Yirui Wang

GOOGLE SCHOLAR https://scholar.google.com/yiruiwang

CONTACT Email: yiruiwang06@gmail.com
Tel: +1 (443) 301-5006
City: Potomac, MD, 20854 (open to relocating)

TECHNICAL SKILLS
- Programming Languages: Python, C++
- Version Control Systems: Git
- Deep Learning Framework: PyTorch
- Expertise: weakly-/semi- supervised learning, object detection/tracking, medical image analysis, semantic segmentation, video matting

WORKING EXPERIENCE

PAII Inc. Bethesda, MD, USA

Research Scientist Oct. 2020 - current
Research Software Engineer Sept. 2018 - Oct. 2020

- Performed data curation for large-scale medical image analysis, including data collection, data cleaning, and data preprocessing
- Developed a torso X-ray imaging-based computer-assisted (pelvic/thoracic) bone fracture and the associated pathology detector (by using DenseNet-121 with Feature Pyramid Network) for emergency medicine as an X-ray imaging solution. The model achieved **physician-level** diagnosis performance in a clinical reader study (AUROC of **97.3%**) and was productized and deployed to healthcare providers through docker images. Published by ***Nature Communications***
- Developed a bone mineral density prediction and fracture risk assessment method (based on VGG backbone) for opportunistic screening via X-ray images. Achieved over **90%** assessment accuracy evaluated on more than 20,000 patients. Published by ***Nature Communications***
- Developed a background replacement application for an internal virtual meeting platform by employing a temporal memory enhanced video matting method (with GRU decoder). Significantly improved matting quality especially on fine-grained details (e.g., hair strands)
- Developed a real-time human counting and tracking application (by using YOLOX) for video-based compliance checking. Achieved efficient and robust predictions under varies interior layouts and lighting conditions

EDUCATION

Johns Hopkins University (JHU) Baltimore, Maryland, USA

Master in Computer Science Sep. 2016 - May. 2018
Courses: machine learning, deep learning, computer vision, machine translation, algorithms, data structures, and database

East China Normal University (ECNU) Shanghai, China

Bachelor in Computer Science Sep. 2012 - Jun. 2016
Courses: Operating Systems, Computer Networks, Data Structure, Databases, Principles of Compiler, Modern Software Engineering, Computer Architecture

HONORS AND AWARDS

2021 Ping An Group Innovation Breakthrough Award Ping An Group, 2021
- The first contributor, one of the three awarded projects in Ping An Group

Major Innovation Team Award Ping An Group, 2021
Excellent Bachelor Degree's Thesis ECNU, 2016

Scholarship for Excellent Student — ECNU, 2016
Second Prize of Microsoft Imagine Cup (China) — Microsoft (China), 2015

Conference Publications

11. **Yirui Wang**, Kang Zheng, Chi-Tung Chang, Xiao-Yun Zhou, Zhilin Zheng, Lingyun Huang, Jing Xiao, Le Lu, Chien-Hung Liao, Shun Miao: "Knowledge Distillation with Adaptive Asymmetric Label Sharpening for Semi-supervised Fracture Detection in Chest X-rays." *the 27th international conference on Information Processing in Medical Imaging (IPMI)*, 2021.

10. Kang Zheng, **Yirui Wang**, Xiaoyun Zhou, Fakai Wang, Le Lu, Chihung Lin, Lingyun Huang, Guotong Xie, Jing Xiao, Chang-Fu Kuo, Shun Miao: "Semi-Supervised Learning for Bone Mineral Density Estimation in Hip X-ray Images." *International Conference on Medical Image Computing and Computer-Assisted Intervention (MICCAI)*, Strasbourg, France, 2021. (early accept)

9. Xinyu Zhang*, **Yirui Wang***, Chi-Tung Cheng, Le Lu , Jing Xiao, Chien-Hung Liao, Shun Miao: "Window Loss for Bone Fracture Detection and Localization in X-ray Images with Point-based Annotation." *the Thirty-Fifth AAAI Conference on Artificial Intelligence (AAAI)*, 2021.

8. Haomin Chen*, **Yirui Wang***, Kang Zheng, Weijian Li, Chi-Tung Cheng, Adam P Harrison, Jing Xiao, Gregory D Hager, Le Lu, Chien-Hung Liao, Shun Miao: "Anatomy-aware Siamese network: exploiting semantic asymmetry for accurate pelvic fracture detection in x-ray images." *the European Conference on Computer Vision (ECCV)*, Glasgow, UK, 2020.

7. Yuhang Lu, Weijian Li, Kang Zheng, **Yirui Wang**, et al. "Learning to Segment Anatomical Structures Accurately from One Exemplar." *International Conference on Medical Image Computing and Computer-Assisted Intervention (MICCAI)*, Lima, Peru, 2020.

6. **Yirui Wang**, Le Lu, Chi-Tung Cheng, Dakai Jin, Adam P Harrison, Jing Xiao, Chien-Hung Liao, Shun Miao: "Weakly Supervised Universal Fracture Detection in Pelvic X-Rays." *International Conference on Medical Image Computing and Computer-Assisted Intervention (MICCAI)*, Shenzhen, China 2019.

Journal Publications

5. Chi-Tung Cheng*, **Yirui Wang***, Huan-Wu Chen, Po-Meng Hsiao, Chun-Nan Yeh, Chi-Hsun Hsieh, Shun Miao, Jing Xiao, Le Lu: "A scalable physician-level deep learning algorithm detects universal trauma on pelvic radiographs." *Nature Communications*, article number: 1066, 2021

4. Chen-I Hsieh*, Kang Zheng*, Chihung Lin, Ling Mei, Le Lu, Weijian Li, Fang-Ping Chen, **Yirui Wang**, Xiaoyun Zhou, Fakai Wang, Guotong Xie, Jing Xiao, Shun Miao, Chang-Fu Kuo: "Automated Bone Mineral Density Prediction and Fracture Risk Assessment using Plain Radiographs via Deep Learning." *Nature Communications*, article number: 5472, 2021

3. Yuhang Lu, Kang Zheng, Weijian Li, **Yirui Wang**, Adam P. Harrison, Chi-huang Lin, Jing Xiao, Song Wang, Le Lu, Chang-Fu Kuo, and Shun Miao: "Contour Transformer Network for One-shot Segmentation of Anatomical Structures." *IEEE Transaction on Medical Imaging*, 2020

2. Aimin Zhou, **Yirui Wang**, and Jinyuan Zhang: "Objective extraction via fuzzy clustering in evolutionary many-objective optimization." *Information Sciences*, 2020.

Book Chapter

1. Dakai Jin, Adam P. Harrison, Ling Zhang, Ke Yan, **Yirui Wang**, Jinzheng Cai, Shun Miao, Le Lu: "Artificial intelligence in radiology." *Artificial Intelligence in Medicine: Technical Basis and Clinical Applications*, Elsevier, 2020

*** Equally contributed**

Clinical Abstracts

3. Chi-Tung Cheng, **Yirui Wang**, Shun Miao, Huan-Wu Chen, Chien-Hung Liao, Le Lu:"PelviXNet: A Generalized Trauma Finding Detection Algorithm of Pelvic Radiography." *RSNA* 2020

2. Kang Zheng, **Yirui Wang**, Le Lu, Shun Miao, et al.: "Consistent and Coherent Computer-Aided Knee Osteoarthritis Assessment from Plain Radiographs." *RSNA* 2020

1. Chi-Tung Cheng, Chien-Hung Liao, **Yirui Wang**, Shun Miao, Le Lu, et al.: "Universal High Performance Pelvic/Hip Fracture Detection on Pelvic Radiographs of Trauma Patients using Cascaded Deep Networks." **(Oral presentation)** *RSNA* 2019

Granted Patents

7. **Yirui Wang**, Le Lu, Dakai Jin, Adam P. Harrison, Shun Miao: "Fracture detection method, electronic device and storage medium." *U.S. Patent* (no. 10937143), 2021

Patent Applications

6. **Yirui Wang**, Haomin Chen, Kang Zheng, Adam P. Harrison, Le Lu, Shun Miao: "Device and method for computer-aided diagnosis based on image" *U.S. Patent Application* (no. 16/850,622), 2020

5. **Yirui Wang**, Kang Zheng, Xiaoyun Zhou, Le Lu, Shun Miao: "Knowledge Distillation with Adaptive Asymmetric Label Sharpening for Semi-supervised Fracture Detection in Chest X-rays" *U.S. Patent Application* (no. 17/214,400), 2021

4. Kang Zheng, **Yirui Wang**, Shun Miao, Changfu Kuo, Chen-I Hsieh: "Estimating Bone Mineral Density From Plain Radiograph By Assessing Bone Texture With Deep Learning." *U.S. Patent Application* (no. 17/142,187), 2021

3. Kang Zheng, Yuhang Lu, Weijian Li, **Yirui Wang**, Adam Harrison, Le Lu, Shun Miao: "Contour Transformer Network: Learning to Segment Anatomical Structures from One Exemplar", *U.S. Patent Application* (no. 62/988,628), 2020

2. Kang Zheng, Shun Miao, **Yirui Wang**, Xiaoyun Zhou, Le Lu: "Semi-Supervised Learning for Bone Mineral Density Estimation in Hip X-ray Images", *U.S. Patent Application* (no. 63/165,223), 2021

1. Fakai Wang, Kang Zheng, Shun Miao, **Yirui Wang**, Le Lu: "Opportunistic Screening of Osteoporosis Using Plain Film Chest X-ray", *U.S. Patent Application* (no. 63/165,231), 2021

Academic Services

Peer-review for Journals and Letters

- IEEE Transactions on Medical Imaging (TMI)
  2020
- IEEE Journal of Biomedical and Health Informatics (JBHI)
  2019, 2020, 2021
- The Visual Computer (TVCJ)
  2021
- IEEE Signal Processing Letters (SPL)
  2020

Peer-Review for Conferences

- IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)
  2021
- IEEE/CVF International Conference on Computer Vision (ICCV)
  2021
- AAAI Conference on Artificial Intelligence (AAAI)
  2020, 2021 (**Top 25% Reviewer**)
- Medical Image Computing and Computer Assisted Intervention (MICCAI)
  2020, 2021 (**Outstanding Reviewer Honorable Mentions**)
- IEEE International Symposium on Biomedical Imaging (ISBI)
  2020