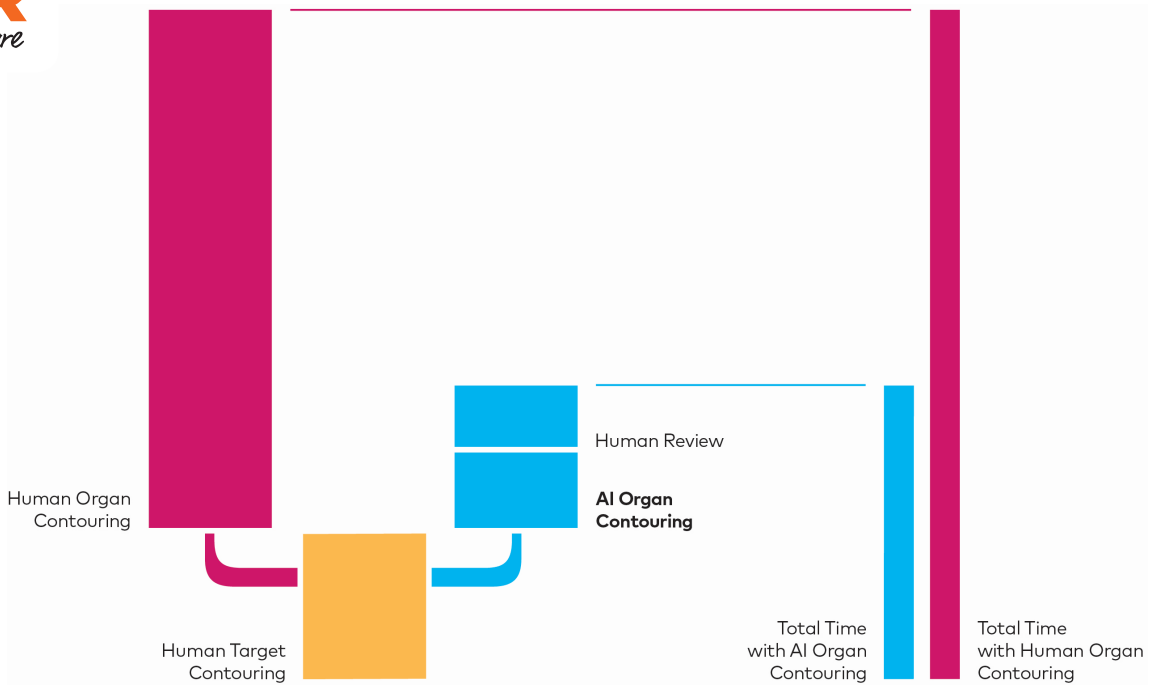

AI IN CONTOURING FOR RADIOTHERAPY PLANNING

MEDICAL FIELD, OR MEDICAL METHOD

Radiotherapy

TYPE

☑ Decision support ☐ Autonomous decision making

CATEGORY

☐ Prevention ☐ Detection ☐ Diagnosis ☐ Treatment

☑ Other

DESCRIPTION

Radiotherapy treatment planning system connected to (cloud based) AI segmentation service.

AIM / PURPOSE

Contouring of organs at risk is a tedious, time consuming, still mostly manual preparation step for radiotherapy planning. Automatic detection speeds up the process and increases consistency.

OUTPUT / RESULTS

Successfully tested for efficiency increase for organs of head and neck, thorax, pelvis and abdomen. Solutions for additional structures and continuous improvement under development.

AI METHODOLOGY

Modified U-Nets (convolutional deep neural networks) trained with hundreds to few thousands' clinical images with curated ground truth organ contours.

INPUT / SIZE OF THE DATA

Planning CT images. About 200 MB per volumetric image.

REFERENCE DOCUMENTS / LINKS / PUBLICATIONS

Schreier, J., Attanasi, F., & Laaksonen, H. (2019). *A Full-Image deep Segmenter for CT images in breast cancer radiotherapy treatment. Frontiers in oncology, 9, 677.*

Schreier, Jan. *"Anatomical Segmentation of CT images for Radiation Therapy planning using Deep Learning." (2018).*

Hänsch, Annika, et al. *"Evaluation of deep learning methods for parotid gland segmentation from CT images." Journal of Medical Imaging 6.1 (2018): 011005.*

SOURCE

Varian