Automated quality assurance of deep learning contours in head-and-neck radiotherapy

Mody, P.P.

Stellingen behorende bij het proefschrift getiteld

Automated Quality Assurance of Deep Learning Contours in Head-and-Neck Radiotherapy

1. Existing radiotherapy plan optimization parameters can be used for evaluating the dose effect of auto-contours. (Chapter 1, this thesis).
2. Evaluating auto-contouring uncertainty by region (accurate vs. inaccurate), not uniformly, provides deeper insights for its utility in quality assessment (Chapter 2, this thesis).
3. Quality assessment based objectives (e.g, AvU loss) can improve the clinical utility of uncertainty as a proxy for auto-contour error detection (Chapter 3, this thesis).
4. AI-driven 3D edits of auto-contours are faster than the 2D edits of manual brushes (Chapter 4, this thesis).
5. Dose comparison between methods should be quantified using a composite score derived as a weighted linear combination of multiple geometric, dosimetric, and clinical endpoints.
6. Traditional metrics for model calibration (e.g., Expected Calibration Error) are insufficient for evaluating the practical utility of uncertainty in pixel-wise medical image segmentation.
7. Basic UNets are all you need for medical image segmentation. Complex neural architectures don't offer performance advantages in the limit.
8. If you have a limited budget to curate a dataset, spend it more on your test dataset, less on your training dataset.
9. Bridging the "bench-to-bedside" gap for AI in medical imaging fundamentally relies on sustained, multi-disciplinary clinical involvement throughout the research and development life cycle.
10. Researchers should be incentivized in their early years to collaborate with fellow researchers.
11. "If you show me the incentive, I will show you the outcome." (Charlie Munger, American businessman). Researchers must balance ambition for novelty with uncompromising scientific rigor.
12. "Ideas are cheap. Execution is everything." The true value of any idea, even a basic one, is unlocked by its effective and thorough implementation.