KEXIN DING

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Actively looking for full-time position in industry and academia.

EDUCATION

University of North Carolina at Charlotte — **Charlotte, NC, United States**
Ph.D. Candidate in Computer Science. GPA: 3.71/4.0 — *09/2019 – Expected 05/2024*

- Advisor(s): Dr. Shaoting Zhang and Dr. Aidong Lu
- Research area: deep learning, machine learning, computer vision, medical image analysis.

Lehigh University — **Bethlehem, PA, United States**
M.S. in Computer Science — *09/2017 - 05/2019*

Xidian University — **Xi'an, Shaanxi, China**
B.S. in Intelligent Science & Technology — *09/2013 - 06/2017*

RESEARCH INTERESTS

AI for Healthcare

- Applying deep learning for medical image analysis
- Multi-modal data fusion and analysis
- Generative AI for healthcare

PROFESSIONAL EXPERIENCE

Philips Research — **Boston, MA, United States**, *05/2023-08/2023*

- Title: Research Intern
- Research topic: Toward reducing domain and label shift for lung ultrasound consolidation detection and classification.

Amazon Web Services (AWS) — **Austin, TX, United States**, *05/2022-08/2022*

- Title: Applied Scientist Intern
- Research topic: HVAC unit health status and maintenance prediction via unsupervised learning on **50TB** time-series data.
- Technical blog: `https://aws.amazon.com/blogs/machine-learning/how-carrier-predicts-hvac-faults-using-aws-glue-and-amazon-sagemaker/`

SenseTime (Leading AI Platform Company in Asia) — **Beijing, China**, *05/2019-08/2019*

- Title: Research Intern
- Research topic: applying deep learning for genetic alteration prediction on the histopathological images.

RESEARCH EXPERIENCE

Pathology-and-genomics Multimodal Transformer for Survival Outcome Prediction

- Achieved **3%-15%** survival prediction improvements (C-Index) compared with other state-of-the-art studies.
- Utilized an unsupervised multimodal pretraining to exploit the interaction between multimodal biomarkers.
- Developed a flexible modality finetuning for broadening the data usage, which is not limited by data modality.
- Achieved a comparable performance with fewer finetuned data (e.g., only use 50% of the finetuned data).

Spatially-aware Graph Neural Networks Enable Cross-level Molecular Profile Prediction in Colon Cancer

- Achieved **5%-15%** prediction improvements (AUC) compared with other state-of-the-art studies.
- Implemented graph neural network for molecular profile prediction on histopathological images while developed an image-graph transformation strategy to define the spatially-connected graph representation.
- Utilized a subgraph ensemble strategy to alleviate cancer heterogeneity and boost the prediction performance.
- Designed a tile importance interpretation method to select clinically-relevant tiles for outcome explanation.

A large-scale synthetic pathological dataset for deep learning-enabled segmentation of breast cancer

- Implemented a large-scale synthetic pathological image dataset generation pipeline for nuclei segmentation.
- Generated and published **20k** synthetic pathological image and the corresponding nuclei segmentation masks.
- Achieved **7%** nuclei segmentation performance improvement (AUC) compared with other state-of-the-art studies by training the model on the synthetics dataset, and testing the trained model on the real image dataset.
- Achieved a further performance improvement (e.g., **3%**) by utilized semi-supervised training strategy.

PUBLICATION

[1] **Ding, Kexin**, Mu Zhou, Dimitris Metaxas, and Shaoting Zhang. "Pathology-and-genomics Multimodal Transformer for Survival Outcome Prediction". **Accepted by MICCAI 2023 (Top 14%, Oral presentation)**.
[2] **Ding, Kexin**, Mu Zhou, He Wang, Shaoting Zhang, and Dimitri N. Metaxas. "Spatially aware graph neural networks and cross-level molecular profile prediction in colon cancer histopathology: a retrospective multi-cohort study." The Lancet Digital Health 4, no. 11 (2022): e787-e795. **The Lancet Digital Health**.
[3] **Ding, Kexin**, Mu Zhou, He Wang, Olivier Gevaert, Dimitris Metaxas, and Shaoting Zhang. "A large-scale synthetic pathological dataset for deep learning-enabled segmentation of breast cancer." Scientific Data 10, no. 1 (2023): 231. **Nature Scientific Data**.
[4] **Ding, Kexin**, Qiao Liu, Edward Lee, Mu Zhou, Aidong Lu, and Shaoting Zhang. "Feature-enhanced graph networks for genetic mutational prediction using histopathological images in colon cancer." **MICCAI 2020 (Oral presentation)**.
[5] **Ding, Kexin**, Mu Zhou, Zichen Wang, Qiao Liu, Corey W. Arnold, Shaoting Zhang, and Dimitri N. Metaxas. "Graph Convolutional Networks for Multi-modality Medical Imaging: Methods, Architectures, and Clinical Applications." arXiv preprint arXiv:2202.08916 (2022).

PROFESSIONAL ACTIVITIES

Journal Review

- IEEE Transactions on Medical Imaging
- Medical Image Analysis
- Machine Intelligence Research

Conference Review

- (Technical Committee Members) MILLanD2023: The 2nd Workshop on Medical Image Learning with Limited and Noisy Data
- DALI2023: The 3rd MICCAI Workshop on Data Augmentation, Labeling, and Imperfections
- NeurIPS 2022: The Thirty-Sixth Annual Conference on Neural Information Processing Systems
- MILLanD2022: Medical Image Learning with Limited and Noisy Data

PROFESSIONAL SKILLS

Programming language: Python, Matlab, SQL, Java, Javascript, C, Scala
Library: PyTorch, PyTorch Geometric, NumPy, Pandas, Matplotlib, Sklearn, AutoGluon, Pillow
Operation system: Linux, MacOS