
Profile

- Postdoctoral Research Fellow at Harvard Ophthalmology AI Lab, Harvard University.

Areas of Interests

- **Deep Learning, Computer Vision, Medical Image Analysis, Anomaly Detection, Out-of-Distribution Detection, AI in Ophthalmology.**

Education/Training

8/2022–present **Postdoctoral**, Harvard Ophthalmology AI Lab, Harvard University.
Advised by: Dr. Mengyu Wang

Research Interests: Computer Vision and AI in Ophthalmology

6/2022 **PhD**, *Computer Science*, Australian Institute for Machine Learning, University of Adelaide.
Advised by: Prof. Gustavo Carneiro, Prof. Rajvinder Singh and Dr. Johan W. Verjans

PhD thesis: Anomaly Detection in Computer Vision and Medical Imaging.

- Awarded University of Adelaide ECMS Research Scholarship (Full Fee)

12/2018 **BSc (First-Class Honours)**, *Computer Science*, University of Adelaide, GPA 7.0/7.0.
Advised by: Prof. Gustavo Carneiro

Thesis: Deep learning Approach for Five-class Polyp Detection and Classification

Publications (* = equal contribution, † = corresponding author)

- SUB **Yu Tian**, Guansong Pang, Yuyuan Liu, Chong Wang, Yuanhong Chen, Fengbei Liu, Rajvinder Singh, Johan W Verjans, Gustavo Carneiro. Unsupervised Anomaly Detection in Medical Images with a Memory-augmented Multi-level Cross-attention Masked Autoencoder. *Arxiv Preprint, Under Review*, 2022.
- SUB **Yu Tian***, Fengbei Liu*, Guansong Pang, Yuanhong Chen, Yuyuan Liu, Johan W Verjans, Rajvinder Singh, Gustavo Carneiro. Self-supervised Multi-class Pre-training for Unsupervised Anomaly Detection and Segmentation in Medical Images. *Medical Image Analysis (MedIA)*, *Under Review*, 2022.
- SUB Chong Wang, Yuanhong Chen, Michael Elliott, Chun Fung Kwok, Carlos Pena-Solorzano, Fengbei Liu, **Yu Tian**, Helen Frazer, Davis J. McCarthy, Gustavo Carneiro. An Interpretable and Accurate Deep-learning Diagnosis Framework Modelled with Reciprocal Learning. *Under Review*, 2022.
- SUB Min Shi, Mojtaba S. Fazli, Vishal Sharma, **Yu Tian**, Yan Luo, Louis R. Pasquale, Tobias Elze, Michael Boland, Nazlee Zebardast, David S. Friedman, Lucy Q. Shen, Mengyu Wang. Artifact-Tolerant Clustering-Guided Contrastive Embedding Learning for Ophthalmic Images. *Arxiv Preprint, Under Review*, 2022.
- SUB Yuanhong Chen*, Fengbei Liu*, **Yu Tian**, Yuyuan Liu, Gustavo Carneiro. Semantic-guided Image Virtual Attribute Learning for Noisy Multi-label Chest X-ray Classification. *Arxiv Preprint, Under Review*, 2022.
- SUB Yuyuan Liu, **Yu Tian**, Chong Wang, Yuanhong Chen, Fengbei Liu, Vasileios Belagiannis, Gustavo Carneiro. Translation Consistent Semi-supervised Segmentation for 3D Medical Images. *Arxiv Preprint, Under Review*, 2022.
- 17 **Yu Tian***, Yuyuan Liu*, Guansong Pang, Fengbei Liu, Yuanhong Chen, Gustavo Carneiro. Pixel-wise Energy-biased Abstention Learning for Anomaly Segmentation on Complex Urban Driving Scenes. *European Conference on Computer Vision (ECCV)*, 2022, **Oral**. (Acceptance rate < 2.7%)

- 16 **Yu Tian**, Guansong Pang, Fengbei Liu, Yuyuan Liu, Chong Wang, Yuanhong Chen, Johan W Verjans, Gustavo Carneiro. Contrastive Transformer-based Multiple Instance Learning for Weakly Supervised Polyp Frame Detection. *International Conference on Medical Imaging Computing and Computer-Assisted Intervention (MICCAI)*, 2022, **Early Accept**. (Acceptance rate < 13%)
- 15 Yuanhong Chen, Wang Hu, Chong Wang, **Yu Tian**, Fengbei Liu, Yuyuan Liu, Michael Elliott, Davis McCarthy, Helen Frazer, Gustavo Carneiro. Multi-view Local Co-occurrence and Global Consistency Learning Improve Mammogram Classification Generalisation. *International Conference on Medical Imaging Computing and Computer-Assisted Intervention (MICCAI)*, 2022, **Early Accept**. (Acceptance rate < 13%)
- 14 Chong Wang, Yuanhong Chen, Yuyuan Liu, **Yu Tian**, Fengbei Liu, Davis McCarthy, Michael Elliott, Helen Frazer, Gustavo Carneiro. Knowledge Distillation to Ensemble Global and Interpretable Prototype-based Mammogram Classification Models. *International Conference on Medical Imaging Computing and Computer-Assisted Intervention (MICCAI)*, 2022, **Early Accept**. (Acceptance rate < 13%)
- 13 Fengbei Liu, Yuanhong Chen, **Yu Tian**, Yuyuan Liu, Chong Wang, Vasileios Belagiannis, Gustavo Carneiro. NVUM: Non-Volatile Unbiased Memory for Robust Medical Image Classification. *International Conference on Medical Imaging Computing and Computer-Assisted Intervention (MICCAI)*, 2022, **Early Accept**. (Acceptance rate < 13%)
- 12 Fengbei Liu*, **Yu Tian***, Yuanhong Chen, Yuyuan Liu, Vasileios Belagiannis, Gustavo Carneiro. ACPL: Anti-curriculum Pseudo-labelling for Semi-supervised Medical Image Classification. *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2022. (Acceptance rate < 26%)
- 11 Yuyuan Liu, **Yu Tian**, Yuanhong Chen, Fengbei Liu, Vasileios Belagiannis, Gustavo Carneiro. Perturbed and Strict Mean Teachers for Semi-supervised Semantic Segmentation. *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2022. (Acceptance rate < 26%)
- 10 Yuanhong Chen*, **Yu Tian***[†], Guansong Pang, Gustavo Carneiro. Deep One-Class Classification via Interpolated Gaussian Descriptor. In *Thirty-Sixth AAAI Conference on Artificial Intelligence (AAAI)*, 2022, **Oral**. (Acceptance rate < 4.5%)
- 9 **Yu Tian**, Guansong Pang, Yuanhong Chen, Rajvinder Singh, Johan W Verjans, Gustavo Carneiro. Weakly-supervised Video Anomaly Detection with Robust Temporal Feature Magnitude Learning. In *International Conference on Computer Vision (ICCV)*, 2021. (Acceptance rate < 25%)
- 8 **Yu Tian**, Guansong Pang, Fengbei Liu, Yuanhong Chen, Seon Ho Shin, Johan W Verjans, Rajvinder Singh, Gustavo Carneiro. Constrained Contrastive Distribution Learning for Unsupervised Anomaly Detection and Localisation in Medical Images. In *International Conference on Medical Imaging Computing and Computer-Assisted Intervention (MICCAI)*, 2021. (Acceptance rate < 32%)
- 7 Fengbei Liu*, **Yu Tian***, Filipe R. Cordeiro, Vasileios Belagiannis, Ian Reid, Gustavo Carneiro. Self-supervised Mean Teacher for Semi-supervised Chest X-ray Classification. In *International Workshop on Machine Learning in Medical Imaging, MICCAI*, 2021.
- 6 Leonardo Z.C.T. Pu, Gabriel Maicas, **Yu Tian**, Takeshi Yamamura, Masanao Nakamura, Hiroto Suzuki, Gurfarmaan Singh, Khizar Rana, Yoshiki Hirooka, Alastair D. Burt, Mitsuhiro Fujishiro, Gustavo Carneiro, Rajvinder Singh. Computer-aided diagnosis for characterization of colorectal lesions: a comprehensive software including serrated lesions. In *Gastrointestinal Endoscopy (GIE)*, 2020. (IF = 9.427)
- 5 **Yu Tian**, Gabriel Maicas, Leonardo Z.C.T. Pu, Rajvinder Singh, Johan W. Verjans, Gustavo Carneiro. Few-Shot Anomaly Detection for Polyp Frames from Colonoscopy. In *International Conference on Medical Imaging Computing and Computer-Assisted Intervention (MICCAI)*, 2020. (Acceptance rate < 30%)
- 4 Yuyuan Liu*, **Yu Tian***[†], Gabriel Maicas, Leonardo Z.C.T. Pu, Rajvinder Singh, Johan W Verjans, Gustavo Carneiro. Photoshopping Colonoscopy Video Frames. In *International Symposium on Biomedical Imaging (ISBI)*, 2020. (Acceptance rate < 35%)
- 3 **Yu Tian**, Leonardo Z.C.T. Pu, Rajvinder Singh, Alastair D. Burt, Gustavo Carneiro. One-stage Five-class Polyp Detection and Classification. In *International Symposium on Biomedical Imaging (ISBI)*, 2019. (Acceptance rate < 35%)

- 2 Leonardo Z.C.T. Pu, Gabriel Maicas, **Yu Tian**, Takeshi Yamamura, Gurfarmaan Singh, Khizar Rana, Hiroto Suzuki, Mitsuhiro Fujishiro, Yoshiki Hirooka, Alastair D. Burt, Mitsuhiro Fujishiro, Gustavo Carneiro, Rajvinder Singh. Prospective study assessing a comprehensive computer-aided diagnosis for characterization of colorectal lesions: Results from different centers and imaging technologies. In *Journal of Gastroenterology and Hepatology*, 2019. (IF = 4.029)
- 1 **Yu Tian**, Leonardo Z.C.T. Pu, Yuyuan Liu, Gabriel Maicas, Johan W Verjans, Alastair D Burt, Seon Ho Shin, Rajvinder Singh, Gustavo Carneiro. Detecting, Localising and Classifying Polyps from Colonoscopy Videos using Deep Learning. Invited book chapter in *Deep Learning for Medical Image Analysis (second edition)*, 2021.

Work Experience

- 8/2022–present Postdoctoral Research Fellow, Harvard Medical School.
- AI in Ophthalmology
- 6/2019–6/2022 Ph.D. Researcher, Australian Institute of Machine Learning (AIML), University of Adelaide.
- Anomaly Detection for Surveillance Videos
 - Anomaly Detection for Industrial Defect Detection
 - Anomaly Detection for Self-driving System/Semantic Segmentation
 - Video Anomaly Detection
 - Unsupervised, Weakly & Self- Supervised Learning
 - Semi-Supervised Learning
 - 5+ top computer vision conference papers
- 6/2019–6/2022 Ph.D. Researcher, South Australian Health and Medical Research Institute (SAHMRI).
- Anomaly Detection for Medical Images
 - Large Scale Noisy Label and Semi-supervised Learning for Medical Images
 - 10+ top medical imaging conference papers

Teaching Experience

- COMP SCI 7097A/B - Master Data Science Research Project, University of Adelaide 2021

Student Advising

- 2019 Yuyuan Liu (Honour student at the University of Adelaide - Now a PhD student at AIML)
- Project: Unsupervised Anomaly Detection for Colonoscopy
- 2020 Yuanhong Chen (Honour student at the University of Adelaide - Now a PhD student at AIML)
- Project: Image Anomaly Detection
- 2021 Ruixuan Zou (Master student at the University of Adelaide - Now a research assistant at AIML)
- Project: Anomaly Detection with Transformer for Medical Imaging

Professional Activities

Journal Reviewer

- IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI)
- IEEE Transactions on Neural Networks and Learning Systems (TNNLS)
- IEEE Transactions on Medical Imaging (TMI)
- IEEE Transactions on Image Processing (TIP)
- ACM Computing Surveys (CSUR)
- Pattern Recognition (PR)

Conference Program Committee / Reviewer

- International Conference on Medical Imaging Computing and Computer-Assisted Intervention (MICCAI) 2021, 2022
- International Conference on Computer Vision (ICCV) 2021
- Thirty-Sixth AAAI Conference on Artificial Intelligence (AAAI) 2022, 2023
- International Conference on Computer Vision and Pattern Recognition (CVPR) 2022

- European Conference on Computer Vision (ECCV) 2022
- ANDEA Workshop, KDD 2022

Honors and Awards

- 2019–2022 University of Adelaide ECMS Research Scholarship (Full Fee)
2018 Dean's Recognition of Academic Excellence of Honours Graduate (GPA 7.0/7.0)

Professional Skills

- Programming Languages: Python/C++/Java
- Deep Learning Libraries: PyTorch, Kera, TorchVision

References

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