

Reproducing Results for 112018-00062

This document walks through the necessary steps to reproduce the results reported in paper #112018-00062 submitted for possible publication in Mathematical Programming Computation. Hence, the below `bash` commands are written for their servers, and should be modified accordingly for other *nix platforms.

We assume that the host machine has the following installed:

- `curl`, `configure` and `make` for building CMake,
- a toolchain that supports C++11 for building and using POLO,
- `boost`'s `program_options` module for building the test scripts,
- `curl` and `bunzip2` for downloading and unpacking the `rcv1` dataset, and,
- `pdflatex` with `mathtools` and `pgfplots` packages for generating the figures.

Initial Setup

Before anything else, we should make a `local` directory under `$HOME` that contains binaries, libraries and configuration files of local installations of the programs:

```
mkdir -p $HOME/local/{bin,etc,include,lib,share}
ln -s lib $HOME/local/lib64
```

Then, we should modify `$HOME/.bash_profile` so that the environment variables `PATH` and `LD_LIBRARY_PATH` point to the correct locations:

```
# $HOME/.bash_profile

# Get the aliases and functions
if [ -f ~/.bashrc ]; then
    . ~/.bashrc
fi

# User specific environment and startup programs

PATH=$HOME/local/bin:$PATH
export PATH

LD_LIBRARY_PATH=$HOME/local/lib
export LD_LIBRARY_PATH
```

After saving the file, we need to `source $HOME/.bash_profile` to make the changes valid for the current session.

Now that we have setup the paths, we can proceed with the installation of CMake. POLO requires CMake (at least v3.9.0) to install its headers and C-API while

managing its dependencies. Moreover, this repository also contains a superbuild CMake file to automate the dependency management and generation of the figures. To install CMake from source, we issue the following on the terminal:

```
# Build and install CMake from source
curl --output /tmp/cmake.tar.gz \
  https://gitlab.kitware.com/cmake/cmake/-/archive/v3.9.0/cmake-v3.9.0.tar.gz
tar xzf /tmp/cmake.tar.gz -C /tmp
cd /tmp/cmake-v3.9.0
./configure --prefix=$HOME/local \
            --datadir=share/cmake \
            --docdir=doc/cmake \
            --no-qt-gui
make
make install
```

NOTE. At this point, we *might* need to logoff and login back to make environment changes valid so that `which cmake` points to the local installation with `cmake --version` reporting 3.9.0.

Experiments

Having successfully installed CMake, we finally clone this repository and initiate the superbuild:

```
git clone https://github.com/pologrp/experiments $HOME/experiments
mkdir $HOME/experiments/build
cd $HOME/experiments/build
cmake -D CMAKE_INSTALL_PREFIX=$HOME/local \
      -D CMAKE_BUILD_TYPE=Release \
      -D BUILD_SHARED_LIBS=ON \
      ../
cmake --build .
```

to

- install all the necessary programs, i.e., 0MQ (v4.2.5), OpenBLAS (v0.3.3), cereal (v1.2.2), Google Test (v1.8.1, for unit testing), and POLO,
- build and run the test scripts used in the paper, and,
- reproduce the figures from the generated results.

When the superbuild finishes, we should find a `figures.pdf` file under `$HOME/experiments/build/external/BUILD/experiments`.