

SOP-U24-...-1.0 Radiomics Assessment of DICOM/DSO Clinical
Human Research MRI Data

- A. **Purpose:** To provide techniques and instructions to do radiomics assessment of the Clinical Human Research MRI data.
- B. **Scope:** The procedure described here can be used to process all DICOMs and lesion region of interest DSOs to generate radiomics assessment.
- C. **Definitions:**

DICOM: The international standard to transmit, store, retrieve, print, process, and display medical imaging information

DSO: DICOM Segmentation Object is a DICOM object that contains a map for the lesion region of interest

ADC: Apparent diffusion coefficient

SER: Statistical parametric mapping

D. **Tools:**

Pyradiomics: An open-source python package for the extraction of Radiomics features from medical imaging

ePAD: An open-source quantitative imaging informatics platform

E. **References:**

Pyradiomics (<https://pyradiomics.readthedocs.io/en/latest/>)

ePAD (<https://epad.stanford.edu/>)

SOP-UTNATMRI-5 Parametric Mapping of DICOM Clinical Human Research MRI Data

F. **Procedures:**

General Considerations:

- Pyradiomics should be run on both ADC and SER parametric maps for both pre and post study

Special considerations for each pathological type of tissue specimen:

- Plugin parameter prefix should be set to *ser* for SER parametric maps
- Plugin parameter prefix should be set to *adc* for ADC parametric maps

1. Upload the patient MRI DICOMs

SOP-U24-...-1.0 Radiomics Assessment of DICOM/DSO Clinical Human Research MRI Data

The screenshot shows the eElite interface with a central search bar containing 'Find' and 'Upload file'. Below the search bar is a table listing six entries, each with a small icon, a name (TEST_01 to TEST_10), and some numerical values. The columns are labeled: Description/Name, # of aims, # of sub, # of images, Type, Creation date, Upload date, Accession, and Identifier.

Description/Name	# of aims	# of sub	# of images	Type	Creation date	Upload date	Accession	Identifier
TEST_01	6	2		MR/SEG		2021-07-27		TEST_01
TEST_02	6	2		MR/SEG		2021-07-27		TEST_02
TEST_04	6	2		MR/SEG		2021-07-27		TEST_04
TEST_07	6	2		MR/SEG		2021-07-27		TEST_07
TEST_09	6	2		MR/SEG		2021-07-27		TEST_09
TEST_10	6	2		MR/SEG		2021-07-27		TEST_10

The screenshot shows the eElite interface with a central search bar containing 'Find patient'. Below the search bar is a table listing multiple entries, each with a small icon, a name (TEST_01 to SER), and some numerical values. The columns are labeled: Description/Name, # of aims, # of sub, # of images, Type, Creation date, Upload date, Accession, and Identifier.

Description/Name	# of aims	# of sub	# of images	Type	Creation date	Upload date	Accession	Identifier
TEST_01	6	2		MR/SEG		2021-07-27		TEST_01
U24 Clinical Data Testing v1	3	3	30	MR/SEG	2017-04-26	2021-07-27	1.3.12.2.1107.5.2.19.45380.30000017042617370052600000106	
ADC (um^2/ms)	1		10	MR			1.3.6.1.4.1.9590.100.1.2.10362816711549530703085873707222047942	
SER	1		10	MR			1.3.6.1.4.1.9590.100.1.2.26082195280048177622724185288059555040	
HRT1w	1		10	MR			1.3.6.1.4.1.9590.100.1.2.97257869738191087428204702502230046773	
U24 Clinical Data Testing v2	3	3	30	MR/SEG	2017-06-07	2021-07-27	1.2.840.114257.15.19.5232017.1728.82829.800	
ADC (um^2/ms)	1		10	MR			1.3.6.1.4.1.9590.100.1.2.17825138092506918823136557660030261967	
HRT1w	1		10	MR			1.3.6.1.4.1.9590.100.1.2.327228425521223641730178549584187224608	
SER	1		10	MR			1.3.6.1.4.1.9590.100.1.2.38807669393465572812946098071237000963	

2. Update the pyradiomics plugin prefix to ser for run SER

The screenshot shows the eElite interface with a central search bar containing 'Find patient'. To the right, a sidebar menu is open, showing several options: Users, Annotations, Templates, Plugins (which is highlighted in red), Worklists, and Scan Data Folder. Below the sidebar is a table listing one entry, TEST_01, with the same structure as the previous tables.

Description/Name	# of aims	# of sub	# of images	Type	Creation date	Upload date	Identifier
TEST_01	6	2		MR/SEG		2021-07-27	TEST_01

SOP-U24-...-1.0 Radiomics Assessment of DICOM/DSO Clinical Human Research MRI Data

SOP-U24-...-1.0 Radiomics Assessment of DICOM/DSO Clinical
Human Research MRI Data

Paramaters

add new parameter

type*

Send parameter to docker

Name

Send name as parameter

format*

prefix

input binding

Default value

Description

*Required

SOP-U24-...-1.0 Radiomics Assessment of DICOM/DSO Clinical
Human Research MRI Data

3. Add SER annotations to run the plugin

The screenshot shows a 'Plugins' interface with a dark theme. At the top, there are tabs: 'manage', 'add process' (which is selected), and 'track process'. Below the tabs are three dropdown menus: 'projects' set to 'lite', 'plugins' set to 'pyradiomics', and 'parameter type' set to 'default'. A 'add selected' button is also present. The main area is titled 'Annotations' and contains a table with the following data:

	patient name	name
<input type="checkbox"/>	TEST_01	TEST_01HRT1w_tumor segmentation
<input type="checkbox"/>	TEST_01	TEST_01HRT1w_tumor segmentation
<input checked="" type="checkbox"/>	TEST_01	TEST_01SER_tumor segmentation
<input checked="" type="checkbox"/>	TEST_01	TEST_01SER_tumor segmentation
<input type="checkbox"/>	TEST_01	TEST_01ADC_tumor segmentation
<input type="checkbox"/>	TEST_01	TEST_01ADC_tumor segmentation
<input type="checkbox"/>	TEST_02	TEST_02HRT1w_tumor segmentation
<input type="checkbox"/>	TEST_02	TEST_02HRT1w_tumor segmentation
<input type="checkbox"/>	TEST_02	TEST_02SER_tumor segmentation
<input type="checkbox"/>	TEST_02	TEST_02ADC_tumor segmentation

At the bottom of the table, there are navigation controls: 'Previous', 'Page 1 of 9', '10 rows', and 'Next'.

4. Start pyradiomics plugin

SOP-U24-...-1.0 Radiomics Assessment of DICOM/DSO Clinical Human Research MRI Data

The screenshot shows a table titled "Plugins" with the following columns: manage, container, plugin, aims, project, param type, status, starttime, endtime, and a set of icons for each row. The rows list various plugins, mostly named "epadplugin_x" followed by a number, each associated with "pyradiomics" and specific project names like "u24utbs_BankSI" or "TEST_01SER_tu". The status column indicates most are "ended" or "default". The starttime and endtime columns show dates from September 2021. A blue button labeled "Start plugin" is located at the bottom right of the table area.

5. Set the pyradiomics prefix to adc for ADC parametric map analysis

The screenshot shows a "Parameters" dialog box. On the left, there's a sidebar with "manage" and "ad" tabs, and a list of parameters. The main area has sections for "add new parameter", "type*", "Send parameter to docker", "Name" (set to "pyradiomicsprefix"), "Send name as parameter" (checkbox checked), "format*", "parameters", "prefix", "input binding" (empty), "Default value" (set to "adc"), and "Description". At the bottom, there's a note "*Required" and buttons for "save" and "Close".

6. Add ADC annotations to plugin processing

SOP-U24-...-1.0 Radiomics Assessment of DICOM/DSO Clinical
Human Research MRI Data

The screenshot shows the 'Annotations' table within the 'Plugins' interface. The table has columns for 'patient name' and 'name'. There are 9 rows of data. The first two rows have checkboxes next to them, while the others do not. The last two rows have checked checkboxes.

	patient name	name
<input type="checkbox"/>	TEST_01	TEST_01HRT1w_tumor segmentation
<input type="checkbox"/>	TEST_01	TEST_01HRT1w_tumor segmentation
<input type="checkbox"/>	TEST_01	TEST_01SER__tumor segmentation
<input type="checkbox"/>	TEST_01	TEST_01SER__tumor segmentation
<input checked="" type="checkbox"/>	TEST_01	TEST_01ADC__tumor segmentation
<input checked="" type="checkbox"/>	TEST_01	TEST_01ADC__tumor segmentation
<input type="checkbox"/>	TEST_02	TEST_02HRT1w_tumor segmentation
<input type="checkbox"/>	TEST_02	TEST_02HRT1w_tumor segmentation
<input type="checkbox"/>	TEST_02	TEST_02SER__tumor segmentation
<input type="checkbox"/>	TEST_02	TEST_02ADC__tumor segmentation

Annotations

Previous Page 1 of 9 10 rows Next

7. Run pyradiomics on ADC series

SOP-U24-...-1.0 Radiomics Assessment of DICOM/DSO Clinical Human Research MRI Data

Plugins								
	manage	add process	track process					
<input type="checkbox"/>	container	plugin	aims	project	param type	status	starttime	endtime
<input type="checkbox"/>	epadplugin_12	pyradiomics	u24utbs_BankSt u24utbs_BankSt	lite	default	- ended	Wed Sep 01 2021 - 19:4:56	Wed Sep 01 2021 - 19:5:40
<input type="checkbox"/>	epadplugin_13	pyradiomics	u24utbs_Bankve u24utbs_Bankve	lite	default	- ended	Wed Sep 01 2021 - 19:19:25	Wed Sep 01 2021 - 19:19:59
<input type="checkbox"/>	epadplugin_14	pyradiomics	u24utbs_Bankve u24utbs_Bankve	lite	default	- ended	Mon Sep 13 2021 - 16:2:13	Mon Sep 13 2021 - 16:6:27
<input type="checkbox"/>	epadplugin_15	pyradiomics	u24utbs_BankSt u24utbs_BankSt	lite	default	- ended	Wed Sep 08 2021 - 19:16:50	Wed Sep 08 2021 - 19:17:25
<input type="checkbox"/>	epadplugin_16	pyradiomics	u24utbs_BankSt u24utbs_BankSt	lite	default	- ended	Mon Sep 13 2021 - 15:51:8	Mon Sep 13 2021 - 15:55:18
<input type="checkbox"/>	epadplugin_17	pyradiomics	Peripancreatic LN	lite	default	- ended	Mon Sep 13 2021 - 18:20:44	Mon Sep 13 2021 - 18:25:50
<input type="checkbox"/>	epadplugin_18	pyradiomics	TEST_01SER__tu TEST_01SER__tu	lite	default	- added	-	-
<input type="checkbox"/>	epadplugin_19	pyradiomics	TEST_01ADC__tu TEST_01ADC__tu	lite	default	- added	-	-

Start plugin

Previous Page 2 of 2 10 rows ▾ Next

G. Revisions log:

Version	Revision Date	Section Revised	Notes
1	9.15.2021	All	SOP created

H. Appendix: