

AbstractID: 1334 Title: Modeling radiotherapy treatment outcomes: open-source data collection, database, and plan review tools

The development of normal tissue complication probability models has been hampered by the difficulty in gathering and using 3-D treatment planning datasets, and the inability of investigators to access datasets used in previous publications. A primary motivation for developing CERR ('Computational Environment for Radiotherapy Research') was the need for a tool which can help bring together treatment planning datasets from multiple sources into a common and convenient format. CERR has been extended to include tools for: (a) importing RTOG or DICOM datasets, (b) building databases of treatment plan archives, (c) searching the archives with general (regular-expression and/or Boolean) queries for multiple field values, and (d) conveniently accessing plans based on the results. These database tools are open-source and are distributed freely for non-commercial and non-clinical research uses. Each treatment plan with associated imaging information is contained in a single Matlab/CERR format file. A 'crawler' program updates an extracted selection of plan meta-data from each treatment planning archive. A client front-end GUI allows the user to select any meta-data field or fields for searching. The query itself can be regular expression and/or Boolean. The tools are general, and could be used to query any Matlab database of items containing metadata ('structs'), such as DICOM imported image datasets. These database tools, combined with CERR, have the potential to make image-based treatment plan archives significantly more convenient to manage and access.

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