C

APPENDIX C Installation and configuration

The MNE software is distributed as a compressed tar archive. This Appendix describes the steps needed to install the software.

C.1 Installation

C.1.1 Create a directory to hold the software

Select a location for the MNE software. This most probably be an NFS file system available to all users in your network. Create the directory with the command:

`mkdir` <*MEGswdir*>

C.1.2 Unpack the archive

Go to the selected directory and unpack the tar archive:

`cd` <*MEGswdir*>
`tar zxvf` <*name of the tar archive*>

C.2 Configuration

C.2.1 Set up a link to Matlab

The Matlab conversion routines make use of libraries distributed with Matlab. Therefore, a link to the Matlab installation root directory must be provided to the MNE sofware. If you have Matlab available, create the a symbolic link:

`cd` <*MEGswdir*>
`ln -s` <*MATLAB root directory*> `matlab`

If you do not have Matlab available, create a dummy directory:

```
cd <MEGswdir>
mkdir matlab
```

Should you later acquire Matlab, remove the dummy directory and replace it with the proper symbolic link:

```
cd <MEGswdir>
rmdir matlab
ln -s <MATLAB root directory> matlab
```

Note: Without Matlab present, the utilities *mne_convert_mne_data*, *mne_convert_surface*, *mne_raw2mat*, and *mne_simu* will not work.

C.2.2 Run the configuration script

The configuration of MNE software is accomplished by running a single configuration script:

```
<MEGswdir>/mne/bin/admin/mne_setup_mne
```

Important: The <*MEGswdir*> must be the absolute pathname (starting with /) of the location of the MNE software as it will appear to the users of the server where the software was installed.

C.2.3 Modify the login scripts

Before using the MNE software each user must 'source' the script

```
<MEGswdir>/mne/setup/mne/mne_setup_analysis_csh
```

or

```
<MEGswdir>/mne/setup/mne/mne_setup_analysis_sh
```

in the shell. This task can be facilitated by setting up suitable aliases in the shell login scripts as described in Section 2.5.

C.2.4 Add open source software

The Mac OSX version of the MNE software relies on a few open source library packages. These packages can be installed with fink. To install fink on your computer, goto http://sourceforge.net/ and look for Fink. There is also a graphical user interface called FinkCommander. The latter is convenient if you want to install open source packages for other purposes. For MNE, however, it is sufficient to install Fink.

The necessary packages can be easily accomplished by the script `mne_install_packages`, which super-user priviledges. To run the script, say:

`sudo` <*MEGswdir*>`/mne/bin/admin/mne_install_packages`

If you accidentally run this script on a platform other than Mac OSX, nothing happens.

C.2.5 Optional: Remove unnecessary binaries

At present, the MNE software distribution contains binaries and shared libraries for LINUX and Mac OSX platforms. If you are always going to use your installed software on only one of these platforms, you can remove the binary code which is not going to be in use:

1. Source the correct setup script to your shell to get the MNE_ROOT environment variable set correctly.
2. Say `$MNE_ROOT/bin/admin/mne_remove_platform` <*platform*>, where <*platform*> is either `darwin` or `linux` depending on whether you want to remove the Mac OSX or LINUX binaries and libraries.

C.3 Licensing

Key modules of the MNE software require a valid license to run. The The proper location of the license file is <*MEGswdir*>`/mne/setup/mne/LICENSES`. The licenses are free and thus the main purpose of the license is to allow the developers of MNE software to be aware of the number of current users of the software and their geographical locations. Furthermore, when obtaining a license, the licensee agrees to the MNE License Agreement included as Appendix E of this manual.

After you have filled out the registration form on our website (http://www.nmr.mgh.harvard.edu/martinos/userInfo/data/sofMNE.php), you will shortly receive an a confirmation email with information of the download location of the software as well as the license file as an attachment.. The name of the file is `LICENSES`. Save it to <*MEGswdir*>`/mne/setup/mne/LICENSES`.

The license file has a finite lifespan. If you have registered as a user of the MNE software, you will automatically receive an email at with a new license file at least two weeks before the expiration date of the current licens.

C.4 Obtain FreeSurfer

The MNE software relies on the FreeSurfer software for cortical surface reconstruction and other MRI-related tasks. Please consult the FreeSurfer home paget site at `http://surfer.nmr.mgh.harvard.edu/`.

D

APPENDIX D Release notes

This appendix contains a brief description of the changes in MNE softwre in each major release.

D.1 Release notes for MNE software 2.4

D.1.1 Manual

The manual has been significantly expanded and reorganized. Chapter 7 describing *mne_analyze* has been added. Chapter 12 contains instructions for analyzing the sample data set provided with the software. Useful background material is listed in Chapter 13. Almost all utility programs are now covered in the manual.

D.1.2 General software changes

The following overall changes have been made:

1. A forward solution library independent of Neuromag software was written.
2. The MEG sensor information is now imported from the coil definition file instead of being hardcoded in the software. For details, see Section 5.6.4.
3. CTF and 4D Neuroimaging sensors are now supported.
4. The number of Neuromag-based utilities was minimized.
5. The LINUX port of Neuromag software modules was completely separated from the MNE software and now resides under a separate directory tree.
6. Support for topologically connected source spaces was added, see Section 3.5.
7. A lot of bugs were fixed.

D.1.3 File conversion utilities

The following import utilities were added:

1. *mne_ctf2fiff* to convert CTF data to the fif format, see Section 9.2.2.
2. *mne_tufts2fiff* to convert EEG data from Tufts university to fif format, see Section 9.2.7.

The output of the Matlab conversion utilities was changed to use structures. For details, see Sections 9.7, 9.8, and 9.9.

Matlab tools to import and export w and stc files were added.

D.1.4 mne_browse_raw

Output of decimated and filtered data is now available. *mne_analyze* now fully supports 32-bit integer data found in CTF and new Neuromag raw data files.

D.1.5 mne_analyze

The following changes have been made in *mne_analyze*:

1. Curved and flat surface patches are now supported.
2. An iterative coordinate alignment procedure was added, see Sections 7.16 and Section 12.11.1.
3. Utility to view continuous HPI information was added, see Section 7.17.
4. Several small changes and bug fixes were done.

D.1.6 mne_make_movie

The only major change in *mne_make_movie* is the addition of support for curved and surface patches.

D.1.7 Averaging

The highly inefficient program *mne_grand_average* has been removed from the distribution and replaced with the combined use of *mne_make_movie* and a new averaging program *mne_average_estimates*, see Section 8.6.

D.2 Release notes for MNE software 2.5

D.2.1 Manual

The MNE Matlab toolbox is now covered in a separate chapter. Change bars are employed to indicate changes in the chapters that existed in the

previous version of the manual. Note that Chapter 10 describing the Matlab toolbox is totally new and change bars have not been used there. Furthermore, Appendix B now contains all the information specific to the Martinos Center.

D.2.2 mne_browse_raw

There are several improvements in the raw data processor *mne_browse_raw/mne_process_raw*:

- Possibility to delete and add channel selections interactively has been added. A nonstandard channel selection file can be now specified on the command line.
- Handling of CTF software gradient compensation has been added.
- The vertical scale of the digital trigger channel is now automatically set to accommodate the largest trigger value.
- It is now possible to load evoked-response data sets from files. Time scales of the evoked-response data and data averaged in *mne_browse_raw* can be now set from the scales dialog. Section 12.9 in Chapter 12 has been updated to employ *mne_browse_raw* in viewing the averages computed from the sample raw data set.
- It is now possible to create new SSP operators in *mne_browse_raw*, see Section 4.4.3.4.
- Listing of amplitude values have been added to both the strip-chart and topographical displays.
- Text format event files can now be loaded for easy inspection of rejected epochs, for example.
- Handling of derived channels has been added, see Sections 4.4.1.10 and 11.5.

D.2.3 mne_epochs2mat

This new utility extracts epochs from a raw data file, applies a bandpass filter to them and outputs them in a format convenient for processing in Matlab, see Section 9.10.

D.2.4 mne_analyze

The following new features have been added:

1. Processing of raw data segment and easy switching between multiple evoked data sets (not in the manual yet);
2. Sketchy surface display mode for source spaces with selection triangulation information created with the `--ico` option to *mne_setup_source_space*;
3. Rotation of the coordinate frame in the coordinate system alignment dialog, see Section 7.16;

4. Several new graphics output file formats as well as automatic and snapshot output modes, see Section 7.8.7.
5. It is now possible to inquire timecourses from stc overlays. Both labels and surface picking are supported.
6. Added an option to include surface vertex numbers to the timecourse output, see Section 7.13.3.1.
7. Overlays matching the scalp surface can now be loaded, see Section 7.14.
8. The dipole display dialog has now control over the dipole display properties. Multiple dipoles can be now displayed, see Section 7.15.

D.2.5 mne_ctf2fiff

Correct errors in compensation channel information and compensation data output. The transformation between the CTF and Neuromag coordinate frames is now included in the output file.

D.2.6 mne_make_movie

Added the `--labelverts` option, see Section 6.5.8.

D.2.7 mne_surf2bem

Added the `--shift` option to move surface vertices outwards. Fixed some loopholes in topology checks. Also added the `--innershift` option to *mne_setup_forward_model*. For more information, see Sections 3.7 and 5.4.

D.2.8 mne_forward_solution

Added code to compute forward solutions for CTF data with software gradient compensation on.

D.2.9 mne_inverse_operator

Added options to regularize the noise-covariance matrix.

D.2.10 mne_compute_raw_inverse

This utility is now documented in Section 6.6. The utility *mne_make_raw_inverse_operator* has been removed from the software.

D.2.11 Time range settings

The tools *mne_compute_raw_inverse*, *mne_convert_mne_data*, and *mne_compute_mne* no longer have command-line options to restrict the time range of evoked data input.

D.2.12 mne_change_baselines

It is now possible to process all data sets in a file at once. All processed data are stored in a single output file.

D.2.13 New utilities

D.2.13.1 mne_show_fiff

Replacement for the Neuromag utility *show_fiff*. This utility conforms to the standard command-line option conventions in MNE software. For details, see Section 11.3.

D.2.13.2 mne_make_cor_set

Replaces the functionality of the Neuromag utility *create_mri_set_simple* to create a fif format description file for the FreeSurfer MRI data. This utility is called by the *mne_setup_mri* script.

D.2.13.3 mne_compensate_data

This utility applies or removes CTF software gradient compensation from evoked-response data, see Section 9.2.4.

D.2.13.4 mne_insert_4D_comp

This utility merges 4D Magnes compensation data from a text file and the main helmet sensor data from a fif file and creates a new fif file Section 9.2.5.

D.2.13.5 mne_ctf_dig2fiff

This utility reads a text format Polhemus data file, transforms the data into the Neuromag head coordinate system, and outputs the data in fif or hpts format.

D.2.13.6 mne_kit2fiff

The purpose of this new utility is to import data from the KIT MEG system, see Section 9.2.8.

D.2.13.7 mne_make_derivations

This new utility will take derivation data from a text file and convert it to fif format for use with *mne_browse_raw*, see Section 11.5.

D.2.14 BEM mesh generation

All information concerning BEM mesh generation has been moved to Appendix A. Utilities for BEM mesh generation using FLASH images have been added, see Section A.2.

D.2.15 Matlab toolbox

The MNE Matlab toolbox has been significantly enhanced. New features include:

- Basic routines for reading and writing fif files.
- High-level functions to read and write evoked-response fif data.
- High-level functions to read raw data.
- High-level routines to read source space information, covariance matrices, forward solutions, and inverse operator decompositions directly from fif files.

The Matlab toolbox is documented in Chapter 10.

The *mne_div_w* utility has been removed because it is now easy to perform its function and much more using the Matlab Toolbox.