KEXIN DING

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Actively looking for 2023 full-time/intern position in computer vision, deep learning and machine learning related fields

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 05/2023*

- 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*

- Coursework: algorithm and data structure, machine learning, deep learning, data mining.

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

WORK & RESEARCH EXPERIENCE

Amazon Web Services (AWS) *Applied Scientist Intern* **United States**, *05/2022-08/2022*

- Designed the solution for HVAC unit health status and maintenance prediction on **50TB** time-series data.
- Developed an unsupervised (e.g., **multi-scale CNN-autoencoder**) cycle representation learning pipeline for extracting the representative cycle embeddings from time-series data with various lengths.
- Utilized **AutoML (e.g., AutoGluon**) for a variety of downstreaming predictions by using cycle embeddings.
- Achieved **2%** prediction improvement (AUC) compared with using the cycle statistics feature for prediction.

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 image 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 clinical-relevance tiles for outcome explanation.

Large-scale Synthetic Histopathogolical Image Dataset Generation for Nuclei Segmentation

- Implemented a large-scale synthetic pathological image dataset generation pipeline for nuclei segmentation.
- Generated **20k** synthetic histopathological image and the corresponding nuclei segmentation masks.
- Achieved **2%** nuclei segmentation performance improvements 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., **1%**) by utilized self-training pretraining strategy.

Transfer Learning for Multimodal Foundation Model in Medical Imaging Domain (In progress)

- Investigated the impact and benefit of using pre-trained **foundation model** (e.g., CLIP) for **multimodal medical imaging** applications, including the histopathological and radiological images with clinical text descriptions.
- Evaluated the optimal transfer learning strategy for boosting the performance, generalization, and robustness of utilizing multimodal foundation models in medical imaging.
- Demonstrated that transfer learning could lead to superior performance on multimodal medical imaging tasks.

PUBLICATION

[1] **Kexin Ding**, 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.", *In International Conference on Medical Image Computing and Computer-Assisted Intervention (MICCAI2020), pp. 294-304. Springer, Cham, 2020.* **Accepted by MICCAI2020**.

[2] Spatially-aware Graph Neural Networks Enable Cross-level Molecular Profile Prediction in Colon Cancer Histopathology: A Retrospective Multicentre Cohort Study. **Accepted by The Lancet Digital Health (IF 36.615)**.

[3] Graph Convolutional Networks in Multi-modality Medical Imaging: Concepts, Architectures, and Clinical Applications. *Submitted to Medical Image Analysis (Under Review).*

[4] A Large-scale Synthetic Histopathological Dataset for Nuclei Segmentation. *Submitted to Nature Scientific Data.*

PROFESSIONAL SKILLS

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