WashU

Office of Technology Management

COMPREHENSIVE SUITE OF TOOLS FOR STREAMLINING AND AUTOMATING TESTING OF RADIOTHERAPY MACHINES

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T-019435

Value Proposition: *Tool and software suite used to automate and improve testing quality of linear accelerators, thus increasing profit.*

Technology Description

Researchers at Washington University in St. Louis have developed a comprehensive suite of hardware and software tools that enables full automation of LINAC acceptance and commissioning, daily QA testing, and required annual testing. Before they can be put into use, new LINAC radiotherapy machines and their integrated treatment planning systems (TPSs) must go through a labor-intensive acceptance and commissioning process. Additionally, the required daily quality assurance (QA) tests for LINACs may take up to 2 hours and necessitate taking the machine offline, resulting in lost revenue. Annual tests must also be performed that require the purchase of a water tank for $70K–$100K, a service. As radiation treatment delivery becomes more complex, there is a pressing need for robust tools to improve efficiency and comprehensiveness, while simultaneously maintaining high accuracy and sensitivity.

This suite comprises an electronic portal imaging device (EPID), QA phantoms (with energy plugs), and software for analysis and comparison. It automatically validates the EPID image prediction model to enable treatment planning as a service (TPaaS) and fully automates the acceptance and commissioning steps, a process that typically takes 5–8 weeks can be done in only 2–4 days.

Stage of Research

Validated in patients

Applications

- Radiation treatment delivery
- Radiation treatment planning systems
- QA for radiation oncology

Key Advantages

- Improves patient treatment by eliminating third-party services for QA and testing and the number of QA tests that can be performed
- The integrated EPID eliminates the need for additional QA phantoms, reducing costs for required annual testing, thus increasing revenue.
- Reduces the duration of the positioning test, X-ray tube test, and image quality test, and it generates the analysis and

QA report in 20 minutes.
- QA can be performed without a radiation oncology physicist on site.

Patents

Patent application filed