BIN WANG

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EDUCATION

Northwestern University   Illinois, USA
Ph.D. student in Electrical and Computer Engineering, advisor: Prof. Ulas Bagci   Sept. 2022 – Present
ShanghaiTech University   Shanghai, China
B.E. in Computer Science and Technology, advisor: Prof. Dinggang Shen   Sept. 2018 – Jun. 2022

RESEARCH INTERESTS

Eye Tracking, Human-In-The-Loop, Human-centered AI, Prompt Learning, Medical Image Analysis, Generative Model, AI Explainability, Multi-modality Learning (Vision and Language), Zero-shot Learning, Computer Vision (Classification, Segmentation, Detection).

SELECTED PUBLICATIONS (*: CONTRIBUTE EQUALLY)

[1] **Bin Wang**, Hongyi Pan, Armstong Aboah, Zheyuan Zang, Ulas Bagci. GazeGNN: A Gaze-Guided Graph Neural Network for Chest X-ray Classification. *(WACV, 2024)*.

[2] **Bin Wang**, Armstong Aboah, Zheyuan Zhang, Hongyi Pan, Ulas Bagci. GazeSAM: Interactive Image Segmentation with Eye Gaze and Segment Anything Model. *(NeurIPS Workshop, 2023)*.

[3] **Bin Wang**, Lin Teng, Lanzhuju Mei, Zhiming Cui, Xuanang Xu, Dinggang Shen. Deep learning-based Head and Neck Radiotherapy Planning Dose Prediction via Beam-wise Dose Decomposition. *(MICCAI, 2022)*.

[4] **Bin Wang**, Huanyu Zhang, Ziping Zhao, Ying Sun. Globally Convergent Algorithms For Learning Multivariate Generalized Gaussian Distributions. *(IEEE Statistical Signal Processing Workshop (SSP), 2021)*.

[5] Zheyuan Zhang, **Bin Wang**, Debesh Jha, Ugur Demir, Ulas Bagci. Domain Generalization with Correlated Style Uncertainty. *(WACV, 2024)*.

[6] Lin Teng*, **Bin Wang***, Xuanang Xu, Jiadong Zhang, Lanzhuju Mei, Qianjin Feng, Dinggang Shen. Beam-wise dose composition learning for head and neck cancer dose prediction in radiotherapy. *(Medical Image Analysis, 2023)*.

[7] Armstrong Aboah, **Bin Wang**, Ulas Bagci, Yaw Adu-Gyamfi. Real-time Multi-class Helmet Violation Detection Using Few-Shot Data Sampling Technique and YOLOv8. *(CVPR Workshop, 2023; 7th place in 2023 AI City Challenge)*.

[8] Zheyuan Zhang, Lanhong Yao, **Bin Wang**, Debesh Jha, Elif Keles, Alpay Medetalibeyoglu, Ulas Bagci. EMIT-Diff: Enhancing Medical Image Segmentation via Text-Guided Diffusion Model. *(In Submission, 2023)*.

[9] Zheyuan Zhang, **Bin Wang**, Lanhong Yao, Ugur Dmir, Debesh Jha, Boqing Gong, Ulas Bagci. Domain Generalization with Adversarial Intensity Attack for Medical Image Segmentation. *(In Submission, 2023)*.

RESEARCH EXPERIENCE

[1] **Interactive Image Segmentation via SAM and Eye Gaze**

- We propose a novel interactive image segmentation system that utilizes Segment Anything Model (SAM) with eye gaze as the interactive prompt instead of the mouse-based interaction. It enhances the annotation workflow efficiency by nearly 50%.

Keywords: Foundational Model, Prompt-guided Segmentation, Human-In-The-Loop

[2] Medical Image Segmentation via Text-Guided Diffusion Model

- We propose a novel approach for generating high-quality synthetic medical images using diffusion probabilistic models with text and edge constraint. It achieves the first successful application of text-guided diffusion models to general medical image segmentation tasks.

Keywords: Text-guided Image Generation, Generative Model

[3] Disease Classification via Gaze-Guided Graph Neural Network

- We propose a novel gaze-guided graph neural network that integrates raw eye-gaze data directly into image classification, enabling real-time disease classification for radiologists and demonstrating the practicality of real-time eye tracking in their daily work.

Keywords: Image Classification, Graph Neural Network, Human-In-The-Loop

[4] Dose Prediction via Beam-wise Dose Composition Learning

- We predict dose map in radiotherapy by utilizing proposed innovative beam masks to decompose the dose map into multiple beam-based sub-fractions, which disassembles the difficult task to a few easy-to-learn tasks. It achieves top-1 rank on OpenKBP challenge.

Keywords: Radiotherapy, Coarse-to-fine Model

TECHNICAL SKILLS

Languages & Software: Python, Matlab, SQL, C/C++, Diffuser, ITK-SNAP, 3D-Slicer, Optitrack.

Data Science & Computer Vision Toolkits: Pytorch, TensorFlow, OpenCV, PIL, Scikit-Image, Sklearn, Matplotlib, SimpleITK, Numpy, Pandas.

Interface Development Toolkits: PyQt5, QtDesigner.