MRI Segmentation Master project | 202305291400

Patient → PatientID

Study → StudyInstanceUID

Series → SeriesInstanceUID

DWI seq

CE seq

...

3D MRI volume

DCM MR file → SOPInstanceUID

DCM Seg file → ReferenceSOPInstanceUID → https://dicom.innolitics.com/ciods/rt-plan/general-reference/00082112/00081155

SOPInstanceUID

ReferenceSOPInstanceUID → SOPInstanceUID

https://wiki.cancerimagingarchive.net/pages/viewpage.action?pageId=50135447#50135447a3ebdd1155ef41b3b0650f8d3cd77675

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Table 1. Series identification for derived DWI and DCE objects

Data type	Series number	Series Description Match
DWI root directory #	Siemens, GE (4b): <root> = Original DWI series number GE (MSMB): <root> = <1st original series>28 Philips: <root> = Original DWI series number / 100	
TRACE Images	<root>0100	ACRIN-6698: *DWI TRACE*
ADC Maps	<root>0200	ACRIN-6698: *ADC*
Whole tumor mask	<root>9000	ACRIN-6698: *DWI MASK*
Whole tumor segmentation	<root>9001	ACRIN-6698: *DWI SEG*
Merged 2b series (MSMB)	<root>	ACRIN-6698: MergedMSMB*
DCE root directory #	Siemens, GE: <root> = 1st original DCE series number Philips: <root> = Original DCE series number / 100	
SER Map	<root>1000	ISPY2: VOLSER: uni-lateral cropped: SER
PE phase <n> Map	<root>100<n>	ISPY2: VOLSER: uni-lateral cropped: PE<n>
Ipsilateral cropped Original	<root>1800	ISPY2: VOLSER: uni-lateral cropped: original DCE
FTV Analysis Mask	<root>1900	ISPY2: VOLSER: uni-lateral cropped: Analysis Mask

Experiments on ACRIN

Preparing data

Patient → 400 patients → ? → 400 images

Study → Filter - Segmented studies → Filter - Segmented Series → Filter - Segmented images → DCM MR file / DCM SEG file → Preparation? → MONAI

UID allows to get back to original dicom file

3D MRI volume

DCM MR file → SimpleITK → 3D numpy array + metadata

DCM MR file → Filter - Segmented images → DCM MR file

SimpleITK / pydicom → 2D numpy array +metadata → Save nifti (nii) or png → ! name files with SOPInstanceUID

Shall match → same shape
Shall match → Link shall be kept → See ReferenceSOPInsrtanceUID

DCM Seg file → SimpleITK / pydicom → 2D numpy array +metadata

Training

1 Brute-force approach

DCM MR file → Segmentation alg

2 Fine tuning

DCM MR file → Pre-processing → Segmentation alg

! Intensity normalization → Resizing → Denoise