learn-gadgetron

Release 0.0.1

Aug 18, 2020

Contents:

This documentation provides support for a users first attempts at using gadgetron by providing scripts for building a singularity image that can be used to run gadgetron and by providing steps for using this image to complete the 2020 summer tutorial on gadgetron that was conducted online.

CHAPTER 1

Repository to support learning of gadgetron

The documentation for this repository is available on read-the-docs

Gadgetron is an open source medical image reconstruction framework maintained by Michael Hansen and developed under a grant from the NIH.

A position paper is published and available here.

The homepage wiki is here.

An online manual is here.

This repository provides a recipe to build a singularity container containing useful elements of the gadgetron ecosystem to faciliate learning od gadgetron based on this tutorial that was developed in spring 2020.

The gadgetron code itself is available here.

To use this repository navigate to a home directory and:

```
git clone https://github.com/chidiugonna/learn-gadgetron.git
cd learn-gadgetron/singularity
sudo singularity build [imagename].sif gadgetron-def
```

References

CHAPTER 2

Learn gadgetron folders

scripts helloWorld tutorial2020

CHAPTER 3

Gadgetron Hello World

reference here

Open 2 terminals. In each terminal navigate to the helloworld folder:

```
cd ./learn-gadgetron/learn/helloWorld
```

In one terminal source the aliases and start the server:

```
source defineAliases.sh
startServer
```

In a 2nd terminal source the aliases and run the tests as:

```
source defineAliases.sh
runhello.sh
```

You can view results in this terminal by either running:

`viewer` to view the results using `ismrmrdviewer`

or use the matlab code to view

`./viewmatlab.sh` exit matlab using `quit()`

CHAPTER 4

Tutorial Spring 2020

Resources for following the summer 2020 tutorial on gadgetron.

4.1 Download data for the tutorial

Download 2 sets of data from Part 1 and Part 2 and unzip into ./learn-gadgetron/learn/tutorial2020

```
unzip -o Gadgetron-2020-summer-school-data.zip
unzip -o Gadgetron-2020-Summer-School-data-part-2.zip
cp -R Gadgetron-2020-Summer-School-data-part-2/* Gadgetron-2020-summer-school-data
rm Gadgetron-2020-summer-school-data.zip
rm Gadgetron-2020-Summer-School-data-part-2.zip
rm -R Gadgetron-2020-Summer-School-data-part-2
```

Each Lesson has its own folder. Navigate to the folder to start as follows:

```
cd Lesson_N
# view lesson specific info
more README.md
```

4.2 Download the Tutorial files

in separate folder from this repository but preferably alongside perform the following:

```
git clone https://github.com/gadgetron/GadgetronOnlineClass.git
```

CHAPTER 5

Lesson 2 - A practical introduction to Gadgetron

Open 2 terminals. Ensure you are in the `Lesson_2` directory for each and execute code below:

```
cd ./learn-gadgetron/learn/tutorial2020/Lesson_2
source ../defineAliases.sh
```

Note that the defineAliases.sh binds local folders to internal folders in the Singularity container. So `/mnt` in the container maps to the current directory i.e. `./learn-gadgetron/learn/tutorial2020/Lesson_2` and `/media` in the container maps to the data folder for the tutorial at `../Gadgetron-2020-summer-school-data`

In one terminal start the gadgetron server

```
source ../defineAliases.sh
startServer
```

In a second terminal open ismrmrdviewer and hdfview:

```
source ../defineAliases.sh
viewer /media/Day-1/Lecture-2/simple_gre.h5 &
# after opening hdfview navigate to file and open simple_gre.h5 at location above
hdfview &
# this startst the custom visualization code
alias gtronvis="gtron visualize"
gtronvis &
```

In this terminal we will :

```
gtronclient -f /media/Day-1/Lecture-2/simple_gre.h5 -C /mnt/config-fixed.xml
```

CHAPTER 6

Building gadgetron in a singularity container

CHAPTER 7

Configure Singularity

7.1 gadgetron aliases

CHAPTER 8

References

Hansen, M. S., & Sørensen, T. S. (2013). Gadgetron: an open source framework for medical image reconstruction. Magnetic resonance in medicine, 69(6), 1768-1776.

Kurtzer, G. M., Sochat, V., & Bauer, M. W. (2017). Singularity: Scientific containers for mobility of compute. PloS one, 12(5), e0177459.

CHAPTER 9

Example Code

CHAPTER 10

Examples of Source code