Method for accurate estimation of organ dose in computed tomography

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Publication(s)

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External Link(s)

• Google Scholar

Value Proposition

Computed tomography (CT) has become an integral tool in modern medicine. The radiological tool allows for direct imaging and variation of soft tissues structures. Accordingly, computed tomography scanners are the first choice for the diagnosis of cardiac complications, oncological problems and trauma patients. The main shortcoming of CT scans remains patient exposure to ionizing radiation. Several approaches have been used to reduce radiation exposure during CT scans. However, there is ongoing need to provide accurate patient radiation dose estimates while also maintaining high-quality images. Organ dose is generally regarded as one of the best to reflect patient radiation load and depends on two main factors, namely patient anatomy and irradiation field. Accordingly, effective modeling of both factors is required for an accurate estimation of organ dose.

Technology

The inventors at Duke developed a new method for esimating patient radiation dose during CT scans. A clinical patient is matched with a corresponding computational phantom to obtain a representation of patient anatomy. Organ dose estimation is achieved based on the radiation field model and the determined patient anatomy model.

Advantages

- Large database represents anatomic diversity across patient population
- Organ dose estimation enables improved dose monitoring
- May aid in the optimization and design of individualized protocols in CT scans