Cardiac Analysis facilitated by automatic workflow steps

CT Comprehensive Cardiac Analysis

Establishing the diagnosis, extent, and severity of CAD and determining the potential risk of cardiovascular events are crucial steps toward improving patient outcomes. The purpose of coronary imaging is to define the coronary anatomy and the degree of luminal obstruction of the coronary arteries. It is commonly used to determine the presence and extent of obstructive coronary artery disease (CAD) and to assess the feasibility and appropriateness of various forms of therapy, such as revascularization by percutaneous or surgical interventions.

Highlights

CT Comprehensive Cardiac Analysis (CCA) application is designed to assist the user in viewing, analyzing and quantifying dedicated cardiac CT angiograms (CTA), mainly for coronary arteries analysis on coronary CTA (CCTA) data.

The application provides an automatic 3D model-based whole-heart segmentation (myocardium, heart chambers and coronary tree) to enable cardiac functional analysis. This includes ventricles and valve morphology in 3D using dynamic cine mode, and analysis calculations include standard cardiac parameters (described in features session), and the user can edit and modify the segmentation and the derived parameters. The application enables automatic extraction and visualization of the coronary tree (vessel and lumen contours). It can automatically extract up to 17 segments of the coronary arteries (AHA guidelines) and more than 90% of the extracted segments do not require editing. Findings management enables integrated view of coronary lesions in a single view, to support determination of disease severity and communication of results. CAD-RADS functionality enables clear communication of results in a standardized manner. Saving time and cost generated reportedly high satisfaction rates among cardiac imagers[1]

Features

- Automatically extract up to 17 segments of the coronary arteries (AHA guidelines) and more than 90% of the extracted segments do not require editing (being 90% of the segments visible in the scan automatically extracted and 85% of the automatically extracted segments labeled correctly)
- Offers detailed coronary plaque assessment[2] providing regional and global quantities of plaque volume, automatic color-coded visualization of plaque content areas on vessel cross-sectional images. Analysis calculations includes standard cardiac parameters such as EF, SV, CO, LV and RV mass, regurgitation volume and fraction index, RV/LV early/late filling volumes, and early/late LV filling ratio

Overview

CT Comprehensive Cardiac Analysis application assists the user in viewing, analyzing, and quantifying dedicated cardiac CT angiography (CTA), providing function cardiac analysis, detailed coronary plaque assessment[2] and mainly, coronary artery analysis.

Cardiac Viewer[3] supports axial, ECG gated CT images, consisting of (but not limited to) multiple time points within the same study of the same myocardial region over time (i.e., dynamic CT scans), after the injection of intravenous contrast.

System Level Features

- Worklist: The Worklist function allows designation of the patient studies to be listed in the Directory.
- Patient list / directory: Automatic display of studies from selected devices (from local or remote lists) in the Patient List within the Patient Directory.
- Reporting: Customized reports using preformatted templates.
- Smart Preprocessing: Automatic pre-processing based on prior usage of the server.
- Storing data
- Producing a CD
- Dicom printing ("filming")
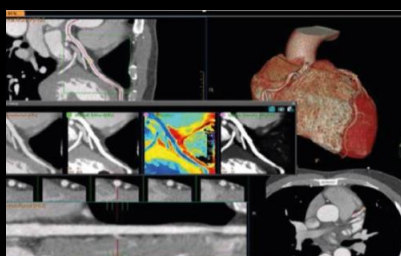
Comprehensive Cardiac Analysis with spectral data

CAD-RADS functionality

Features (continued)

- Consolidated findings management, consolidating multiple coronary lesions in a single view and displaying stenosis findings side-by-side in one click. It supports determination of disease severity and enable discrete results sharing[4] with external reporting systems
- CAD-RADS enables reporting in standardized manner, providing prognostic value for the risk of myocardial infarction. This functionality supports[5] diagnosis and provides treatment plan suggestions
- Multi-Batch capability support users to create and save multiple batches of Coronary Vessels in the Coronary Extraction stage based on pre-defined saved templates for group of batches for selected vessels including curved and straightened MPRs. This can save more than 60 clicks and 10 minutes for coronary artery result creation[6].
- Discreate results sharing[4] enables automatic transfer of structural results between the Workspace and reporting solutions, reducing reporting time and optimizing AV reporting workflow

Your Hospital Environment

PACS and 3rd Party Integration
Desktop integration with 3rd Party PACS vendors to enable the launch of AV client (and load data to selected application) directly via 3 types of integration:
- URL Integration (loose integration)
- AV API (tight integration)
- 3rd Party PACS API

Advantages
- Launching advanced clinical applications directly from PACS based on study selection (no need to launch patient directory for study selection) including load/save bookmarks
- Allow PACS users working with AVI to use Film application to send images to printers and organize key images sent from applications
- Default Storage Device for result saving
- Automatic storage DICOM images and series as an output of Preprocessing to PACS if configured

Report Application
Generating, editing, and printing reports, the application is accessed through the Report Workflow button. The report draft can be edited after images and information application have been stored in the Reporting database. The Report application includes information from the patient's scan into the report as well as additional content such as: analysis results, sample images, recommendations and comments.

Additional enhancements
- Usability improvements within report editor – within TEDIT tool bars, editor space.
- User-friendly Template Editor
- Support CT, MR and NM report templates
- Changing between JPEG and TIFF formats for summary images optional

Presentation States
Saving & loading Presentation States from/to clinical & viewing applications.
Film & Report applications support loading and applying presentation state on the images sent by applications to Film & Report.

Pre-Processing and Background Processing
Pre-Processing functionality by enabling pre-processing of data and automatic creation of results/processed data for applications.

Processing Mechanisms
1. Pre-Processing: Enabling processing data (run algorithms according to pre-defined conditions/parameters
2. Background Processing: Enabling applications to initiate processing tasks in the background.
3. Supporting Preprocessing on multiple series.
4. Pre-processing will be triggered/enabled to onsite configuration
5. Pre-processing and background processing will be able to run on both master and slave servers in the EX-configuration

System Requirements

Configuration Options:
1. The product can be operated in the following configurations:. Standalone workstation
2. Client-Server scenario (HX/EX) : Multiple concurrent users connected to the server using hospital LAN or home network connection via VPN.
3. Client – multi-server scenario (Concerto) for enterprise-sized hospitals: deployed as a multi-server system that is spread across the main hospital and satellite sites, connecting to a Global Worklist (GWL) and view each study across the system.

For system requirements please consult the Advanced Visualization Workspace Technical Datasheet available in Advanced Visualization Workspace webpage: www.philips.com/avw15.

Footnotes
1. More than 85% of clinical users gave a positive score for automatic coronary artery extraction and labeling.
2. CT Cardiac Plaque Assessment is an optional add on CT CCA application
3. CT Cardiac Viewer is a separated application, part of cardiac packages available while purchasing the CCA application. Please contact Philips rep. for more details.
4. The integration of the solution is via IBE services or via customer home-grown solutions. Please contact Philips representative for more details.
5. CAD-RADS = Coronary Artery Disease - Reporting and Data System (www.jacc.org/doi/abs/10.1016/j.jcmg.2022.07.002)
6. For 4 vessels and three types of batches each

How to reach us
Please visit www.philips.com/advanced-visualization