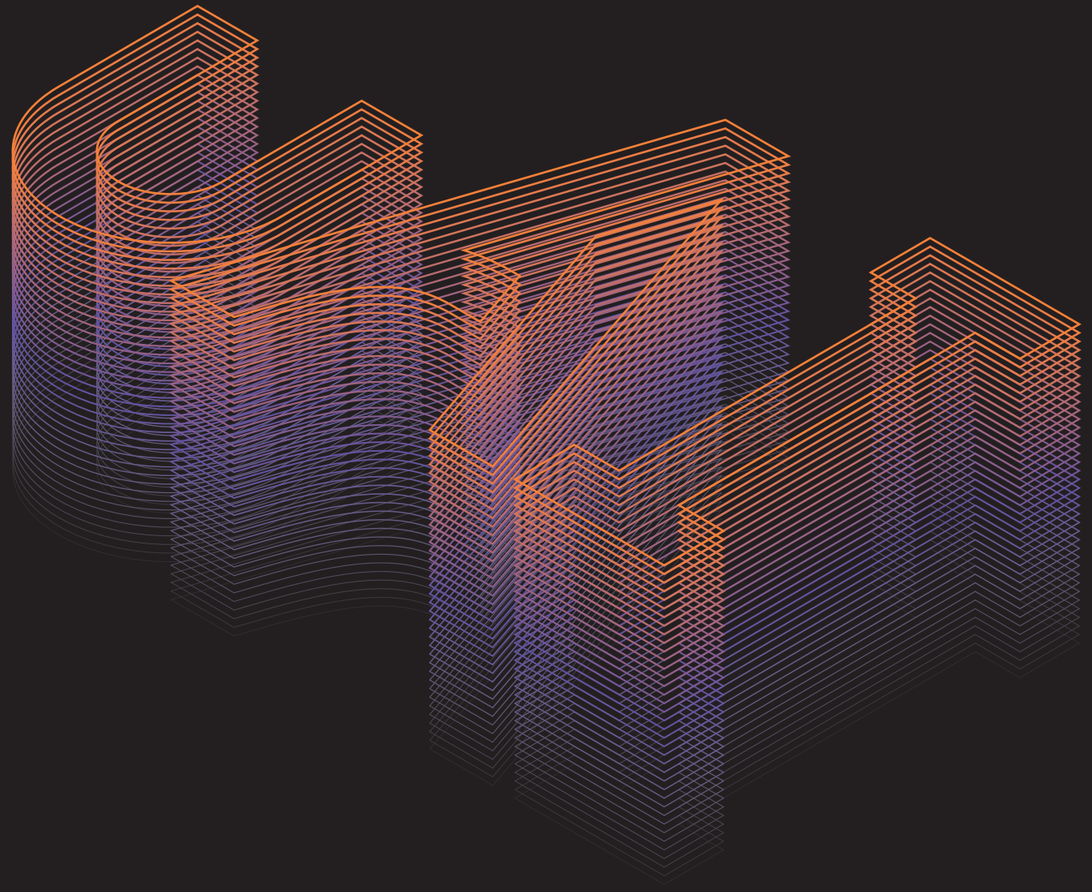
Shanghai United Imaging Intelligence Co., Ltd.

UNITED IMAGING | United Imaging Intelligence

AI SOLUTIONS for HEALTHCARE



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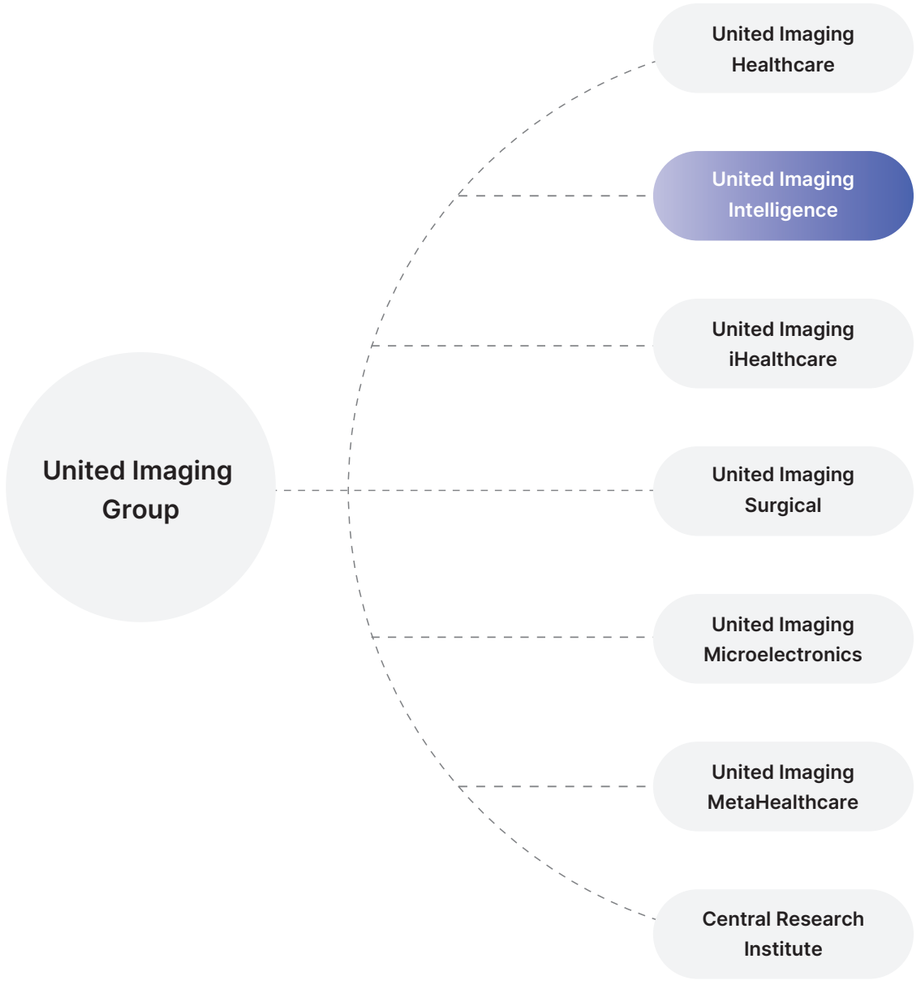
ABOUT US

Shanghai United Imaging Intelligence Co., Ltd. (UII), headquartered in Shanghai, is a subsidiary of United Imaging Group. Since its founding in 2017, UII has been delivering various artificial intelligence (AI) solutions to medicine and transforming the way healthcare is delivered. UII has become a prominent international medical AI company that enables smart equipment, supports biomedical research, and provides total solutions to clinical workflow from screening and diagnosis to treatment and follow-up assessment.



VISION

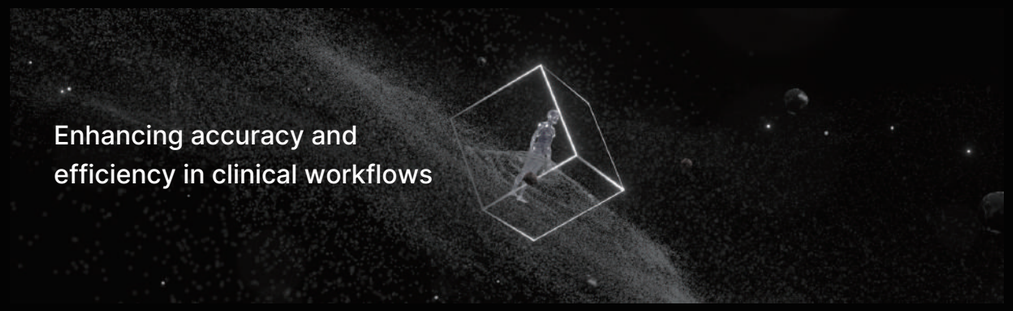
Leading Medical AI Innovation

MISSON

Bringing Benefit of Medical AI to All

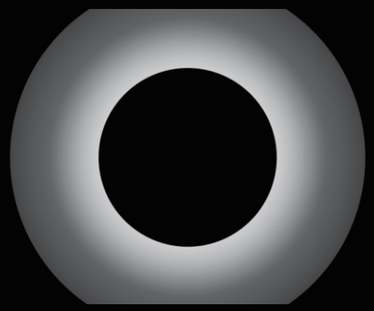
UII Worldwide

uAI PRODUCT PORTFOLIO

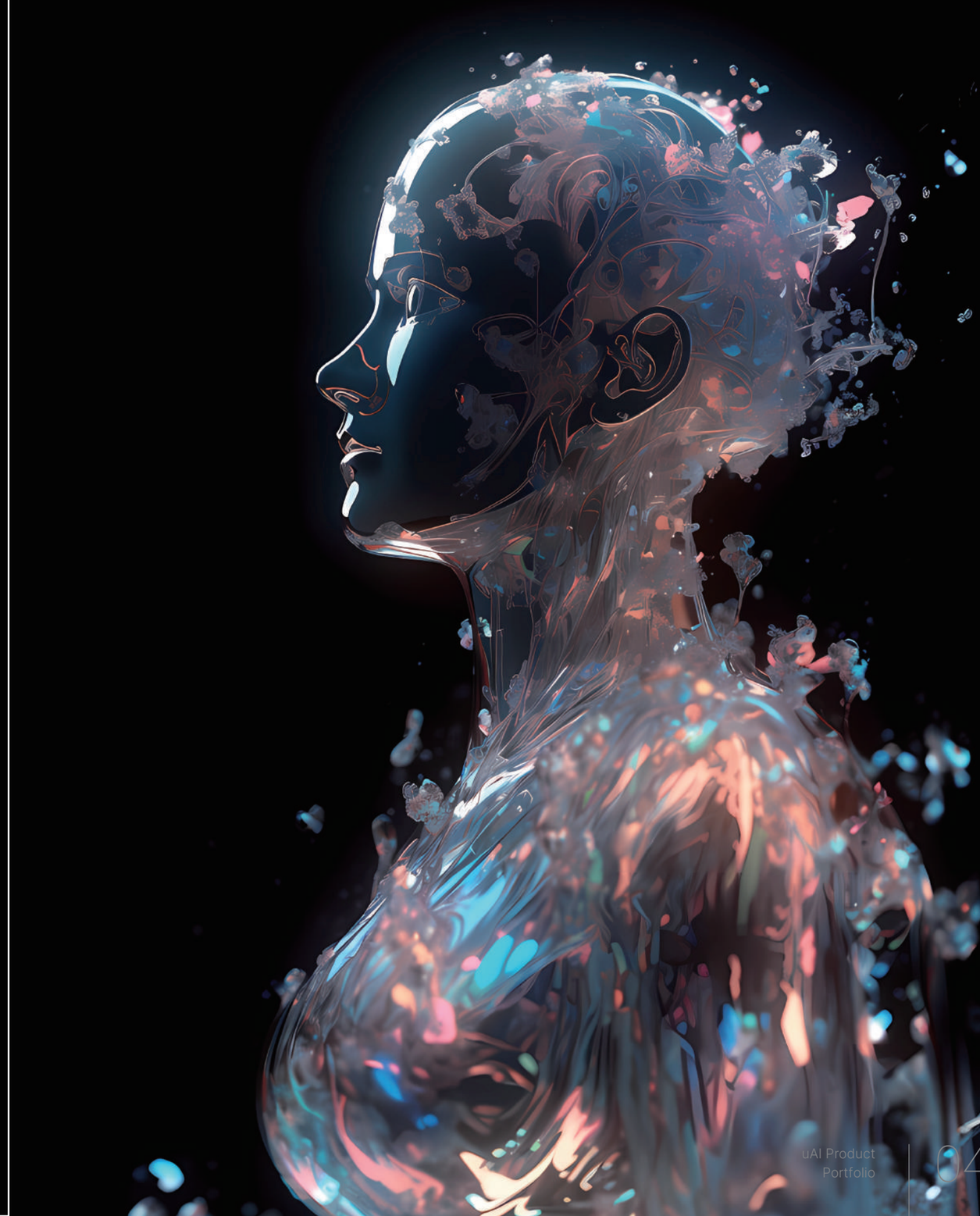


Enhancing accuracy and efficiency in clinical workflows

Expanding opportunities for biomedical research and collaborations



Enabling medical equipment with unprecedented capabilities and user-friendliness



Empowering Clinical Workflow with AI

uAI's 50+ AI-assisted applications are seamlessly integrated to optimize and streamline the entire clinical workflow. These applications cover various diseases in different anatomical regions and clinical scenarios, and encompass all medical imaging modalities, from screening and diagnosis to treatment and follow-up assessment. By focusing on the intricate details of medical diagnostics, our AI technology is designed to enhance healthcare practices, ensuring improved outcomes for patients worldwide.

BRAIN

- ICH
- Ischemic Stroke
- Cerebral and Carotid CTA
- Cerebral CTP
- Cerebral Collateral
- Head MRA
- Brain Parcellation
- CSVD
- fMRI

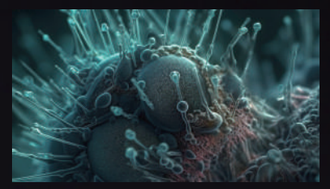
HEART

- CCTA
- Coronary Plaque
- FAI
- Aorta
- EKG-gated CACS
- Non-gated CACS
- CCTP
- CMR Cine
- CMR T1 Mapping
- CMR LGE/T2W

CHEST

- Pulmonary Nodules
- PLBMD
- QCT Analysis
- Fracture
- PE
- Emphysema
- Pneumonia
- Lymph Nodes
- Esophagus

CANCER



- Pulmonary Nodules 3D
- Brain Mets
- Bone Mets
- FFDM
- DBT
- Liver MRI
- Prostate MRI
- PET/CT

OTHER DOMAINS

- Runoff CTA
- Spine Scoliosis
- X-ray Fracture
- Bone Age
- Ortho Q
- Chest X Ray

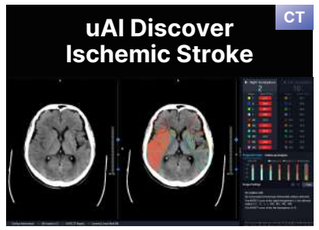
SURGERY

- Thoracic
- Hepatobiliary
- Urological
- THA

uAI Portal · Brain

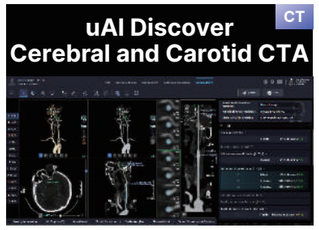
Detection and Evaluation of Intracranial Hemorrhage

- Automatic detection and precise localization of 5 subtypes of intracranial hemorrhages
- Accurate measurement of hemorrhage volume and midline deviation
- Automated registration of follow-up CT scans, combined with automatic tracking and quantitative comparison of lesions



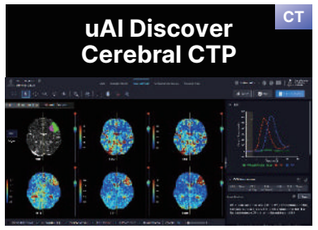
Detection and Evaluation of Cerebral Ischemia

- Automated segmentation of ASPECTS partitions
- Automated scoring of ASPECTS for left and right hemispheres
- Automatic detection of infarct area and visualization with heatmaps
- Quantitative measurement of infarct area, i.e., using net water uptake (NWU)



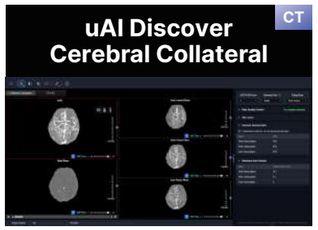
Reconstruction and Analysis of Head and Neck Vessels

- Automated and precise reconstruction of head and neck vessels, and detection of arterial variations and lesions, e.g., stenosis, aneurysm, and stent
- Automatic segmentation and quantitative analysis of arterial plaques and aneurysms in the head and neck region
- 4D dynamic visualization of blood flow based on thin-slice CTP series
- Robust reconstruction of occluded vessels in acute stroke patients for interventional procedure guidance



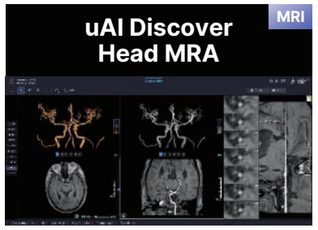
Reconstruction of Perfusion Maps and Analysis of Perfusion Parameters

- Automated detection and correction of motion artifacts
- Automatic construction of tMIP and perfusion maps, including CBF, CBV, MTT, TTP, and Tmax
- Automatic localization of core infarct and hypoperfusion regions, and along with the calculation of their mismatch volume and ratio
- Automated recording of Time Density Curves and motion plots



Reconstruction and Analysis of Cerebral Collateral Circulation

- Thin MIP and tMIP reconstructions from single-phase and cerebral CTP series
- Automatic identification of crucial phases based on Time Density Curves
- Automatic identification of the abnormal hemisphere and its filling phase
- Automated calculation of ASITN/SIR collateral score
- Quantitative analysis of asymmetric regions
- 4D dynamic visualization of blood flow based on thin-slice CTP series



Intelligent Processing of Cerebral Vessels using Non-Contrast MRA Images

- Automatic and rapid segmentation and centerline extraction of cerebral vessels
- Displaying images in diverse reconstruction formats
- One-click archiving and printing

uAI Portal · Brain

Parcellation and Quantitative Analysis of Brain

- Automated segmentation of 111 brain and 68 cerebral cortex regions
- Support for subjects from 0 to 110 years of age
- Automated identification of abnormal regions based on normal references
- Automatic calculation of risk related to neurodegenerative diseases
- Automated follow-up assessment, and brain health report generation

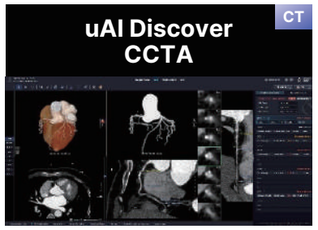
Lesion Detection and Risk Assessment of Cerebral Small Vessel Disease

- Automated analysis of brain atrophy
- Automatic quantitative analysis of various lesions, including WMHs, LA, PVS, RSSI, and CMB, and calculation of semiquantitative visual scores, e.g., Fazekas and Medial Temporal lobe Atrophy (MTA)
- Automatic calculation of cerebral small vessel disease (CSVD) total score

Resting-State fMRI Data Processing

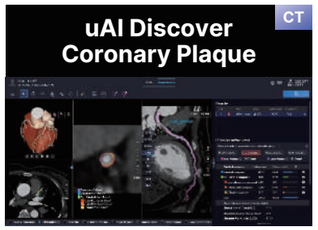
- Streamlined data processing without complex parameter settings
- Visualization of functional connectivity matrix and 3D brain network
- Availability of 8 brain atlases, including AAL, Glasser, etc.
- Automatic removal of the time points with significant head movement
- Automated calculation of graph theory measurements

uAI Portal · Heart



Reconstruction and Analysis of Coronary Arteries

- Automated 3D reconstruction of coronary arteries, including complex conditions, e.g., coronary artery bypass grafting (CABG), anomalous coronary origins, chronic total occlusion (CTO), coronary artery fistula (CAF), etc.
- Automatic detection of lesions, including stenosis, stent and myocardial bridge and CAD-RADS grading
- Convenient research tools such as transluminal attenuation gradient (TAG)



Detection and Quantitative Analysis of Coronary Plaques

- Automatic detection and classification of coronary plaques
- Comprehensive qualitative and quantitative analysis of coronary plaques, including assessment of plaque composition, volume and burden, and morphological features such as positive remodeling index
- Automatic identification of high-risk vulnerable plaques
- User-friendly editing tools for lumen and plaque contours

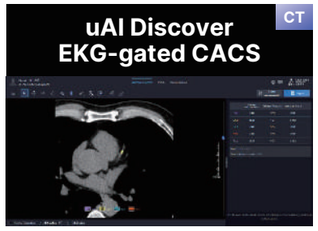
Analysis of Pericoronary Fat

- Automated segmentation of coronary arteries for accurate identification and quantitative analysis of pericoronary fat
- Automated and customized quantitative analysis of pericoronary fat for precise and specific measurements
- Automated report generation and exporting parameters for research

uAI Portal · Heart

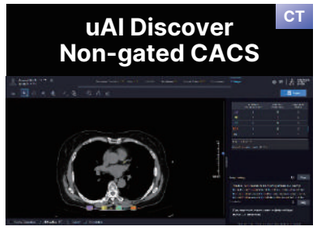
Detection and Analysis of Aortic Dissection

- Automated 3D reconstruction of the aorta and its branches
- Automatic identification and classification to triage aortic dissection patients
- Automatic localization of intimal tears and segmentation of true/false lumen with diameter measurement
- Automated evaluation of the condition of aortic branch vessel inlets being affected by dissection



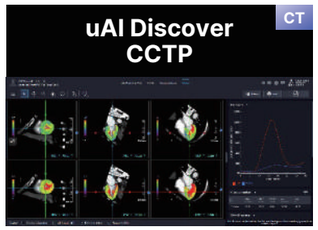
Analysis of EKG-Gated Coronary Artery Calcium Score

- Automatic detection of calcified plaques in the four major coronary arteries
- Automated calculation of the aggregated calcium score
- Automated report generation
- Customizable lesion editing for any coronary artery branch



Analysis of Non-Gated Coronary Artery Calcium Score

- Automatic calcified plaques in the four major coronary arteries
- Automated calculation of the aggregated calcium score
- Eliminating the need for electrocardiography (EKG) gating while achieving a high level of consistency with traditional EKG-gated calcium score

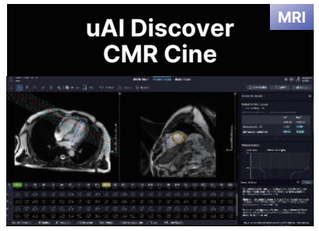


Comprehensive Analysis of Myocardial Ischemia

- Automated reconstruction of long- and short-axis views from multi-phase image series, as well as rapid creation of AIF and TAC curves
- Comprehensive analysis and computation of myocardial ischemic parameters and perfusion maps
- Automatic generation of voxel- and AHA segmental-level bull's eye maps
- Precise determination of the percentage of the ischemic LV myocardium

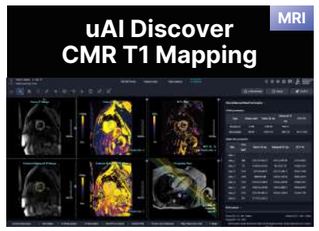
COMMON FEATURES OF CMR

- Automated and intelligent classification of CMR sequences
- Automatic classification of imaging planes
- AI-assisted segmentation of left ventricle myocardium, blood pool and papillary muscles
- Automatic multi-parametric assessment and bull's eye plot generation
- User-friendly editing tools



Cardiac Function and Strain Analysis of Cine

- Fully automated analysis of cardiac function based on cine images
- Comprehensive analysis of strain to assess myocardial deformations across 482 parameters, providing enhanced clinical insights and in-depth research



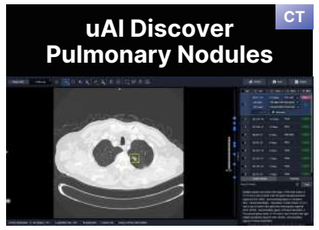
Comprehensive and Quantitative Analysis of Myocardial T1 Mapping

- Automatic generation of extracellular volume (ECV) map
- Automatic alignment of native and contrast-enhanced T1 images and maps
- Customizable map visualization

Comprehensive and Quantitative Analysis of LGE and T2W

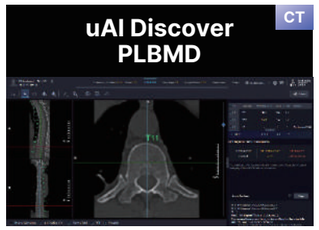
- Automatic and precise outline of hyperintense areas on late gadolinium enhancement (LGE) and T2-weighted (T2W) images
- Automatic selection of skeletal muscles and quantitative analysis of T2W images
- Intelligent detection of gray zone and assessment of myocardial salvage

uAI Portal · Chest



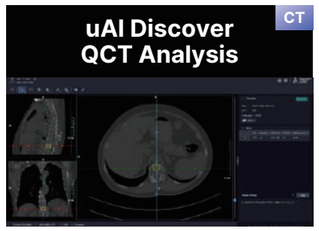
Pulmonary Nodule Detection and Follow-up Assessment

- Automatic, efficient and highly sensitive detection of pulmonary nodules
- Comprehensive quantitative analysis of lesions
- Automated registration of follow-up CT scans, combined with automatic tracking and quantitative comparison of lesions
- Automated and customized diagnostic reports



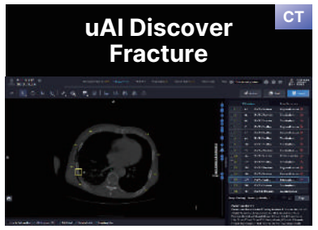
Phantom-less Bone Mineral Density Calculation

- Rapid assessment of bone density without using a phantom
- Intelligent detection of Region of Interest (ROI), excluding fractures and bone irregularities
- Easy switching among CPR, MPR, and single vertebral views for smooth visualization and ROI editing



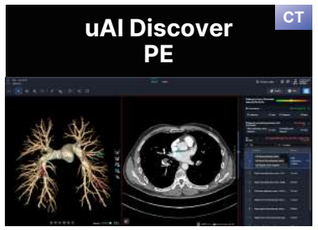
Computer-Aided Analysis System for Quantitative CT Imaging

- Automatic and rapid phantom calibration
- Quantitative analysis of bone mineral density across the entire skeletal system
- User-defined archiving and film printing



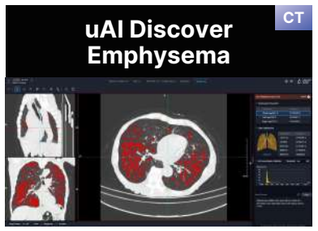
Bone Labeling and Fracture Detection

- Precise identification and labeling of individual ribs and vertebrae
- Accurate detection and visualization of rib fractures using MPR/VRT/MIP/CPR
- Substantially enhancing fracture detection sensitivity
- Significantly improving radiologists' reading efficiency by over a quarter



Detection and Analysis of Pulmonary Embolism

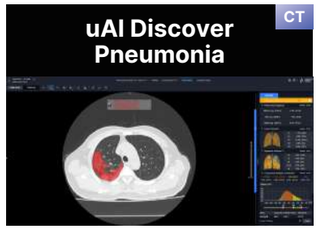
- Automated segmentation and reconstruction of pulmonary arteries and veins
- Automatic triage and classification of pulmonary embolism
- Highly sensitive detection of pulmonary emboli, along with automatic calculation of the pulmonary artery clot load scores
- Automatic measurements of RV/LV and PA/Ao



Quantitative Analysis of Emphysema

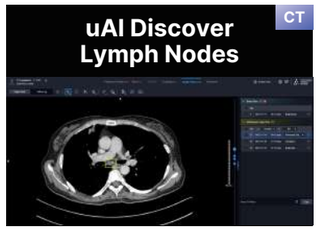
- Multidimensional quantitative analysis of lungs based on CT images
- Automatic segmentation of lung and emphysema regions
- Automated generation of reports

uAI Portal · Chest



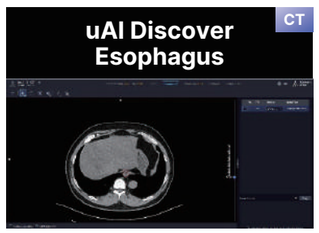
Pneumonia Detection and Follow-up Assessment

- Automatic and rapid detection of pneumonia
- Accurate quantification of the infected area
- Automated registration of follow-up CT scans, combined with automatic tracking and quantitative comparison of lesions



Detection and Follow-up Assessment of Lymph Nodes

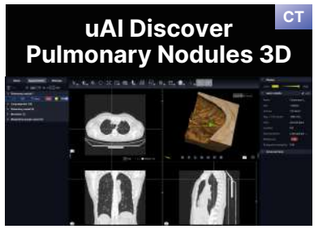
- Precise identification and classification of abnormal lymph nodes in the mediastinum and axilla
- Accurate quantification of lymph nodes
- Automated registration of follow-up CT scans, combined with automatic tracking and quantitative comparison of lesions



Detection of Esophagus Thickening

- Automated segmentation of the esophagus for accurate analysis
- Automatic localization of abnormal sections within the esophagus

uAI Portal · Cancer Care

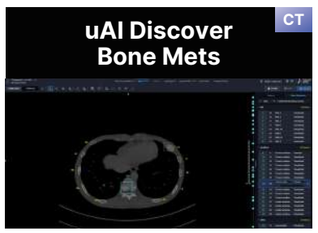


Automatic Reconstruction and Visualization of CT Pulmonary Nodules

- Automated detection and multidimensional analysis of pulmonary nodules
- Automated generation of various types of 3D reconstructed images to illustrate the relationships between the nodules and surrounding blood vessels, bronchi, pleura, etc.
- Automated generation of structured reports with one-click functionality for archiving and printing

Detection of Brain Metastasis

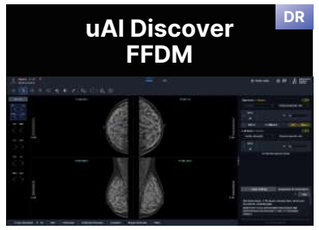
- Automatic detection and analysis of brain metastases
- Substantially enhancing detection sensitivity
- Significantly improving radiologists' reading efficiency by nearly half



Detection and Follow-up Assessment of Skeletal Abnormalities

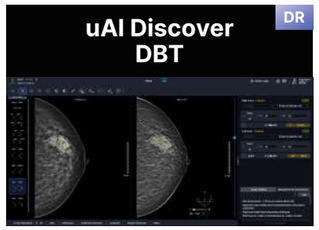
- Automated detection and identification of bone metastases, tumors, and other skeletal lesions across the entire body
- Precise labeling of individual ribs, vertebrae, pelvis and other bone structures
- Automatic detection of symptom-accompanying lesions
- Automated registration of follow-up CT scans, combined with automatic tracking and quantitative comparison of lesions

uAI Portal · Cancer Care



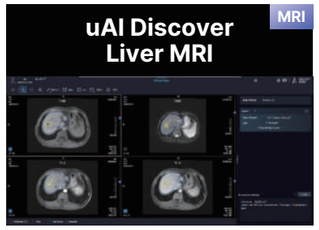
Automatic Detection of Breast Lesions in Full-Field Digital Mammography

- Automatic classification of breast tissue density
- Automatic detection of calcification, mass, architectural distortion and asymmetry
- Precise localization of lesions
- Automated analysis of lesions with BI-RADS rating



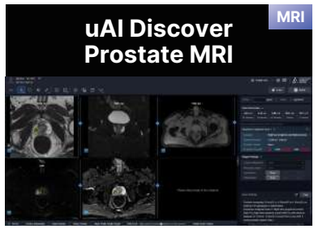
Automatic Detection of Breast Lesions in Digital Breast Tomosynthesis

- Automatic detection of calcification, mass, architectural distortion and asymmetry utilizing both digital breast tomosynthetic images and 2D mammographs
- Automatic classification of breast tissue density
- Precise localization of lesions
- Automated analysis of lesions with BI-RADS rating



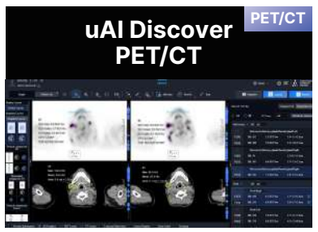
Automatic Detection and Visualization of Liver Lesions

- Automated detection and visualization of liver lesions on MRI scans
- Comprehensive analysis of liver tumors and lesions
- Automated generation of customizable reports



Quantitative Analysis of Prostate Gland and Risk Assessment of Tumor

- Accurate segmentation and quantitative analysis of prostate gland and lesions
- Automated calculation of PI-RADS for tumor risk assessment
- Automatic generation of structured graphical reports for comprehensive analysis



Detection of Whole-Body Abnormal Uptakes

- Automated PET/CT registration and fusion for synchronized viewing
- Precise detection, quantification and localization of lesions and anatomical structures
- Automatic extraction of liver and mediastinal reference uptakes
- Automated differentiation between pathological and physiological uptakes
- Automatic registration of follow-up PET/CT, combined with automated tracking for quantitative comparison of lesions
- Automated generation of structured graphical reports

uAI Portal · Other Domains

Reconstruction, Visualization, and Lesion Detection of Lower Extremity Vessels

- Automated reconstruction and visualization of lower extremity vessels
- Accurate detection of stenosis and plaques
- Automatic localization and visualization of perforators
- Automated and customizable archiving and printing

Automated Analysis of Scoliosis based on Digital Radiographs of Full-Length Spine

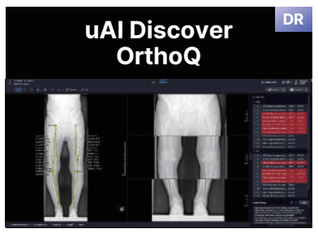
- AI-assisted segmentation and localization of vertebrae on both frontal and lateral radiographs
- Accurate identification of 20+ anatomical landmarks for 10+ customizable measurements
- Automated analysis of scoliosis and kyphosis
- User-friendly interface with a single window for full-length spine image and three windows for detailed visualization

Automated Detection of Fractures on Digital Radiographs

- Automated detection of fractures on long bones and joints in both anteroposterior and lateral radiographs
- Automatic localization of the detected fractures

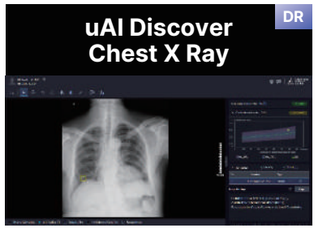
Evaluation of Bone Age in Children

- Accurate evaluation of pediatric skeletal maturity based on various internationally recognized standards
- Comprehensive assessment of growth and development in pediatric population
- Automated generation of customizable reports



Scanometry of Lower Limb Alignment

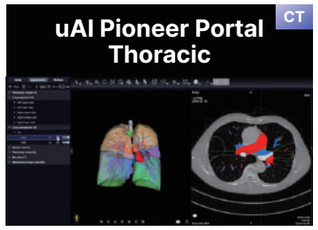
- Precise assessment of lower limb alignment on standing radiographs
- Accurate detection of 30+ anatomical landmarks for 20+ customizable measurements
- 450x increase in efficiency, drastically reducing the measurement time from 15 minutes manually to 2 seconds automatically
- User-friendly interface with three zoomed-in windows for easy adjustment and visualization



Lesion Detection in Digital Chest Radiographs

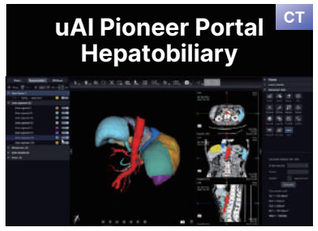
- Automatic detection of pneumothorax and calculation of lung compression ratio
- Automatic detection and precise localization of pulmonary masses and nodules
- Accurate measurement of cardiothoracic ratio

uAI Pioneer Portal · Surgery



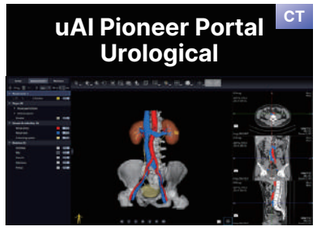
AI-Assisted Surgical Planning System for Thoracic Surgery

- Automated demarcation of pulmonary structures and lesions, e.g., lung segments and sub-segments, tracheobronchial tree, pulmonary arteries and veins, pulmonary nodules, and mediastinal lymph nodes
- One-shot 3D reconstruction and visualization
- Comprehensive surgical simulation and planning tools



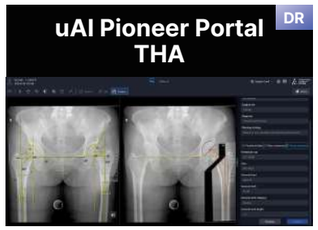
AI-Assisted Surgical Planning System for Hepatobiliary Surgery

- Automated segmentation and one-shot 3D visualization of liver segments, tumors, hepatic arteries and veins, portal veins, bile ducts, gallbladder, pancreas, spleen, etc.
- Comprehensive surgical simulation and planning tools
- Automatic calculation of the ratio of residual liver volume
- Portal territory analysis for tumors



AI-Assisted Surgical Planning System for Urological Surgery

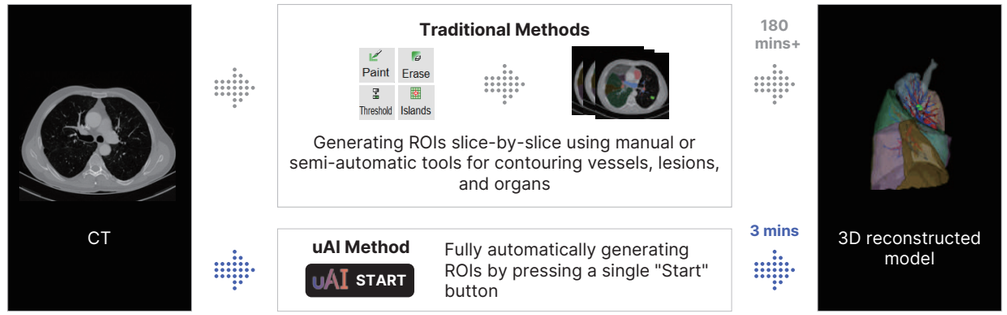
- Automated segmentation of renal tumors, renal arteries and veins, adrenal glands, ureters, and bladder
- One-shot 3D reconstruction and visualization
- Comprehensive surgical simulation and planning tools



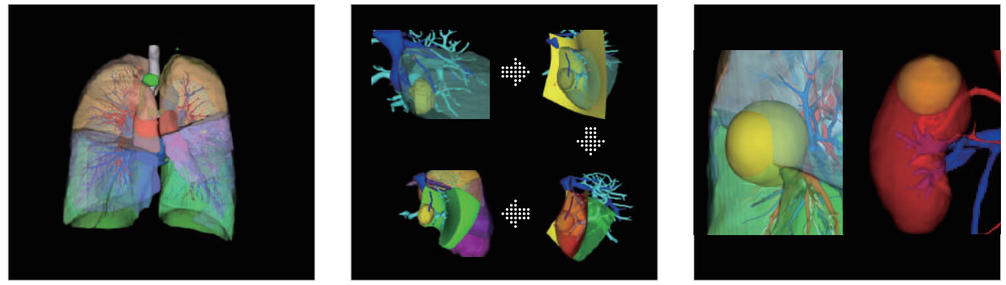
AI-Assisted Surgical Planning System for Total Hip Arthroplasty

- Automated recommendations for the size and position of a hip prosthesis
- Seamless and institutive workflow from prosthesis selection to virtual osteotomy while ensuring precise symmetry with the healthy side
- Automatic correction of image magnification
- Intelligent tools for over 10+ customizable key measurements, facilitating preoperative planning and postoperative assessment

One-Click Automatic 3D Reconstruction



Various Surgical Simulation Tools



Customizable color, transparency settings, and show/hide toggles

Intelligent simulation of tumor resection

Intelligent simulation of resection margin

Simultaneous Viewing on Multi-Platforms

- Supporting various use cases, including consultation rooms and operating rooms
- Enabling visualization on PCs without software installation and on mobile devices through QR code scanning

Surgeon's Office

Operating Room

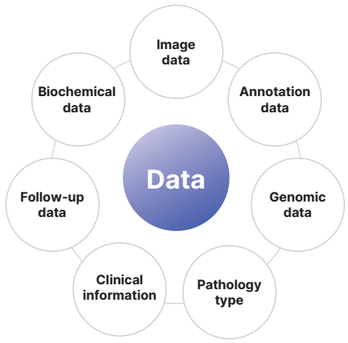
Mobile Terminal

Supporting Biomedical Research with AI

uAI has created an inclusive platform and a collaborative ecosystem for sharing medical AI technology. This platform hosts a diverse array of over 150 medical AI algorithms and specialized toolboxes designed for biomedical research in the areas of neurology, cardiology, PET imaging, and beyond. Our collaborators can leverage this platform and ecosystem to become AI research masters and drive medical AI research forward, delving deeper into the mysteries of human life, and expanding their understanding of unexplored territories.

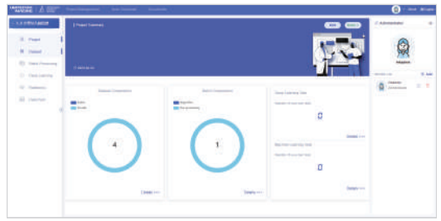
uAI Research Portal

Efficient Data Management



Data Collection

- Local server deployment
- Seamless integration with in-house data management systems
- Supporting data import from different modalities



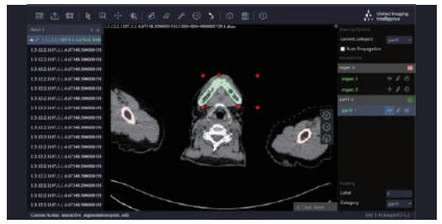
Data Management

- Data and project management with user credentials
- Repository for multi-center data sharing
- Automatically identifying and removing patient protected health information (PHI)

Versatile Annotation Tools

Fully-Automated Image Annotation

- Fully automated segmentation of 150+ organs and lesions
- A wide range of image annotation tools
- Accelerating image segmentation workflow



Semi-Automated Image Annotation

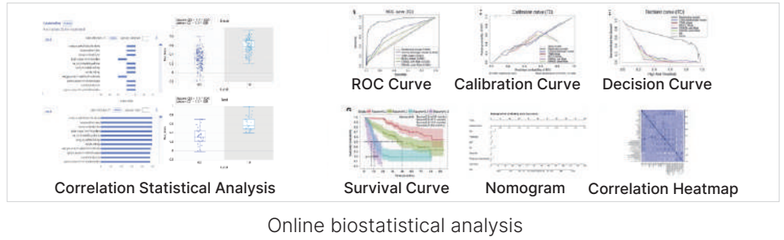
- Validated high-performance algorithms for rapid and accurate segmentation and reconstruction
- Efficient interactive uAI smart annotation tool (uSAT) segmentation tools
- Accurate online self-learning algorithms for delineation and propagation

Advanced Research Capabilities

Radiomics Analysis Tools

Automated extraction of 2,200-dimensional features

13 machine learning classifiers, and grid searching algorithms for the optimal hyper-parameters

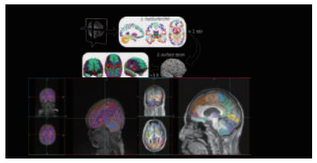


Online biostatistical analysis

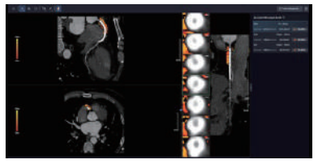
Convenient Deep Learning Tools

- Customized AI models for specific research needs
- Cascaded segmentation models
- Visual inspection permitted during segmentation model training
- No requirement for algorithm implementation experience

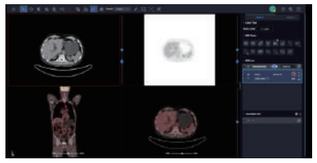
Designated Toolboxes



Neurological Research: 110+ segmentation algorithms of MRI brain structures



Cardiovascular Research: A range of segmentation algorithms of coronary artery and peri-coronal fat

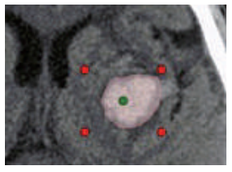


Nuclear Medicine Research: Advanced registration of PET and CT images, and segmentation of organs and lesions

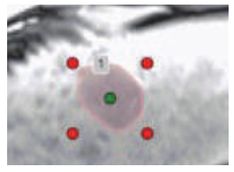
uSAT: A Smart Annotation Tool

Modality-Nonspecific

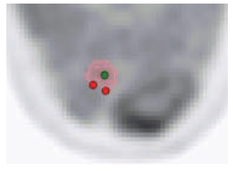
uSAT supports generic segmentation tasks for various types of the images, including CT, MRI, radiotherapy, and cell biology, within a single software package. This feature makes it convenient for medical AI research



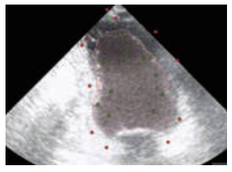
CT



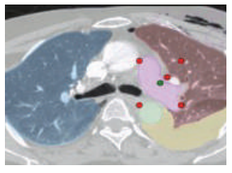
MRI



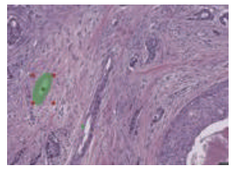
PET



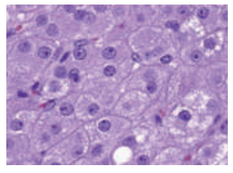
Ultrasound



Radiotherapy



Pathology



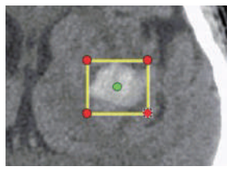
Cell Biology

Colonoscopy

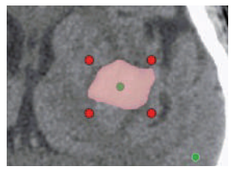
Smart Segmentation

uSAT accelerates a research project with its efficiency in data labeling. A single 2D bounding box is all that is needed to generate fine segmentation on the entire 3D sequence, thanks to the powerful collection of intuitive, generic and interactive segmentation tools

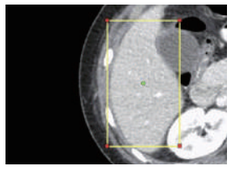
Efficient Segmentation Tools



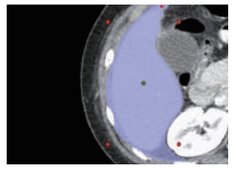
Example 1



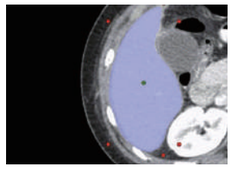
One-Shot result



Example 2

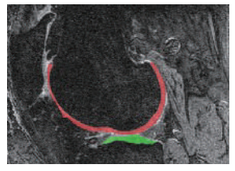


One-Shot result



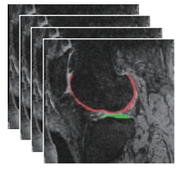
Minimally refined result using the same uSAT tool

Automatic Propagation for Efficient 3D Segmentation



Initial segmentation on a single slice

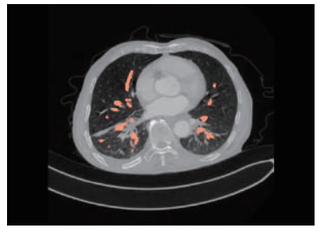
Automated label propagation

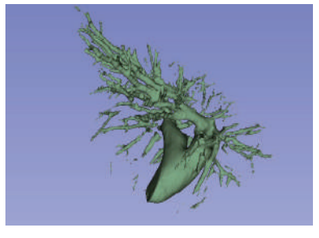


Automatic propagation of the initial segmentation throughout full sequence

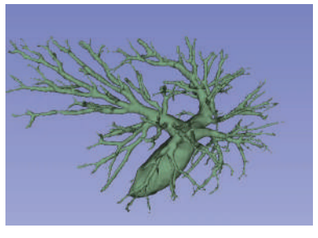
3D reconstruction result from uSAT

Segmentation of Tubular Structures





5 seconds of interaction



5 minutes of interaction

Excellent Performance

uSAT can complete the “most accurate” target segmentation with the “least number of clicks“, compared with the state-of-the-art segmentation models

Table 1: **One model** for segmentation on a wide range of segmentation tasks. *SEEM* is the first model to simultaneously support generic segmentation, referring segmentation, and interactive segmentation, as well as prompt compositionality. (#Concurrent work. - indicates the model does not have capability for the task, * indicates do not have reported number.)

	Method	Segmentation Data	Type	Generic Segmentation COCO PQ	COCO mAP	COCO mIoU	Referring Segmentation RefCOCOg cIoU	RefCOCOg mIoU	RefCOCOg AP50	Interactive Segmentation PascalVOC 5-NoC85	10-NoC85	20-NoC85	5-NoC90	10-NoC90	20-NoC90
	Mask2Former (T) [6]	COCO (0.12M)		53.2	43.3	63.2	-	-	-	-	-	-	-	-	-
	Mask2Former (B) [6]	COCO (0.12M)		56.4	46.3	67.1	-	-	-	-	-	-	-	-	-
	Mask2Former (L) [6]	COCO (0.12M)		57.8	48.6	67.4	-	-	-	-	-	-	-	-	-
	Panoo/SegFormer (B) [45]	COCO (0.12M)	Segmentation	55.4	*	*	-	-	-	-	-	-	-	-	-
	LAVT (B) [53]	Ref-COCO (0.03M)			-	-	61.2	*	*	-	-	-	-	-	-
	PolyFormer (B) [17]	Ref-COCO+VG+... (0.16M)			-	-	69.3	*	*	-	-	-	-	-	-
	PolyFormer (L) [17]	Ref-COCO+VG+... (0.16M)			-	-	71.1	*	*	-	-	-	-	-	-
	RITM (-CT) [18]	COCO+LVIS (0.12M)			-	-	-	-	-	*	*	2.60	*	*	3.45
uSAT	PseudoClick (-CT) [54]	COCO (0.12M)			-	-	-	-	-	*	*	1.94	*	*	2.25
	FocalClick (T) [21]	COCO (0.12M)			-	-	-	-	-	*	*	2.97	*	*	3.52
	FocalClick (B) [21]	COCO (0.12M)	Interactive		-	-	-	-	-	*	*	2.46	*	*	2.88
	SimpleClick (B) [20]	COCO+LVIS (0.12M)			-	-	-	-	-	1.75	1.93	2.06	1.94	2.19	2.38
	SimpleClick (L) [20]	COCO+LVIS (0.12M)			-	-	-	-	-	1.52	1.64	1.72	1.67	1.84	1.96
	SimpleClick (H) [20]	COCO+LVIS (0.12M)			-	-	-	-	-	1.51	1.64	1.76	1.64	1.83	1.98
	UVIM (L) [55]	COCO (0.12M)		45.8	*	*	-	-	-	-	-	-	-	-	-
	Pix2Seq v2 (B) [56]	COCO (0.12M)		-	38.2	-	-	-	-	-	-	-	-	-	-
	X-Decoder (T) [11]	COCO (0.12M)		52.6	41.3	62.4	59.8	*	*	-	-	-	-	-	-
	X-Decoder (B) [11]	COCO (0.12M)		56.2	45.8	66.0	64.5	*	*	-	-	-	-	-	-
	X-Decoder (L) [11]	COCO (0.12M)		56.9	46.7	67.5	64.6	*	*	-	-	-	-	-	-
	UNINEXT (T) [48]	Image+Video (3M)		-	44.9	-	70.0	*	*	-	-	-	-	-	-
	UNINEXT (L) [48]	Image+Video (3M)		-	49.6	-	73.4	*	*	-	-	-	-	-	-
	Painter (L) [57]	COCO+ADE+NYUv2 (0.16M)	Generalist	43.4	*	*	-	-	-	-	-	-	-	-	-
	#SegGPT (L) [50]	COCO+ADE+NYUv2 (0.16M)		34.4	*	*	-	-	-	-	-	-	-	-	-
SAM	#SAM (B) [36]	SAM (11M)		-	-	-	-	-	-	2.47	2.65	3.28	2.23	3.13	4.12
	#SAM (L) [36]	SAM (11M)			-	-	-	-	-	1.85	2.15	2.60	2.01	2.46	3.12
	#SAM (H) [36]	SAM (11M)			-	-	-	-	-	1.87	2.15	2.55	1.98	2.43	3.11
SEEM	SEEM (T)	COCO+LVIS (0.12M)		50.8	39.7	62.2	60.9	65.7	74.8	1.72	2.30	3.32	1.97	2.83	4.41
	SEEM (B)	COCO+LVIS (0.12M)		56.1	46.4	66.3	65.0	69.6	78.2	1.56	2.04	2.93	1.77	2.47	3.79
	SEEM (L)	COCO+LVIS (0.12M)		57.5	47.7	67.6	65.6	70.3	78.9	1.51	1.95	2.77	1.71	2.36	3.61
SEEM	SEEM (T)	COCO+LVIS (0.12M)		-	-	-	70.4	71.7	82.1	1.72	2.28	3.33	1.97	2.82	4.32
	SEEM (B)	COCO+LVIS (0.12M)	Composition	-	-	-	76.2	77.8	87.8	1.56	2.03	2.91	1.77	2.46	3.76
	SEEM (L)	COCO+LVIS (0.12M)		-	-	-	75.1	76.9	86.8	1.52	1.97	2.81	1.72	2.38	3.64

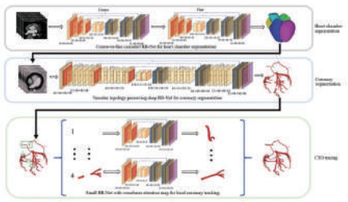
* Zou et al., Segment everything everywhere all at once. NeurIPS,2023

Showcase for Research

Radiology (2023)

Deep learning segmentation and reconstruction for CT of chronic total coronary occlusion

Chronic Total Coronary Occlusion Reconstruction



CHALLENGE Time-consuming in manual reconstruction and quantification of chronic total occlusion (CTO) in coronary CT angiography

SOLUTION To develop a deep learning (DL) model for automated CTO reconstruction

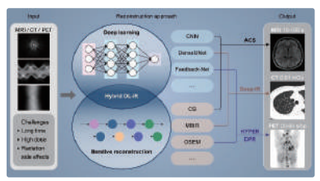
95%
Success rate of CTO reconstruction

73%
Reduced reconstruction and measurement time

Cell Reports Medicine (2023)

Fast and low-dose medical imaging generation empowered by hybrid deep-learning and iterative reconstruction

Multi-Modality Image Reconstruction



CHALLENGE Difficulties in achieving fast and low-dose medical image reconstruction

SOLUTION To develop a hybrid deep-learning and iterative reconstruction framework

10 - 100s
Organ-level scan time in MR

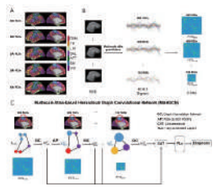
90%
Radiation dose reduction in CT

90%
Radiation dose reduction in CT

IEEE Transactions on Neural Networks and Learning Systems (2023)

Hierarchical graph convolutional network built by multiscale atlases for brain disorder diagnosis using functional connectivity

Functional MRI for Brain Disorder Diagnosis



CHALLENGE Difficulties in considering functional interactions across different spatial scales

SOLUTION To develop a lightweight deep learning framework for fast and accurate delineation

89%
Accuracy of Alzheimer's disease diagnosis

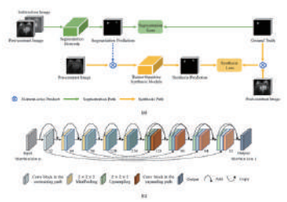
79%
Accuracy of mild cognitive impairment diagnosis

73%
Accuracy of autism spectrum disorder diagnosis

IEEE Transactions on Neural Networks and Learning Systems (2023)

Breast Tumor Segmentation in DCE-MRI With Tumor Sensitive Synthesis

Breast Tumor Segmentation



CHALLENGE Difficulties in accurately segmenting tumors in DCE-MR images

SOLUTION To develop a novel tumor-sensitive synthesis module and further integrate it with tumor segmentation

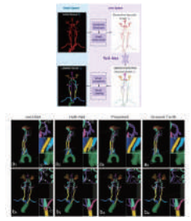
0.78
Dice in the validation set

2.1s
Average inference time

IEEE Transactions on Medical Imaging (2023)

Topology-Aware Graph Network for Centerline-Based Vessel Labeling

Segmentation and Labeling of Head and Neck Vessels



CHALLENGE Difficulties in anatomically labeling head and neck vessels due to their tortuous and branched nature and frequent proximity to nearby vasculature

SOLUTION To develop a novel topology-aware graph network (TaG-Net) for vessel segmentation and labeling

0.915
Average Dice in segmentation

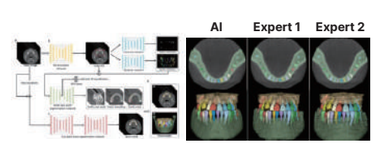
18
Vessel segments/parts

97.8%
Average precision in centerline labeling

Nature Communications (2022)

A fully automatic AI system for tooth and alveolar bone segmentation from cone-beam CT images

Tooth and Alveolar Segmentation



CHALLENGE Difficulties in delineating individual tooth and alveolar bones from dental cone-beam CT (CBCT) images

SOLUTION To develop an AI system for efficient, precise, and fully automated segmentation

4,938
CBCT scans from 15 centers

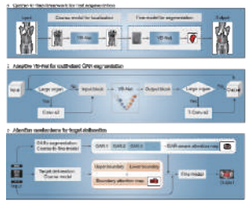
0.945
Dice of segmentation

Showcase for Research

Nature Communications (2022)

Deep learning empowered volume delineation of whole-body organs-at-risk for accelerated radiotherapy

Whole-Body Segmentation



CHALLENGE Time-consuming in manual delineation of organs-at-risk and tumors, which delays radiotherapy

SOLUTION To develop a lightweight deep learning framework for fast and accurate delineation

67 Organs and tumors

28,581 Large-scale dataset

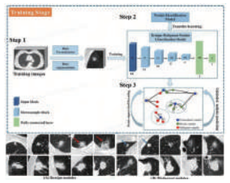
0.95 Average Dice

< 2s Near real-time delineation

IEEE Transactions on Medical Imaging (2022)

Semi-Supervised deep transfer learning for benign-malignant diagnosis of pulmonary nodules in chest CT images

Lung Nodule Malignancy Prediction



CHALLENGE Limited data with pathologically-proven lung nodules, along with imbalanced benign and malignant distributions

SOLUTION To develop a Semi-supervised Deep Transfer Learning (SDTL) framework

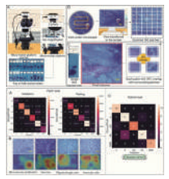
3,038/14,735 Labeled/unlabeled nodules for semi-supervised learning

88.3% Diagnosis accuracy

Neuro Oncology (2021)

Artificial intelligence neuropathologist for glioma classification using deep learning on hematoxylin and eosin stained slide images and molecular markers

Brain Tumor Diagnosis



CHALLENGE Requiring neuropathologists to make histological diagnosis of glioma on postoperative hematoxylin and eosin stained slides

SOLUTION To develop an AI neuropathologist for glioma classification with whole-slide imaging (WSI)

323 WSIs with 97,252 image patches

87.5% Patient-level accuracy of 5 glioma types, including A, O, AA, AO and GBM

NUMBER of PATENTS

Granted

200+

(70 Int'l)

Submitted

800+

ACCUMULATED SCIENTIFIC RESEARCH ACHIEVEMENTS

Articles published

2,000+

Top scientific articles (since 2018)

400+

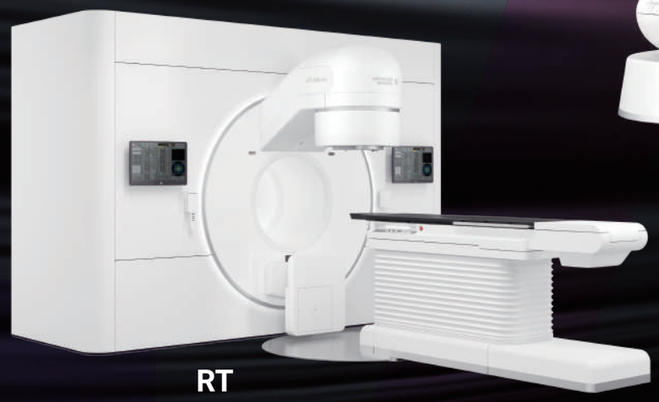
Total citations

170,000+

Enabling Medical Equipment with AI

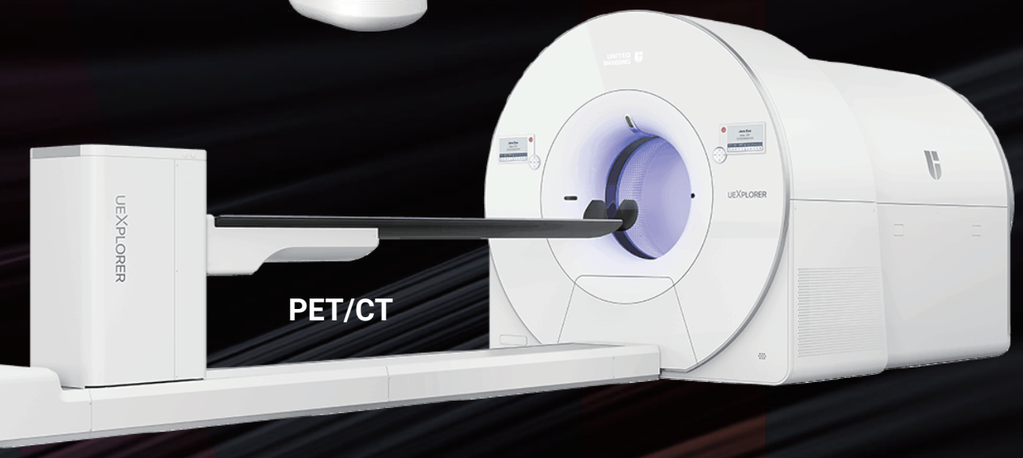
uAI enables multimodal medical imaging and radiotherapy equipment with 40+ AI technologies. These technologies are integrated into the entire process of diagnosis and treatment, making imaging and therapy faster, better, safer, and more cost-effective.

DSA



RT

MR



PET/CT

CT

Mammo

DR

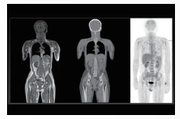
PET/MR

Enhancing All-Modalities Medical Imaging

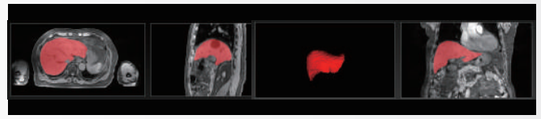
uAI Vision

One-Click Scanning for All Modality Scanners

- Real-time 3D patient modeling
- Precisely capturing all postures and body shapes of patients
- Real-time detection of starting line & scan range
- Automated isocenter adjustment and alignment



Intelligent attenuation correction

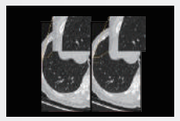


Diagnosis and treatment integration based on intelligent target segmentation

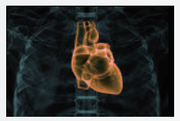
PET/MR

CT

DELTA

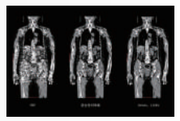


ePhase

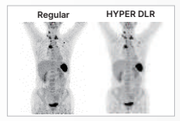


CardioCapture

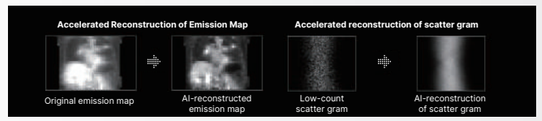
Deep IR

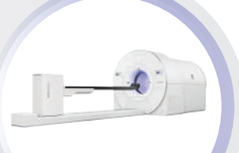


HYPER-DLR PET



Intelligent Scatter Correction Technology



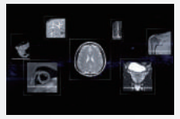


PET/CT

MR

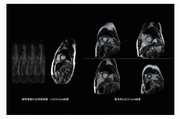
ACS

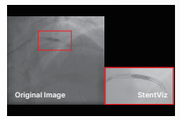
uAIFI DeepRecon™



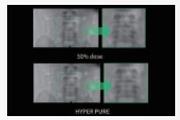
uAIFI EasyScan

t-ACS Cine

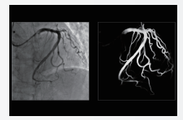




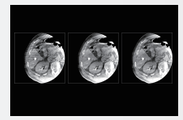
Super-resolution imaging



Perspective mode low-dose imaging



Vessel segmentation and quantification

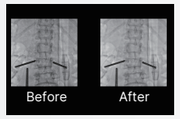


Sparse sampling

DSA

DR

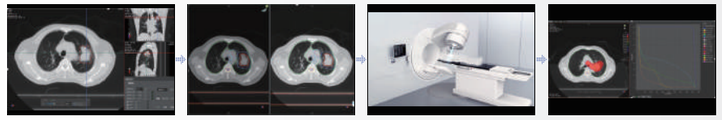
uAI Vision



Small C intelligent noise cancellation

Automatic light field collimator smart beam limiter detection

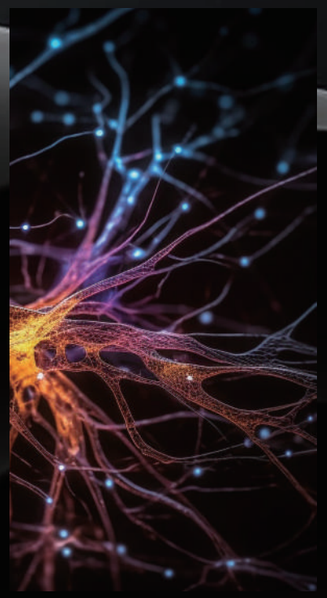
All-In-One Solution



RT

uAI Solutions

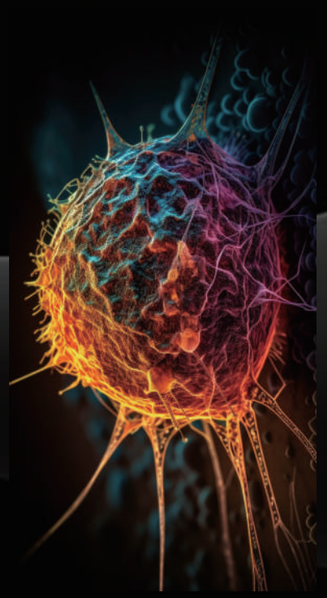
uAI's multi-scenario solutions integrate multiple AI platforms and applications, building a digital healthcare ecosystem, and enabling precision clinical diagnosis and treatment. Furthermore, the integration of multiple AI technologies enables the entire process of diagnosis and treatment.



uAI Solution for
Neuroradiology

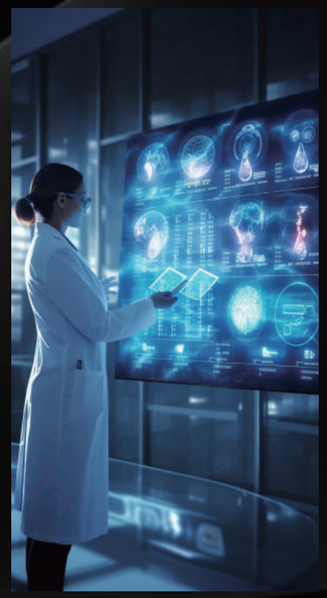
uAI Solution for
Cardiology

uAI Solution for
Thoracic Radiology



uAI Solution for
Cancer Care Management

uAI Solution for
Surgery



uAI Solution for
Quality Control

uAI Solution for Neuroradiology

CT

uAI innovative stroke solution combines three powerful platforms, offering a comprehensive and efficient approach to stroke management.

Key Features

Accelerating Identification of Critical Patients

Optimizing Decision-Making Process

Facilitating Efficient Triage Communication

Easy Triage Platform

Rapid Triage
- Analyzing and sending real-time notifications to physicians regarding patients in critical condition

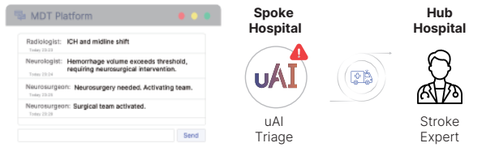
Priority Notifications
- Automatic flagging potential critical findings and prioritize worklists

AI-Powered Stroke Platform

Comprehensive AI analysis
- Providing rapid and precise image analysis

Follow-up Management
- Automatically correlating and comparing head CT results

Care Coordination Platform



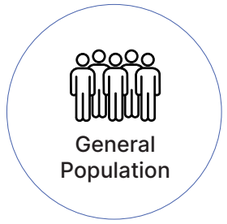
Fast and easy communication
- Collaborating with the multidisciplinary team in real time

Telestroke
- Timely notifying physicians in regional hospitals
- Remote image reading

MRI

AI-powered solution streamlines the analysis of MRI brain image.

Key Features



Better Understanding of Brain Health

Enabling Profound and Precise Insights

Streamline Neurological Research

Health Management

- Structured and quantitative radiological reports
- Brain health assessment across various age groups

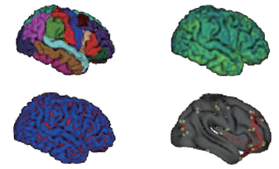
Early Diagnosis and Treatment

- Comparing volumetric results with normative reference database
- Analysis of multiple brain disorders

Identifying Abnormal Brain Regions

- Fully automated segmentation and analysis of brain structures and lesions
- Longitudinal analysis

Multi-Dimensional Analysis of Brain MRIs



- Analysis of both brain structural and functional information
- Examination of burdens and patterns of lesions

uAI Solution for Cardiology

In the field of cardiology, uAI offers a comprehensive cardiac assessment from multiple perspectives: anatomy, physiology, function, and tissue characteristics, providing AI-powered assistance for more precise clinical decisions.

Key Features

- Comprehensive Cardiac Assessment
- Multi-Modality Platform
- Automated Workflows

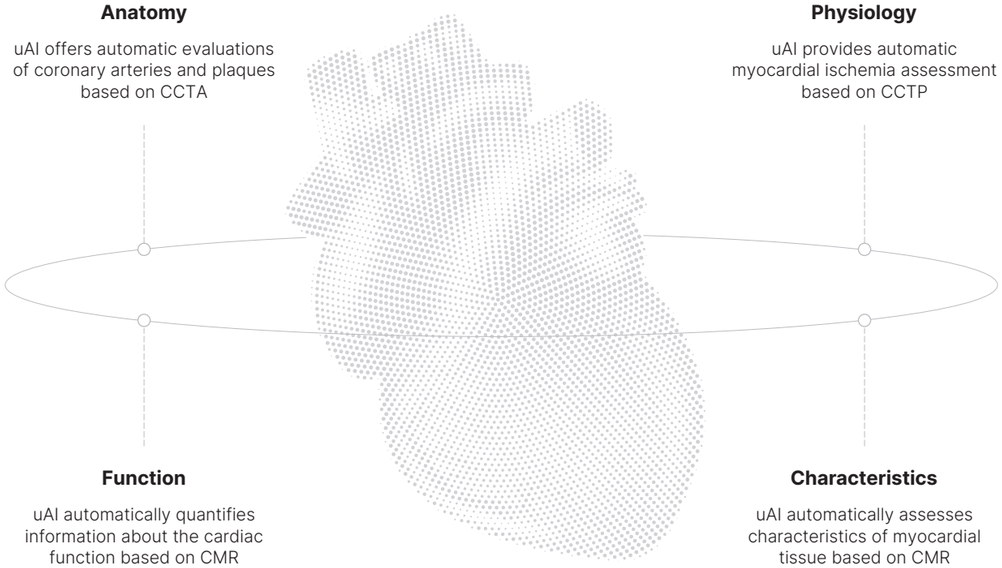
Accelerating Identification of Critical Patients

Anatomy

uAI offers automatic evaluations of coronary arteries and plaques based on CCTA

Physiology

uAI provides automatic myocardial ischemia assessment based on CCTP



Function

uAI automatically quantifies information about the cardiac function based on CMR

Characteristics

uAI automatically assesses characteristics of myocardial tissue based on CMR

Comprehensive Multi-Modality Platform

Cardiac CT

Coronary [CTA] | **Coronary Plaque** [CTA] | **Cardiac** [CTP] | **Aorta** [CTA] | **PE** [CTA]

- Evaluation of coronary and cardiac functions
- Rapidly identifying patients with acute chest pain
- Supporting groundbreaking innovative research

Cardiac MRI

Cardiac Cine [CMR] | **Cardiac T1 Mapping** [CMR]

- A high degree of accuracy validated in various peer-reviewed articles
- Quantifying cardiac function and assessing tissue abnormalities faster than ever before
- Comprehensive and innovative parameters covering both clinical and research needs

Automated Workflows for Faster Patient Care

One-Stop Image Reading

- Enabling radiologists to view different inspection results on the same page to get a comprehensive case overview
- Dragging and dropping series into the viewer for easy workflow

Multiple Image Analysis Tools

- Fully automated segmentation, mapping, classification, detection, and registration algorithms enable radiologists to save time on each image reading
- Providing qualitative and quantitative analysis tools to assist radiologists in evaluating the burden and progression of disease

Automatic Reporting

- Customizable reporting and automated archiving for cardiac MRI and CT evaluations
- Enabling radiologists to access all relevant data from a single location

uAI Solution for Thoracic Radiology

uAI empowers radiological diagnosis with enhanced efficiency and accuracy, enabling the detection of multiple chest diseases from a single CT scan.

Key Features

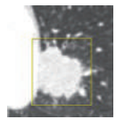
For Clinical Diagnosis

Increase Diagnostic Accuracy

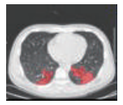
For Physical Examinations

Assist in Early Detection

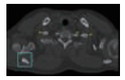
One Scan, Multiple Detection for Chest CT Scan



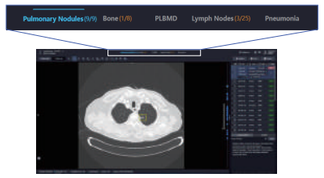
Pulmonary Nodules



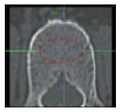
Pneumonia



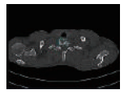
Bone Fractures



User-Friendly Interface

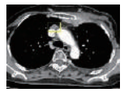


Osteoporosis

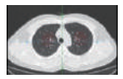


Bone Metastasis

Coronary Artery Disease



Lymph Nodes



Emphysema

Esophageal Thickening

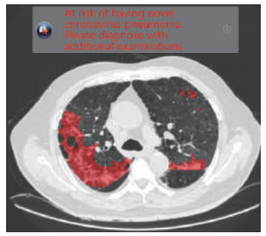
Examples of Clinical Use Cases

uAI Automatically Detects Suspicious Findings

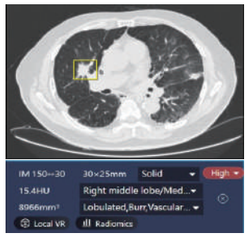
Medical History

For Clinical Diagnosis

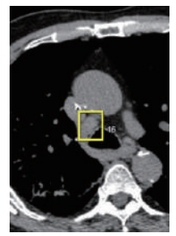
- Male, 80 years old
- Underwent a chest CT scan for dyspnea



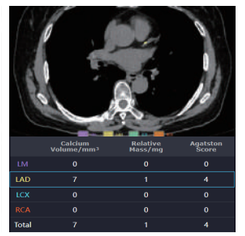
Pneumonia caused by COVID-19



High-risk solid pulmonary nodule in the right middle lobe



Enlarged mediastinal lymph nodes



The total calcium score of the coronary arteries is 4

Source: Shanghai Top Hospital

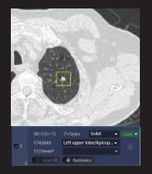
uAI Automatically Notifies Potential Diseases

Medical History

For Annual Physical Examinations

- Male, 68 years old
- Underwent a chest CT scan for annual checkup

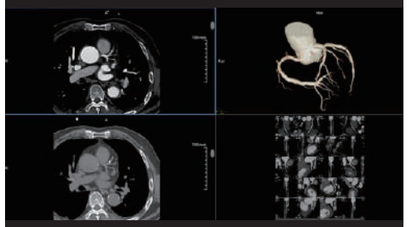
Detection of Two Potential Diseases



- A solid nodule in the posterior segment of the upper lobe of the left lung
- An annual follow-up was recommended based on guidelines

- Total coronary artery calcium score: 188
- Calcium score of the left anterior descending artery: 166

Verifying the Risk of Coronary Artery Disease



- CCTA examination was followed
- Confirmed moderate calcification and moderate stenosis in the coronary arteries

uAI Solution for Cancer Care Management

uAI empowers the entire process of cancer care, supporting early cancer screening, comprehensive diagnosis, and precision treatment.

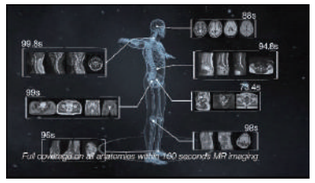
Key Features

Improving Image Quality | **Increasing Detection Accuracy** | **Facilitating Diagnosis** | **Assisting in Treatment Planning**

Improving Image Quality

uAI ACS
Smart Constellation Shuttling MR Imaging

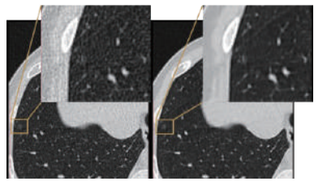
Ultra-high speed MR scanning



AI-assisted Scanning

DELTA
Low Dose CT Imaging

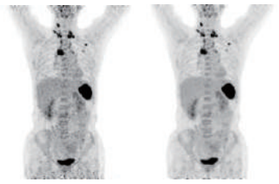
Ultra-low dose non-destructive imaging



Traditional Imaging | CT DELTA Imaging

HYPER-DLR
Noise Reduction for PET Scanning

Effectively reducing PET imaging noise while greatly improving imaging quality



Traditional Reconstruction | HYPER DLR

Increasing Detection Accuracy

Multiple Types of Cancer

Brain | Lung | Breast | Bone | Liver | Kidney | Prostate

Facilitating Accurate Diagnosis

Quantitative Analysis

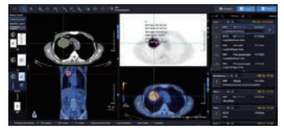
Prostate Tumor

Breast Lesion

Pulmonary Nodule

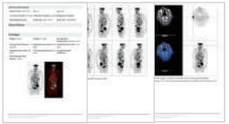
Multidimensional analysis results: nodule or tumor size, volume, density, composition, and enhancement characteristics

Enhanced Diagnosis Through Molecular Imaging



Automatic Lesion Detection

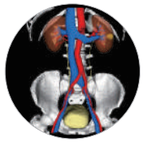
Quantitative Analysis



Reporting System

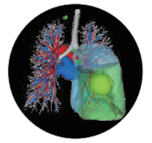
Assisting in Treatment Planning

One-Click Automated Reconstruction



Short Time for Reconstruction

More Accurate Reconstruction Results



Intraoperative Visualization

Versatile Applications Across Different Clinical Scenarios

Preoperative Planning

Intraoperative Navigation

Clinician-Patient Communication

Surgical Education

uAI Solution for Surgery

uAI MERITS

Metaverse Ecosystem for Robotic Intervention, Therapy, and Surgery

Preoperatively

Intelligent Patient Identification and Positioning

Motion Monitoring

- Motion estimation of anatomical regions
- Patient readiness verification
- Activity detection and Prediction

Patient Modeling

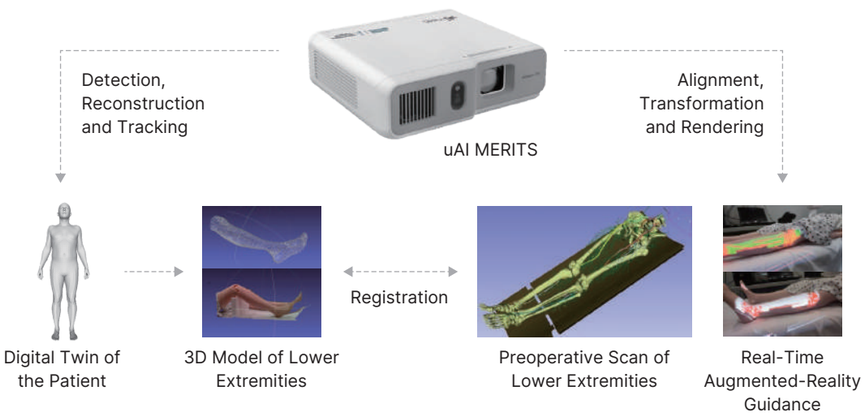
- Real-time 3D patient modeling
- Automated positioning
- Automatic isocenter estimation
- Estimation of radiation exposure parameters
- Cross modality fusion
- Target organ localization

Environment Monitoring

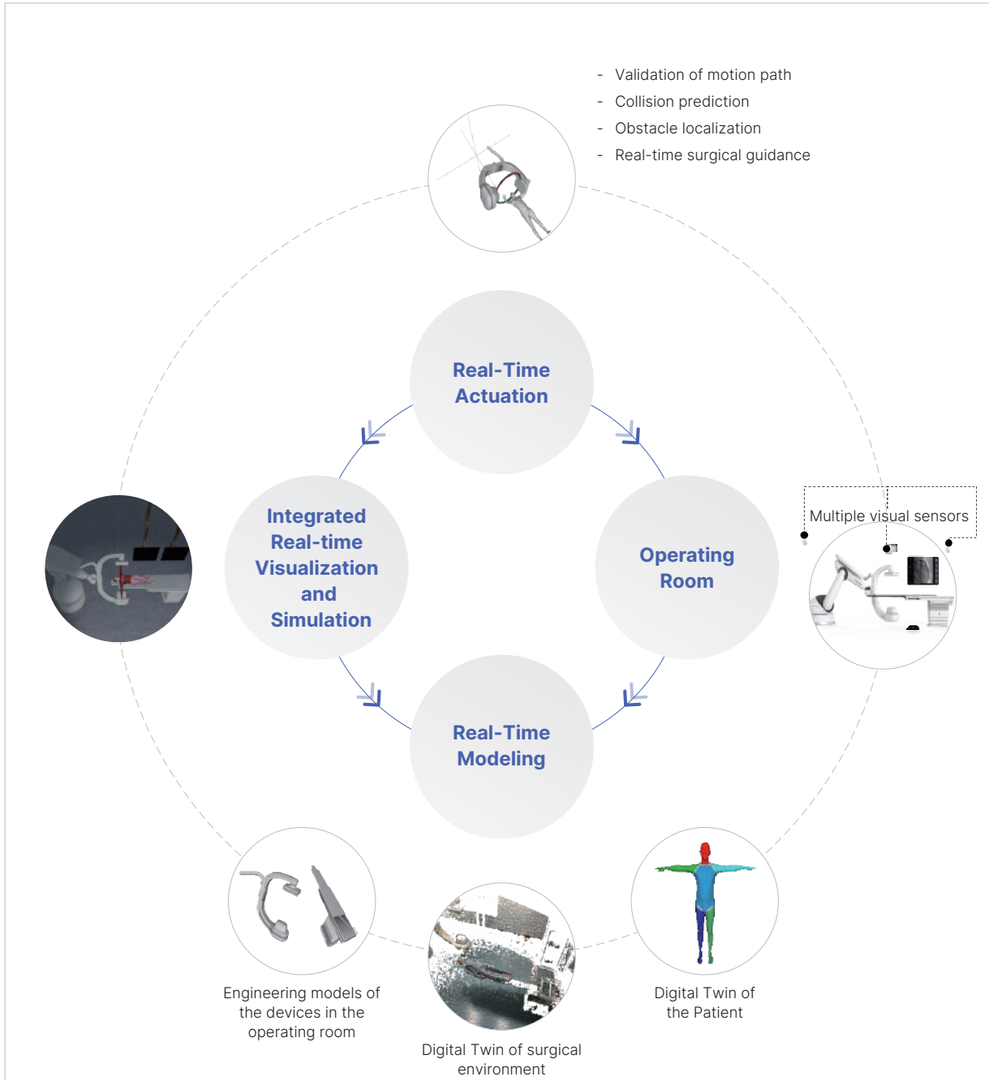
- 3D modeling of environment
- Collision avoidance
- Radiation dose monitoring
- Device positioning and tracking
- Automated navigation
- Process monitoring

Intraoperatively

Real-time Registration, Fusion and Guidance



Precise Execution/Actuation of Procedures with Guidance from Digital Twins



Real-Time Construction of Digital Twin for Surgical Environment

uAI Solution for Quality Control

uAI QC Portal provides AI-assisted automatic image quality control for hospitals and regional medical alliances, ensuring image quality meets the standards required for sharing across hospitals and institutes.

Key Features

CT/DR

Multiple Modalities and Anatomical Locations

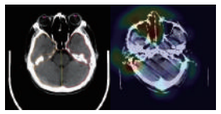
Overall/ Line Items

Multi-Dimensional Analysis of QC Line Items

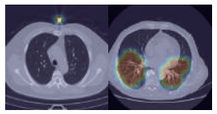
Real-Time/ Retrospective

Two Models of Image QC

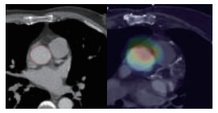
CT



Head



Chest

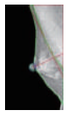


Coronary Artery

DR

Cervical Spine

Chest



Breast

Abdomen

Lumbar Spine

Knee Joint

Overall QC Analysis

Distribution, Percentage, Trend, etc.

Specific Item/Factor QC Analysis

Anatomical Location

Grade

Sex

Equipment

Age

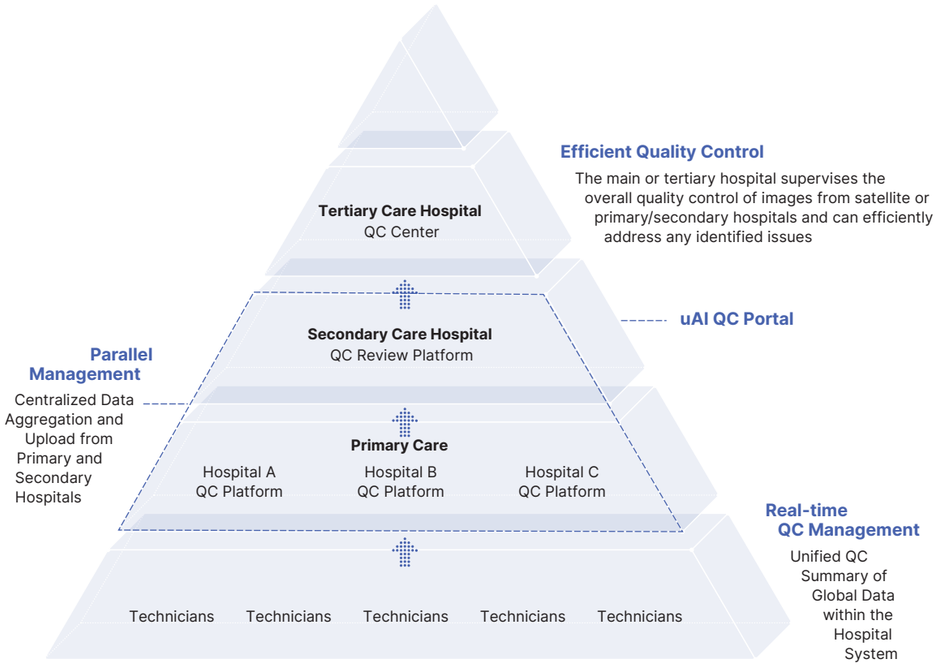
Real-Time Image QC

- Intelligent Identification
- Instantaneous Feedback
- Guidance for Image Retake Considerations

Retrospective Image QC

- Check Quality at Any Time Frame
- Quality Assurance for Sharing
- Quantitative Analysis QC

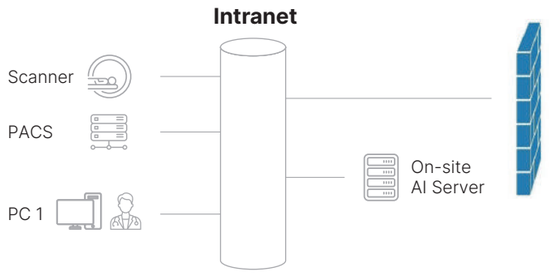
Empowering Regional Imaging Centers



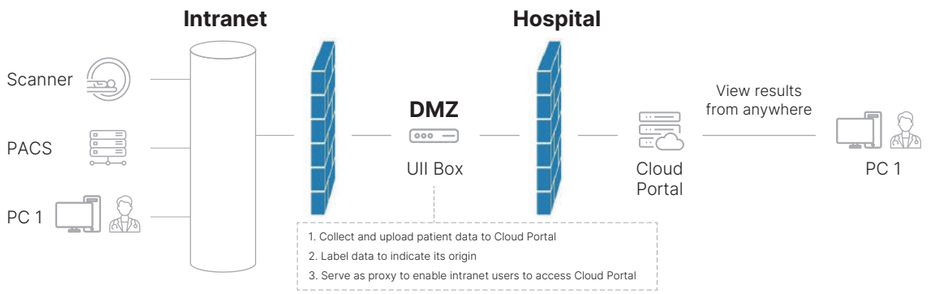
DEPLOYMENT and WORKFLOW

Deployment

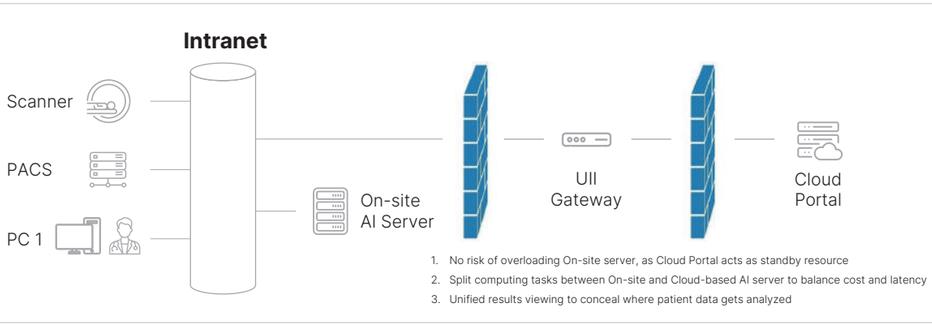
On-Premise



SaaS Mode



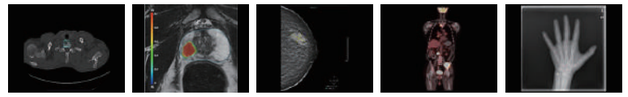
Hybrid Mode



Workflow Improvement

Data Acquisition

Multimodality



CT MRI Mammography PET/CT DR

Data Checking

AI-Driven Image Preprocessing

- Rapidly and accurately determine key attributes, e.g., modality and anatomical location, by analyzing only a minimal number of images
- Replace predefined rules with AI
- Distribute data to the relevant AI algorithms for analysis

AI Computing

Powerful uAI Server

- Improve the quality, speed, and accuracy of diagnosis
- Support the diagnosis of multiple diseases

Physicians

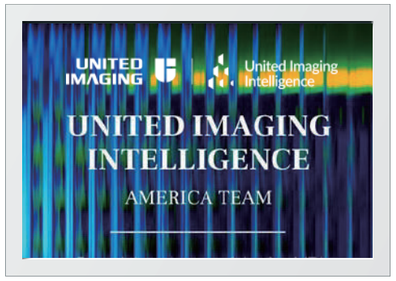
Synchronization of Results

- Flexible result access
  - API-based PACS integration
  - Auto-load AI results matching what is examined on PACS (integration unnecessary)
- Multi-terminal display
- Immediate presentation of result

AWARDS and CERTIFICATION

MICCAI 2023 AIIB Challenge: CT-based Prediction of Mortality in Pulmonary Fibrosis

2020 Super AI Leader



One of the Winners of the fastMRI Image Reconstruction Challenge, Oganized by Facebook AI Research (FAIR) and NYU Langone Health

First Prize of the SegTHOR Challenge: Segmentation of Thoracic Organs at Risk in CT images

Super AI Leader TOP30

U.S. FOOD & DRUG ADMINISTRATION

CE

国家药品监督管理局
National Medical Products Administration