

AbstractID: 5600 Title: The Computational Environment for Radiotherapy Research: new tools for multi-modality imaging, treatment plan comparisons, and plan evaluations

Purpose: CERR (a Computational Environment for Radiotherapy Research) is an open-source Matlab-based set of tools for conducting radiotherapy research which has been available for several years. In order to make CERR as useful as possible to radiotherapy researchers, we have added multi-modality imaging support as well as new dosimetric and radiobiological plan review tools.

Method: The existing DICOM Import tool box in CERR was upgraded with capability to import PET, MR and SPECT DICOM images. While MR and PET are single frame image sets, CERR seamlessly imports multiframe SPECT DICOM. Automated and interactive registration tools were developed. A new metric selection GUI provides user ability to select a variety of metrics and save a 'plan evaluation set' for later use. When adding an individual metric, the user can select applicable parameters as well as information about criteria, including passing and marginal values, and priority. The metrics can then be compared on a graphical display or a report can be generated which lists passed/marginal/failed for all criteria and displays a score for each dose distribution. Several new dose comparison tools have been added, including: (1) side-by-side dose comparison views, (2) dose subtraction views for up to three dose distributions compared to a reference distribution, and (3) a 3-D slicer view which paints differences on coordinate system or transparent anatomic structure surfaces.

Results: CERR continues to undergo continuous development to provide a wide range of tools for image-guided research. The latest release can be downloaded from www.radium.wustl.edu/cerr. CERR can be used freely only for research work.

Conclusions: New CERR tools can facilitate research in adaptive and 4-D treatment planning.

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