Revolutionising Healthcare with Trustworthy AI

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AI Reshapes Clinical Workflow

from acquisition to prognosis

Acquisition | Reconstruction | Visualization | Analysis | Treatment & Prognosis

Safer, Faster, Better        See the unseeable, Accurate, Quantitative      Decision support, Minimize risk
Trustable, generalizable, and explainable AI algorithms.
Research Direction

- Full-stack AI solution in data acquisition, screening, diagnosis, progression, treatment, and prognosis (e.g., molecular underpinning and survival analysis).
Human-machine collaboration with application to clinical translation and validation, etc.
Covid-19 CT Lesion Segmentation for Quantitative Evaluation

[ MICCAI 2021 ]
Cervical Cancer Screening

[Collection and preservation] → [Centrifugation] → [Slide making] → [Staining] → [Scanning/Observation]

Hard mimics:
- NILM
- ASC-US
- NILM
- LSIL
- NILM
- ASC-H
- NILM
- HSIL
- NILM
- SCC
- NILM
- SCC
- NILM
- SCC
- ASC-US
- LSIL
- ASC-US
- LSIL
- ASC-US
- LSIL
- ASC-US
- SCC
- ASC-US
- SCC
- ASC-US
- SCC
- LSIL
- HSIL

[MIA 2021, ISBI 2022, TMI 2019]
Breast Cancer Metastasis Detection

[JAMA 2017, WACV 2018, TMI 2019]
Automated Contouring of PTV for Nasopharyngeal Carcinoma from MRI

Blue and red lines indicate human experts and AI, respectively.

Patients with newly diagnosed, histologically proven NPC who underwent RT dedicated MRI before radiation therapy from September 1, 2016 to September 30, 2017 (N = 1081)

Excluded patients:
1) Without required four MRI sequences (N = 23);
2) The scanning area could not cover the whole tumor (N = 10);
3) With artifacts on MRI due to motion or foreign bodies that affected tumor inspection (N = 27)

Eligible patients (N = 1021)

Training cohort (N = 715)
Validation cohort (N = 103)
Testing cohort (N = 203)

Train 3D CNN model and optimize its hyperparameters

AI contouring tool — AI-generated contours

Evaluate the accuracy of AI-generated contours

[Radiology 2019]
Automated Contouring of PTV for Nasopharyngeal Carcinoma from MRI

[Graph showing comparison of contouring by doctors, AI, and doctors with AI assistance]
Collaborators

More than 50+ clinical partners.
Thank you!

Welcome collaboration!

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