RadiPOP_API

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Chapter 1

Namespace Index

1.1 Packages

Here are the packages with brief descriptions (if available):

Chapter 2

Hierarchical Index

2.1 Class Hierarchy

This inheritance list is sorted roughly, but not completely, alphabetically:

Chapter 3

Class Index

3.1 Class List

Here are the classes, structs, unions and interfaces with brief descriptions:

Chapter 4

File Index

4.1 File List

Here is a list of all files with brief descriptions:

Chapter 5

Namespace Documentation

5.1 config Namespace Reference

Classes

- class BaseConfig
- class DevelopmentConfig
- class ProductionConfig
- class TestingConfig

5.2 radipop_gui Namespace Reference

Classes

- class RadiPopGUI

  Bridge between the flask server/API and the RadiPOP segmenter:

5.3 segmentation_utils Namespace Reference

Functions

- def add_sobel_edges (mask, img)

  Smooth edges Steps:
- def draw_region_outlines (mask)

  Color the mask light green.
- def guess_bounds (regions_map, reference_map)

  Guess the bounds/labels of the region based on reference region Guess the bounds/labels of the region based on reference region (generally neighboring slice).
- def partition_at_threshold (img, thresh, square_size, min_size, title=None, show_plot=True)

  After some smoothing, calculate new mask for img Steps:
- def save_partition (mask, path)

5.3.1 Function Documentation

5.3.1.1 add_sobel_edges()

```
def segmentation_utils.add_sobel_edges (
              mask,
              img )
```

Smooth edges Steps:

- Edge filter image using the Canny algorithm.
- euclidean distance transform

Parameters

mask	mask corresponding to image
img	image corresponding to mask

Returns

mask with smoothed edges

5.3.1.2 draw_region_outlines()

```
def segmentation_utils.draw_region_outlines (
              mask )
```

Color the mask light green.

Color the edges of the mask darker green.

Parameters

mask	mask for which to color the outlines

Returns

mask with colored outlines

5.3.1.3 guess_bounds()

```
def segmentation_utils.guess_bounds (
              regions_map,
              reference_map )
```

Guess the bounds/labels of the region based on reference region Guess the bounds/labels of the region based on reference region (generally neighboring slice).

Parameters

regions_map	mask to guess labels for
reference_map	reference mask (already labelled)

Returns

mask (labelled)

5.3.1.4 partition_at_threshold()

```
def segmentation_utils.partition_at_threshold (
              img,
              thresh,
              square_size,
              min_size,
              title = None,
              show_plot = True )
```

After some smoothing, calculate new mask for img Steps:

- gaussian filter,
- remove small objects,
- greyscale morphological closing,
- euclidean distance transform

Parameters

img	type numpy.ndarray
thres	Threshold value
min_size	Minimum size of an organ in the mask
squaresize	For greyscale morphological closing
title	Title of plot
show_plot	Show plot True/False

Returns

New binary mask (same size as img)

5.3.1.5 save_partition()

```
def segmentation_utils.save_partition (
              mask,
              path )
```

5.4 segmenter_flask_API Namespace Reference

Functions

- def correctPartition ()

  Reveives index to slice/mask + coordinates--> returns partion corrected mask as PNG to client.
- def dcm2png ()

  Receive Paths to dcm files, converts them to PNG.
- def dcm2pngPreview ()

  Receive Paths to dcm file, converts it to PNG.
- def drawOnMask ()

  Reveives index to slice/mask + x,y coordinates --> returns drawn on mask as PNG to client.
- def extendLabels ()

  Reveives index to slice mask + label id --> returns highlighted mask as PNG to client.
- def getMask ()

  Reveives index to slice/mask --> returns mask stored on flask server as PNG to client.
- def highlightOrgan ()

  Reveives index of slice + x,y coordinates --> returns highlighted mask as PNG to client.
- def initialize ()

  Receive Paths to ordered slices, caches slices.
- def labelOrgan ()

  Reveives index to slice mask + label id --> returns highlighted mask as PNG to client.
- def postPickleGetMask ()

  Receives path to pickle file --> returns mask as PNG to client.
- def saveMasks ()

  Reveives path, saves all stored masks as pickle files to path --> returns output path.
- def updateMask ()

  Receives index of slice + slider values --> returns updated mask as PNG to client.

Variables

- app = Flask(__name__)
- int FLASK_PORT = 4041
- string FLAST_HOST = '0.0.0.0'
- host
- dictionary patients = {}

  Dictionary which will hold for each patientID a RadiPopGUI object.
- port

5.4.1 Function Documentation

5.4.1.1 correctPartition()

```
def segmenter_flask_API.correctPartition ( )
```

Reveives index to slice/mask + coordinates--> returns partion corrected mask as PNG to client.

Parameters

patientID	The ID of the patient
index	The index of the slice for which to mask should be updated
coordinates	array of coordinates of the form [x0,y0,x1,y1,...,xn,yn]

Returns

JSON: {mask: byte stream} mask as transparent PNG as byte stream

Note: The coordinates array will be used to generate a line that cuts/divides the segmented organs.

Example handling of return image stream in js:

```
fetch(RadiPOP_states.FLASK_SERVER+"/labelOrgan", {
    method: 'POST',
    headers: { 'Content-Type': 'application/json'},
    body: JSON.stringify(data)
})
.then(function(response){ return response.json();})
.then(function(data){
bytestring = data["mask"];
img = bytestring.split('\'')[1]
```

5.4.1.2 dcm2png()

```
def segmenter_flask_API.dcm2png ( )
```

Receive Paths to dcm files, converts them to PNG.

Included metadata IDs: "PatientID","PatientBirthDate","PatientName", "PatientAge","PatientSex","PatientName","↩
SliceThickness","StudyID","ContentDate"

Parameters

paths	An array with the paths to the slices
low_clip	lowest pixel value (Recommended:850)
high_clip	highest pixel value (Recommended: 1250)

Returns

JSON: {message: message, metadata: dictionary}

5.4.1.3 dcm2pngPreview()

```
def segmenter_flask_API.dcm2pngPreview ( )
```

Receive Paths to dcm file, converts it to PNG.

Included metadata IDs: "PatientID","PatientBirthDate","PatientName", "PatientAge","PatientSex","PatientName","↩ SliceThickness","StudyID","ContentDate"

Parameters

path	The paths to the dcm file
low_clip	lowest pixel value (Recommended:850)
high_clip	highest pixel value (Recommended: 1250)

Returns

JSON: {slice: slice stream} slice as PNG as byte stream

5.4.1.4 drawOnMask()

```
def segmenter_flask_API.drawOnMask ( )
```

Reveives index to slice/mask + x,y coordinates --> returns drawn on mask as PNG to client.

Parameters

patientID	The ID of the patient
index	The index of the slice for which to mask should be updated
coordinates	array of coordinates of the form [x0,y0,x1,y1,...,xn,yn]

Returns

JSON: {mask: byte stream} mask as transparent PNG as byte stream

Note: The coordinates array will be used to draw a line on the mask.

Example handling of return image stream in js:

```
fetch(RadiPOP_states.FLASK_SERVER+"/labelOrgan", {
    method: 'POST',
    headers: { 'Content-Type': 'application/json'},
    body: JSON.stringify(data)
})
.then(function(response){ return response.json();})
.then(function(data){
bytestring = data["mask"];
img = bytestring.split('\'')[1]
```

5.4.1.5 extendLabels()

```
def segmenter_flask_API.extendLabels ( )
```

Reveives index to slice mask + label id --> returns highlighted mask as PNG to client.

Parameters

patientID	The ID of the patient
index	The index of the slice for which to mask should be updated
left	Extend labeling up to index-left
right	Extend labeling up to index+right

Returns

JSON: {left_most_idx: idx, right_most_idx: idx}

Note: The left_most_idx and right_most_idx correspond to the indices of the slices up to which the labeling has been extended. After the the function has finished use the function API's function /getMask to update the masks in your GUI. Example in js:

```
for (let index=parseInt(data["left_most_idx"]); index<parseInt(data["right_most_idx"])+1; index++) {
    $.post(FLASK_SERVER+"/getMask", {
        javascript_data: JSON.stringify({patienID: id, index: idx})
    })
}
```

5.4.1.6 getMask()

```
def segmenter_flask_API.getMask ( )
```

Reveives index to slice/mask --> returns mask stored on flask server as PNG to client.

Parameters

patientID	The ID of the patient
index	The index of the slice for which to mask should be updated

Returns

JSON: {mask: byte stream} mask as transparent PNG as byte stream

Example handling of return image stream in js:

```
fetch(RadiPOP_states.FLASK_SERVER+"/labelOrgan", {
    method: 'POST',
    headers: { 'Content-Type': 'application/json'},
    body: JSON.stringify(data)
})
.then(function(response){ return response.json();})
.then(function(data){
bytestring = data["mask"];
img = bytestring.split('\'')[1]
```

5.4.1.7 highlightOrgan()

```
def segmenter_flask_API.highlightOrgan ( )
```

Reveives index of slice + x,y coordinates --> returns highlighted mask as PNG to client.

Parameters

patientID	The ID of the patient
index	The index of the slice for which to mask should be updated
x	relative x coordinates (0<=x<=1)
y	relative y coordinates (0<=y<=1)

Returns

JSON: {mask: byte stream} mask as transparent PNG as byte stream

Example handling of return image stream in js:

```
fetch(RadiPOP_states.FLASK_SERVER+"/labelOrgan", {
    method: 'POST',
    headers: { 'Content-Type': 'application/json'},
    body: JSON.stringify(data)
})
.then(function(response){ return response.json();})
.then(function(data){
bytestring = data["mask"];
img = bytestring.split('\'')[1]
```

5.4.1.8 initialize()

```
def segmenter_flask_API.initialize ( )
```

Receive Paths to ordered slices, caches slices.

Parameters

patientID	The ID of the patient. Must be unique!
paths	An array with the paths to the slices

Returns

JSON: {message: message}

Note: Paths to slices !!!MUST BE ORDERED!!! 0,1,..,n

5.4.1.9 labelOrgan()

```
def segmenter_flask_API.labelOrgan ( )
```

Reveives index to slice mask + label id --> returns highlighted mask as PNG to client.

Parameters

patientID	The ID of the patient
index	The index of the slice for which to mask should be updated
label	Label of organ (1 for liver, 2 for spleen, 0 nothing, >2 other organ)

Returns

JSON: {mask: byte stream} mask as transparent PNG as byte stream

Example handling of return image stream in js:

```
fetch(RadiPOP_states.FLASK_SERVER+"/labelOrgan", {
    method: ’POST’,
    headers: { ’Content-Type’: ’application/json’},
    body: JSON.stringify(data)
})
.then(function(response){ return response.json();})
.then(function(data){
bytestring = data["mask"];
img = bytestring.split(’\’’)[1]
```

5.4.1.10 postPickleGetMask()

```
def segmenter_flask_API.postPickleGetMask ( )
```

Receives path to pickle file --> returns mask as PNG to client.

Parameters

patientID	The ID of the patient
index	The index of the slice the mask refers to
path	The path to the mask file

Returns

JSON: {mask: byte stream} mask as transparent PNG as byte stream

Example handling of return image stream in js:

```
fetch(RadiPOP_states.FLASK_SERVER+"/labelOrgan", {
    method: 'POST',
    headers: { 'Content-Type': 'application/json'},
    body: JSON.stringify(data)
})
.then(function(response){ return response.json();})
.then(function(data){
bytestring = data["mask"];
img = bytestring.split('\'')[1]
```

5.4.1.11 saveMasks()

```
def segmenter_flask_API.saveMasks ( )
```

Reveives path, saves all stored masks as pickle files to path --> returns output path.

Parameters

patientID	The ID of the patient
index	The index of the slice for which to mask should be updated

Returns

JSON: {outdir: path} path/directory to which the pickle files were written

5.4.1.12 updateMask()

```
def segmenter_flask_API.updateMask ( )
```

Receives index of slice + slider values --> returns updated mask as PNG to client.

Parameters

patientID	The ID of the patient
index	The index of the slice for which to mask should be updated
liver-intensity-slider	Slider value for liver intesity
bone-intensity-slider	Slider value for bone intesity
blood-vessel-intensity-slider	Slider value for blood-vessel intesity

Returns

JSON: {mask: byte stream} mask as transparent PNG as byte stream

Example handling of return image stream in js:

```
fetch(RadiPOP_states.FLASK_SERVER+"/labelOrgan", {
    method: 'POST',
    headers: { 'Content-Type': 'application/json'},
    body: JSON.stringify(data)
})
.then(function(response){ return response.json();})
.then(function(data){
bytestring = data["mask"];
img = bytestring.split('\'')[1]
```

5.4.2 Variable Documentation

5.4.2.1 app

```
app = Flask(__name__)
```

5.4.2.2 FLASK_PORT

```
int FLASK_PORT = 4041
```

5.4.2.3 FLAST_HOST

```
FLAST_HOST = '0.0.0.0'
```

5.4.2.4 host

```
host
```

5.4.2.5 patients

```
dictionary patients = {}
```

Dictionary which will hold for each patientID a RadiPopGUI object.

Patients are added by the API's /initialize function

5.4.2.6 port

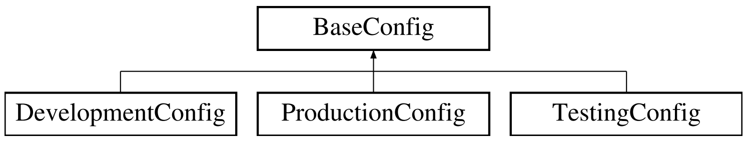
```
port
```

Chapter 6

Class Documentation

6.1 BaseConfig Class Reference

Inheritance diagram for BaseConfig:



Static Public Attributes

- SECRET_KEY = os.getenv('SECRET_KEY', 'REPLACE ME')

6.1.1 Member Data Documentation

6.1.1.1 SECRET_KEY

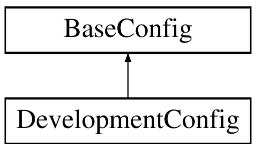
```
SECRET_KEY = os.getenv('SECRET_KEY', 'REPLACE ME')  [static]
```

The documentation for this class was generated from the following file:

- /Users/lorenz/Desktop/temp/radipop/electron-react/segmenter_flask_API/utility/config.py

6.2 DevelopmentConfig Class Reference

Inheritance diagram for DevelopmentConfig:



Static Public Attributes

- bool DEBUG = True

6.2.1 Member Data Documentation

6.2.1.1 DEBUG

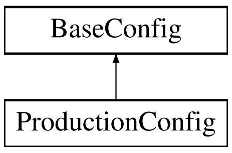
```
bool DEBUG = True  [static]
```

The documentation for this class was generated from the following file:

- /Users/lorenz/Desktop/temp/radipop/electron-react/segmenter_flask_API/utility/config.py

6.3 ProductionConfig Class Reference

Inheritance diagram for ProductionConfig:



Additional Inherited Members

The documentation for this class was generated from the following file:

- /Users/lorenz/Desktop/temp/radipop/electron-react/segmenter_flask_API/utility/config.py

6.4 RadiPopGUI Class Reference

Bridge between the flask server/API and the RadiPOP segmenter:

Public Member Functions

- def __init__ (self, patient_id)

    Class constructor:
- def extend_labels (self, cur_idx, left_extend, right_extend)

    Extend labels from current slice to neighbouring slices.
- def highlight_np_label_array_to_png (self, mask_np_array, highlight)

    Takes an numpy label array dim(n,m,1) and returns a RGBA pillow image dim(n,m,4)
- def highlightOrgan (self, slice_idx, x, y)

    Highlights regions of the mask (organs) that were clicked on by user.
- def labelMask (self, slice_idx, newlabel)

    Labels mask at given index at previously selected region.
- def save_masks (self, path)

    Saves masks as pickle file to given path.
- def slice_dim (self, index)

    Returns dimensions of slice images (x,y)

Static Public Member Functions

- def clip_dcm (dcm_file, clip_low=850, clip_high=1250)

    Read dicom image (.dcm), clips it and returns it as a grey scale PNG.
- def color_mask (mask_np_array)

    Takes an numpy label array dim(n,m,1) and returns a color mask dim(n,m,4)
- def correct_partition (image)

    Convert PNG mask to 1 channelled label mask.
- def create_image_stream (img)

    Returns base64 bytestream for given input image.
- def draw_on_image (coordinates, img, correctionMode=False)

    Draws a point or lines on given PNG image.
- def extract_metadata_from_dcm (dcm_file)

    Read dicom image (.dcm) and extract metadata Extracted metadata IDs: "PatientID","PatientBirthDate","Patient←
    Name", "PatientAge","PatientSex","PatientName","SliceThickness","StudyID","ContentDate".
- def find_organs (img, bones_thresh, blood_vessels_thresh, liver_thresh)

    Uses three threshold values to find organs.
- def np_label_array_to_png (mask_np_array)

    Takes an numpy label array dim(n,m,1) and returns a RGBA pillow image dim(n,m,4)
- def read_pickle_mask_to_np_label_array (path)

    Opens mask pickle file and returns it as a np.array.
- def readPNG (path)

    Reads an image (e.g.
- def update_mask_upon_slider_change (image, bone_intensity, blood_vessel_intensity, liver_intensity)

    Sets threshold for liver intensity.
- def writePillow2PNG (img, outfile)

Public Attributes

- last_clicked_x

    The x-coordinate of the region that was last selected/clicked on.
- last_clicked_y

    The y-coordinate of the region that was last selected/clicked on.
- masks

    Dictionary: key: mask index, value: mask numpy array dim(n,m,1)
- pathToSlices

    List contaning the path to the png slice files
- patient_id

    ID of the patient.
- selected_pixel_value_of_label_mask

    The label of the region that was last selected/clicked on.
- sliceCache

    Dictionary: key: slice index, value: slice PNG.

Static Public Attributes

- list LABELS = [SPLEEN_LABEL,SPLEEN_LABEL]

    list with labels
- int LIVER_LABEL = 1

    Regions in mask with this label value are considered liver.
- int SPLEEN_LABEL = 2

    Regions in mask with this label value are considered spleen.

6.4.1 Detailed Description

Bridge between the flask server/API and the RadiPOP segmenter:

Note:

- For each patient one object of this class should be instantiated.
- An object of this class contains all the slices and masks associated with the patient
- This class also contains static utility functions
- This class is the bridge between the flask server/API and the RadiPOP segmenter (segmentations_utils)

6.4.2 Constructor & Destructor Documentation

6.4.2.1 __init__()

```
def __init__ (
               self,
               patient_id )
```

Class constructor:

Parameters

patient←→ _id	The ID of the patient. Must be unique!

Note:

- For each patient one object of this class should be instantiated.
- An object of this class contains all the slices and masks associated with the patient

6.4.3 Member Function Documentation

6.4.3.1 clip_dcm()

```
def clip_dcm (
              dcm_file,
              clip_low = 850,
              clip_high = 1250 )  [static]
```

Read dicom image (.dcm), clips it and returns it as a grey scale PNG.

```
    @param dcm_file Path to .dcm file
    @param clip_low lowest pixel value
    @param clip_high highest pixel value

    @return tuple(L (grey scale) Pillow Image, slice index)
```

6.4.3.2 color_mask()

```
def color_mask (
              mask_np_array )  [static]
```

Takes an numpy label array dim(n,m,1) and returns a color mask dim(n,m,4)

Parameters

mask_np_array	numpy label array dim(n,m,1)

Returns

color mask image dim(n,m,4) --> RGBA

```
- Default liver color is red (LIVER_LABEL)
- Default spleen color is blue (SPLEEN_LABEL)
- Default for other regions is green
```

6.4.3.3 correct_partition()

```
def correct_partition (
              image )  [static]
```

Convert PNG mask to 1 channelled label mask.

Parameters

image	Image (e.g.: RGBA PNG pillow)

Returns

label mask

6.4.3.4 create_image_stream()

```
def create_image_stream (
              img )  [static]
```

Returns base64 bytestream for given input image.

Parameters

img	Image (e.g. Pillow PNG)

Returns

img_base64 stream

6.4.3.5 draw_on_image()

```
def draw_on_image (
              coordinates,
              img,
              correctionMode = False )  [static]
```

Draws a point or lines on given PNG image.

Parameters

coordinates	List of the form [x0,y0,x1,y1,...,xn,yn]
img	Image (e.g.: RGBA PNG pillow)
correctionMode	True/False If true the drawn line acts as an eraser (dividing organs). If false a colored line is drawn on the image. DEFAULT: False

The modifications are made directly on the provided image. No return value

6.4.3.6 extend_labels()

```
def extend_labels (
              self,
              cur_idx,
              left_extend,
              right_extend )
```

Extend labels from current slice to neighbouring slices.

Parameters

cur_idx	Index of reference slice
left_extend	Number of slices to extend the labeling to below reference slice
right_extend	Number of slices to extend the labeling to above reference slice

Returns

(left_most_idx,right_most_idx) The index of the outermost slices to which the labeling was extended

Extends labels left and right from current slice How far the labels are extended is taken from left and right expansion bounds

6.4.3.7 extract_metadata_from_dcm()

```
def extract_metadata_from_dcm (
              dcm_file ) [static]
```

Read dicom image (.dcm) and extract metadata Extracted metadata IDs: "PatientID","PatientBirthDate","Patient←
Name", "PatientAge","PatientSex","PatientName","SliceThickness","StudyID","ContentDate".

Parameters

dcm_file	Path to .dcm file

Returns

dictionary with metadata information

6.4.3.8 find_organs()

```
def find_organs (
              img,
              bones_thresh,
              blood_vessels_thresh,
              liver_thresh )  [static]
```

Uses three threshold values to find organs.

Parameters

image	Image (e.g.: RGBA PNG pillow)
bones_thresh	bones threshold: [threshold, square_size , min_size]
blood_vessels_thresh	blood vessels threshold: [threshold, square_size , min_size]
liver_thresh	liver threshold: [threshold, square_size , min_size]

Returns

New labelled mask (same size as slice)

```
The algorithm is:
    - After some smoothing, remove every pixel above bones threshold from the image.
    - After some smoothing, remove every pixel above blood vessel threshold.
    - Everything that then remains above liver threshold is called an organ.
    - Use contiguous area divisions to roughly split into organs.
```

6.4.3.9 highlight_np_label_array_to_png()

```
def highlight_np_label_array_to_png (
              self,
              mask_np_array,
              highlight )
```

Takes an numpy label array dim(n,m,1) and returns a RGBA pillow image dim(n,m,4)

Parameters

mask_np_array	numpy label array dim(n,m,1) @highlight Highlight regions where highlight==label in brighter color

Returns

RGBA pillow image dim(n,m,4)

Turns a labelled mask into a transparent (RGBA) PNG.

- Default liver color is red (LIVER_LABEL)
- Default spleen color is blue (SPLEEN_LABEL)
- Default for other regions is green

6.4.3.10 highlightOrgan()

```
def highlightOrgan (
              self,
              slice_idx,
              x,
              y )
```

Highlights regions of the mask (organs) that were clicked on by user.

Parameters

slice_idx	Index of mask/slice to be highlighted
x	x-coordinate of slice (in pixels)
y	y-coordinate of slice (in pixels)

Returns

tuple(Mask where the region specified by x and y is highlighted in brigther colors, pixel_value)

6.4.3.11 labelMask()

```
def labelMask (
              self,
              slice_idx,
              newlabel )
```

Labels mask at given index at previously selected region.

Parameters

slice_idx	Index of mask/slice to be labelled
label	Label to be assigned to previously selected region (either LIVER_LABEL or SPLEEN_LABEL or -1 (for removeing label))

Returns

Mask with new label

Note: It is expected that the client has before highlighted an organ with the function self.highlightOrgan(). This determines the region/organ that will be labelled with label.

6.4.3.12 np_label_array_to_png()

```
def np_label_array_to_png (
              mask_np_array )  [static]
```

Takes an numpy label array dim(n,m,1) and returns a RGBA pillow image dim(n,m,4)

Parameters

mask_np_array	numpy label array dim(n,m,1) @highlight Highlight regions where highlight==label in brighter color

Returns

RGBA pillow image dim(n,m,4)

Turns a labelled mask into a transparent (RGBA) PNG.

- Default liver color is red (LIVER_LABEL)
- Default spleen color is blue (SPLEEN_LABEL)
- Default for other regions is green

6.4.3.13 read_pickle_mask_to_np_label_array()

```
def read_pickle_mask_to_np_label_array (
              path )  [static]
```

Opens mask pickle file and returns it as a np.array.

Parameters

path	Path to pickle file

Returns

numpy array of mask

6.4.3.14 readPNG()

```
def readPNG (
              path )  [static]
```

Reads an image (e.g.

: PNG file) to numpy array

Parameters

path	Path to image

Returns

numpy array of image

6.4.3.15 save_masks()

```
def save_masks (
              self,
              path )
```

Saves masks as pickle file to given path.

Parameters

path	Path to which mask files should be written

Masks are written as .p (pickle) files

6.4.3.16 slice_dim()

```
def slice_dim (
              self,
              index )
```

Returns dimensions of slice images (x,y)

Returns

(x,y) Dimensions of slices

6.4.3.17 update_mask_upon_slider_change()

```
def update_mask_upon_slider_change (
              image,
              bone_intensity,
              blood_vessel_intensity,
              liver_intensity )  [static]
```

Sets threshold for liver intensity.

Parameters

image	Image (e.g.: RGBA PNG pillow)
bones_thresh	bones threshold
blood_vessels_thresh	blood vessels threshold
liver_thresh	liver threshold

Returns

New labelled mask

Steps:

- Sets thresholds for current slice
- Runs self.find_organs on current slice with new thresholds

6.4.3.18 writePillow2PNG()

```
def writePillow2PNG (
              img,
              outfile )  [static]
```

6.4.4 Member Data Documentation

6.4.4.1 LABELS

```
list LABELS = [SPLEEN_LABEL,SPLEEN_LABEL]  [static]
```

list with labels

6.4.4.2 last_clicked_x

```
last_clicked_x
```

The x-coordinate of the region that was last selected/clicked on.

6.4.4.3 last_clicked_y

```
last_clicked_y
```

The y-coordinate of the region that was last selected/clicked on.

6.4.4.4 LIVER_LABEL

```
int LIVER_LABEL = 1  [static]
```

Regions in mask with this label value are considered liver.

6.4.4.5 masks

```
masks
```

Dictionary: key: mask index, value: mask numpy array dim(n,m,1)

6.4.4.6 pathToSlices

```
pathToSlices
```

List contaning the path to the png slice files

6.4.4.7 patient_id

```
patient_id
```

ID of the patient.

6.4.4.8 selected_pixel_value_of_label_mask

```
selected_pixel_value_of_label_mask
```

The label of the region that was last selected/clicked on.

6.4.4.9 sliceCache

```
sliceCache
```

Dictionary: key: slice index, value: slice PNG.

6.4.4.10 SPLEEN_LABEL

```
int SPLEEN_LABEL = 2  [static]
```

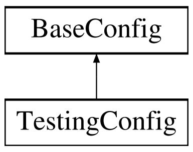
Regions in mask with this label value are considered spleen.

The documentation for this class was generated from the following file:

- /Users/lorenz/Desktop/temp/radipop/electron-react/segmenter_flask_API/utility/radipop_gui.py

6.5 TestingConfig Class Reference

Inheritance diagram for TestingConfig:



Static Public Attributes

- bool DEBUG = True

6.5.1 Member Data Documentation

6.5.1.1 DEBUG

```
bool DEBUG = True  [static]
```

The documentation for this class was generated from the following file:

- /Users/lorenz/Desktop/temp/radipop/electron-react/segmenter_flask_API/utility/config.py

Chapter 7

File Documentation

7.1 /Users/lorenz/Desktop/temp/radipop/electron-react/segmenter_↩ flask_API/segmenter_flask_API.py File Reference

Namespaces

- namespace segmenter_flask_API

Functions

- def correctPartition ()

  Reveives index to slice/mask + coordinates--> returns partion corrected mask as PNG to client.
- def dcm2png ()

  Receive Paths to dcm files, converts them to PNG.
- def dcm2pngPreview ()

  Receive Paths to dcm file, converts it to PNG.
- def drawOnMask ()

  Reveives index to slice/mask + x,y coordinates --> returns drawn on mask as PNG to client.
- def extendLabels ()

  Reveives index to slice mask + label id --> returns highlighted mask as PNG to client.
- def getMask ()

  Reveives index to slice/mask --> returns mask stored on flask server as PNG to client.
- def highlightOrgan ()

  Reveives index of slice + x,y coordinates --> returns highlighted mask as PNG to client.
- def initialize ()

  Receive Paths to ordered slices, caches slices.
- def labelOrgan ()

  Reveives index to slice mask + label id --> returns highlighted mask as PNG to client.
- def postPickleGetMask ()

  Receives path to pickle file --> returns mask as PNG to client.
- def saveMasks ()

  Reveives path, saves all stored masks as pickle files to path --> returns output path.
- def updateMask ()

  Receives index of slice + slider values --> returns updated mask as PNG to client.

Variables

- app = Flask(__name__)
- int FLASK_PORT = 4041
- string FLAST_HOST = '0.0.0.0'
- host
- dictionary patients = {}

    Dictionary which will hold for each patientID a RadiPopGUI object.
- port

7.2 /Users/lorenz/Desktop/temp/radipop/electron-react/segmenter_↩ flask_API/utility/config.py File Reference

Classes

- class BaseConfig
- class DevelopmentConfig
- class ProductionConfig
- class TestingConfig

Namespaces

- namespace config

7.3 /Users/lorenz/Desktop/temp/radipop/electron-react/segmenter_↩ flask_API/utility/radipop_gui.py File Reference

Classes

- class RadiPopGUI

    Bridge between the flask server/API and the RadiPOP segmenter:

Namespaces

- namespace radipop_gui

7.4 /Users/lorenz/Desktop/temp/radipop/electron-react/segmenter_↩ flask_API/utility/segmentation_utils.py File Reference

Namespaces

- namespace segmentation_utils

Functions

- def add_sobel_edges (mask, img)

  Smooth edges Steps:
- def draw_region_outlines (mask)

  Color the mask light green.
- def guess_bounds (regions_map, reference_map)

  Guess the bounds/labels of the region based on reference region Guess the bounds/labels of the region based on reference region (generally neighboring slice).
- def partition_at_threshold (img, thresh, square_size, min_size, title=None, show_plot=True)

  After some smoothing, calculate new mask for img Steps:
- def save_partition (mask, path)

Index