Li Sun

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EDUCATION

University of Pittsburgh, USA   *Sept 2019 - Current*
PhD student in Intelligent Systems
GPA: 3.92/4.00, advisor: Prof. Kayhan Batmanghelich

Southern University of Science and Technology, China   *Sept 2015-June 2019*
B.Sc. in Bioinformatics
GPA: 3.86/4.00, ranking: 2/22

SELECTED PUBLICATIONS

Robinson, J., **Sun, L.**, Yu, K., Batmanghelich, K., Jegelka, S., & Sra, S. (2021). Can contrastive learning avoid shortcut solutions? In *Advances in Neural Information Processing Systems (NeurIPS)*.

Sun, L., Yu, K., & Batmanghelich, K. (2020). Context Matters: Graph-based Self-supervised Representation Learning for Medical Images. In *Proceedings of the AAAI Conference on Artificial Intelligence (AAAI)*.

Sun, L., Chen, J., Xu, Y., Gong, M., Yu, K., & Batmanghelich, K. (2020). Hierarchical Amortized Training for Memory-efficient High Resolution 3D GAN. In *Medical Imaging meets NeurIPS workshop*

Sun, L., Zhang, S., Chen, H., & Luo, L. (2019). Brain Tumor Segmentation and Survival Prediction Using Multimodal MRI Scans with Deep Learning. *Frontiers in neuroscience*, 13, 810.

WORK EXPERIENCE

Microsoft Research Asia   *Mar 2019 - Aug 2019*
Research Intern, manager: Dr. Eric I-Chao Chang
- Developed fine-grained model that make used of anatomical structure for chest radiograph interpretation
- Achieved improved results on thoracic diseases that are subtle and require close observation
- Developed reinforcement learning model for interpretable life support device detection

Johns Hopkins University   *June 2018 - Sept 2018*
Visiting Research Assistant, advisor: Prof. Yun Chen
- Designed and built a robotic indenter to measure force versus displacement and force versus time responses of soft tissue

RESEARCH EXPERIENCE

Avoiding Shortcut Solutions in Contrastive Learning   *Nov 2020 - May 2021*
Mentor: Prof. Suvrit Sra, MIT & Prof. Kayhan Batmanghelich, University of Pittsburgh
- Analyzed feature suppression in contrastive learning, and explained why feature suppression can occur when optimizing the InfoNCE loss
- Studied the relation between instance discrimination tasks and feature learning; concretely, adjustments to instance discrimination difficulty leads to different features being learned
- Proposed implicit feature modification, a simple and efficient method that reduces the tendency to use feature suppressing shortcut solutions and improves generalization
- Highlighted by World Economic Forum and MIT News

Context-aware Self-supervised Learning for Medical Images   *May 2020 - Sept 2020*
Mentor: Prof. Kayhan Batmanghelich, University of Pittsburgh
- Proposed a self-supervised representation learning method for volumetric medical images that accounts for anatomical context, which is from both local anatomical profiles and graph-based relationship
- Proposed method that provides task-specific explanation for the predicted outcome
- Short version accepted by Medical Imaging meets NeurIPS workshop (Oral), long version paper accepted by AAAI

Hierarchical Amortized GAN for 3D High Resolution Medical Image Synthesis   *Jan 2020 - Nov 2020*
Mentor:Prof. Kayhan Batmanghelich, University of Pittsburgh
- Proposed a novel end-to-end GAN architecture that can generate high-resolution volumetric images while being memory efficient
- Discovered that moving along certain directions in latent space results in explainable anatomical variations in generated images
- Short version paper accepted by Medical Imaging meets NeurIPS workshop, long version under review

Brain Tumor Segmentation and Survival Prediction with Deep Learning   *May 2018 - Aug 2018*
Mentor:Prof. Lin Luo, Peking University
- Developed an ensemble model of 3D CNNs to segment brain tumor from multimodal MRI scans, then extracted radiomic features from segmented tumor combined with clinical features to predict patients' overall survival
- Ranked 2nd place and 5th place out of 60+ teams in 2018 MICCAI BraTS challenge on survival prediction task and segmentation task respectively, received prize from Intel AI
- Paper accepted by MICCAI BrainLes 2018 workshop and was invited for spotlight presentation

ACADEMIC SERVICE

Invited reviewer for MICCAI

AWARD

- China National Scholarship Award (Top 0.5%)
- Cum Laude Graduates, SUSTech (Top 3%)
- First-Class Undergraduate Scholarship, SUSTech (Top 5%)

SKILLS

Languages:	Python, R, Shell, Java, C++
Operating Systems:	Linux, Windows, MacOS

REFERENCE

Kayhan Batmanghelich, Assistant Professor
University of Pittsburgh
Email: kayhan@pitt.edu

Eric I-Chao Chang, Senior Director
Microsoft Research Asia
Email: echang@microsoft.com

Lin Luo
Vice Dean, Beijing Institute of Collaborative Innovation
Associate Researcher, Peking University
Email: luol@pku.edu.cn