It is enabled by default, but requires a working installation of another software package called Xerces-C++. If you do not have this package, or if you do not want to use XML I/O in Vaucanson, you can use:

```
./configure --disable-xml
```

To specify a special path for the Xerces-C library:

```
./configure --with-xerces=/absolute/path/to/xerces
```

For further configure options, type:

```
./configure --help
```

Tweaking compilation options

Use `CXXFLAGS_DEBUG` or `CXXFLAGS_OPTIMIZE` to pass debug or optimization flags, not `CXXFLAGS`. For example:

```
./configure CXXFLAGS_DEBUG='-fstack-check -fbounds-check -ggdb'
```

This is because Vaucanson tries to use some particular default flags with some specific compilers such as GCC or ICC. Using `CXXFLAGS` conflicts with those specific flags; `CXXFLAGS_DEBUG` and `CXXFLAGS_OPTIMIZE` override these default flags.

Layout of the tarball

The Vaucanson project directory layout is as follows:

argp A freestanding version of the GNU C Library's argp, a powerful command line argument parser. Used by TAF-Kit.

build-aux Auxialiary tools used by the GNU Build System during "make" stages.

data Files to be installed on your system.

debian Data to generated Debian packages.

doc The documentations.

> **manual** The Vaucanson User Guide.
>
> **share** LaTeX components used to generate the documentation.
>
> **xml** The XML Proposal for Automata I/O.

include The code of the Vaucanson C++ Library.

src Demonstration tools, tests.

taf-kit TAF-Kit sources and tests.

vaucanswig VaucanSWIG sources and tests. Very experimental.

Requirements

Vaucanson was tested with the GNU C++ Compiler (GCC) version 3.[34] and 4.0, and should work with ICC 9. The code is fully compliant with the ISO C++ standard (ISO-IEC 14882) to permit a higher portability in the future.

High verbose mode of the testing suites uses the AT&T dot format to save automaton in a human readable file. Use Graphviz to visualize these .dot files.

If you want to use the XML I/O system, you will need the Apache Xerces-C++ library version 2.3 or above.

The C++ Application Binary Interface (ABI) of the Xerces-C++ library must be the same as the C++ ABI of the compiler used to built Vaucanson's XML I/O system. In particular, users of Fink or DarwinPorts on MacOS should pay attention to the compiler that was used to build their version of the Xerces-C++ library, as it might differ from the one used to build Vaucanson.

Using Vaucanson

Vaucanson comes with several demos. Looking at them is a good way to see what Vaucanson can do and how it works. They can be found in the `src/demos` directory.

The TAF-Kit (Typed Automata Functions) documentation can be found as the first chapter of the User's Manual (see `doc/manual`).

See Also

There are other sources of interest in the distribution.

- Headline news about the project can be found in the file `NEWS` at the root of the source tree.

- Frequently asked questions are answered in the file `FAQ`.

- Some information about input and output of automata can be found in the file `README-IO`.

- Documentation about the XML I/O subsystem can be found in the `doc/xml` subdirectory.

- The library reference manual, generated by Doxygen, is located in `doc/ref`. It comes distributed as an archive of HTML files called `ref.tar.gz`.

- Information about the test suite generation mechanism can be found in the file `src/tests/test-suites/README`.

Licence

Vaucanson is now released under the GNU General Public Licence. See the file `COPYING` (at the root of the source tree) for details.

Vaucanson was released under the GNU Lesser General Public Licence until version 0.7.

Contacts

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