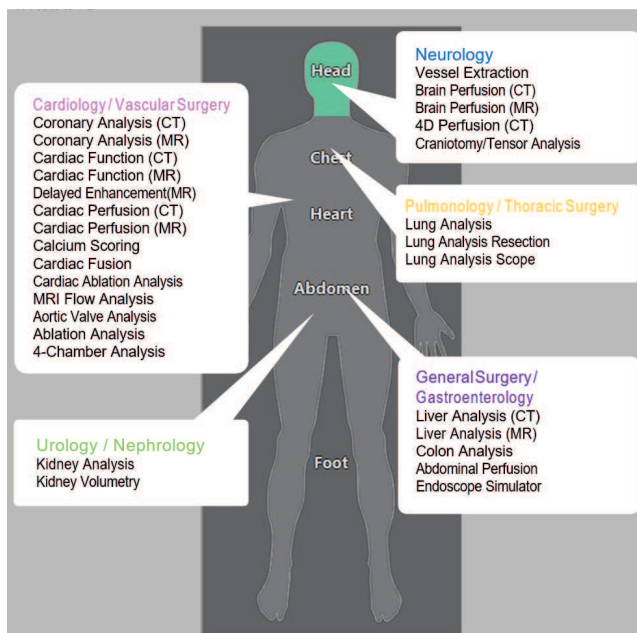


Overview

Synapse® 3D provides radiologists, cardiologists, surgeons, researchers and other clinical professionals a comprehensive collection of application tools for advanced image visualisation and analysis. The general tools provide day-to-day 2D, 3D and 4D image analyses while the clinical tools provide comprehensive clinically-specific tools that aid trained clinical users to interpret, report and provide treatment planning analysis. Most tools can be used alone or combined seamlessly with other application tools for additional advanced clinical workflows. Note: Synapse 3D is not intended to use with or for the primary diagnostic interpretation of mammography images.

Clinical Tools



General Tools

| | | | |
|--------------|--------------------|-----------------|-----------------|
| 2D Viewer | 3D Viewer | 4D Viewer | 3D Comparison |
| Dynamic Data | Fusion | NM Viewer | Slicer |
| 3D Composer | Sector MPR | Combination | Sector MPR |
| ADC Map | 2D Fusion | Tx Map | General CPR |
| MPR Reformat | IVIM | RECIST Tracker | PERCIST Tracker |
| Dental MPR | Breast Analysis MR | 2D Fat Analysis | 3D Fat Analysis |

Key Benefits

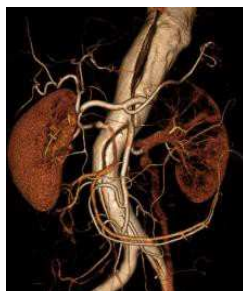
- High image quality for clinical confidence
- Scalable platforms and options
- Comprehensive and clinically-relevant analysis software
- Enterprise access for convenience and efficiency

General Functions

3D Viewer

3D Viewer is a comprehensive tool that allows orthogonal and oblique analysis of CT, MR, NM and PT data. Main functions include:

- Macros – allows users to save and play workflows
- 2D and 3D display of cross sections
- Body part recognition, extraction or removal of the following:
 - Bone extraction or removal (CT)
 - Bed removal (automatic)
 - Brain extraction (CT or MR)
 - Cerebra Vessels Separation (CT)
 - Heart extraction (CT)
 - Colon extraction (CT)
 - Lung and Bronchus Extractions (CT)
 - Liver Extraction (CT)
 - Tumor Extraction (CT or MRI)
 - Vessel Extraction (CT)
 - Hip Joint Extractions (CT)
 - Spine Extraction (CT)
 - Surface Extraction (CT)
 - Bone Separation (CT)
 - Tube Extraction (CT)
 - Cerebral Vessels A/V separation (CT)
 - Pulmonary Artery/Vein Extraction (CT)
 - Spinal Cord Extraction (CT)
- Inserts image plane – inserts 2D cross section planes into 3D view and synchronizes with 2D cross section view
- Report – outputs observations and images to report
- Launches General CPR Tool for vessel analysis
- 3D Reformats including
 - Volume rendering (VR)
 - Shaded surface rendering (SSD)
 - Maximum intensity projection (MIP)
 - Minimum intensity projection (MinIP)
 - Ray summation (RaySum)
- VR Colour template
- Mask editing : 8 editing tools
- Object extraction and removal using erosion, dilation, threshold, etc.
- Multi-mask up to 12 layers
- Image Filter : 3 smoothing filters, Contour smoothing,
- ROI editing



- Extra Mask storage 8 layers
 - Ability to reverse masks
 - ADD, SUB, AND, XOR operations

2D Fusion

2D Fusion is useful for users wishing to fuse multi-modality, multi-dimensional data for purposes such as breast or prostate MRI or police science applications. Viewer superimposes two 2D or 3D images of same or different modality. Main functions include:

- Fuse 2D or 3D images
- Save created fusion images as DICOM file

MPR Reformat

MPR Reformat allows users to create a plane along a straight line or in the shape of a fan on 2D images, allowing the user to print or save the plane as a new image. The user is able to link directly to 3D Viewer for additional analysis.

3D Comparison

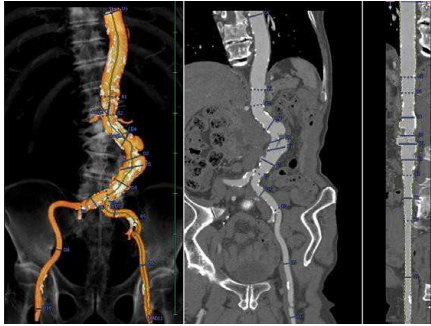
3D Comparison is a tool that allows direct side-by-side comparison and synchronization of multiple 3D data. Main functions include:

- Simultaneous display of images in multiple series
- Synchronization using "Image Intelligence"
- Synchronization of various operations between images including measurements and annotations and histograms
- Display of the average image

General CPR

General CPR is an application tool designed to visualize curved planar reconstructions (CPR), useful for clinical analysis of blood vessels (aorta, carotid, etc.) and other tubular structures. Main functions include:

- Display of axial, sagittal, and coronal images
- CPR path creation
- Modification of CPR center line and contour
- CPR image display
- Display of vessels started from a different application
- Measurement of stenosis ratios
- Color-coded display from color mapping analysis
- Virtual stent graft with TAA, AAA and TAVR templates
- Display of catheter diameter rate and curve angles for procedure planning
- Panorama display
- Saving CPR and orthogonal plane images



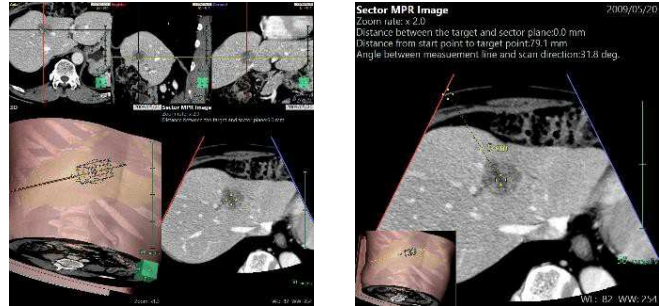
The software allows display single or multiphasic studies allowing the radiologist to visualize probe and puncture placement. Main functions include:

- Display of sector MPR images
- Cine playback of multiphasic MPR images
- Display of pseudo light decay shading for realistic visualization
- Measurements on sector MPR images for puncture planning

Tx Map

Tx Map provides radiologist calculations derived from the MR signal values. Clinical utility of T2 assessment include cartilage and collagen analysis. T2* is useful to determine iron deposits and distribution. Main functions include:

- Display the T2* Map
- Measure T2* values in ROIs
- Monitor the T2* Map time intensity curve
- Pseudo-color display of T2* Map images

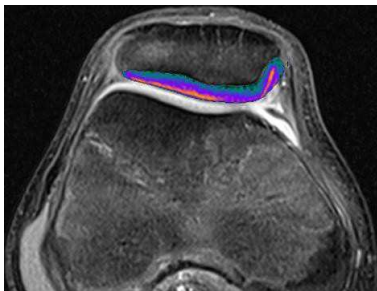


Combination

Combination is an application tool designed to combine multiple series to a single series, especially useful for visualizing multiple spine or vessel series as a single image. Images do not need to overlap, but should be captured at continuing positions. Main functions include:

- Display of orthogonal sections of MIP that are created by combining different series
- Save DICOM images after combining

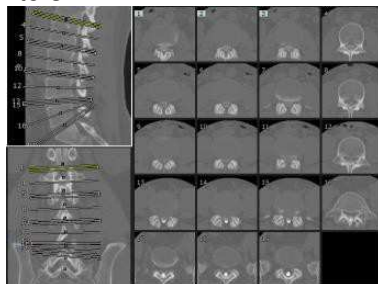
Slicer



Slicer is an application tool useful for reconstructing slice data through various translations, especially helpful for complex spinal analysis such as scoliosis treatment planning.

Main functions include:

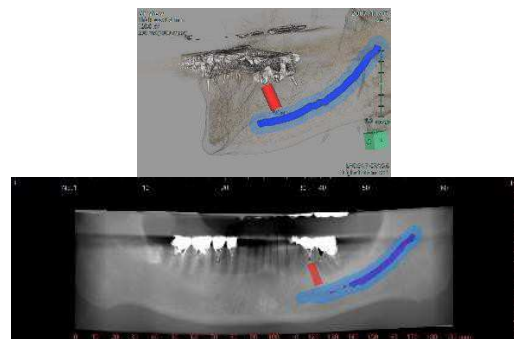
- Display slice images
- Reformat and reconstruction options
- Specialized layouts for slice visualization
- Spine detection with spine labeling
- Output slice images to DICOM or Windows printers



Dental MPR

Dental MPR is a useful tool for radiologists to create and view panoramic images of teeth and alveolar bones, useful for implant planning. Main functions include:

- Display cross sections
- Display panorama images of alveolar bones
- Virtual implant operations
- Output to DICOM or Windows printer



Sector MPR

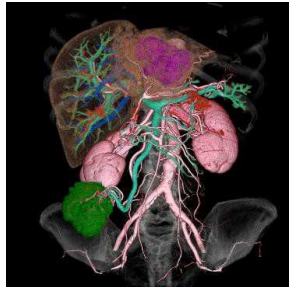
Sector MPR is a tool that is used to help radiologists simulate ultrasound examinations, particularly for aspiration and biopsy planning.

3D Compositor

Compositor is an application tool helpful to radiologists and surgeons, especially for complex surgical interventions. The software allows the fusion of up to five series in the same space to

display the volume rendering of combined images. Example uses include displaying CT images of the liver exposed at multiple time phases, CT images of bone fused with MRI images of soft tissue or MRA images of artery with phase contrast of vein. Main functions include:

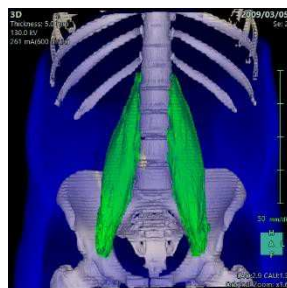
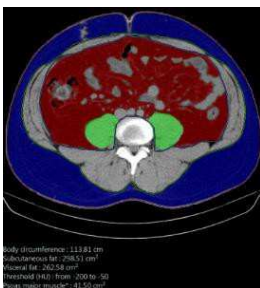
- Fusion of up to five 3D series in the same space and display the 3D volume rendered images
- Automatic and manual registration of images



Fat Analysis (2D and 3D)

Synapse 3D Fat Analysis is a useful tool for radiologists, oncologists, surgeons and endocrinologists. The key benefit of Synapse 3D Fat Analysis is the calculation of subcutaneous fat, visceral fat and psoas muscle volume, useful for monitoring sarcopenia, cachexia and response to chemotherapy. Main functions include:

- Three-dimensional analysis and display of subcutaneous fat and visceral fat, current and prior
- Calculation of the area of subcutaneous fat and visceral fat for each slice Extraction of measure psoas muscle with area/volume calculation
- Calculation of circumference of the body surface, fat ratio, BMI

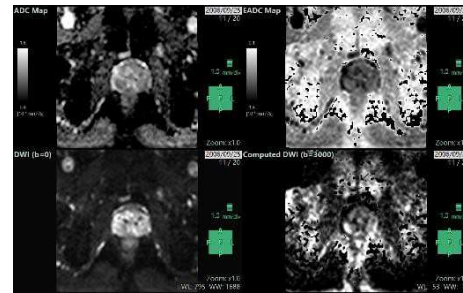


ADC Viewer

ADC Viewer is a useful tool for radiologists and neurologists. In ADC Viewer, apparent diffusion coefficients are calculated and visualized from information on signal values of diffusion-weighted images collected with MR. Main functions include:

- Display ADC Map and EADC Map images
- Measure ADC values in ROIs
- Pseudo-colour display of ADC Map images
- Blending display of ADC Map images and background images
- Automatic/manual registration of ADC Map

- images and background images
- Computed DWI images

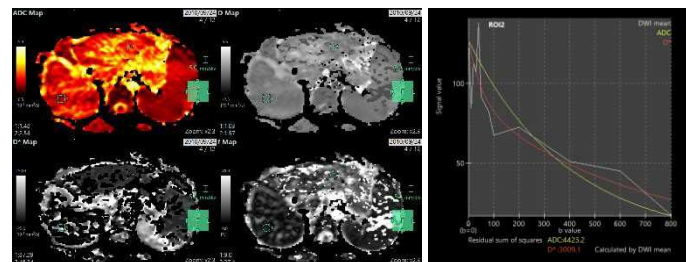


IVIM

IVIM is a useful tool for Radiologists and physician. In IVIM apparent diffusion coefficients and diffusion coefficients for which the perfusion has been considered are calculated simultaneously and visualized from information on signal values of diffusion-weighted images collected with MR.

Main functions include:

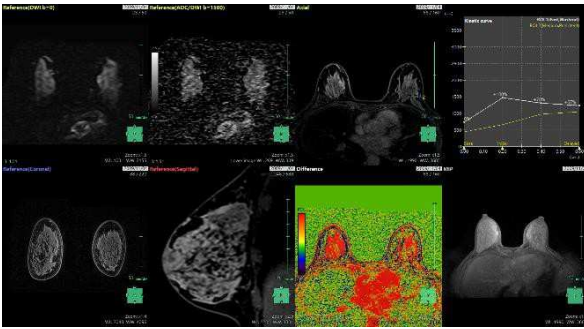
- Display ADC Map, EADC Map, D Map, D*Map, and f Map images
- Measure ADC values, D values, D*values, and f values in ROIs
- Pseudo-color display of ADC Map, EADC Map, D Map, D*Map, and f Map images
- Automatic and manual registration of images
- Blending display of ADC Map, EADC Map, D map, D* Map, f Map, images and background images



Breast Analysis (MR)

In Breast Analysis, you can observe parameter images from dynamic mammary gland MR data, as well as kinetic curves. The main functions include:

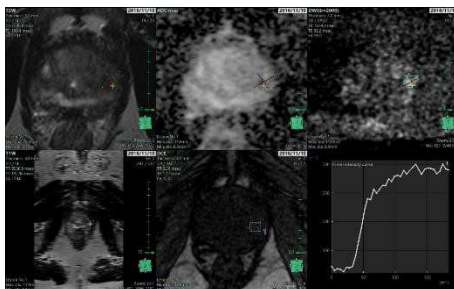
- Create parameter images
- Create kinetic curves
- ROI measurement
- Display related images in a reference view
- Output reports conforming to BI-RADS™



Prostate Viewer

In Prostate Viewer, you can observe multiple parametric MRI in Pelvis FOV. This tool improves your work-flow for PI-RADS™ reporting. The main functions include :

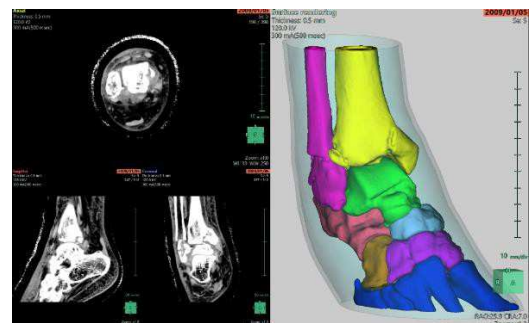
- Semi-automatic volume measurement of prostate
- PSA density (ng/ml/cm³) calculation
- Display T1, T2, ADC Map, DWI,DCE, Time intensity curve.
- Tumor extraction
- Tumor measurement of Max. Min. diameter and volume.
- ROI measurement of ADC and DCE
- PI-RADS™ Category tool configured with report



Surface Viewer

Surface Viewer allows to create polygon mesh display from surface determined by threshold processing of volume data. This tool is useful for creating STL file and 3D PDF file for 3D printing, reporting. The main functions include:

- 3D VR mask edit
- Create mesh model
- Mesh edit
- Position registration
- Surface mesh calculation
- Arrange primitive surface mesh
- Export as STL. file
- Export as 3D PDF file



Neurology

Vessel Extraction

Vessel Extraction is a useful tool for radiologists and neurologists. In Vessel Extraction, the blood vessel region is semi-automatically extracted from the post-contrast image by removing the bone region using the pre-contrast image. Main functions include:

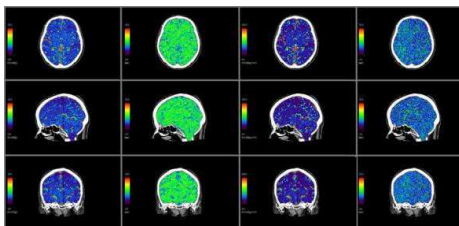
- Display three planes (axial, sagittal, and coronal) and respective 3D images
- Display of artery, vein and calcium
- Automatic and manual registration of images
- Displays of the brain vessel extraction result as 3D, MIP or Fusion
- Stereoscopic display using two 3D images with differing angles



Brain Perfusion CT

Brain Perfusion CT is a useful tool for radiologists and neurologists. The software analyses the changes in cerebral blood flow from the dynamic scan images of CT for the same slice and calculates CBV (Cerebral Blood Volume), CBF (Cerebral Blood Flow), MTT (Mean Transient Time), and TTP (Time to Peak) from the analysis results. Main functions include:

- Analysis of 3D or 4D brain perfusion CT data
- Automatic registration
- Position detection and correction of arteries and veins
- Calculation of CBV, CBF, MTT, and TTP
- Analysis result list display



Brain Perfusion MR

Brain Perfusion MR is a useful tool for radiologists and neurologists. The software analyses the changes in cerebral blood flow from the dynamic scan images of CT for the same slice and calculates CBV (Cerebral Blood Volume), CBF (Cerebral Blood Flow), MTT (Mean Transient Time), and TTP (Time to Peak) from the analysis results. Main functions include:

- Automatic registration
- Position detection and correction of arteries

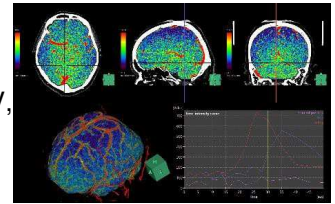
and veins

- Calculation of CBV, CBF, MTT, and TTP
- Analysis result list display
- Blend with the ADC Map

4D Perfusion

4D perfusion is a useful tool for radiologists and neurologists. The software analyzes cerebral blood flow over time (in 4D), using multi-phase 3D whole-brain images. CBV (cerebral blood volume), CBF (cerebral blood flow), MTT (mean transient time), and TTP (time to peak) are calculated as analysis results. Main functions include:

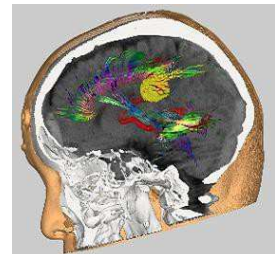
- Position detection and correction of arteries and veins
- Calculation of CBV, CBF, MTT, and TTP
- Analysis result list display



Tensor Analysis with Craniotomy

Tensor Analysis with Craniotomy is a useful tool for radiologists, neurologists and neurosurgeons. It enables tensor analysis from diffusion-weighted MR images and tractography-based extraction and observation of white matter tractography pathways. Additional images (mainly CT images) can be loaded, and skin, bone, brain parenchyma, tumor, and cerebral vessels can be extracted in craniotomy simulations. Main functions include:

- Displays Fractional Anisotropy (FA) and diffusion colour map images
- Extract and observe white matter tractography
- Calculate FA value, number of fibres, area, and volume in the specified ROI
- Simultaneous display of white matter tractography and skin, bone, brain parenchyma, tumor, artery, vein, and other regions.
- Simultaneous display of DWI and ADC, useful to differentiate between malignant and benign tumors.³
- Craniotomy simulations involving cutting of skin and bone regions, brain surface clipping by depth, and tumor plane clipping
- Automatic and manual data registration options



Cardiology

Coronary Analysis CT

Coronary Analysis CT is a useful tool for cardiologists and radiologists. Using the software, the user is able to extract the path of the target blood vessels and perform evaluation of the coronary arteries. Main functions include:

- Display of axial, sagittal, and coronal images
- Automatic extraction of the heart
- Automatic extraction of coronary arteries
- Color-coded display of plaque (hard plaque and soft plaque)
- Measure coronary artery stenosis ratios
- Virtual stent graft
- Display coronary artery CPR images
- Save coronary artery CPR and orthogonal plane images
- Modify coronary artery paths and heart region
- Various types of 3D displays for observation of coronary arteries
- Simultaneous display of CT images in direct comparison to related XA images

Cardiac Function CT

Cardiac Function CT is a useful tool for cardiologists and radiologists. The software allows cardiac function analysis by obtaining the contour of ventricle and myocardium from CT images constructed by the multiple time phases. Cardiac Function CT calculates ejection fraction, end-diastolic volume, end-systolic volume, stroke volume etc. Main Functions include:

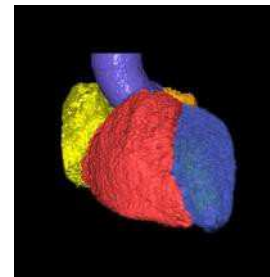
- Automatic extraction of the heart
- Automatic extraction of the contours of ventricle and myocardium which are required cardiac function analysis
- Display the long axis and short axis images of the heart
- 3D mapping display of analysis results
- Volume measurement and display of the bull's eye for ventricle and myocardium
- Measuring of various cardiac function evaluations including end- diastolic volume, end-systolic volume, end-diastolic ventricular index, end-systolic ventricular index, stroke volume, cardiac output, peak filling rate, time to peak filling, cardiac index, ejection fraction, body surface area, heart rate, and myocardial mass
- Output cine movies

4-Chamber Analysis

4-Chamber Analysis is a useful tool for cardiologists and radiologists. The software extracts left and right ventricles, atria, and myocardium region from CT images consisting of the multiple time phases, calculates cardiac

function parameters such as ventricular ejection fraction, and enables observation of transitions in ventricle and atrial volume. Main functions include:

- Pre-rendering and automatic extraction of ventricular, atrial, and myocardial regions
- 3D surface rendering of ventricular, atrial, and myocardial regions, saves to .stl format for 3D printing
- Automatic extraction of the contours of ventricle and myocardium which are required cardiac function analysis
- Display the long axis and short axis images of the heart
- 3D mapping display of analysis results
- Volume measurement and bull's eye display of ventricle, atrium, and myocardium
- Measuring of various cardiac function evaluations including end- diastolic volume, end-systolic volume, end-diastolic ventricular index, end-systolic ventricular index, stroke volume, cardiac output, peak filling rate, time to peak filling, cardiac index, ejection fraction, body surface area, heart rate, and myocardial mass
- Output cine movies
- Non-rigid phase registration



Calcium Scoring

Calcium Scoring is a useful tool for cardiologists and radiologists. The software displays the plaque area of the coronary artery by color and calculates the quantitative value of plaque by using the Agatston score method. Main functions include:

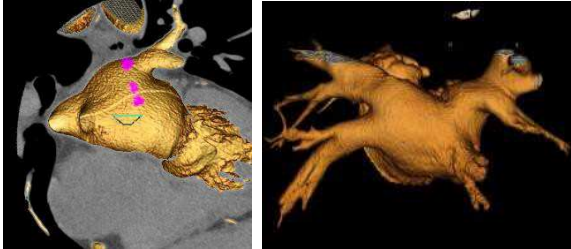
- Automatic extraction of the heart
- Calculation of the Agatston score based on the Agatston score method
- Threshold value setting for scoring
- Specification for the plaque area in 2D and 3D images

Cardiac Ablation Analysis

Cardiac Ablation Analysis is a useful tool for cardiologists. The software extracts left and right ventricles, atria, and myocardium regions from CT images consisting of the multiple time phases. The software also extracts the pulmonary vein based on the left atrium region, in pre-operation simulation for ablation, and in post-operation observation. Main functions include:

- Automatic extraction of the heart
- Automatic extraction of ventricular, atrial, and myocardial regions

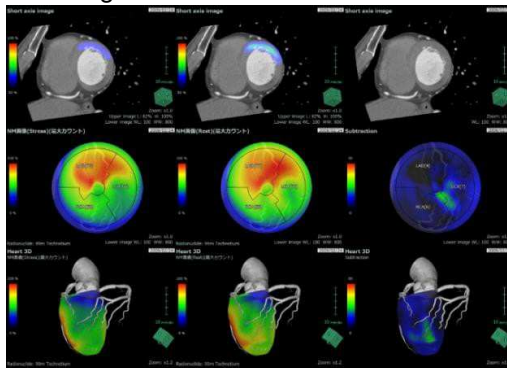
- Automatic pulmonary vein extraction
- Extraction and visualization of esophagus for positioning
- 3D view inside the pulmonary vein
- Virtual endoscopic view of inside the pulmonary vein



Cardiac Fusion

Cardiac Fusion is a useful tool for cardiologists and radiologists for viewing fusion of cardiac anatomy and functional analysis. Main functions include:

- Display the axial, sagittal, and coronal plane images
- Overlay display of a functional image and a structural image
- Automatic and manual registration of images



Aortic Valve Analysis (TAVR)

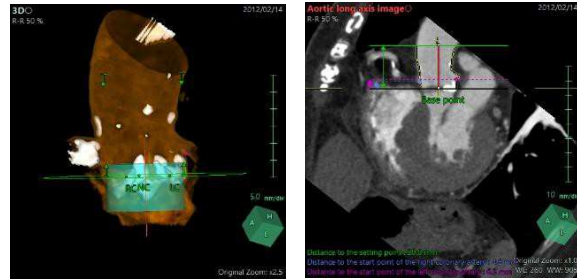
Aortic Valve Analysis is useful for cardiologists in preparation for Trans-catheter Aortic Valve Replacement (TAVR) planning. The software measures various aspects of the vicinity of the aortic valve by extracting the heart and aorta regions from the input CT images. Aortic Valve Analysis also allows the confirmation of the size of the aorta and the performance and calcification of the aortic valve to support an aortic valve replacement.

Main functions include:

- Pre-rendering with automatic extraction of the heart and aorta regions
- Allows single or multi-phase data
- Automatic detection of the contour of the aorta
- Measurements include circumference, area, major and minor axis, average diameter and area, distance to right and left coronary

artery, and plaque volumes

- Trans-apical approach displays and measurements
- Coronary cusp labelling
- Virtual valves with pre-sets
- Output cine movies and data to report summary



Coronary Analysis MR

Coronary Analysis MR is a useful tool for cardiologists and radiologists. The software uses MR images to extract the path of the target blood vessels and performs evaluation of the coronary arteries. Main functions include:

- Display axial, sagittal, and coronal images
- Automatic extraction of coronary arteries
- Colour mapping analysis
- Measure coronary artery stenosis ratios
- Virtual stent graft
- Display coronary artery CPR images
- Save coronary artery CPR and orthogonal plane images
- Modify coronary artery paths and heart region
- Various types of 3D displays for observation of coronary arteries

Cardiac Function MR

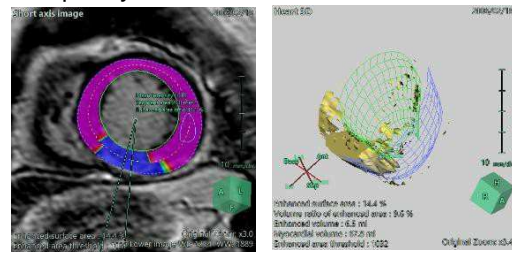
Cardiac Function MR is a useful tool for cardiologists and radiologists. The software evaluates cardiac function, obtains ventricle and myocardium boundaries from MR images consisting of multiple time phases and calculates ejection fraction, end-diastolic volume, end-systolic volume, stroke volume, and other related information.

The contour of ventricle and the contour of the cardiac wall can be set by automatic extraction based on the image information or by user input or modification. The calculated result can be displayed as a graph or bull's-eye images, and it can be printed as a report. Main Functions include:

- Semi-automatic extraction of the contours of right and left ventricle and myocardium which are required cardiac function analysis
- Display the long axis and short axis images of the heart
- 3D mapping display of analysis results

- Volume measurement and display of the bull's-eye for ventricle and myocardium
- Display of measurement results including end-diastolic volume, end-systolic volume, end-diastolic ventricular index, end-systolic ventricular index, stroke volume, cardiac output, peak filling rate, time to peak filling, cardiac index, ejection fraction, body surface area, heart rate, and myocardial mass
- Calculation of the ventricle capacity from a long axis image with the Area-Length method
- Output cine movies

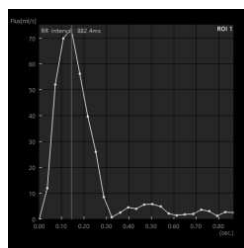
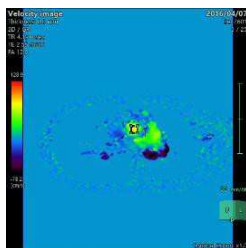
- Display of the enhanced area in the bull's-eye within both the inner side and outer side of the myocardium
- Display of the surface ratio and the volume occupancy ratio of the enhanced area



MR Flow Analysis

MR Flow Analysis is a useful tool for cardiologists and radiologists. In MR Flow Analysis the blood flow volume and the flow velocity per heart rate velocity of an arranged ROI can be calculated. Main functions include:

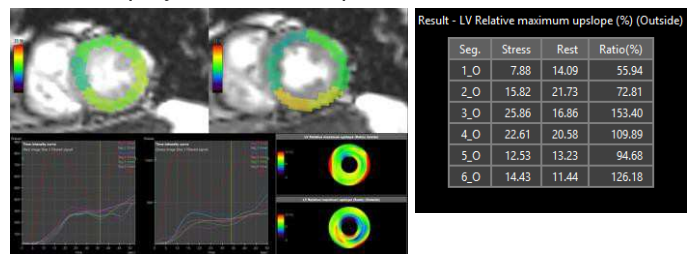
- Display analysis table (flow volume analysis and flow velocity analysis)
- Display blood flow velocity image
- Display original image, phase image, or absolute value image
- Display original image, phase image, or absolute value image, overlapped with the blood flow velocity image
- Display the result of the flow volume analysis and the flow velocity analysis by the time intensity curve
- Comparison with past analysis results and report output



Cardiac Perfusion (MR)

Cardiac Perfusion MR is useful tool for cardiologists and radiologists. The software is calculated the maximum upslope of analysis result of each myocardial segment, the LV relative maximum upslope, time to the peak, the LV relative accumulated enhancement, and ratios between items at rest/stress. Main functions include:

- Registration of myocardia using ROIs
- Calculation of the maximum upslope, the LV relative maximum upslope, time to the peak, the LV relative accumulated enhancement, and ratios between items at rest/stress(Pseudo color display, bull's eye display)
- Display a list of each plane



Cardiac Perfusion (CT)

Cardiac perfusion CT is useful tool for cardiologists and radiologists. The software analyzes myocardial blood flow using multi-phase 3D heart images. MBV(myocardial blood volume), MBF(myocardial blood flow), MTT(mean transit time), TTP(time to peak), PE(peak enhancement), PER(peak enhancement ratio) are calculated as analysis results. The main functions includes:

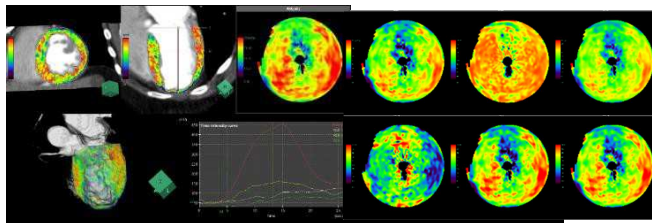
- Position detection and correction of arteries
- Visualization of intensity changes in each phase
- Calculation of MBV, MBF, MTT, TTP, PE and PER
- Myocardial territory extraction

MR Delayed Enhancement

MR Delayed Enhancement is a useful tool for cardiologists and radiologists. The software extracts myocardial enhanced area from 2D, 3D MR delayed enhancement images, displays the enhanced area in bull's eye format, and calculate the enhanced volume. The main functions include:

- Display of area and volume of the enhanced area
- Display of the enhanced area in the bull's-eye
- Display of area and volume of the enhanced area within both the inner side and outer side of the myocardium

- Visualization of myocardium region analysis results



Measurement result(Myocardial analysis)

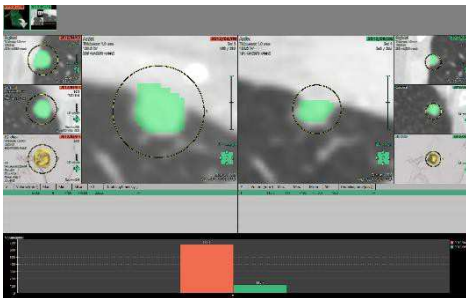
| # | MBF [ml/g/min] | MTT [sec] | MBV [ml/g] | TTP [sec] | PE [HU] | PER [%] |
|---|-------------------|--------------|---------------|--------------|------------|------------|
| 1 | 0.94 | 11.64 | 0.18 | 21.41 | 58 | 14.47 |
| 2 | 1.78 | 12.66 | 0.38 | 15.63 | 112 | 28.16 |
| 3 | 0.71 | 12.53 | 0.15 | 21.16 | 49 | 12.40 |

Pulmonology

Lung Analysis Airway

Lung Analysis Airway is a useful tool to analyze lung nodules, bronchi and low attenuation areas of the lungs, useful to assess nodules, airway obstructions and lung data over time. Main functions include:

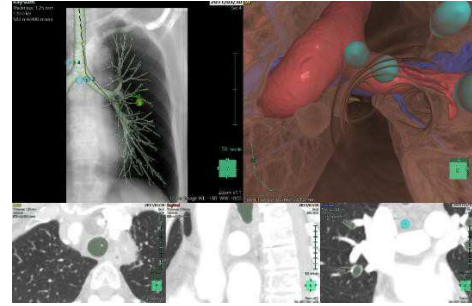
- Automatic and semi-automatic extraction of the lung field and lung lobes
- Extraction of the contact area between the lung field and diaphragm
- Semi-automatic extraction and volume calculation for nodules existing in lung field
- Extraction of bronchus regions and measurement of diameter of bronchi
- Signal values, Goddard Score and low attenuation cluster analysis for lung field region
- Comparison of nodules, attenuation and airway between current and prior studies.



Lung Analysis Scope

Lung Analysis Scope is useful for planning bronchoscopy procedures. The software searches for optimal bronchus pathways towards a lung lesion. A bronchoscope simulation is performed along the path, helpful to visualize difficult procedures prior to invasive examinations. The main function include :

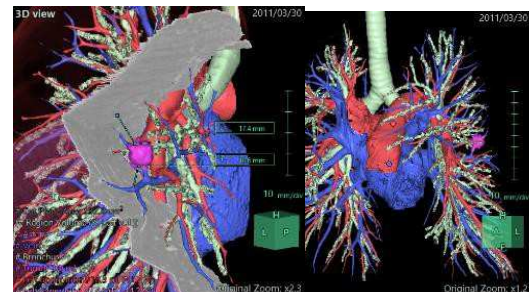
- Automatic extraction of lung field and bronchus
- Semi-automatic extraction of tumor and lymph node
- Search the optimum bronchus path to access to the target(tumor)
- Virtual endoscopic image display of the bronchus path
- Display the bronchus extended end point marker on lung surface



Lung Analysis Resection

Lung Analysis software extracts lung regions, pulmonary artery, pulmonary vein, bronchus and other regions for a 3D visualization of the lungs. Lung resection simulation can be performed by extracting and segmented the territories of pulmonary vessels and bronchi, useful for preoperative planning. The main functions include:

- Automatic and semi-automatic extraction of the lung field and lung lobes
- Extraction and display of diaphragm region
- Extraction of tumors with volume calculation
- Automatic extraction of the pulmonary artery, pulmonary vein, and bronchus
- Surface display, printable to .stl formats for 3D printing
- Calculation of the territories of pulmonary vessels and bronchi of the lung field region



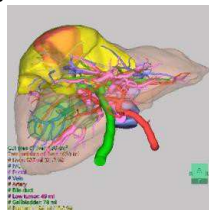
Gastroenterology

Liver Analysis (CT)

Liver Analysis (CT) is a useful tool for HBP surgeons for pre-operative planning. The software allows extraction of the liver and nearby vessel regions from contrast-enhanced CT images and displays the results as 3D- mapped images. In addition, the dominant region of the extracted liver region, portal vein and veins can be extracted and divided into areas.

Hepatectomy simulation can be performed. Main functions include:

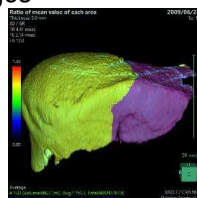
- Display of images in axial, sagittal and coronal reformats
- Semi-automatic extraction of liver region
- Semi-automatic or manual options for paths of artery, vein, portal, biliary and other tubular structures
- Simultaneous display of liver, blood vessels, bile duct, tumors, bladder, body surface, bones and other regions
- Volume calculations of liver, tumors, gallbladder and other regions
- Extraction of vascular territories in liver
- Extraction resection areas by portal or arterial territory, drill or manual selections
- Manual modification of any extractions
- Observation and measurements through sector MPR of the liver region
- Fusion of NM or MR comparison data



Liver Analysis (MR)

Liver Analysis (MR) is a useful tool for radiologists, gastroenterologists and liver surgeons for liver function analysis. The software will display MR multi-phase contrast-enhanced images and reference images. The user is able to calculate and view calculation results for liver and spleen regions. Main functions include:

- Display of multi-phase contrast-enhanced images and reference images
- Extraction of liver and spleen regions
- Visualisation of signal ratio to Liver result
- Manual modification of extractions

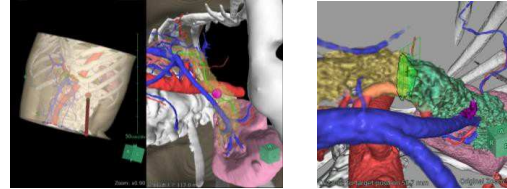


Endoscope Simulator

Endoscope Simulator is a useful tool for laparoscope / Thoracoscopic surgeons. The software perform to extract organ and vessels regions from contrast – enhanced CT images and displays the results in 3D using virtual endoscopy.

The main functions include:

- Display of axial, sagittal, and coronal images
- Automatic and semi-automatic extraction of body surface, bone, pancreas, spleen, and abdominal arteries and veins
- Simultaneous display of extracted regions
- Virtual endoscopy based on virtual endoscope insertion and target observation positions



Abdominal Perfusion

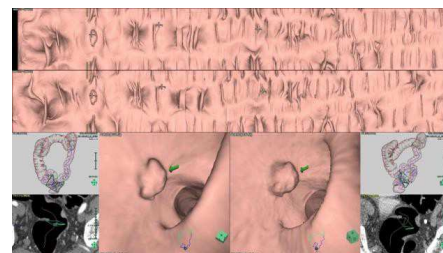
Abdominal Perfusion is useful tool for radiologists and gastroenterologists. The software analyses the blood flow of abdominal organs over time (in 4D), using multi-phase 3D abdomen images. TBV(tissue blood volume), TBF(tissue blood flow), MTT(mean transient time), TTP(time to peak) are calculated as analysis results. Main functions include:

- Position detection and correction of arteries and veins
- Calculation of TBV, TBF, MTT, and TTP
- Analysis result list display

Colon Analysis

Colon analysis is a useful tool for radiologists and gastroenterologists. Main features include:

- Automatic extraction and centerline tracking of the intestinal canal
- Comparative observation for supine and prone positions
- Lesion observation and analysis tools
- Special displays such as colon unfolded cube view display, straight open display, straight cross-section display, etc.
- Digital cleansing and nodule detection
- Observation of lesions and colon in 2D and/or 3D
- Simultaneous display of colon and surrounding organs for treatment planning

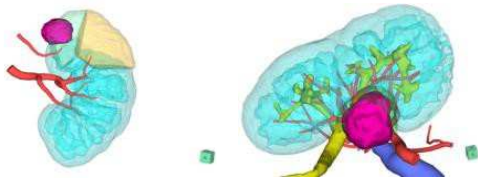
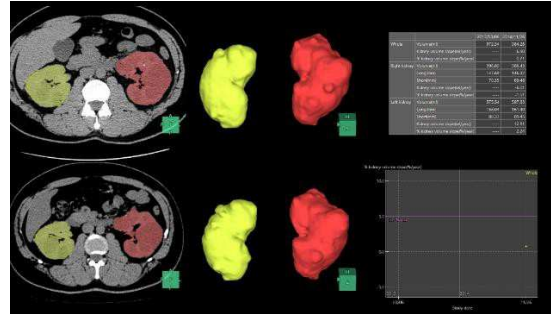


Urology / Nephrology

Kidney Analysis

Kidney Analysis is useful tool for Urologist. The software extracts kidney, renal cortex and regions including various surrounding organs from contrast – enhanced CT images and displays results as 3D images. In addition, further extraction of the extracted kidney region and arterial territory region extraction are possible, region can be divided, and nephrectomy simulation can be performed. Main functions include:

- Display of axial, sagittal and coronal image
- Semi-automatic extraction of the kidney region
- Semi-automatic or manual searching for paths of tubular structures
- Simultaneous display of kidney, blood vessels, urinary duct, tumors, renal calculus, body surface, bone, and other regions
- Volume calculation for kidney, tumors, renal calculus, gallbladder and other regions
- Extraction of the vascular territories in the kidney
- Extraction of through tumor scooping in the kidney region
- Manual segmentation of the kidney region
- Observation and measurement through sector MPR of the kidney region



Kidney Volumetry

Kidney Volumetry is useful tool for radiologist and nephrologist to measuring the volume of Polycystic kidney disease kidney when physician make prescription. In Kidney Volumetry, the left and right kidneys are extracted, and observation is possible by measuring the volume of that region. Main function include:

- Semi-automatic extraction and editing of the kidney region from non- contrast enhanced CT image
- Measurement in the kidney region
- Observation of the kidney region over time

Oncology

Nuclear Medicine Viewer

Nuclear Medicine Viewer allows the fusion and display of CT and Nuclear Medicine (SPECT or PET) to visualize anatomical and physiological data together. Main functions include:

- Fusion of structural images captured by CT and functional images using rigid or non-rigid registration
- Manual or automatic registration
- Fusion display in orthogonal or oblique planes
- Layout options optimal for PET and SPECT-CT viewing
- Measurement of SUV
- Comparison with past analysis results and report output

Oncology Viewer

Oncology Viewer is useful to determine temporal changes of solid tumors in CT image or PET-CT/MRI. You can evaluate the tumors by in this tool.

Main functions include :

- Allows evaluation of CT or PET-CT data
- Automatic or manual registration of PET and CT /MR images
- Measurement and display of lesions
- Comparison with up to 9 prior studies
- Display of evaluation data with exportable trend graphs and data tables
- Allows evaluation criteria by 7 criteria (WHO, RECIST, mRECIST, Choi Criteria, irRC, Cheson-criteria, PERCIST) and Non-criteria.



Common Features

These features are common across all Synapse 3D application tools where applicable:

- 2D cross section display
- Changing window width and level
- Rendering options include MIP, MiniP, Volume Rendering (VR), RaySum and Surface
- Movie Creation and Saving
- Gamma and image edge/smoothing filters
 - Measurement and Analysis
 - Measures lines, polygonal lines, angles, intensity values, rectangles, ellipses, polygons, freehand, boxes, and spheres
 - Calculates volume of mask region, and average/max/min/standard deviation of intensity values in 3D images
 - Calculates volume of mask region, and average/max/min/standard deviation of intensity values in 2D images
 - Displays profile curve or histogram of each measurement
 - Semi-automatic measurement of half-width
 - Stores measurement results and graph in text file (.csv, .txt) or in captured image
 - Ability to create ROI along the contour of an image by detecting contours during freehand measurement
- Annotations
- Clipping
- User-customizable settings
- Reformat by straight line, fan shape or circular to preset thicknesses and degrees
- Report to DICOM and PDF
- Save workflow snapshots for viewing on zero client or for workflow enhancement