Unblur & Summovie

Unblur is used to align the frames of movies recorded on an electron microscope to reduce image blurring due to beam-induced motion. It reads stacks of movies that are stored in MRC/CCP4 format. Unblur generates frame sums that can be used in subsequent image processing steps and optionally applies an exposure-dependent filter to maximize the signal at all resolutions in the frame averages. Movie frame sums can also be calculated using Summovie, which uses the alignment results from a prior run of Unblur. The idea for this procedure was originally developed by Brilot et al. and Campbell et al. [1] [2].

Unblur was written by Timothy Grant and Alexis Rohou and is described in [3]. This software is subject to Janelia Farm Research Campus Software Copyright 1.1. For support, feedback and bug reports, please use the Unblur forum.

Installation instructions

Both unblur and summovie are provided as compressed tar archives. Each archive contains a binary which should work on most modern 64-bit linux systems, and the src archive enabling the programs to be recompiled using the Intel fortran compiler.

Extracting the archives

The archives can be extracted using the following command on a linux system:

```
tar xfz unblur_1.0.2.tar.gz
```

and

```
tar xfz summovie_1.0.2.tar.gz
```

which will create directories "unblur_1.0.2" and "summovie_1.0.2".

Using the binaries

Inside each of these directories is a sub-directory named "bin", containing a pre-compiled binary which should work on most modern 64-bit linux systems. In most cases the program can be run using this directory by simply executing it, e.g.

```
./unblur_openmp_7_17_15.exe
```

The programs prompt for input interactively, and help for each prompt can be obtained by typing a "?".

Compiling from src

The full src archive is provided, enabling users to recompile from source if the binary will not run on their system. The code is written and tested using the Intel Fortran compiler, and we therefore recommend this compiler is used to compile the source. The package is an autotools managed system, and makefile can be generated with the following command:

```
./configure FC=ifort F77=ifort –enable-optimizations –enable-openmp
```

This command will run the configure script which will attempt to setup the compilation based on the current system, and will attempt to locate any required dependencies. If a required dependency is not found the script will throw an error, and the dependency must be installed and the configure re-run.

Once the configure script executes without error, the code can be compiled by typing

```
make
```

If the compilation finishes without error, the compiled binary will be located in the "src" directory.

References
