

Dazhou Guo

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Short Bio

Ph.D. in Computer Science & Engineering with 8+ years of R&D experience in medical image analysis, computer vision, and machine learning. Intensively experienced in problem formulation, algorithm design & implementation, and model delivery. Specializes in deep learning for product-driven innovation in diagnostic imaging, leading projects in organ and radiotherapy target segmentation and detection through close collaboration with multidisciplinary teams and clinicians.

Education

- Ph.D.** Computer Science and Engineering, *University of South Carolina*, USA
M.S. Information and informatics Engineering, *Tianjin University*, China
B.E. Electrical Engineering, *Dalian University of Technology*, China

Experience & Projects

Senior Algorithm Engineer, Alibaba DAMO Academy

- 2025 – Present **Lead the development of accurate lung nodule detection and segmentation**
- Conducted 3D RetinaUNet-based automated screening to identify and remove erroneous lung nodule annotations, collaborating closely with oncologists to ensure high-precision labels.
 - Cleaned, standardized, and categorized a comprehensive dataset containing more than 20K CT scans sourced from five medical centers, producing a collection of over 100K individual lung nodule labels.
 - *Tech Stack*: ConvNets, 3D Detection, Monai, etc.
- 2023 – 2024 **Lead the development of the continual learning-driven framework for accurate and generalizable whole-body anatomies segmentation (3 papers, 1 submitted, 2 filed patents)**
- Developed a single unified AI model capable of segmenting hundreds of anatomies across CT scans by leveraging multiple partially labeled datasets without catastrophic forgetting.
 - Cleaned, standardized, and categorized 20 public and 18 private datasets, resulting in a comprehensive collection of 14K+ high-quality CT images and more than 235 anatomical labels.
 - Shipped online models that consistently improve DSC by an average of 5% relative to an ensemble of specialist nnUNets trained on a per-dataset basis, and surpass the segmentation accuracy of “Segment Anything”/SAM-style foundation models by over 9.9% DSC.
 - Led initiatives to consolidate and analyze models by systematically collecting and categorizing corner cases, evaluating the impacts of different body parts, assessing self-supervised pre-training, implementing model pruning, and addressing additional optimization challenges.
 - *Tech Stack*: Continual Learning, Partial Label Learning, Self-supervised Pretraining, ConvNets, 3D Segmentation, SAM, Transformers, Low-rank Adaptation, Model Pruning, Model Optimization.
- 2023 – 2024 **Co-developed the accurate pretreatment identification of extra-nodal extension (ENE) in laryngeal and hypopharyngeal cancers (2 papers, 2 filed patents)**
- Conducted a size-independent and size-aware two-branch network architecture to simultaneously encode unaltered lymph node features and zoomed-in features that better account for localized subtle changes in textures and boundaries.
 - Curated a dataset comprising 1,824 malignant lymph nodes from 248 patients across 4 centers with lymph nodes semi-automatically segmented, labeled, and subsequently confirmed by oncologists.
 - Trained and delivered models that outperformed head and neck specialists (AUC, 0.96 vs [0.79, 0.92]) in prediction of ENE, especially in early-stage ENE detection (AUC, 0.87 vs [0.33, 0.69]).
 - *Tech Stack*: ConvNets, 2.5D Classification, Monai, Transformer, etc.

- 2022 – 2023 **Lead the development of the thoracic lymph node segmentation framework in CT imaging via lymph node station stratification and size encoding (1 paper, 1 filed patent)**
- Developed a 3D stratified segmentation framework that encodes both lymph node station and size variations by mapping thoracic lymph node stations into three super stations and subsequently learning station-specific size differences.
 - Achieved the state-of-the-art performance with an average DSC of 74.2% (a 9.9% increase) and a detection recall of 72.0% (a 15.6% improvement), while reducing false positives to 4.0 per patient—a reduction of 1.9 FP per patient.
 - Led the lymph node data collection and annotation pipeline, achieving a five times speedup compared to manual delineation.
 - *Tech stack*: ConvNets, Network Stratification, Network Architecture Search, etc.
- Senior Research Scientist, PAII Inc.*
- 2021 – 2022 **Lead the development of the thoracic lymph node station (LNS) parsing segmentation framework and lymph node detection framework in CT scans (3 papers, 3 filed patents)**
- Developed an automated search module to identify key organs that optimize LNS parsing performance, achieving an average DSC of 81.1%—a 5.0% improvement over pure CT-based CNN models and a 19.2% increase compared to the previous representative approach.
 - Co-developed a malignant lymph node detection model using distance-sensitive gating, achieving 65.7% and 70.1% recall at 4 and 8 FPs per patient (9.2% improvement).
 - Co-developed the malignant lymph node segmentation model using distance-based GNN.
 - *Tech stack*: ConvNets, Network Architecture Search, Mask-RCNN, FCOS, GNN, etc.
- 2019 – 2021 **Co-Lead the development of organ at risk segmentation framework for head & neck cancer using stratified learning and neural architecture search (2 papers, 1 filed patent)**
- Developed a comprehensive framework to stratify organs into anchor, mid-level, and small & hard OAR categories, with each category addressed by tailored segmentors optimized through neural architecture search.
 - Cleaned, standardized, and categorized CT scans from six centers covering 42 head and neck OARs, yielding a comprehensive collection of over 1,600 high-quality CT images.
 - Led initiatives to consolidate and analyze the model through multi-center retrospective studies, comprehensively evaluating performance and spearheading targeted revision efforts.
 - Shipped online models that enhanced DSC by at least 3–5% relative to the nnUNet benchmark. Multi-user studies demonstrated that 98% of model predictions required only minor (< 1 min) or no revisions to meet clinical acceptance, reducing workloads by 90%.
 - *Tech stack*: ConvNets, 3D Segmentation, Organ Stratification, Small/Hard Organ Detection, Neural Architecture Search, etc.
- Research Intern at PAII Inc. & TuSimple LLC*
- 2018 – 2019 **Developed the automatic segmentation and parsing models for esophageal gross tumor volume, clinical target volume (3 papers, 2 filed patents)**
- Collected and cleaned a retrospective dataset of 606 esophageal cancer patients from four centers: 354 underwent CT scans only, while 252 received additional diagnostic FDG-PET/CT scans.
 - Developed and deployed online models achieving an average DSC of 81.0% using CT images alone, with performance increasing to 83.1% when incorporating PET scans. Multi-user studies showed that 88% of model predictions required only minor (< 1 min) or no revisions for clinical acceptance, resulting in a 48% reduction in workload and a 37.6% decrease in inter-user variation.
 - *Tech stack*: DEEDS, 3D Segmentation, small/hard object segmentation, Imbalanced learning, etc.
- 2017 **Developed Deep Segmentation Assisted Lane Marking Detection Using LiDAR Point Cloud Data (2 filed patents)**
- Conducted deep segmentation assisted algorithm to detect landmark/traffic-sign on 3D LiDAR point cloud and localization of vehicle using 3D LiDAR prior map and image assisted low-cost GPS/IMU.
 - *Tech stack*: Point Cloud, SLAM, Segmentation, small/hard object detection, etc.

Invited Talks

SyncedTech

- 2023 Continual Segment: Towards a Single, Unified and Accessible Continual Segmentation Model of 143 Whole-body Organs in CT Scans
- 2021 Accurate Parsing and Segmentation of Target Volumes and Organs at Risk in Radiotherapy Planning
MICCAI Industry Talk
- 2020 Organ at Risk for Head and Neck Cancer using Stratified Learning and Neural Architecture Search

Professional Activities & Awards

- Award MICCAI-2020 NIH Award
- Award Medical Image Analysis MICCAI-2019 selected papers
- Editor Machine Learning for Quantitative Neuroimaging Analysis ([link](#))
- Reviewer CVPR, ICCV, AAAI, MICCAI, IEEE TPAMI, IEEE TIP, IEEE Multimedia, IEEE TMI, etc.

Selected Publications

- [1] **Guo D**, Ji Z, Su Y, et al. A Continual Learning-driven Model for Accurate and Generalizable Segmentation of Clinically Comprehensive and Fine-grained Whole-body Anatomies in CT. arXiv preprint arXiv:2503.12698, 2025.
 - [2] Ye X*, **Guo D***, Zhao L, et al. Development and validation of AI delineation of the thoracic RTOG organs at risk with deep learning on multi-institutional datasets. *Intelligent Oncology*, 2025, 1(1): 61-71.
 - [3] Wang P, **Guo D**, Zheng D, et al. Accurate airway tree segmentation in ct scans via anatomy-aware multi-class segmentation and topology-guided iterative learning. *IEEE transactions on medical imaging*, 2024, 43(12): 4294-4306.
 - [4] Ji Z*, **Guo D***, Wang P, et al. Continual segment: Towards a single, unified and non-forgetting continual segmentation model of 143 whole-body organs in ct scans. *Proceedings of the IEEE/CVF International Conference on Computer Vision*. 2023: 21140-21151.
 - [5] Ye X*, **Guo D***, Ge J, et al. Comprehensive and clinically accurate head and neck cancer organs-at-risk delineation on a multi-institutional study. **Nature communications**, 2022, 13(1): 6137.
 - [6] **Guo D**, Ge J, Yan K, et al. Thoracic lymph node segmentation in CT imaging via lymph node station stratification and size encoding. *International Conference on Medical Image Computing and Computer-Assisted Intervention*. Cham: Springer Nature Switzerland, 2022: 55-65.
 - [7] **Guo D**, Ye X, Ge J, et al. Deepstationing: thoracic lymph node station parsing in ct scans using anatomical context encoding and key organ auto-search, *International Conference on Medical Image Computing and Computer-Assisted Intervention*. Cham: Springer International Publishing, 2021: 3-12.
 - [8] Jin D*, **Guo D***, Ho T Y, et al. DeepTarget: Gross tumor and clinical target volume segmentation in esophageal cancer radiotherapy. *Medical Image Analysis*, 2021, 68: 101909.
 - [9] **Guo D**, Jin D, Zhu Z, et al. Organ at risk segmentation for head and neck cancer using stratified learning and neural architecture search. *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition*. 2020: 4223-4232.
 - [10] Jin D, **Guo D**, Ho T Y, et al. Accurate esophageal gross tumor volume segmentation in PET/CT using two-stream chained 3D deep network fusion. *International Conference on Medical Image Computing and Computer-Assisted Intervention*. Cham: Springer International Publishing, 2019: 182-191.
- Patents >10 patents filed for projects in Alibaba DAMO Academy, PAII Inc and TuSimple LLC.
- Abstracts >10 clinical abstracts in RSNA and ASTRO.
- Full List <https://scholar.google.com/citations?user=GG4UXqsAAAAJ&hl>