

Purpose: Currently Philips' Pinnacle treatment planning system (TPS) is the only commercial TPS with the ability to encode sequences of internal command messages into 'scripts' which can be executed by the user within the TPS itself, although other vendors will be incorporating this functionality into future releases. The purpose of this work was to evaluate the use of 'read-only' scripting to improve the safety and quality of the radiotherapy treatment planning process.

Methods: 'Read-only' scripting is defined to be routines, called from within a TPS, that do not modify any state of the treatment plan but do allow access to primary data elements, e.g. imaging data, contours, beams, dose grid, and dose volume histograms. A suite of analysis and safeguard scripts were developed using a combination of Pinnacle scripts and Perl routines which accomplish a myriad of clinical goals, including backup of irreplaceable treatment planning information, enforcing naming conventions of contours and beams, checks of the technical integrity of IMRT plans, and standardizing the evaluation of treatment plans. Version control of clinical scripts ensures the integrity and safe usage of the routines themselves.

Results: Backup scripts have highlighted edits of tumor volume contours, as well as providing the ability to restore the lost data. Formerly common errors in IMRT planning, such as the creation of fields with in-field MLC abutments or couch/gantry collisions, have been all but eliminated. Report scripts presenting quantitative dosimetric information to clinicians have reduced the time expended in evaluating the clinical acceptability of treatment plans. Finally, ongoing process improvement studies have been facilitated by the active storage of aggregate planning data.

Conclusions: While 'read-only' scripting does not give clinicians the ability to modify elements of the treatment plan, this functionality can be used to ensure a safer and more consistent treatment planning process.