SINAPP (MODULAR BIDS APP) FOR FETAL BRAIN MRI SUPER-RESOLUTION

SINAPP

- Modularity

BIDS App

BIDS

- Interoperability
- Re-usability

- Portability
- Reproducibility

docker

SINAPP FOR FETAL BRAIN MRI SUPER-RESOLUTION

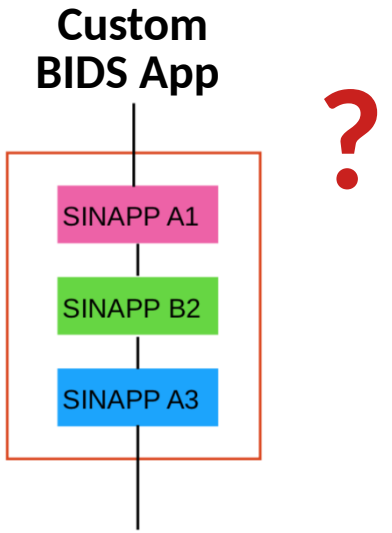
- **Challenge for Brainhack Global 19 @ Campus Biotech**

  - **Creation of the proper so-called SINAPP** that integrates the workflow developed previously and takes BIDS App arguments

    Note: need to execute a second docker image (C++ program for denoising in MIALSRTK container) within the execution of a first docker image (the SINAPP)

    → **Proof of concept** that the *overall SINAPP framework* is **feasible**

    → Set up **basis for developement of the whole pipeline**



Nipype interfaces

mialSRTK
C++ Medical Image Analysis Laboratory
Super-Resolution TooKit

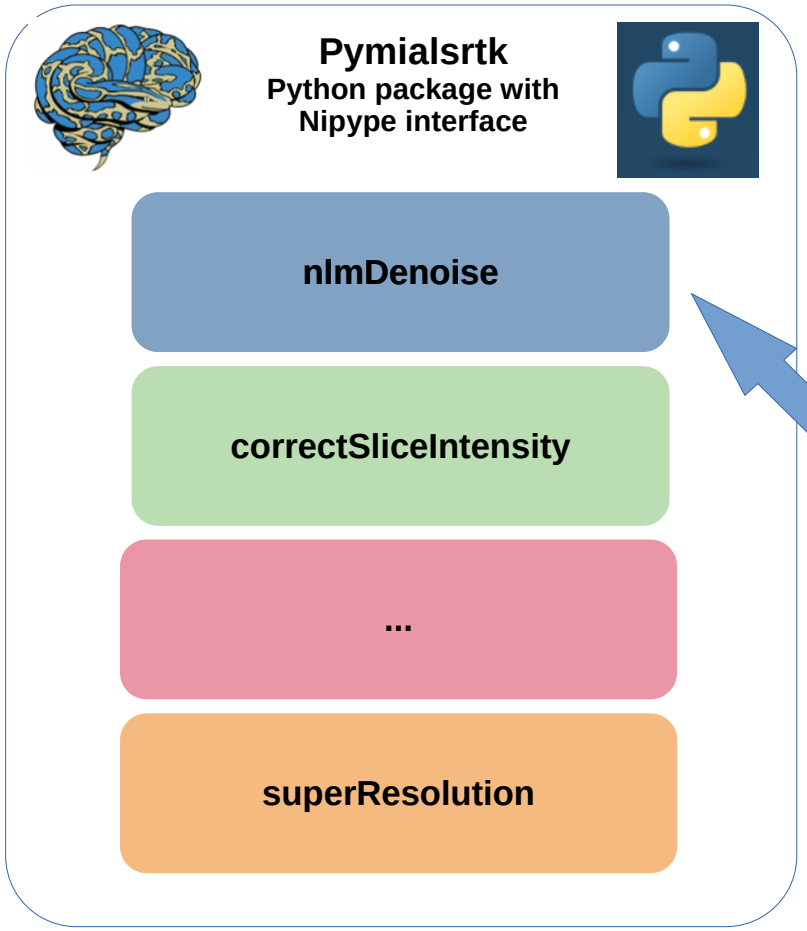
docker

- btkNLMdenoising
- mialsrtkCorrectSliceIntensity
- ...
- mialsrtkTVSuperResolution

Pymialsrtk
Python package with
Nipype interface

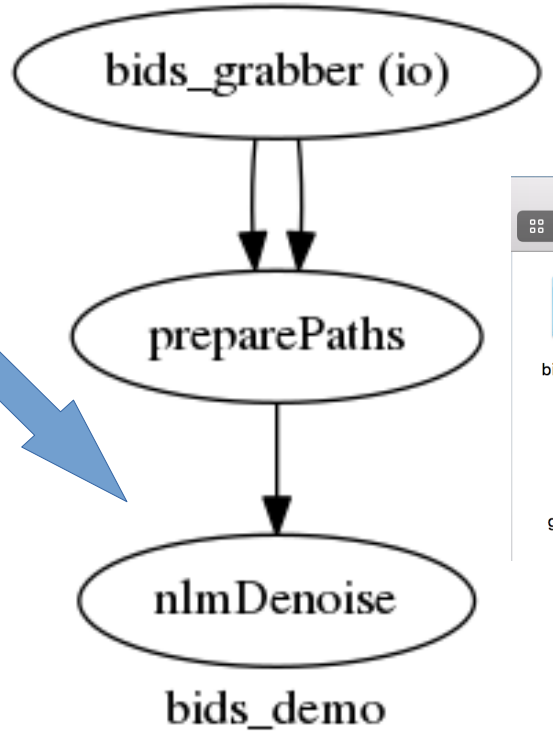
- nlmDenoise
- correctSliceIntensity
- ...
- superResolution

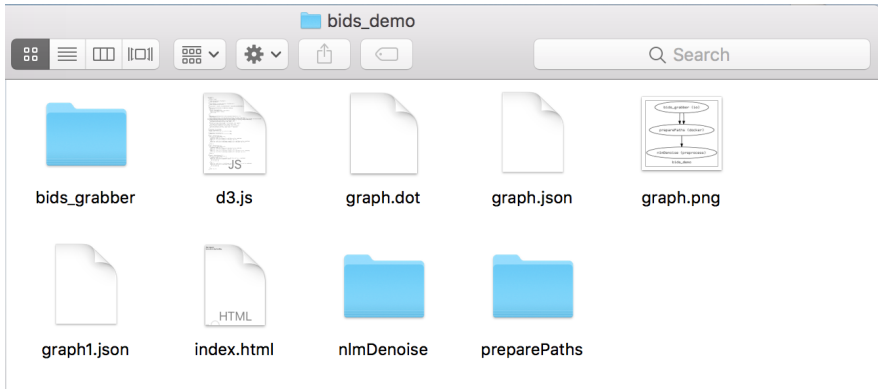
SINAPP workflow



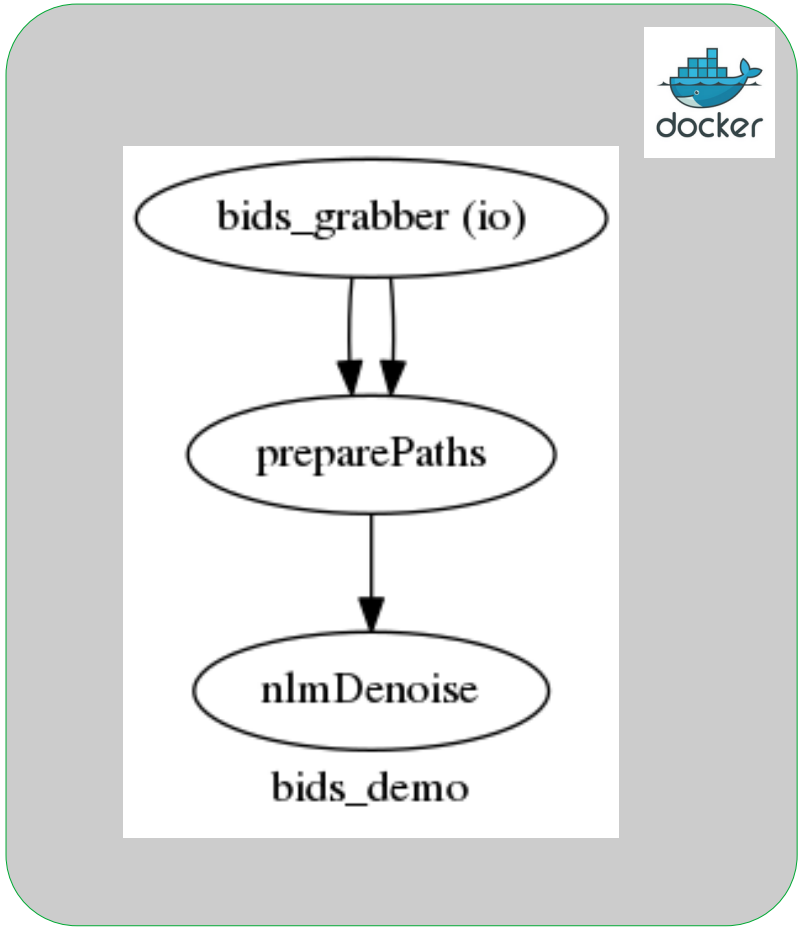

```
%%bash

python ${PYMIALSRTK_DIR}/sinapps/nlmdenoise/run.py ${BIDS_DIR} ${OUTPUT_DIR} participant --participant_label "01"
```





SINAPP Containerization



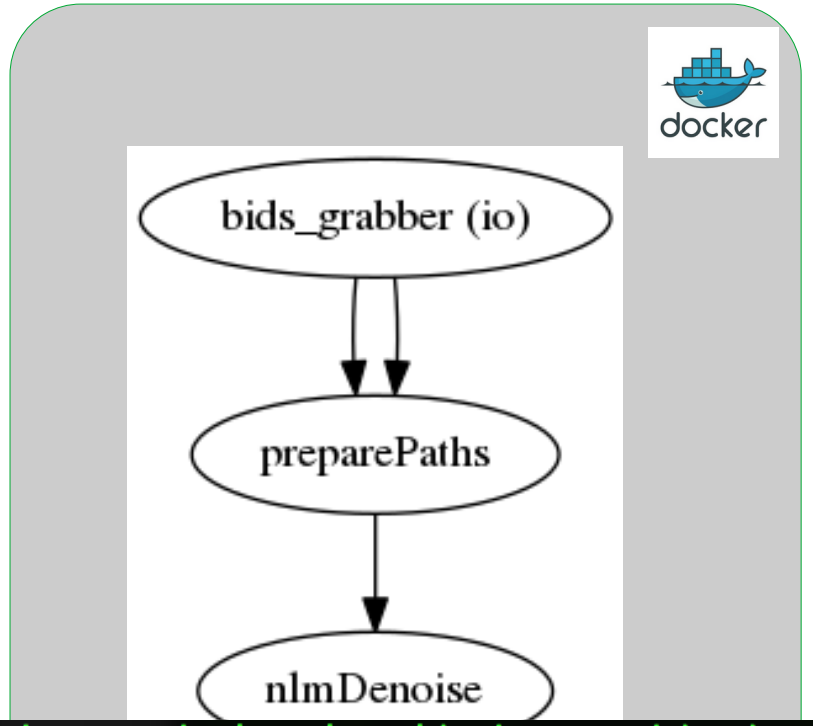

```
bids_dir=/Users/sebastientourbier/Softwares/mialsuperresolutiontoolkit/data

rm -R "${bids_dir}/derivatives/bids_demo"

docker run --rm \
    -u $(id -u):$(id -g) \
    --group-add $(id -g) \
    -v /var/run/docker.sock:/var/run/docker.sock \
    -v /usr/local/bin/docker:/usr/bin/docker \
    -v ${bids_dir}:/fetaldata \
    supermri-team/sinapp-nlmdenoise:0.1 \
    /fetaldata /fetaldata/derivatives participant --participant_label 01
```

We can execute it but…

SINAPP Containerization and Execution




```
bids_dir=/Users/sebastientourbier/Softwares/mialsuperresolutiontoolkit/data

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    -u $(id -u):$(id -g) \
    --group-add $(id -g) \
    -v /var/run/docker.sock:/var/run/docker.sock \
    -v /usr/local/bin/docker:/usr/bin/docker \
    -v ${bids_dir}:/fetaldata \
    supermri-team/sinapp-nlmdenoise:0.1 \
    /fetaldata /fetaldata/derivatives participant --participant_label 01
```

Sharing the docker sock is still an open question -> Next Brainhack

```
'-v /var/run/docker.sock:/var/run/docker.sock', '-v /usr/local/bin/docker:/usr/bin/docker', '-v /fetaldata:/fetal
NLMDenoising', '-i /fetaldata/sub-01/anat/sub-01_run-1_T2w.nii.gz -o /fetaldata/derivatives/bids_demo/nlmDenoise/su

-u 501:20 -v /var/run/docker.sock:/var/run/docker.sock -v /usr/local/bin/docker:/usr/bin/docker -v /fetaldata:/fe
NLMDenoising -i /fetaldata/sub-01/anat/sub-01_run-1_T2w.nii.gz -o /fetaldata/derivatives/bids_demo/nlmDenoise/sub-
b'', stderr=b"docker: Got permission denied while trying to connect to the Docker daemon socket at unix:///var/run
40/containers/create: dial unix /var/run/docker.sock: connect: permission denied \nSee 'docker run --help'.\n")
```

Brain Hack GLOBAL 2019

The Team

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