Overview of Thesis Code

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gui/dicomConvert

Purpose

dicomConvert is a simple program to convert DICOM images into analyze of MetaIO format images.

Platforms

Windows, Linux, Mac OS-X

Dependencies

- Qt $\geq$ v4.2 $\Longrightarrow$ http://trolltech.com/products
- dcmtk $\geq$ v3.5.4 $\Longrightarrow$ http://dicom.offis.de/dcmtk

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gui/dicomConvert

Compilation

- Check dicomConvert.pro for the correct directory of dcmTK
- Call `qmake` in the `gui/dicomConvert` directory
- Call `make`

gui/markTags

Purpose

markTags is a simple program to mark landmarks on time-varying images. Although it was developed for marking tag intersection points in tagged cardiac MR images, it should be useful for selecting landmarks/correspondences in other images too.

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Compilation

- Check markTags.pro for the correct directory of dcmTK
- Call `qmake` in the `gui/markTags` directory
- Call `make`

gui/Cardiac

Purpose

Cardiac is a 3D viewer targeted at visualization of volumes, myocardial fibers, deformation fields and octrees.

Platforms

Windows, Linux

Dependencies

- Qt $\geq$ v4.2 $\Longrightarrow$ http://trolltech.com/products
- dcmtk $\geq$ v3.5.4 $\Longrightarrow$ http://dicom.offis.de/dcmtk
- Coin3D $\geq$ v2.5 $\Longrightarrow$ http://www.coin3d.org/
  - Also download the related SoQt and SimVoleon packages.

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  - Also download the related SoQt and SimVoleon packages.

gui/Cardiac

Compilation

- Check Cardiac.pro for the correct directory of dcmTK
- Check Cardiac.pro for the correct directory of Coin3D
- Call `qmake` in the `gui/Cardiac` directory
- Call `make`

FiberEstimation/warpDT

Purpose

`warpDT` is the main program that warps the template diffusion tensor image using a deformation field mapping the template space to the subject space.

Platforms

Linux

Dependencies

- GNU Scientific Library (GSL) $\geq$ v1.0 $\Longrightarrow$ http://www.gnu.org/software/gsl/

FiberEstimation/warpDT

Compilation

- Two makefiles are provided to support the two versions of this program
- Check `MakefileV5` or `MakefileV3` to confirm the correct paths
- build using `make -f MakefileV5`

FiberEstimation/utils

Purpose

A set of DTI related utilities are provided for conversion between formats and extracting associated data like FA and PD.

Programs

- `dtiFA` extracts the FA map from a given DTI image,
- `dtiPD` extracts the Principal direction (PD) from a given DTI image,
- `MakeSmoothDTI` smooths a given DTI image.

FiberEstimation/utils

Dependencies

- GNU Scientific Library (GSL) $\geq$ v1.0 $\Longrightarrow$ http://www.gnu.org/software/gsl/

Compilation

- Makefiles are provided to build the utilities.
- All utilities can be built together using the `compile.sh` script.

MutualInformation/octMI

Purpose

octMI is a simple program to compute and test the octree based mutual information image similarity measure.

Platforms

Windows, Linux

Dependencies

- Qt $\geq$ v4.2 $\Longrightarrow$ http://trolltech.com/products

MutualInformation/octMI

Purpose

octMI is a simple program to compute and test the octree based mutual information image similarity measure.

Platforms

Windows, Linux

Dependencies

- Qt $\geq$ v4.2 $\Longrightarrow$ http://trolltech.com/products

MutualInformation/octMI

Compilation

- Check octMI.pro for the correct paths
- Call `qmake` in the `gui/octMI` directory
- Call `make`

A command line version of the test exists in the `MutualInformation/nonGui` folder.

Octree Meshing

Detailed documentation on the Octree Meshing method can be found online at
http://www.seas.upenn.edu/~csela/dendro/

Inverse Problem

Purpose

The purpose of the inverse problem is to evaluate cardiac motion.

Dependencies

- PETSC v2.3.3 $\Longrightarrow$ http://www.mcs.anl.gov/petsc/petsc-as/
- Dendro $\Longrightarrow$ http://www.seas.upenn.edu/~csela/dendro/

Compilation

- A Petsc based Makefile are provided to build the programs,
- The environment variable `OTK_DIR` needs to point to the Dendro directory.

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Compilation

- A Petsc based Makefile are provided to build the programs,
- The environment variable `OTK_DIR` needs to point to the Dendro directory.

Inverse Problem

Forward Problem

- `fwd_RG_fullForce` This program solves the forward problem on a regular grid using a full force representation.
- `fwd_RG_fiberForce` This program solves the forward problem on a regular grid using the fiber orientations and an activation vector.
- `fwd_Oct_fullForce` This program solves the forward problem on an octree grid using a full force representation.
- `fwd_Oct_fiberForce` This program solves the forward problem on an octree grid using the fiber orientations and an activation vector.

Inverse Problem

Inverse Problem

- `inv_RG_fullForce` This program solves the inverse problem on a regular grid using a full force representation.
- `inv_RG_fiberForce` This program solves the inverse problem on a regular grid using the fiber orientations and an activation vector.
- `inv_Oct_fullForce` This program solves the inverse problem on an octree grid using a full force representation.
- `inv_Oct_fiberForce` This program solves the inverse problem on an octree grid using the fiber orientations and an activation vector.