Purpose:

To report recent progress toward developing and testing the VirtualDose software under the 'Software as a Service (SaaS)' platform for tracking and reporting patient CT doses.

Methods:

Many of existing tools for reporting CT dose are based on data derived from phantoms that are anatomically crude and ignore pediatric, obese and pregnant patients. Based on extensive original dose data derived from Monte Carlo simulations and computational phantoms including a new set of BMI-adjustable obese patient phantoms, VirtualDose was designed under the 'Software as a Service (SaaS)' platform to provide a Web based software application to a large number of client users. Unlike the traditional software, SaaS does not require the installation of the software on a user's computer. Organ doses and effective doses are computed using ICRP Publication 60 and 103. Dosimetry capabilities for tube current modulation (TCM) protocols are included by integrating a DICOM information extraction function module. A new 'Service-Orientated Architecture (SOA)' software developing pattern is adopted in designing and building the whole software architecture. The entire software framework was developed using Microsoft .NET platform. C# was used as the primary programming language in the development of the graphical user interface (GUI).

Results:

Testing of the VirtualDose package shows that the modern GUI accommodates for interactively displaying 3D phantoms and selecting scanner parameters. The patient (weight, age, gender) and scan parameter information(e.g., kVp, mAs, scan protocol, etc.) stored in the DICOM file can be automatically retrieved and imported into 'VirtualDose' to calculate the organ dose and effective dose for specific patients. After the dose calculation process is complete, the software will automatically summarizes various scan parameters and results in Microsoft Word ('.doc') format.

Conclusions:

The VirtualDose package shows improved patient organ dose database, software GUI design, reporting features, and software distribution mode when compared with existing tools.

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