

NIH Biomarkers Consortium for
Vascular Contributions to Cognitive Impairment and Dementia

MRI WMH Volume Algorithm

MarkVCID Kit Operations

Charles DeCarli | Feb 12, 2020

Agenda

1. Introduction of method
2. Download process
3. Operation review and discussion
4. Review of output and visualization

Questions/discussion

MarkVCID Biomarker: WMH—Imaging Biomarker

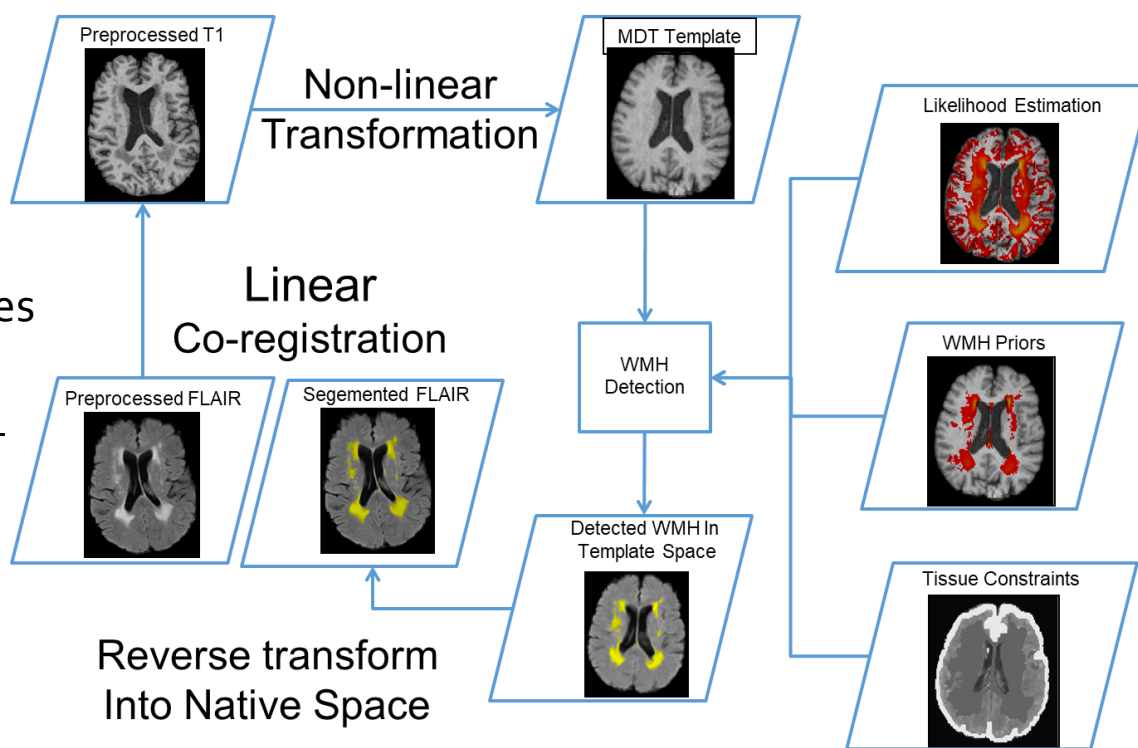


Bayesian algorithm based on quantitative prior segmentations, Gaussian likelihood and posterior probability constraints

May be used on single FLAIR images or combined with tissue segmentation of high resolution T₁ weighted imaging

Executables can be downloaded from: <http://idealab.ucdavis.edu/software/index.php>

Automatic WMH Detection



2. Download process

markvcid.partners.org/consortium-protocols-resources

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Mark VCID

HOME ABOUT RESOURCES SEARCH OPTIONS

Home / Consortium Protocols & Resources

Consortium Protocols & Resources

Manual of Operating Procedures (v12.11.19)

Clinical/Cognitive Measures Collection Manuals

Biospecimen Collection Best Practices & Shipping Procedures

Imaging Standard Operating Procedures

Patient MRI Protocols

Phantom MRI Protocols

Imaging-based Biomarker Kits

Fluid-based Biomarker Kits

Note: Kit validation currently in progress. All kit protocols should be considered in draft form until validation is complete.

- Video tutorial available on the MarkVCID website

Imaging-based Biomarker Kits

MRI Arteriosclerosis

- MRI Arteriosclerosis Kit Protocol (v2_1.17.19)
- Kit Supporting Documents (zip file)
- For research questions, contact Konstantinos Arfanakis (konstantinos_arfanakis@rush.edu)

MRI Cerebrovascular Reactivity

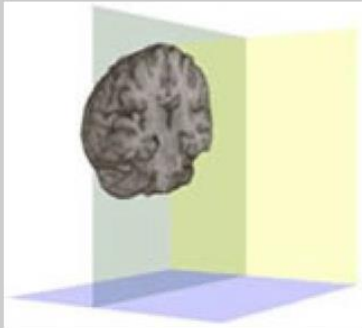
- MRI Cerebrovascular Reactivity Kit Protocol (v2_2.4.19)
- For research questions, contact Hanzhang Lu (hanzhang.lu@jhu.edu)

MRI White Matter Hyperintensity Volume

- MRI WMH Volume Protocol (v2_1.17.19)
- Click here for the WMH Volume analysis code
- Click here for WMH Volume algorithm video tutorial
- For research questions, contact Charles DeCarli (cdecarli@ucdavis.edu)

IDeA Webpage

IDeA Lab - Software - Download



IDeA Lab



Imaging of Dementia & Aging

- people
- software
- data management
- case studies
- publications
- current projects

Software - Download

Please let us know who you are:

Name:



Institution:

Email address:

Confirm email address:

Package Selection

Select the package(s) you are interested in downloading: (Date of the most current version is displayed after each package).

- ☐ Image File Management Utilities
- ☐ Stroke Viewer (32 bit)
- ☐ Stroke Viewer (64 bit)
- ☐ Segmenter (Tissue Classifier 32 bit)
- ☐ Segmenter (Tissue Classifier 64 bit)
- ☒ UCD WMH Segmentation (Python3 version)
- ☐ UCD WMH Segmentation (Python2 version)

Download Link

Software - Download

Thanks for your submission.

Please use the following link to download your software:

http://idealab.ucdavis.edu/software/files/ucdwmhsegmentation_linuxinstaller.run

Please consult the README file(s) for directions on installing and running each individual package. If you need further support, please contact Evan Fletcher (emfletcher@ucdavis.edu).

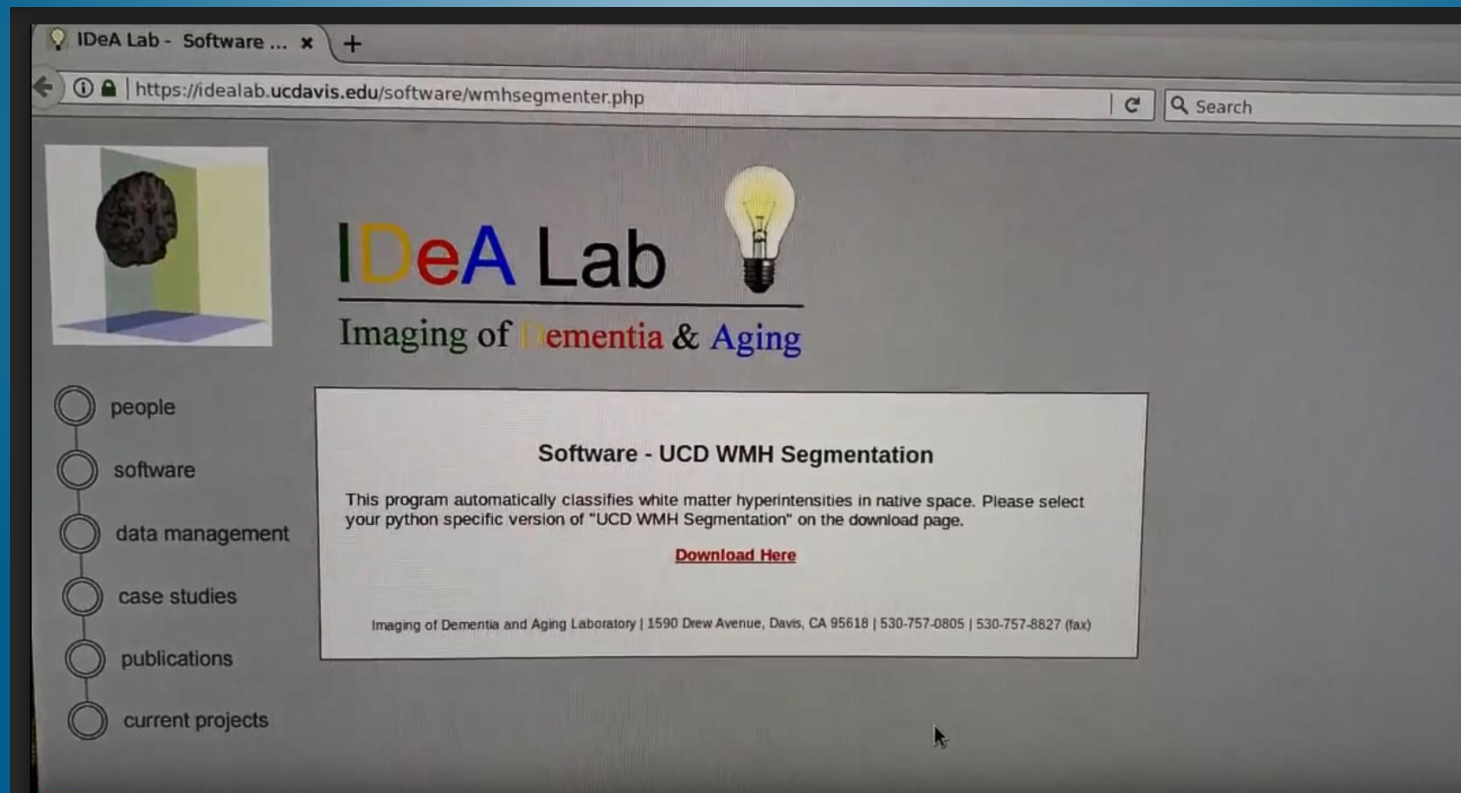
[Back to Software](#)

UCD WMH
Segmentation
(Python3
version)

Imaging of Dementia and Aging Laboratory | 1590 Drew Avenue, Davis, CA 95618 | 530-757-0805 | 530-757-8827 (fax)

2. Download process

Click [WMH Volume algorithm video tutorial](https://ideallab.ucdavis.edu/software/wmhsegmenter.php) link:



3. Operation review & discussion

- 3 inputs
 - Brain Mask
 - 3DT1
 - FLAIR
- 6 outputs
 - WMH threshold Mask
 - WMH Z-score mask
 - Brain Mask
 - Stripped Brain
 - 4 tissue segmented image
 - CSV file containing specified segmentation results
- Working subdirectory
 - Stripped Brain
 - Bias Field
 - Co-registered FLAIR
 - Stripped FLAIR

4. Review of output & visualization

```
[charliebrain@ideagate:~/wmhtest]$ ls
MRN_flair.nii.gz
MRN_flair_WMH_Native.nii.gz
MRN_flair_ZScore_Native.nii.gz
MRN_t1_data.csv
MRN_t1_mask.nii.gz
MRN_t1.nii.gz
MRN_t1_Stripped_corrSmTP_segmentedWMT-Z4T.nii.gz
MRN_t1_WMHPProcess
```

ICV	CSF	GRAY	WHITE	WMH
1541.29	366.96	645.91	487.60	40.82

MRN_t1_data.csv:

ICV,CSF,GRAY,WHITE,WMH

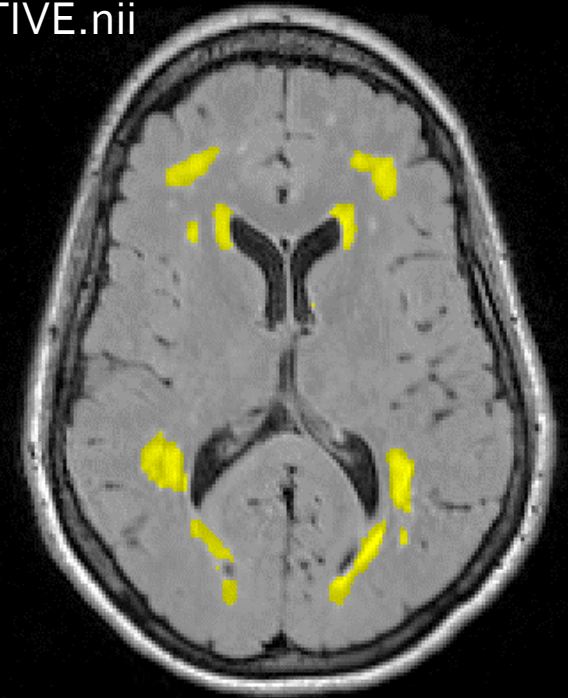
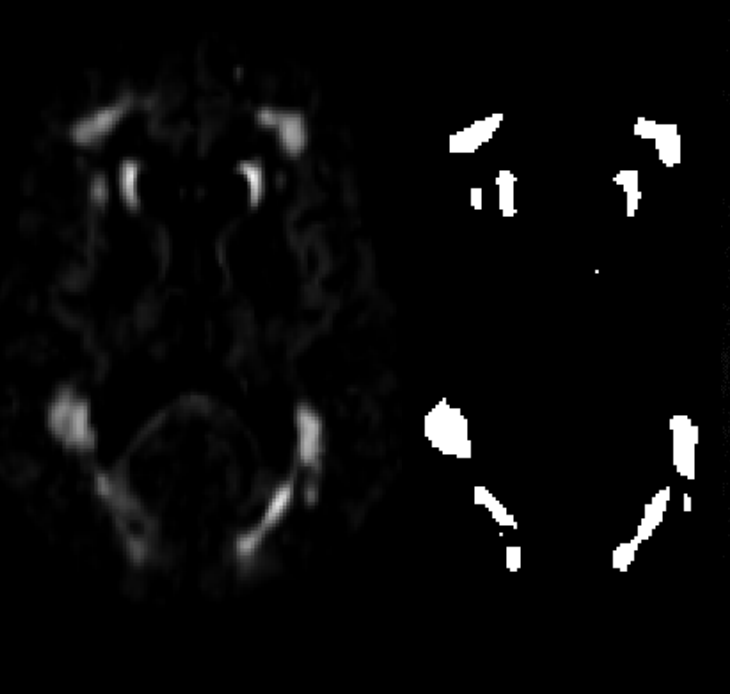
1541.29,366.959,645.914,487.595,40.822

Output files

MRN_FLAIR.nii

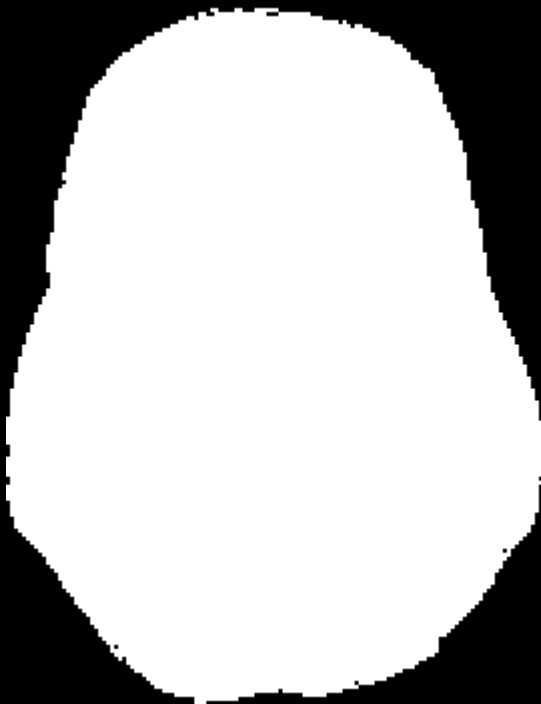


MRN_FLAIR_WMH_NATIVE.nii



MRN_ZSCORE_WMH_NATIVE.nii

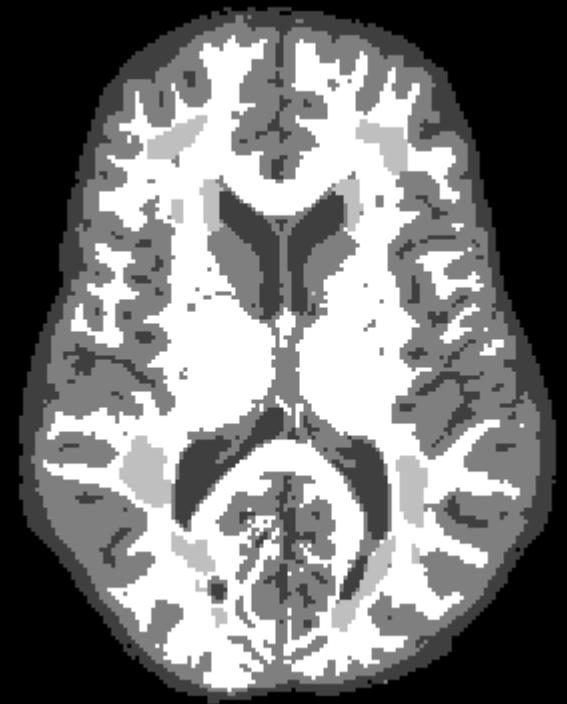
Output files (Cont'd)



Input Mask



Masked Brain



4 Tissue
segmentation

Questions/discussion

- Questions?

For support, please contact
Charlie DeCarli (cdecarli@ucdavis.edu) and
Baljeet Singh (bjsingh@ucdavis.edu)