Zongwei Zhou

Ph.D. Candidate, Biomedical Informatics

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Research Overview

Zongwei Zhou is currently a Ph.D. candidate in the Department of Biomedical Informatics, Arizona State University supervised by Dr. Jianming Liang. He has received a B.S. degree with honors in Computer Science from Dalian University of Technology in 2016. He has also spent time at Mayo Clinic, University of California, Berkeley, and Université de Montréal. Drawing upon the realms of biomedical informatics, computer vision, and deep learning, his research focuses on developing novel methodologies to minimize the annotation efforts for computer-aided diagnosis, therapy, and surgery. Zhou has published 10+ peer-reviewed publications in prestigious journals and conferences in his field. Moreover, he holds 3 US patents and additional 7 patents pending. He is the recipient of the MICCAI Young Scientist Award in 2019.

Education

- ■ **Arizona State University**   Aug 2017 - present
  - Ph.D. Candidate of Biomedical Informatics. (GPA: 4.0 / 4.0)
  - Thesis: Cost-Effective Deep Learning in Medical Image Analysis
  - Advisor: Dr. Jianming Liang
  - Thesis Committee: Dr. Edward H. Shortliffe and Dr. Murthy Devarakonda
- ■ **Dalian University of Technology**   Sep 2012 - June 2016
  - B.S. in Computer Science and Technology. (GPA: 86.6 / 100, Ranking: 7 / 70)
  - Thesis: Medical Image Classification based on Deep Learning
  - Advisor: Dr. Hongkai Wang

Awards and Honors

Research Grants

- ■ XSEDE Research (135,360 GPU Hours, 12,000 GB Storage); PI: Dr. Jianming Liang   June 2020

Awards and Recognitions

- ■ MICCAI Student Participation Award   Aug 2020
- ■ First & third places in Annual Student Poster Competition, BMI/BMD Symposium   Apr 2020
- ■ University Graduate Fellowship, Arizona State University   Mar 2020
- ■ MICCAI Young Scientist Award   Oct 2019
- ■ MICCAI Best Presentation Award Finalist   Oct 2019
- ■ MICCAI Graduate Student Travel Award   Aug 2019
- ■ First place in the Annual Student Poster Competition, Mayo Clinic, BMI/BMD Symposium   Apr 2019
- ■ Outstanding Graduate, Dalian University of Technology   June 2016

Experience

- ■ **Centre Hospitalier de l'Université de Montréal**   Jan 2018 - July 2018
  Position: Research Intern, Advisor: Dr. An Tang
  - Department: Laboratoire clinique de traitement de l'image (LCTI)
  - Project: Predictive model of colorectal cancer liver metastases response to chemotherapy
  - Joint Collaboration: Centre de recherche du CHUM and Mila - Quebec Artificial Intelligence Institute
- ■ **Mayo Clinic, Rochester MN**   June 2017 - July 2017
  Position: Research Intern, Advisor: Dr. Bradley Erickson
  - Department: Radiology Informatics Lab
  - Project: Thyroid Ultrasound imaging, tumor radiogenomics

Peer-refereed Journal Publications

[1] F. Haghighi, M. R. Hosseinzadeh Taher, <u>Z. Zhou</u>, M. Gotway, J. Liang. "**Transferable Visual Word**." Submitted to *IEEE Transactions on Medical Imaging,* 2020.

[2] M. M. Rahman Siddiquee, <u>Z. Zhou</u>, R. Feng, N. Tajbakhsh, M. Gotway, Y. Bengio, and J. Liang. " **Fixed-Point Image-to-Image Translation**." Submitted to *International Journal of Computer Vision,* 2020.

[3] <u>Z. Zhou</u>, V. Sodha, J. Pang, M. Gotway, and J. Liang. "**Models Genesis.**" Submitted to *Medical Image Analysis,* 2020.

[4] <u>Z. Zhou</u>, J. Shin, S. Gurudu, M. Gotway, and J. Liang. "**Active, Continual Fine Tuning of Convolutional Neural Networks for Reducing Annotation Efforts.**" Submitted to *Medical Image Analysis*, 2020.

[5] <u>Z. Zhou</u>, M. M. Rahman Siddiquee, N. Tajbakhsh, and J. Liang. "**UNet++: Redesigning Skip Connections to Exploit Multi-Resolution Features in Image Segmentation.**" *IEEE Transactions on Medical Imaging,* 2020.

[6] <u>Z. Zhou</u>, J. Shin, R. Feng, R. Hurst, C. Kendall, and J. Liang. "**Integrating Active Learning and Transfer Learning for Carotid Intima-Media Thickness Video Interpretation.**" *Journal of Digital Imaging,* 2019.

[7] H. Wang, Z. Chen, <u>Z. Zhou</u>, Y. Li, P. Lu, W. Wang, W. Liu, L. Yu. "**Evaluation of Machine Learning Classifiers for Diagnosing Mediastinal Lymph Node Metastasis of Lung Cancer from PET/CT Images.**" *Journal of ZheJiang University (Engineering Science)*, 2018

[8] H. Wang, <u>Z. Zhou</u>, Y. Li, Z. Chen, P. Lu, W. Wang, W. Liu, and L. Yu. "**Comparison of Machine Learning Methods for Classifying Mediastinal Lymph Node Metastasis of Non-Small Cell Lung Cancer from 18 F-FDG PET/CT Images.**" *EJNMMI Research,* 2017.

Peer-refereed Conference Proceedings

[1] R. Feng, <u>Z. Zhou</u>, M. Gotway, J. Liang. "**Self-supervised Learning: From Parts to Whole**." *Domain Adaptation and Representation Transfer (DART'20),* 2020.

[2] F. Haghighi, M. R. Hosseinzadeh Taher, <u>Z. Zhou</u>, M. Gotway, J. Liang. "**Learning Semantics-enriched Representation via Self-discovery, Self-classification, and Self-restoration**." *International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI'20),* 2020. (Oral)

[3] M. M. Rahman Siddiquee, <u>Z. Zhou</u>, R. Feng, N. Tajbakhsh, M. Gotway, Y. Bengio, and J. Liang. "**Learning Fixed Points in Generative Adversarial Networks: From Image-to-Image Translation to Disease Detection and Localization**." *International Conference on Computer Vision (ICCV'19),* 2019.

[4] <u>Z. Zhou</u>, V. Sodha, M. M. Rahman Siddiquee, R. Feng, N. Tajbakhsh, M. Gotway, and J. Liang. "**Models Genesis: Generic Autodidactic Models for 3D Medical Image Analysis**." *International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI'19),* 2019. (Young Scientist Award; Oral)

[5] <u>Z. Zhou</u>, M. M. Rahman Siddiquee, N. Tajbakhsh, and J. Liang. "**UNet++: A Nested U-Net Architecture for Medical Image Segmentation.**" *Deep Learning in Medical Image Analysis (DLMIA'18),* 2018. (Oral)

[6] <u>Z. Zhou</u>, J. Shin, L. Zhang, S. Gurudu, M. Gotway, and J. Liang. "**Fine-tuning Convolutional Neural Networks for Biomedical Image Analysis: Actively and Incrementally.**" *Conference on Computer Vision and Pattern Recognition (CVPR'17),* 2017.

Conference Abstracts

[1] <u>Z. Zhou</u>, Z. Akkus, M. S. Warner, M. N. Stan, J. Liang, and B. J. Erickson. "**A Preliminary Study of Using Machine Learning to Reduce Biopsies of Thyroid Nodules Based on Ultrasound Images.**" *The 2nd SIIM Conference on Machine Intelligence in Medical Imaging,* 2017.

[2] P. D. Korfiatis, <u>Z. Zhou</u>, J. Liang, and B. J. Erickson. "**Fully Automated IDH Mutation Prediction in MRI Utilizing Deep Learning.**" *The 2nd SIIM Conference on Machine Intelligence in Medical Imaging,* 2017.

[3] <u>Z. Zhou</u>, J. Shin, R. T. Hurst, C. B. Kendall, and J. Liang. "**Integrating Active Learning and Transfer Learning for Carotid Intima-Media Thickness Video Interpretation.**" *The 2nd SIIM Conference on Machine Intelligence in Medical Imaging,* 2017.

[4] L. Zhang, <u>Z. Zhou</u>, H. Siddiki, N. S. Madiraju, F. C. Ramirez, S. R. Gurudu, and J. Liang. "**Approaching Medical Fellow-Level Performance on Colonoscopy Frame Classification with Deep Neural Networks.**" *WP Time, the 82rd Annual Meeting,* 2017.

US Patents

[1] <u>Z. Zhou</u>, M. M. Rahman Siddiquee, N. Tajbakhsh, and J. Liang. "**Systems, methods, and apparatuses for implementing a multi-resolution neural network for use with imaging intensive applications including medical imaging.**" *US Patent App. 16/556,130,* 3/5/2020.

[2] <u>Z. Zhou</u>, J. Shin, and J. Liang. "**Methods, systems, and media for selecting candidates for annotation for use in training classifiers.**" *US Patent App. 16/397,990,* 10/31/2019.

[3] <u>Z. Zhou</u>, J. Shin, and J. Liang. "**Systems, methods, and/or media, for selecting candidates for annotation for use in training a classifier.**" *US Patent App. 15/965,691,* 11/1/2018.

[4] R. Feng, <u>Z. Zhou</u>, M. Gotway, J. Liang. "**Self-supervised Learning: From Parts to Whole**." *Tech Id: M20-240L* (pending)

[5] <u>Z. Zhou</u>, V. Sodha, J. Pang, and J. Liang. "**Models Genesis.**" *Tech Id: M20-225L* (pending)

[6] F. Haghighi, M. R. Hosseinzadeh Taher, <u>Z Zhou</u>, and J. Liang. "**Learning Semantics-enriched Representation via Self-discovery, Self-classification, and Self-restoration.**" *Tech Id: M20-127L* (pending)

[7] <u>Z. Zhou</u>, V. Sodha, M. M. Rahman Siddiquee, R. Feng, N. Tajbakhsh, and J. Liang. "**Models Genesis: Generic Autodidactic Models for 3D Medical Image Analysis.**" *Tech Id: M19-252LC* (pending)

[8] M. M. Rahman Siddiquee, <u>Z. Zhou</u>, R. Feng, N. Tajbakhsh, and J. Liang. "**Learning Fixed Points in Generative Adversarial Networks: From Image-to-Image Translation to Disease Detection and Localization.**" *Tech Id: M19-117L* (pending)

[9] <u>Z. Zhou</u>, M. M. Rahman Siddiquee, N. Tajbakhsh, and J. Liang. "**UNet++: Redesigning Skip Connections to Exploit Multi-Resolution Features in Image Segmentation.**" *Tech Id: M19-189LC* (pending)

[10] <u>Z. Zhou</u>, J. Shin, and J. Liang. "**Integrating active learning and transfer learning for cutting annotation cost.**" *Tech Id: M17-151L* (pending)

Invited Talks

■ **Computer-aided Diagnosis and Therapy in Medical Imaging**   Sep 4 2020
Venue: BMI Seminar, Host: Dr. Anita Murcko

■ **Cost-Effective Computer-Aided Diagnosis of Lung Cancer in Chest Computed Tomography**   Aug 13 2020
Venue: Phoenix Symposium on Data Analytics in Healthcare, Host: Dr. Claire Pascavis

■ **Models Genesis: Generic Autodidactic Models for 3D Medical Image Analysis**   Nov 11 2019
Venue: Mila ⁻ Quebec Artificial Intelligence Institute, Host: Dr. Joseph Paul Cohen

■ **3D Transfer Learning in Medical Image Analysis**   Oct 24 2019
Venue: AI Research Club

■ **Models Genesis: Generic Autodidactic Models for 3D Medical Image Analysis**   Sep 24 2019
Venue: MICS Webinar, Host: Dr. Yong Xia, Dr. Huiguang He

■ **UNet++: A Nested U-Net Architecture for Medical Image Segmentation**   Sep 18 2018
Venue: AI Research Club

■ **How to Cut Annotation Cost in Biomedical Imaging**   May 22 2018
Venue: Centre Hospitalier de l'Université de Montréal, Host: Dr. Catherine Huet

Teaching

■ **BMI 598: NLP Methods for Biomedical Text Mining**   Fall 2020
Position: Teaching Assistant, Instructor: Dr. Murthy Devarakonda

■ **BMI 598: Imaging in Diagnostics**   Spring 2020
Position: Teaching Assistant, Instructor: Dr. Jianming Liang

■ **BMI 507: Intro Digital Image Processing**   Spring 2019
Position: Teaching Assistant, Instructor: Dr. Jianming Liang

PROFESSIONAL SERVICES

- **Journal Reviewer**
  - IEEE Transactions on Pattern Analysis and Machine Intelligence
  - Medical Image Analysis
  - IEEE Transactions on Medical Imaging
  - Pattern Recognition
  - IEEE Transactions on Biomedical Engineering
  - Journal of Biomedical and Health Informatics
  - IEEE Access
  - Journal of Biomedical Informatics
- **Conference Program Committee**
  - AAAI Conference on Artificial Intelligence (AAAI'21), Vancouver, Canada
  - International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI'20), Lima, Peru
  - AAAI Conference on Artificial Intelligence (AAAI'20), New York, USA
  - ICCV'19 Workshop Visual Recognition for Medical Images (VRMI), Seoul, Korea

REFERENCES

- Jianming Liang, Associate Professor, Arizona State University; `Jianming.Liang@asu.edu`
- Edward H. Shortliffe, Adjunct Professor, Arizona State University; `Ted.Shortliffe@asu.edu`
- Murthy Devarakonda, Research Professor, Arizona State University; `murthy.devarakonda@asu.edu`
- Hongkai Wang, Associate Professor, Dalian University of Technology; `wang.hongkai@dlut.edu.cn`