

AbstractID: 11732 Title: New developments in The Computational Environment for Radiotherapy Research (CERR) software system

Purpose: CERR continues to be used across the world for radiotherapy research, and was downloaded over 1,000 times in the last year. We present recent improvements and changes to the system in response to user requests and research needs.

Methods: New developments in the last year include: (1) integration of more powerful image registration tools (a multi-scale demons algorithm), (2) the development of an extensive plan robustness analysis module (used to statistically simulate the effect of random, systematic, and contouring variations over a course of treatment), (3) generalizations to the java-based DICOM input and output, (4) documentation now available via an extensive wiki page, and (5) a new tool that indicates the location of cold spots in a target volume by plotting the distance to the edge of a target volume for each voxel below a user-selected dose threshold.

Results: The image registration module has been stabilized and is being used extensively. The plan robustness module provides the statistical effect on DVH curves of presumed uncertainties. These 'dose-distance histograms' give the user a simple graphical method for understanding the location of cold spots in target volumes. Documentation is now much more extensive.

Conclusion: The updates to CERR will enhance user experience in using image registration and plan QA to validate treatment plan.

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