A Web based *Radiation Oncology Dose Manager* with a Rich User Interface developed using AJAX, Ruby, Dynamic XHTML and the new Yahoo/EXT User Interface Library

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**Abstract**

*With the evolution of AJAX, ruby on rails and advanced dynamic XHTML technologies and the advent of powerful user interface libraries for javascript (EXT, Yahoo User Interface Library), developers now have the ability to provide truly rich interfaces within web browsers, with reasonable effort and without resorting to third-party plugins. We designed and developed an example of such a solution. The User Interface allows radiation oncology practices to intuitively manage different dose fractionation schemes by helping estimate total dose to irradiated organs.*

**Description of the Problem**

The design and development of effective and usable interfaces for medical software has continued to be a challenge. This is evidenced by the software that we use within our radiation oncology department. We employ multiple software programs that aid us at different points within our workflow: from the management of patient information, to the visualization of radiological images, to contouring of volumes, to dosimetric planning, to the administration of radiation through linear accelerators, software drives not only how efficiently we meet our goals, but also helps us define what we are able to eventually accomplish. Unfortunately, in our experience, all these programs suffer from poor and non-intuitive user interfaces. In addition most of the programs are monolithic entities that have to be launched separately, and induce significant delays upon initial launch within the workflow.

This inspired one of our residents with considerable programming experience to develop a web-based program to solve the problem of calculating the total radiation dose absorbed by an organ or area of interest, using an easy to use and robust user interface. We used a well known radiobiological model to calculate the total dose to an organ that may have received multiple doses based on different fractionation schemes. This is a common problem within a Radiation Oncology practice that offers brachytherapy and/or radiosurgery along with other forms of teletherapy. Most departments develop ad-hoc solutions using spreadsheet software that ends up being cumbersome and difficult to use. No efficient user interface has yet been developed.

With the use of new web programming technologies such as AJAX, ruby on rails, advanced dynamic XHTML and powerful and ingenious javascript libraries, such as Yahoo’s User Interface Library and Jack Slocum’s innovative EXT library, we, as practicing radiation oncologists, developed software that proved to solve our problem well. The software is easy to use and integrates well within our workflow – the GUI is intuitive and being a web-browser based solution – all computers that have a modern web-browser can access it.