CardIQ Xpress 2.0 Reveal

Bringing integration and automation to your CT Cardiac post processing needs.

Cardiac disease is one of the leading health concerns worldwide. Successful treatment of the many conditions that cause and perpetuate heart disease requires that physicians approach specific cardiac problems with as much information as today's technology can provide. To supply your referring physicians with this information you need software that gives you insight into cardiac anatomy and tools for thorough evaluation into the extent of disease.

Overview

CardIQ Xpress 2.0 Reveal is an integrated post processing imaging analysis application dedicated to cardiovascular imaging on GE Advantage Workstation (AW) and AW Server (AWS). The CardIQ Xpress 2.0 Reveal software option can be used to display, reformat and analyze 2D or 3D cardiac CT images for qualitative or quantitative assessment of heart anatomy and coronary artery vessels from a single or multiple cardiac phase image data sets. Cardiac motion is a very real challenge that can occur at any heart rate. CardIQ Xpress 2.0 Reveal is designed to work with SnapShot Freeze* images to automatically process and display images generated with reduced motion blur artifact.

Highlights

- Automatically segment coronary tree across phases.
- Automatically tracks and labels coronary arteries.
- Improved centerline editing tools for faster edits.
- New right mouse wheel menu for quick access to renaming, deleting and editing centerlines.
- Plaque ID tool assists in visualizing and quantifying plaque burden
- Relative perfusion highlights and quantifies hypo-dense areas of myocardium

Features

- Pre-processing automatically recognizes cardiac datasets and performs all segmentations as data arrives on the system saving processing time.
- Auto Coronary analysis automatically segments the coronary tree, tracks the centerline and labels the coronary arteries.
- For readers who prefer a 2D read, three pre-defined orientations provide quick access to planes for best visualization of the coronaries.
- Quick AVA allows access to vessel tracking at any time.
- Relative perfusion color codes and quantifies percent of hypo-dense areas of myocardium with four selectable color maps and fusion overlays with the coronary tree.
- Plaque ID provides volume measurements for four distinct Hounsfield ranges to aid with identification and visualization of coronary plaque in axial, curved or MPVR views.
- Automatically display SnapShot Freeze processed images for reduced motion blur[1].
- Robust, automatic calculation of ejection fraction and stroke volumes from the 3D endocardium volumes.
- Portfolio of tools such as stenosis measurements, IVUS views and preset volume rendering models assist in communication of specific findings back to referring physicians.
- Measure ES and ED for ejection fraction & volume with automatic extraction of the left ventricle.
- Create multiphase beating heart images
- Select oblique reformat views in the standard cath angles for easy analysis of the coronary vessels
- Display 4D aortic valve and mitral valve views with a single click

Indications for Use

CardIQ Xpress 2.0 is intended to provide an optimized non-invasive application to analyze cardiovascular anatomy and pathology and aid in determining treatment paths from a set of Computed Tomography (CT) Angiographic images. CardIQ Xpress 2.0 is a CT, non-invasive, image analysis software package, which aids in diagnosing of cardiovascular disease to include, coronary artery disease, functional parameters of the heart, heart structures and follow-up for stent placement, bypasses and plaque imaging.

CardIQ Xpress 2.0 offers unique tools such as automatic tracking, which will pre-process the CT data into multiple viewing ports to allow for an expedited read time improving workflow. With CardIQ Xpress 2.0, the user can color code the myocardial tissue to show hypo/hyper-dense areas in the myocardial tissue of the heart. With the IVUS-like view the user can color code the HU units of the plaque to better visualize the difference between calcified and non-calcified plaque in the wall of the vessel and the lumen to determine the amount of atherosclerosis.

The user can see the different valve planes along with a variety of new layouts to align the heart. The IVUS-like view is created by applying GE's Volume Rendering on a cross-section perpendicular to the detected centerline. This view merely displays a cross section as in IVUS imaging and color codes like IVUS images. No new or additional diagnostic information is added.

CardIQ Xpress 2.0 is for use on the Advantage Workstation (AW) platform, CT Scanner, PAC or Centricity stations, which can be used in the analysis of 2D or 3D CT angiography images/data derived from DICOM 3.0 CT scans.

System Requirements

CardIQ Xpress 2.0 Reveal option can be installed on GE's AW workstation or AW Server with VolumeShare 5, VolumeShare 7 or later software.

Compatible hardware VolumeShare 5:

- 8400, 8600 workstation 16GB RAM
- Z800 24GB RAM
- AW Server 2.0

Compatible hardware VolumeShare 7:

- Z800, Z820 (and later) 24GB of RAM
- AW Server 3.1 and above
(recommended monitor resolution is up to dual 2MP (1600 x 1200) or a single 3MP (1536 x 2048)
- Centricity™ Universal Viewer

Regulatory Compliance

This product complies with the following requirements:
European Council Directive 93/42/EEC concerning medical devices.

[1] SnapShot Freeze option is not compatible with Centricity Universal Viewer.

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Feature Details

Pre-Processing

- Automated processing of single or multiphase data
- Customizable menu to choose which protocols are pre-processed
- Pre-processed protocols include: Auto Coronary Analysis, Labeling of vessels, VR heart, Angiographic View, and Auto EF

Auto Launch

- Multiple exams can be loaded into the auto launch to ready them for review   (AW only)
- Color-code display of ready-to-read exam listing (AW only)
- The ability to switch between exams without having to quit out of the application and reload

Automated Coronary Vessel Analysis (CVA)

- CVA allows the users to track, extract, visualize and measure coronary arteries from either single or multiple cardiac phase images
- Auto launch case selection and display of automatically tracked and labeled coronary vessels
- Simple, corrections to vessel branch tracking
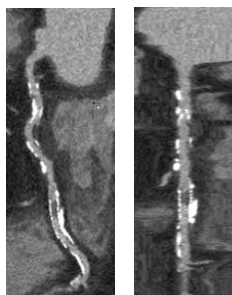
- Curved, oblique, longitudinal and cross-sectional reformatted views are automatically generated in the software for quick review
- Current-state tracking points within vessel analysis may be saved for future review and/or manipulation
- Color-coded plaque analysis with volume measurements for evaluating the change in plaque size over time
- Generate and save rotational movies from curved planar reformation, best section and cross-sectional (lumen) views
- Quantitative or qualitative coronary vessel assessment on user-selected vessel segments.
- Vessel measurements including:
  - o Distance and volume
  - o Cross-sectional area and mean diameter

- o Single or Dual reference point comparison
- o Relative percent stenosis

- Single-screen filming capabilities with multi-views within the screen to show the entire picture of the vessel
- Automatically display of the coronary vessel tree
- Using pre-set protocols, 2D or 3D coronary vessel tree models can be generate and displayed in an automatic fashion to give users a qualitative overview of coronary vessel structures
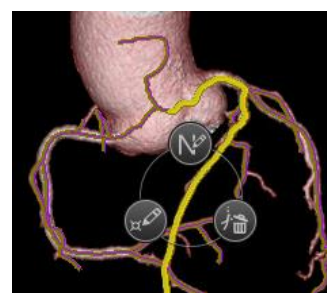
- New right mouse wheel menu for quick access to renaming, deleting and editing centerlines
- Improved centerline editing tools for faster edits
- The vessel tree models can be in the form of either 3D volume rendered or Maximum Intensity Projection (MIP)


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2D Review

- Three pre-defined orientation protocols for easy review of the coronary vessels and chambers
- Dual reformat review allows automatic review of the coronaries from an axial image while linking to oblique views in longitudinal and cross-sectional planes
- Reformat review predefines workflow steps to automatically present thick, multi-planer views of cardiac anatomy
- One-click access to quick vessel analysis

Quick/Dynamic AVA

- Single or dual click vessel analysis from any protocol; 3D, reformat or vessel tree
- Real-time tracking of the center line with instant visualization of a vessel for quick inspection
- Ability to extend tracking proximally or distally for full view of the vessel
- Ability to select a point above and below potential lesions for automated vessel analysis

Vessel Data Base

- A vessel name data base for quick access to vessel labels
- Anatomically relevant listings
- Ability to add new vessel names into the data base
- Automated processing of single or multiphase data
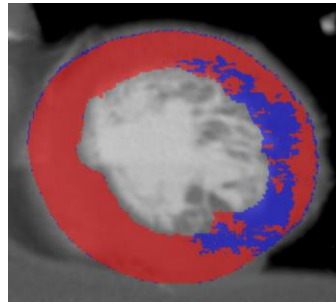
Relative Perfusion

- Hypo-dense areas of myocardium can be high-lighted with color to aid in the visualization of ischemic heart disease
- Pre-defined layouts for density enhancement
- A hybrid display view to show the relationship of the vessel tree with the perfusion defect
- Quantification of a hypo-perfused area as it relates to myocardial defects
- Four selectable color maps to help display the hypo-dense areas
- Exportable statistics via one touch

IVUS Views

- Interactive volume rendered images to better define the calcium, lumen and non-calcified plaque related to lumen narrowing or wall abnormalities

- Can be applied to any 2D MIP image to include; cross-section, MPR, best L-section images
- Display cross-sections perpendicular to the vessel centerline to create an IVUS-like image. No new diagnostic information is added

PlaqID

- Customizable color mapping to HU ranges for easy Identification of plaque in axial, curved reformat or MPVR images
- Four distinct colors to aid in differentiating vessel lumen, non-calcified plaque and calcified plaque
- Easy modification of the color and transparency of plaque
- Volume, area to track size of plaque over time
- Smooth transition of color from one density to another
- Plaque volume and area automatically captured in summary table.
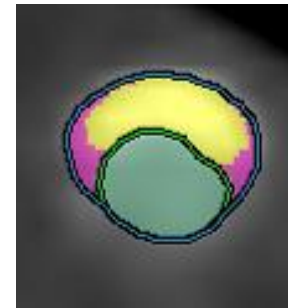
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VR Heart

- One-touch automatic segmentation algorithm designed to extract the cardiac anatomy from within the chest image
- Optimize algorithms for the easy review of heart and bypass grafts
- Multiple optimized VR curve settings to enhance different structures within the heart.
- Automatic segmentation of both single or multi-phase cardiac image data sets
- 4D beating heart images with the ability to page through the phases, rotate the image with real-time functionality

Multi-Phase Image Review

- Multiphase images can be reviewed in any protocol
- 10 phase images show the heart throughout the complete cycle
- Quickly edit phase images to keep only the phase or phases needed for analysis of the coronary vessels once multi-phase review is complete

Transparency View

- 3D vessel tree overlaid on the heart chambers with the ability to adjust opacity of chambers of heart, myocardium vessels tree and bones

3D Angiographic View
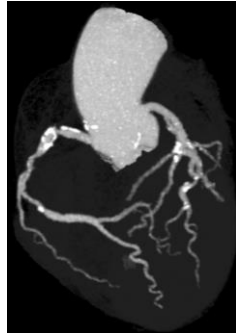
- One-touch automatic visualization of the coronary arteries in an x-ray angiographic view
- Single click cardiac cath views to orientate the angiographic view into RAO/LAO, or CRANIAL/CAUDAL orientation
- Added or removed vessels are easily archived with the Auto Select feature
- Toggle between gray scale or inverse video views

One Touch Cath Views

- Default cardiac cath views are provided with CardIQ Xpress 2.0 Reveal software to provide 3D VR heart, 3D vessel tree or reformatted image in the orientation of a standard cardiac catheterization
- Single click on the angulation area to change between one-touch views

- Interactive RAO/LAO & CRANIAL/CAUDAL orientations allow for manually positioning the view
- Customizable orientations can be easily generated and saved for future use

3D Ejection Fraction

- Automatic extraction of the left ventricle across all phases and the automatic detection of systole and diastole delivers calculated ejection fraction and stroke volumes
- Robust, automatic calculation of ejection fraction and stroke volumes from the 3D endocardium volumes

Layouts

- Configurable layouts
- Dual monitor support
- Configurable default layout for use at AVA launch
- Easily capture the screen layout for identical visualization on PACs or film

4D Movie Mode

- Movie mode allows the user to view and save multiple views of the heart and display as a movie sequence

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- Load multiple phases from systole to diastole to create a beating heart movie
- Save movies as a DICOM image set or export in JPEG/MPEG format

SnapShot Freeze (SSF)

- Automatically display motion blur-reduced SnapShot Freeze processed images
- Reprocess SnapShot Freeze images for artifacts caused by motion blurring after manual vessel editing
- Motion blurring correction requires the use images produced by a CT using the optional SnapShot Freeze feature

Protocols

- CardIQ Xpress 2.0 Reveal is supplied with a set of pre-defined protocols that are easily adaptable to customized protocols
- The protocols have comprehensive instructions and tools which minimize the need to memorize the procedures or to refer continuously to user documentation.

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AW

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