

Thesis Portfolio

Automated radiation therapy treatment planning generation combining prior data and novel optimization techniques

Public private partnership after new waste classification policy implementation in China

An Undergraduate Thesis

Presented to the Faculty of the School of Engineering and Applied Science
University of Virginia • Charlottesville, Virginia

In Fulfillment of the Requirements for the Degree
Bachelor of Science, School of Engineering

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Spring, 2020

Department of Biomedical Engineering

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Thesis Prospectus

Sociotechnical Synthesis

Modern radiotherapy uses reverse planning to find a single patient-specific treatment plan.¹ The field modulation is optimized by manual adjustment technology, and the priority between the target and normal tissue dosimetry is determined according to historical experience. The current radiotherapy plan relies on the professional knowledge of human beings and the experimental determination of achievable radiation dosimetry. Highly specialized training for physicians, physicists, dosimetrists, and radiation therapists can ensure high-quality radiation therapy. Using the power of artificial intelligence and big data to predict the achievable radiation dose, and has the ability to improve the treatment efficiency, improve the treatment quality, and overcome the limitations of humans in the implementation of advanced technology. Current technologies do not provide real-time patient-specific dosimetry and trade-off analysis. To this end, the project will create an analytical real-time dose (RTD) calculator to generate radiation doses outside the target area in real-time. Compared with the clinical dose distribution in Oncospace database of big data and the predicted metering distribution of RTD, the obtained results lead to the following conclusion that RTD uses data-driven artificial intelligence method to increase the ability to avoid human errors, improve the quality of patients' specific plans, and finally effectively improve the treatment results.

Last year, president Xi encouraged to strive for cultivating the good habit of classifying garbage, with the purpose of improving people's living environment as well as promoting the green, sustainable development. This was shocking news at that time. I never thought President Xi, also the general secretary of the Communist Party of China Central Committee and the chairman of the Central Military Commission, would express such views in an instruction regarding garbage sorting. In my opinion, the president would focus on more serious and macroscopic problems such as war decision, law making and politics. President Trump is the president for America in the four years in which I studied in America. I have never seen him focusing on anything that specific even though he used twitter so often. As a Chinese student studying abroad, I just can't give up this perfect opportunity to explore the relationship between government and private sector companies after the waste classification policy changed. It will start by looking at some background for new policy in Shanghai and how it has integrated and affected people's daily lives. Finally, everything will be pulled together to provide and answer to the question, how can we understand the new waste management system to ensure it achieve the desired outcomes for everyone?

The technical and STS theses are not related.