5

Digital Imaging and Communications in Medicine (DICOM)

Supplement 189: Advanced Blending Presentation State Storage

10

15

Prepared by:

DICOM Standards Committee, Working Group 16 (MR sub group Functional MRI)

1300 N. 17th Street, Suite 900

20 Rosslyn, Virginia 22209 USA

VERSION: Final Text, April 5th, 2017

25 Developed in accordance with: DICOM Workitem 2014-12-A

Table of Contents

Scope and Field

50   This IOD describes how to blend color sources such as Parametric maps together with other images with a consistent color presentation.

        Parametric Maps can be used to store the quantification of a specific measurement. The Advanced Blending Presentation State defines the blending of the content of different Parametric

55   Maps with an optional anatomical image as underlay, showing the measurements (e.g., BOLD fMRI, Diffusion maps, CT/MRI Perfusion maps, FDG PET map) in relation to the anatomical structure. Blending can be performed on any combination of Images.

        The Supplement defines information that is needed to combine the different maps and show the

60   combination. This way the user will be able to relate different items together, giving the opportunity to get a full overview instead of seeing every single item in isolation.

        Displayed Area and Graphic modules are included to allow the user to add graphical information, for example, marking the Motor Cortex on the combined image.

        The usage is described by using an example of an fMRI study in a new chapter in PS3.17 as

65   Informative Annex.

        The usage of Color in the Parametric Map was added through CP 1584.

DICOM PS 3.2 Conformance

Item: Add SOP Class to Table A.1-2

70

Table A.1-2
UID VALUES

UID Value	UID NAME	Category
…		
1.2.840.10008.5.1.4.1.1.11.8	**Advanced Blending Presentation State Storage**	**Transfer**
…		

DICOM PS 3.3: Information Object Definitions

Item: Add in Section A.1.4, rows and column to Table A.1-6

75

A.1.4   Overview of the Composite IOD Module Content

IODs Modules	Advanced Blending Presentation State
Patient	**M**
Clinical Trial Subject	**U**
General Study	**M**
Patient Study	**U**
Clinical Trial Study	**U**
General Series	**M**
Clinical Trial Series	**U**
Presentation Series	**M**
Frame of Reference	**M**
General Equipment	**M**
Enhanced General Equipment	**M**
Presentation State Identification	**M**
Advanced Blending Presentation State	**M**
Advanced Blending Presentation State Display	**M**
Displayed Area	**U**
Graphic Annotation	**U**
Spatial Transformation	**C**
Graphic Layer	**C**
Graphic Group	**U**
ICC Profile	**M**
Common Instance Reference	**M**

SOP Common	**M**

80

Item: Add in the following new section in Annex A

A.X ADVANCED BLENDING PRESENTATION STATE IOD

A.X.1 Advanced Blending Presentation State IOD Description

The Advanced Blending Presentation State Information Object Definition (IOD) specifies information that
may be used to blend two or more sets of images that are referenced from within the IOD for the purpose
of presentation (display).

It includes capabilities for specifying:

    a. output color space in PCS-Values
    b. optional thresholds to restrict contributing areas of an input
    c. definition of blending control values for the different inputs
    d. selection of the area of the output images to display and whether to rotate or flip it
    e. image and display relative annotations, including graphics, text and overlays

A.X.2 Advanced Blending Presentation State IOD Entity-Relationship Model

The E-R Model in Section A.1.2 depicts those components of the DICOM Information Model that directly
reference the Advanced Blending Presentation State IOD.

A.X.3 Advanced Blending Presentation State IOD Module Table

Table A.X-1. Advanced Blending Presentation State IOD Modules

IE	Module	Reference	Usage
Patient	Patient	C.7.1.1	M
	Clinical Trial Subject	C.7.1.3	U
Study	General Study	C.7.2.1	M
	Patient Study	C.7.2.2	U
	Clinical Trial Study	C.7.2.3	U
Series	General Series	C.7.3.1	M
	Presentation Series	C.11.9	M
	Clinical Trial Series	C.7.3.2	U
Frame of Reference	Frame of Reference	C.7.4.1	M
Equipment	General Equipment	C.7.5.1	M
	Enhanced General Equipment	C.7.5.2	M
Presentation State	Presentation State Identification	C.11.10	M

	Advanced Blending Presentation State	C.11.x1	M
	Advanced Blending Presentation State Display	C.11.x2	M
	Displayed Area	C.10.4	U
	Graphic Annotation	C.10.5	U
	Spatial Transformation	C.10.6	C - Required if rotation or flipping are to be applied
	Graphic Layer	C.10.7	C - Required if Graphic Annotation Module is present
	Graphic Group	C.10.11	U
	ICC Profile	C.11.15	M
	Common Instance Reference	C.12.2	M
	SOP Common	C.12.1	M

Item: Add the following new sections in PS 3.3 C.11

C.11.X1   Advanced Blending Presentation State Module

C.11.X1.1 Advanced Blending Presentation State Module Attributes

Table C.11.X1-1 contains Attributes that describe one or more inputs optionally one or more sets of registration objects, and the color and thresholds to be applied to them, for the purpose of blending.

Table C.11.X1-1. Advanced Blending Presentation State Module Attributes

Attribute Name	Tag	Type	Attribute Description
Advanced Blending Sequence	(0070,1B01)	1	A Sequence of Items identifying the inputs and describing transformations of them. One or more Items shall be included in this Sequence. See Section C.11.X1.1.1.
>Blending Input Number	(0070,1B02)	1	Identification number of the input. Values shall be ordinal numbers starting from 1 and monotonically increasing by 1 within the Advanced Blending Presentation State Instance.
>Study Instance UID	(0020,000D)	1	Unique identifier for the Study.

Attribute Name	Tag	Type	Attribute Description
>Series Instance UID	(0020,000E)	1	Unique identifier of a Series that is part of the Study defined by the Study Instance UID (0020,000D)
>Referenced Image Sequence	(0008,1140)	1C	The set of images comprising this input. One or more items shall be included in this sequence. Required if the input is not the entire set of instances in the series.
>>Include 'Image SOP Instance Reference Macro' Table 10-3			
>Referenced Spatial Registration Sequence	(0070,0404)	1C	A reference to a Spatial Registration Instance that is used to register the referenced inputs. Only one item shall be included in this sequence. Required if the Frame of Reference UID (0020,0052) value of the Images referenced by the Referenced Image Sequence (0008,1140) of this item does not match the Frame of Reference UID (0020,0052) value of this Presentation State Instance. May be present otherwise.
>> Include Table C.17-3 "Hierarchical SOP Instance Reference Macro Attributes"			
>Include Table C.11.X1.1-1 "Threshold Sequence Macro Attributes"			

Attribute Name	Tag	Type	Attribute Description

>Time Series Blending	(0070,1B07)	1C	Whether this Series is a time series and every time point in this Series will be blended with the single volumes in the other Series specified in the Advanced Blending Sequence (0070,1B01).
			
			ENUMERATED:
			   TRUE
			   FALSE
			
			Only a single item in the Sequence may have the value TRUE
			
			Required if the input is a Time Series and all time points need to be blended with the other Series. May be present otherwise

>Geometry for Display	(0070,1B08)	1C	Whether the geometry of this Series is used as the geometry for the blending operation.
			See C.11.X1.1.1
			
			ENUMERATED:
			   TRUE
			   FALSE
			
			Only a single item in the Sequence may have the value TRUE
			
			Required if the geometry of this input is to be used as the geometry for the blending operation. May be present otherwise.

C.11.X1.1.1 Advanced Blending Sequence

The images to be blended are specified in the Advanced Blending Sequence (0070,1B01).

Geometry refers to the following attributes:

- Number of Frames (0028,0008)
- Rows (0028,0010)
- Columns (0028,0011)
- Pixel Aspect Ratio (0028,0034)
- Imager Pixel Spacing (0018,1164) (if applicable)
- Nominal Scanned Pixel Spacing (0018,2010) (if applicable)
- Slice Thickness (0018,0050)
- Spacing Between Slices (0018,0088)

The geometry of the output images shall match the geometry of the input specified as having the Geometry for Display (0070,1B08) as TRUE. If no input has Geometry for Display (0070,1B08) equal TRUE then the application shall choose which geometry to use.

125 If all inputs do not have the same frames, resolution, etc., the application determines the appropriate pixels to be blended. This implies that the blending result may vary between different applications. If consistent blending results are desired the inputs should be resampled in advance such that they have the same frames, resolution, etc.

This module specifies no explicit relationship (such as pairing or ordering) between the sets of images and 130 frames defined in the sequence elements. This module does not define how the images are spatially related, and what re-sampling, if any, needs to be performed before the images are blended for rendering.

It is expected that blending takes place between pixels at the same position in space.

The images in the image sets may share the same Frame of Reference, in which case the rendering application can spatially relate the image sets based on their Image Position (Patient) (0020,0032) and 135 Image Orientation (Patient) (0020,0037) Attributes.

If a spatial registration object is included in the Advanced Blending Sequence (0070,1B01) it shall be applied to the referenced input even if the Frame of Reference is the same, as small corrections might have taken place during post-processing.

If they are both missing the application will decide how to blend the inputs.

140 Note

1. The underlying image for a superimposed segmentation image need not be the source image for the segmentation.

C.11.X1.1.2   Threshold Sequence Macro

145 The Threshold Sequence is defining the values of the image that are used or ignored.

Table C.11.X1.1-1
THRESHOLD SEQUENCE MACRO ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Threshold Sequence	(0070,1B11)	1C	Threshold specification for the image One or more Items shall be included in this Sequence. Required if Threshold needs to be applied.

>Threshold Type	(0070,1B13)	1	Type of threshold comparison used to determine the presence of a pixel value in the output.
			See C.11.X1.1.2.1
			Enumerated Values:
			  RANGE_INCL
			  RANGE_EXCL
			  GREATER_OR_EQUAL
			  LESS_OR_EQUAL
			  GREATER_THAN
			  LESS_THAN

>Threshold Value Sequence	(0070,1B12)	1	Values for thresholding. If the Threshold Type (0070,1B13) is GREATER_OR_EQUAL,LESS_OR_EQUAL, GREATER_THAN or LESS_THAN only a single Item shall be included in this Sequence. If the Threshold Type (0070,1B13) is RANGE_INCL or RANGE_EXCL, exactly two Items shall be included in this Sequence, the first of which is less than or equal to the second.
>>Threshold Value	(0070,1B14)	1	Value for the threshold See C.11.X1.1.2.1 Note: VR of Threshold Value is FD and if this is different than the VR of the pixels then format conversion is needed.

C.11.X1.1.2.1   Threshold

150   The Threshold Type (0070,1B13) defines the pixel values that will be shown. Values that are not inside any of the specified Threshold Sequence (0070,1B11) Items shall be treated as padding pixels.

To describe a threshold that consists of more than one range, multiple items are specified in the Threshold Sequence (0070,1B11) Items.

When more than one item is specified in the Threshold Sequence (0070,1B11) the pixel shall be shown if
155   any item specifies that the pixel shall be shown.

The number of Items in the Threshold Value Sequence (0070,1B12) and the use of Threshold Value (0070,1B14) depends on the value of the Threshold Type (0070,1B13) as follows:

RANGE_INCL   a pixel value shall be shown when the value lies between the specified values or is equal to one of the specified values.

160   RANGE_EXCL   a pixel value shall be shown when the value lies outside (i.e. not between) the specified values.

GREATER_OR_EQUAL a pixel value shall be shown when the value is greater than or equal to the specified value.

165   LESS_OR_EQUAL   a pixel value shall be shown when the value is less than or equal to the specified value.

GREATER_THAN   a pixel value shall be shown when the value is greater than the specified value.

LESS_THAN   a pixel value shall be shown when the value is less than the specified value.

170

C.11.x2. Advanced Blending Presentation State Display Module

The Advanced Blending Presentation State Display Module specifies the input and the method used for each blending step.

Table C.11.X2.1-1

175   **ADVANCED BLENDING PRESENTATION STATE DISPLAY MODULE ATTRIBUTES**

Attribute Name	Tag	Type	Attribute Description
Pixel Presentation	(0008,9205)	1	Grayscale or color space of the Presentation State output. Enumerated Values: TRUE_COLOR Output consists of PCS-Values
Blending Display Sequence	(0070,1B04)	1	The blending operations and the input series to be used. Each item results in a single RGB output that may be reused in a following step. One or more items shall be included in this sequence. Note: The order of operations is determined by the specified Blending Input Number (0070,1B02) for each blending step. The displayed output will be the result of the blending step that is not assigned a Blending Input Number (0070,1B02)
>Blending Display Input Sequence	(0070,1B03)	1	Each item is an input series that will be used in the blending operation. The order of items is significant Two items shall be included if the blending mode is FOREGROUND. One or more items shall be included if the blending mode is EQUAL.
>>Blending Input Number	(0070,1B02)	1	Identification number of the input series to which the Blending information must be applied.

>Relative Opacity	(0070,0403)	1C	Specifies Relative Opacity for the visible pixels of the set referenced by the first Blending Input Number (0070,1B02) Required if Blending Mode (0070,1B06) is equal to FOREGROUND

>Blending Mode	(0070,1B06)	1	Describes the method for weighting the different input images during the blending operation:
			
			Enumerated values:
			    EQUAL
			    FOREGROUND
			
			See section PS3.4 Annex N.2.6

>Blending Input Number	(0070,1B02)	1C	Identification of the result as input for a subsequent blending operation. Required if the result is used for further Blending. Note If this Attribute is not present the item describes the final output of the blending process.

DICOM PS3.4: Service Class Specifications

Amend DICOM PS 3.4 Annex B.5 Standard SOP Classes as follows:

180

Table B.5-1. Standard SOP Classes

SOP Class Name	SOP Class UID	IOD Specification (defined in PS3.3)
…	…	…
XA/XRF Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.5	XA/XRF Grayscale Softcopy Presentation State IOD
Advanced Blending Presentation State Storage	**1.2.840.10008.5.1.4.1.1.11.8**	**Advanced Blending Presentation State IOD**
…	…	…

Add DICOM PS 3.4 Annex N.2.6 Color Blending Transformations as follows:

N.2.6 Advanced Blending Transformations

185 The advanced blending transformation model applies to multiple color inputs and uses foreground blending or equal blending.

Several transformations in this IOD affect the input prior to its use in blending as depicted in Figure N.2.6-1.

Grayscale inputs that have no associated Color LUT information shall have the normal grayscale
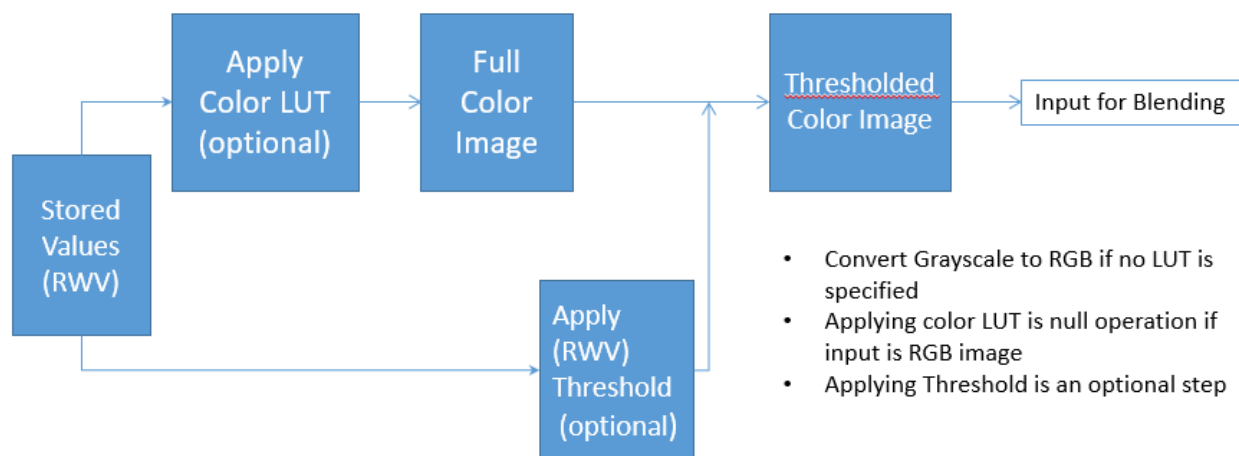190 processing and then be converted to a full color image by setting R equals G equals B.

Figure N.2.6-1 Color and Threshold application

Padding pixels in an input are given an opacity value zero and shall be set to 0 for Red, Green, and Blue.

The foreground method blends two inputs. The first input uses an opacity of Relative Opacity (0070,0403) and the second input uses an opacity of (1 - Relative Opacity (0070,0403)).

195

If both the inputs are padding values then the result is padding value.

If one of the values is padding value then the result is the non-padding value.

If both pixels have values then result is Relative Opacity * first value + (1 – Relative Opacity) * second value.
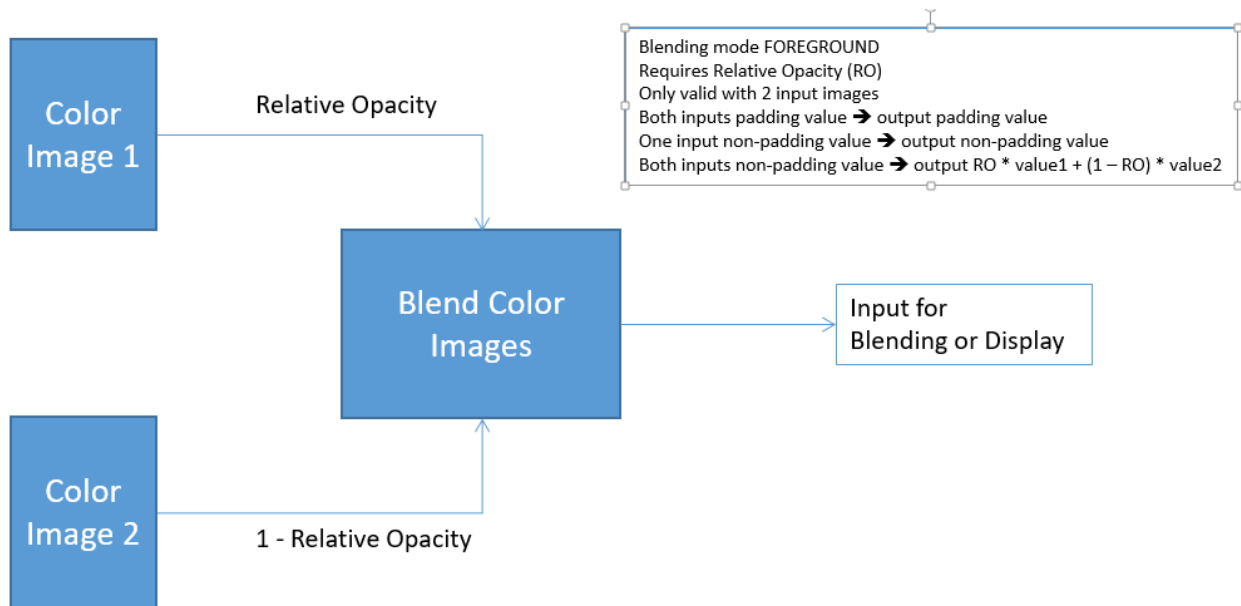
200

Blending mode FOREGROUND
Requires Relative Opacity (RO)
Only valid with 2 input images
Both inputs padding value ➔ output padding value
One input non-padding value ➔ output non-padding value
Both inputs non-padding value ➔ output RO * value1 + (1 – RO) * value2

Figure N.2.6-2 Foreground blending

The Equal blending mode blends two or more inputs where for each pixel location the opacity is calculated as 1.0 divided by the number of non-padding pixels. The result pixel blends all non-padding pixels using the calculated opacity.

205

If an input pixel value is the padding-value then the Relative Opacity for that input pixel is zero.

If an input pixel value is not the padding value then the Relative Opacity for that pixel is 1 / (number of input pixels that are non-padding pixels).

210 The result value is the sum for all input pixels of the input pixel value * Relative Opacity.

If all the inputs pixels are padding values then the result is padding value.
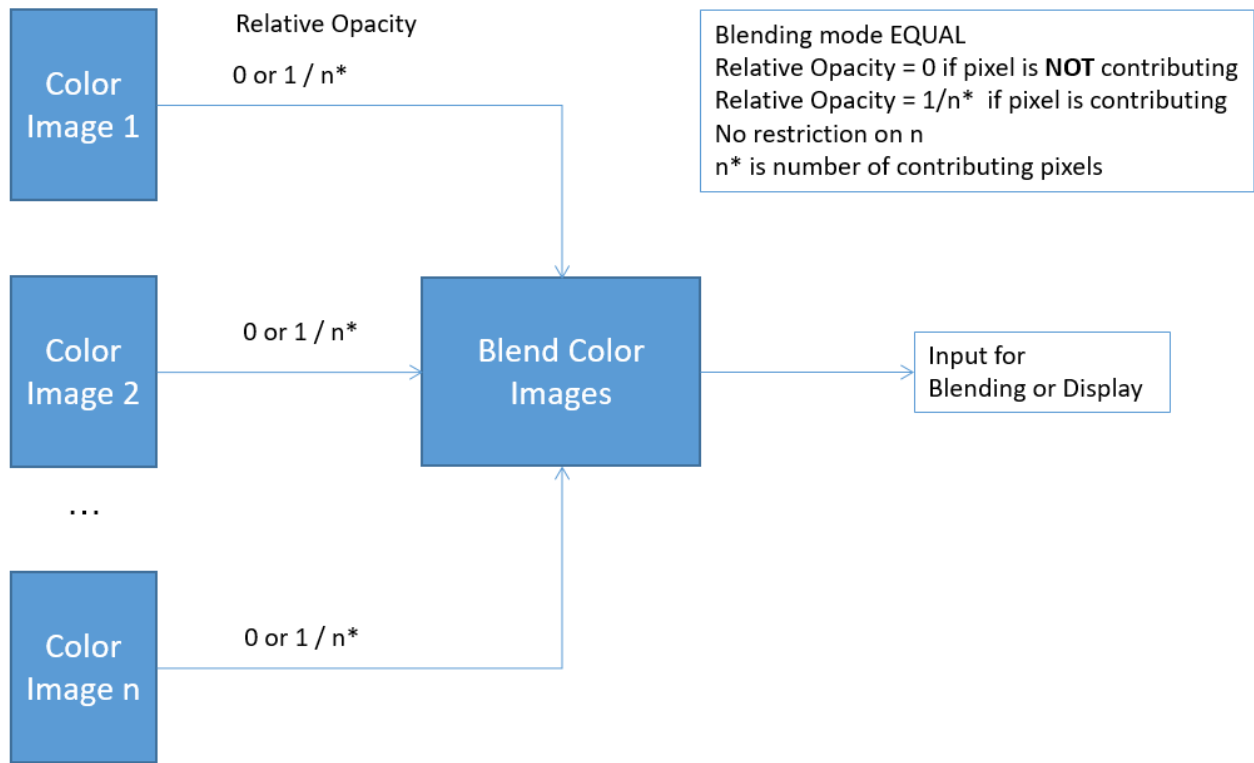
Relative Opacity

0 or 1 / n*

Color Image 1

0 or 1 / n*

Color Image 2

...

0 or 1 / n*

Color Image n

Blend Color Images

Input for Blending or Display

Blending mode EQUAL
Relative Opacity = 0 if pixel is **NOT** contributing
Relative Opacity = 1/n* if pixel is contributing
No restriction on n
n* is number of contributing pixels

Figure N.2.6-3 Equal blending

215

DICOM PS 3.6: Data Dictionary

Amend DICOM PS 3.6 – Data Dictionary – Section 6 Registry of DICOM Data Elements as follows:

220

Table 6-1. Registry of DICOM Data Elements

Tag	Name	Keyword	VR	VM	
(0070,1B01)	Advanced Blending Sequence	AdvancedBlendingSequence	SQ	1	
(0070,1B02)	Blending Input Number	BlendingInputNumber	US	1	
(0070,1B03)	Blending Display Input Sequence	BlendingDisplayInputSequence	SQ	1	
(0070,1B04)	Blending Display Sequence	BlendingDisplaySequence	SQ	1	
(0070,1B06)	Blending Mode	BlendingMode	CS	1	
(0070,1B07)	Time Series Blending	TimeSeriesBlending	CS	1	
(0070,1B08)	Geometry for Display	GeometryForDisplay	CS	1	
(0070,1B11)	Threshold Sequence	ThresholdSequence	SQ	1	
(0070,1B12)	Threshold Value Sequence	ThresholdValueSequence	SQ	1	
(0070,1B13)	Threshold Type	ThresholdType	CS	1	
(0070,1B14)	Threshold Value	ThresholdValue	FD	1	

DICOM PS 3.17: Explanatory Information

Item: Add the following Section

---

225 **XX   Advanced Blending Presentation State Storage Encoding Example (Informative)**

This section illustrates the usage of the Advanced Blending Presentation State for a functional MRI study.

XX.1 Introduction

Quantitative imaging provides measurements of physical properties, in vivo and non-invasively, for research and clinical practice. DICOM support for parametric maps provides a structure for organizing
230 these results as an extension of the already widely-used imaging standard. The addition of color LUT support for parametric maps bridges the gap between data handling and visualization.

An example of quantitative imaging in clinical practice today is the use of MRI, PET and other modalities in brain mapping for diagnostic assessment in pre-treatment planning for tumor, epilepsy, arterio-venous malformations (AVMs) and other conditions. MR Diffusion tensor imaging (DTI) results in fractional
235 anisotropy (FA) and other parametric maps highlighting white matter structures. Task-based functional MRI (fMRI) highlights specific areas of eloquent cortex (gray matter) as expressed in statistical activation maps. Other parameters and modalities including perfusion, MR spectroscopy, and PET are often employed to locate and characterize lesions by means of their hyper- and hypo-metabolism and –perfusion in parametric maps.

240 The visualization of multiple parametric maps and sources of anatomical information in the same space requires the tools to highlight areas of interest (and hide irrelevant areas) in parametric maps. Two important tools provided in this supplement are thresholding of parametric maps by their real-world values, and blending of multiple image data sets in a single view.

In this example the series 2 to 5 have a lower resolution and are expected to be resampled to have the
245 same resolution as series 1 as this is identified as series to be used for target Geometry.

XX.2 Example (Informative)

The example describes the blending of five series:

Series 1: the anatomical series which is stored as a single volume in an Enhanced MR Image object having no Color LUT attached. The Image will be displayed with a Relative Opacity of 0.7.
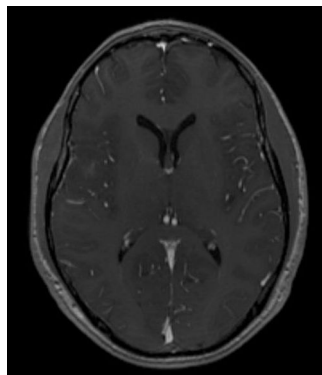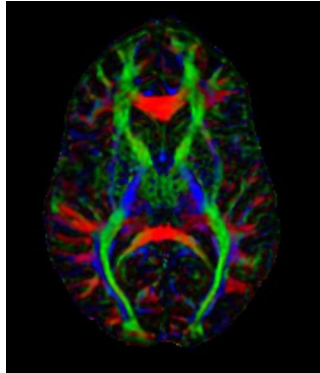

250

Figure XX.2-1 Anatomical image

Series 2: the DTI series which is stored as an Enhanced MR Color Image object means that no RGB transformation is needed. The Image will be displayed with a Relative Opacity of 1 – 0.7.

255   **Figure XX.2-2 DTI image**

Series 3: Reading task captured in a Parametric Map with Color LUT Winter attached to it. The Image will be displayed with threshold range 6% to 50%. Opacity will be equal divided with the other two task maps.
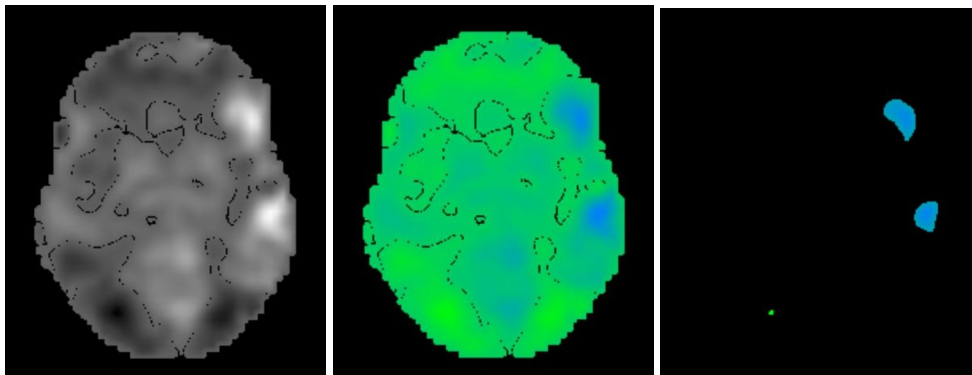

Figure XX.2-3 Reading task image with coloring and threshold applied

260   Series 4: Listening task captured in a Parametric Map with Color LUT Fall attached to it. The Image will be displayed with threshold range 9% to 60%. Opacity will be equal divided with the other two task maps.
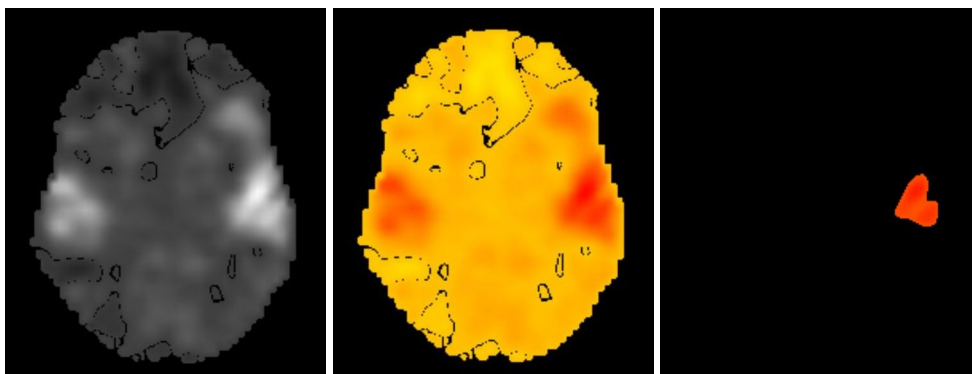

Figure XX.2-4 Listening task image with coloring and threshold applied

Series 5: Silent word generation task captured in a Parametric Map with Color LUT Spring attached to it.
265   The Image will be displayed with threshold range 7% to 75%. Opacity will be equal divided with the other
two task maps.
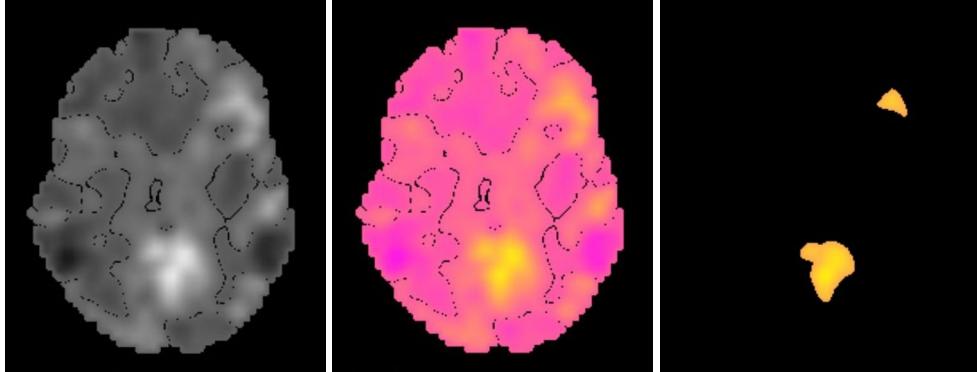
Figure XX.2-5 Silent word generation task image with coloring and threshold applied

The result of the first blending operation (FOREGROUND) will be blended with the result of the second
270   blending operation (EQUAL) through a FOREGROUND blending operation with a Relative Opacity of 0.6.

Figure XX.2-6 Blended result

Figure XX.2-6 shows the final result with information of patient and different blended image layers. The
overlay of the patient and layer information is not described in the object but would be application specific
275   behavior.

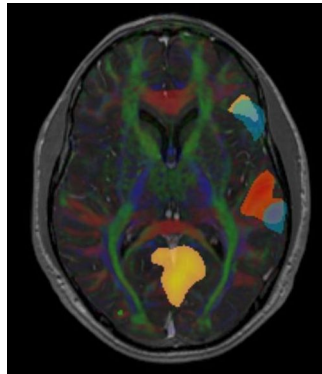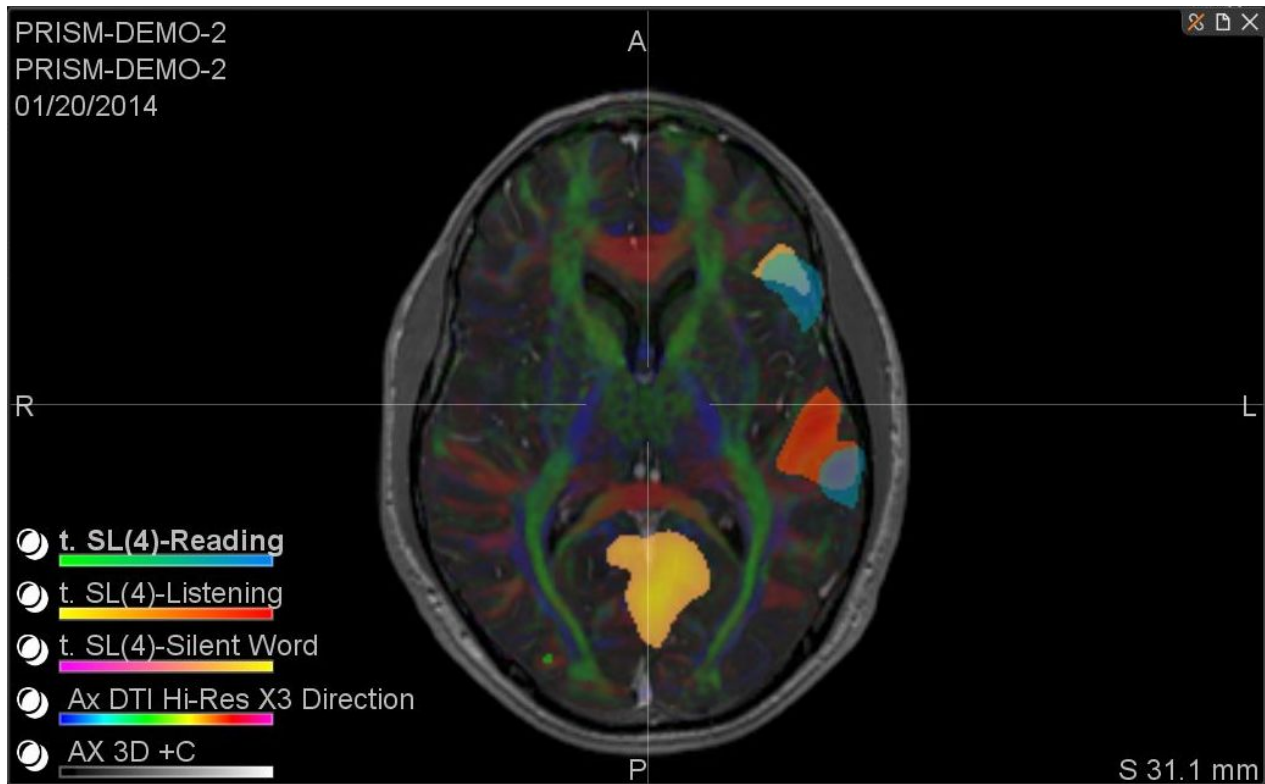**Figure XX.2-7 Blended result with Patient and Series information**

XX.3 Encoding example (Informative)

Attribute Name	Tag	Value	Comment
Advanced Blending Sequence	(0070,1B01)		
Sequence Item 1			Identifies Anatomical Series, no subset of series or registration
>Blending Input Number	(0070,1B02)	1	
>Study Instance UID	(0020,000D)	"1.3.46.670589.11.3"	
>Series Instance UID	(0020,000E)	"1.3.46.670589.11.3.4 5"	
>Geometry for Display	(0070,1B08)	TRUE	Series geometry shall be used as target geometry for the blending operation
End Sequence item 1			

Attribute Name	Tag	Value	Comment
Sequence Item 2			Identifies DTI Series, no subset of series is used, no registration present
>Blending Input Number	(0070,1B02)	2	
>Study Instance UID	(0020,000D)	"1.3.46.670589.11.3"	
>Series Instance UID	(0020,000E)	"1.3.46.670589.11.3.49"	
> Geometry for Display	(0070,1B08)	FALSE	Series geometry shall not be used as target geometry for the blending operation

Attribute Name	Tag	Value	Comment
End Sequence item 2			
Sequence Item 3			Identifies first Parametric map, no registration
>Blending Input Number	(0070,1B02)	3	
>Study Instance UID	(0020,000D)	"1.3.46.670589.11.3"	
>Series Instance UID	(0020,000E)	"1.3.46.670589.11.3.5 6"	
>Threshold Sequence	(0070,1B11)		
>Sequence Item 3-1			
>>Threshold Value Sequence	(0070,1B12)		
>>Sequence Item 3-1-1			
>>> Threshold Value	(0070,1B14)	6	First threshold value
>> End Sequence Item 3-1-1			
>>Sequence Item 3-1-2			
>>>Threshold Value	(0070,1B14)	50	Second threshold value
>>End Sequence Item 3-1-2			
>>Threshold Type	(0070,1B13)	RANGE_INCL	
>End Sequence Item 3-1			
End Sequence item 3			
Sequence Item 4			Identifies second Parametric map, no registration
>Blending Input Number	(0070,1B02)	3	
>Study Instance UID	(0020,000D)	"1.3.46.670589.11.3"	
>Series Instance UID	(0020,000E)	"1.3.46.670589.11.3.5 8"	
>Threshold Sequence	(0070,1B11)		
>Sequence Item 4-1			
>>Threshold Value Sequence	(0070,1B12)		
>>>Sequence Item 4-1-1			
>>>Threshold Value	(0070,1B14)	9	First threshold value
>>End Sequence Item 4-1-1			
>>Sequence Item 4-1-2			
>>>Threshold Value	(0070,1B14)	60	Second threshold value

Attribute Name	Tag	Value	Comment
>>End Sequence Item 4-1-2			
>>Threshold Type	(0070,1B13)	RANGE_INCL	
>End Sequence 4-1			
End Sequence item 4			
Sequence Item 5			Identifies third Parametric map, no registration
>Blending Input Number	(0070,1B02)	3	
>Study Instance UID	(0020,000D)	"1.3.46.670589.11.3"	
>Series Instance UID	(0020,000E)	"1.3.46.670589.11.3.5 9"	
>Threshold Sequence	(0070,1B11)		
>Sequence Item 5-1			
>>Threshold Value Sequence	(0070,1B12)		
>>Sequence Item 5-1-1			
>>>Threshold Value	(0070,1B14)	7	First threshold value
>>End Sequence Item 5-1-1			
>>Sequence Item 5-1-2			
>>>Threshold Value	(0070,1B14)	75	Second threshold value
>>End Sequence Item 5-1-2			
>>Threshold Type	(0070,1B13)	RANGE_INCL	
>End Sequence Item 5-1			
> End Sequence Item 2-3			
End Sequence item 5			
Pixel Presentation	(0008,9205)	"TRUE_COLOR"	
Blending Display Sequence	(0070,1B04)		
Sequence Item 1			
>Blending Display Input Sequence	(0070,1B03)		
>Sequence Item 1-1			Anatomical series, no threshold
>>Blending Input Number	(0070,1B02)	1	
>End Sequence Item 1-1			
>Sequence Item 1-2			DTI series, no threshold

Attribute Name	Tag	Value	Comment
>>Blending Input Number	(0070,1B02)	2	
>End Sequence Item 1-2			
>Relative Opacity	(0070,0403)	0.7	
>Blending Mode	(0070,1B06)	FOREGROUND	
>Blending Input Number	(0070,1B02)	6	Output is used for later Blending
End Sequence item 1			
Sequence Item 2			
> Blending Display Input Sequence	(0070,1B03)		
>Sequence Item 2-1			Parametric series 1
>>Blending Input Number	(0070,1B02)	3	
>End Sequence Item 2-1			
>Sequence Item 2-2			Parametric series 2
>>Blending Input Number	(0070,1B02)	4	
>End Sequence Item 2-2			
>Sequence Item 2-3			Parametric series 3
>>Blending Input Number	(0070,1B02)	5	
>End Sequence Item 2-3			
>Blending Mode	(0070,1B06)	EQUAL	
>Blending Input Number	(0070,1B02)	7	Output is used for later Blending
End Sequence item 2			
Sequence Item 3			
> Blending Display Input Sequence	(0070,1B03)		
> Sequence Item 3-1			Output first blending operation, no threshold
>> Blending Input Number	(0070,1B02)	6	
> End Sequence Item 3-1			
> Sequence Item 3-2			Output second blending operation, no threshold
>> Blending Input Number	(0070,1B02)	7	
> End Sequence Item 3-2			
>Relative Opacity	(0070,0403)	0.6	

Attribute Name	Tag	Value	Comment
Blending Mode	(0070,1B06)	FOREGROUND	
End Sequence item 3			No Parametric Blending Input Number is present as this step defines the output to be displayed.