

Applications

- Radiation therapy
- Irregular breathing pattern classification
- Research tool for designing software for radiation therapy

Advantages

- Precise radiation dose delivery
- Better prediction of tumor motion
- Side effects reduction
- Improved prediction accuracy

Inventors

[Yuichi Motai, Ph.D.](#)

Suk Jin Lee

Contact

T. Allen Morris, Ph.D., MBA

Associate Director

amorris5@vcu.edu

Direct 804-827-2211

Market Need

Effective radiation treatment requires motion compensation for uncertainty and irregularity originating from systematic and physiological phenomena. The irregular respiratory motion can impact the radiation dose calculation and overall patient treatment effectiveness. When the system for respiratory prediction considers the breathing patterns from multiple patients, it can yield a more accurate radiation delivery, less side effects, and more efficient therapy. Thus, the detection of irregular breathing motion before and during radiotherapy is desired for optimizing the delivery and safety margin.

Technology Summary

This technology presents an irregular breathing pattern classifier and a respiratory motion prediction for multiple patients. Analyzing breathing traces from multiple data sets allows patients to be classified into several different classes based on breathing patterns. Each classifier represents different parameters, which allows for improved prediction accuracy and more precise radiation delivery during external beam radiation therapy. Researchers propose a new approach to detect irregular breathing patterns using neural networks, where the reconstruction error can be used to build the distribution model for each breathing class. The proposed classification uses a regular ratio to decide whether or not the current breathing patterns were regular. This technology presents a great opportunity to potentially improve radiation therapy and minimize side effects.

Technology Status

Patent pending: U.S. rights are available.

Lee *et al*, IEEE Trans Inf Technol Biomed, 2012 Aug 21.

This technology is available for licensing to industry for further development and commercialization.