

# Lichen Wang

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## 🎓 Education

- Sep. 2016 - Apr. 2021 **Northeastern University, Boston, USA**  
Doctors of Philosophy Major : Electrical & Computer Engineering  
Advisor : *Prof. Yun Raymond Fu*  
Thesis : Correlation Discovery for Multi-view and Multi-label Learning [PDF]
- Sep. 2013 - Jul. 2016 **Xi'an Jiaotong University, Xi'an, China**  
Master of Science in Engineering Major : Electronic & Information Engineering  
Advisor : *Prof. Aimin Zhang*  
Thesis : Vision based PCB Defects Detection Algorithms and System Implementation [PDF]
- Sep. 2009 - Jul. 2013 **Harbin Institute of Technology, Harbin, China**  
Bachelor of Engineering Major : Electrical Engineering  
Advisor : *Prof. Zhenshen Qu*  
Thesis : Vision based Intravenous Bottle Foreign Matter Inspection [PDF]

## 🌐 Field of Interests

Machine Learning, Computer Vision, Multi-modal Learning, Transfer Learning, Reinforcement Learning, NLP

## ☰ Skills

- Programming Skills :** Python, C/C++, MATLAB.
- Operation System :** Linux (Ubuntu), MacOS, Windows.
- Software :** PyTorch, TensorFlow, OpenCV, Point Cloud Library, MATLAB/Simulink, Tableau.

## </> Experiences

### • Zillow, Seattle, WA Group of Rich Media Experience.

- Applied Scientist** 06/2021-Present **2D & 3D Home Feature Extraction,** Python
- Explored 2D and 3D home data, such as the Zillow Indoor Dataset, and utilized large AI models in both visual and language domains to extract additional home features and insights.
- Computer Vision Multi-modal Foundational models Large Language Model Zillow Indoor Dataset
- Intern Supervisor,** Python
- As a supervisor for two interns, recruited and guided them on their research projects, which involved home layout estimation and large-modal adaptive fine-tuning.
- Layout estimation Adaptive fine-tuning Transfer Learning Few-shot Learning

### • Northeastern University, Boston, MA Department of Electrical & Computer Engineering.

- Research Assistant** 09/2016-04/2021 **Multi-modal Learning,** Python MATLAB
- (1) Led a team in collecting a large-scale multi-modal (RGB-D, EMG, Skeleton) action dataset; (2) Proposed various multi-modal methods that fully explore latent correlations across modalities; (3) Developed generative strategies to address multi-modal challenges (e.g., modality missing and corruption).
- Multi-modal Generative Model RGB-D Transfer Learning Action Recognition Electromyography (EMG)
- Transfer Learning & Domain Adaptation,** Python MATLAB
- (1) Designed novel training strategies that adapt large models to fit specific tasks with limited data, either in a supervised or unsupervised manner; (2) Various modules are designed for different data types (e.g., images, depth, 3D point cloud, multi-modal) and different settings (e.g., co-training, self-supervised, generative, adversarial).
- Domain Adaptation Transfer Learning Co-training 3D Image Generation Incremental Learning Life-long Learning
- Multi-label Learning,** Python MATLAB
- Proposed methods which predict multiple labels from a single instance. Modules are designed for tackling challenges such as complex label correlations and long-tail label distributions. Models are evaluated in various applications such as image classification, annotation, and retrieval.
- Multi-label Label Correlation Generative Manifold Learning Active Learning Transfer Learning Domain Adaptation

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| Teaching Assistant<br>09/2016-04/2021 | <b>Data Visualization (EECE5642)</b> , <a href="#">Python</a> <a href="#">Tableau</a> <a href="#">MATLAB</a><br>Introduced diverse visualization strategies in various scenarios, including presentations, reports, and research papers. Tools such as MATLAB and Tableau are introduced in assignments.<br><b>Unsupervised Machine Learning (DS5230)</b> , <a href="#">Python</a> <a href="#">MATLAB</a><br>Introduced various traditional and SOTA unsupervised learning strategies such as clustering, dimension reduction, auto-encoder, deep learning, self-supervised learning, etc.<br><b>Computer Vision (EECE 5639)</b> , <a href="#">Python</a> <a href="#">MATLAB</a> <a href="#">C/C++</a><br>Introduced conventional and advanced computer vision algorithms including image processing, 3D reconstruction, deep learning, classification, detection, segmentation, etc. |
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| • <b>Samsung Research America, Mountain View, CA</b> Group of Artificial Intelligence.<br>Research Intern<br>05/2020-09/2021 | <b>Multi-modal (RGB-D) visual saliency detection</b> , <a href="#">Python</a><br>Explored a multi-modal (RGB-D) saliency detection framework, which identifies significant objects. A Knowledge-Distillation strategy is implemented to reduce the network's complexity and enhance its inference efficiency, even on mobile platforms.<br><a href="#">Multi-Modal Learning</a> <a href="#">RGB-D</a> <a href="#">Saliency Detection</a> <a href="#">Model Compression</a> |
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| • <b>NEC Labs America, Princeton, NY</b> Department of Data Science and System Security.<br>Research Intern<br>05/2019-01/2020 | <b>Reinforced Sentiment Classification</b> , <a href="#">Python</a><br>Proposed a reinforcement learning-based NLP model which predicts sentimental polarities of a given text. It disregards task-irrelevant text and instead prioritizes identifying the most effective clues. It considerably reduces the computational resource requirements.<br><a href="#">Sentiment Classification</a> <a href="#">NLP</a> <a href="#">Reinforcement Learning</a><br><b>Graph Data Representation Learning</b> , <a href="#">Python</a><br>Developed a novel mechanism for learning graph data representations. Graph structured data retains valuable connectivity information among instances (e.g., social networks and advertising). The model allows for inductive and unsupervised learning in a highly efficient and effective manner.<br><a href="#">Graph Isomorphism</a> <a href="#">Graph Similarity</a> <a href="#">Representation Learning</a> <a href="#">Auto-encoder</a> <a href="#">Random Walk</a> |
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| • <b>Zebra Technology, Lincolnshire, IL</b> Chief Technology Office, Computer Vision Algorithm.<br>CV Engineer Intern<br>05/2018-09/2018<br><br>05/2017-09/2017 | <b>Robust 3D Objects Detection &amp; Localization</b> , <a href="#">C/C++</a> <a href="#">Python</a><br>Developed computer vision system with the capability to capture 3D containers, classify container types, and accurately measure the dimensions/locations. The system is able to perform high-precision localization in high-level noise and low computational cost (e.g., embedded platform)<br><a href="#">RGB-D</a> <a href="#">Point Cloud</a> <a href="#">3D Deep Learning</a> <a href="#">Object Detection</a><br><b>Vision-based Human &amp; Pose Detection</b> , <a href="#">C/C++</a> <a href="#">Python</a><br>Deployed human/face detection and pose estimation algorithms in a warehouse environment. It effectively tackles challenges such as low illumination, occlusion, and various interruptions.<br><a href="#">Computer Vision</a> <a href="#">Pose detection</a> <a href="#">Faster-RCNN</a> <a href="#">YOLO</a> <a href="#">QR Code</a> |
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## Publications

- **Conferences & Journals**
  - > Chang Liu, **Lichen Wang**, Yun Fu, "Rethinking Neighborhood Consistency Learning on Unsupervised Domain Adaptation," *ACM International Conference on Multimedia (MM)*, 2023
  - > Yue Bai, **Lichen Wang**, Yunyu Liu, Yu Yin, Hang Di, Yun Fu, "Semi-supervised Domain Adaptive Structure Learning," *IEEE Transactions on Image Processing (TIP)* [PDF]
  - > Can Qin, **Lichen Wang**, Qianqian Ma, Yu Yin, Huan Wang, Yun Fu, "Semi-supervised Domain Adaptive Structure Learning," *IEEE Transactions on Image Processing (TIP)* [PDF]
  - > **Lichen Wang**, Zhengming Ding, Kasey Lee, Seungju Han, Jae-Joon Han, Changkyu Choi, Yun Fu, "Generative Multi-Label Correlation Learning," *ACM Transactions on Knowledge Discovery from Data (TKDD)* [PDF]
  - > Yi Xu, **Lichen Wang**, Yizhou Wang, Can Qin, Yulun Zhang, Yun Fu, "MemREIN : Rein the Domain Shift for Cross-Domain Few-Shot Learning," *International Joint Conference on Artificial Intelligence (IJCAI)*, 2022 [PDF]
  - > Yi Xu, **Lichen Wang**, Yizhou Wang, Yun Fu, "Adaptive Trajectory Prediction via Transferable GNN," *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2022 [PDF]
  - > Chang Liu, **Lichen Wang**, Yun Fu, "Meta Adversarial Weight for Unsupervised Domain Adaptation," *SIAM International Conference on Data Mining (SDM)*, 2022 [PDF]
  - > Yue Bai, Zhiqiang Tao, **Lichen Wang**, Sheng Li, Yu Yin, Yun Fu, "Collaborative Attention Mechanism for Multi-Modal Time Series Classification," *SIAM International Conference on Data Mining (SDM)*, 2022 [PDF]
  - > **Lichen Wang**, Yunyu Liu, Hang Di, Can Qin, Gan Sun, Yun Fu, "Semi-supervised Dual Relation Learning for Multi-label Classification," *IEEE Transactions on Image Processing (TIP)* [PDF]
  - > Can Qin, Handong Zhao, **Lichen Wang**, Huan Wang, Yulun Zhang, Yun Fu, "Slow Learning and Fast Inference : Efficient Graph Similarity Computation via Knowledge Distillation," *Neural Information Processing Systems (NeurIPS)*, 2021 [PDF]

- > **Lichen Wang**, Bo Zong, Yunyu Liu, Can Qin, Wei Cheng, Wenchao Yu, Xuchao Zhang, Haifeng Chen, Yun Fu, "Aspect-based Sentiment Classification via Reinforcement Learning," *IEEE International Conference on Data Mining (ICDM)*, 2021 [\[PDF\]](#)
- > Chang Liu, **Lichen Wang**, Kai Li, Yun Fu, "Domain Generalization via Feature Variation Decorrelation," *ACM International Conference on Multimedia (MM)*, 2021 [\[PDF\]](#)
- > Songyang Jiang, Bin Sun, **Lichen Wang**, Yue Bai, Kunpeng Li, Yun Fu, "Skeleton Aware Multi-modal Sign Language Recognition," *IEEE Conference on Computer Vision and Pattern Recognition (CVPR) Workshop*, 2021 [\[PDF\]](#)
- > **Lichen Wang**, Zhengming Ding, Yun Fu, "Generic Multi-label Annotation via Adaptive Graph and Marginalized Augmentation," *ACM Transactions on Knowledge Discovery from Data (TKDD)* [\[PDF\]](#)
- > Can Qin, **Lichen Wang**, Qianqian Ma, Yu Yin, Huan Wang, Yun Fu, "Contradictory Structure Learning for Semi-supervised Domain Adaptation," *SIAM International Conference on Data Mining (SDM)*, 2021 [\[PDF\]](#)
- > Yue Bai, **Lichen Wang**, Zhiqiang Tao, Sheng Li, Yun Fu, "Correlative Channel-Aware Fusion for Multi-View Time Series Classification," *AAAI Conference on Artificial Intelligence (AAAI)*, 2021 [\[PDF\]](#)
- > Jiahua Dong, Yang Cong, Gan Sun, Bingtao Ma, **Lichen Wang** "I3DOL : Incremental 3D Object Learning without Catastrophic Forgetting," *AAAI Conference on Artificial Intelligence (AAAI)*, 2021 [\[PDF\]](#)
- > Yue Bai, **Lichen Wang**, Yunyu Liu, Yu Yin, Yun Fu, "Dual-Side Auto-Encoder for High-Dimensional Time Series Segmentation," *IEEE International Conference on Data Mining (ICDM)*, 2020 [\[PDF\]](#)
- > Yunyu Liu, **Lichen Wang**, Yue Bai, Can Qin, Zhengming Ding, and Yun Fu, "Generative View-Correlation Adaptation for Semi-Supervised Multi-View Learning," *European Conference on Computer Vision (ECCV)*, 2020 [\[PDF\]](#)
- > **Lichen Wang**, Bin Sun, Joseph Robinson, Taotao Jing, and Yun Fu, "EV-Action : Electromyography-Vision Multi-Modal Action Dataset," *IEEE International Conference on Automatic Face and Gesture Recognition (FG)*, 2020 [\[PDF\]](#)
- > **Lichen Wang**, Bo Zong, Qianqian Ma, Wei Cheng, Jingchao Ni, Wenchao Yu, Yanchi Liu, Dongjing Song, Haifeng Chen, Yun Fu, "Inductive and Unsupervised Representation Learning on Graph Structured Objects," *International Conference on Learning Representations (ICLR)*, 2020 [\[PDF\]](#)
- > **Lichen Wang**, Yunyu Liu, Can Qin, Gan Sun, Yun Fu, "Dual Relation Semi-supervised Multi-label Learning," *AAAI Conference on Artificial Intelligence (AAAI)*, 2020 [\[PDF\]](#)
- > Can Qin, Haoxuan You, **Lichen Wang**, C.-C. Jay Kuo, Yun Fu, "PointDAN : A Multi-Scale 3D Domain Adaption Network for Point Cloud Representation," *Neural Information Processing Systems (NeurIPS)*, 2019 [\[PDF\]](#)
- > **Lichen Wang**, Zhengming Ding, Seungju Han, Jae-Joon Han, Changkyu Choi, Yun Fu, "Generative Correlation Discovery Network for Multi-Label Learning," *IEEE International Conference on Data Mining (ICDM) (Long paper)*, 2019 [\[PDF\]](#)
- > Denghui Zhang, Junming Liu, Hengshu Zhu, Yanchi Liu, **Lichen Wang**, Pengyang Wang, Hui Xiong, "Job2Vec : Job Title Benchmarking with Collective Multi-View Representation Learning," *ACM International Conference on Information and Knowledge Management (CIKM) (Long paper)*, 2019 [\[PDF\]](#)
- > **Lichen Wang**, Zhengming Ding, Zhiqiang Tao, Yunyu Liu, Yun Fu, "Generative Multi-View Human Action Recognition," *International Conference on Computer Vision (ICCV) (Oral)*, 2019 [\[PDF\]](#)
- > Can Qin, **Lichen Wang**, Yulun Zhang, Yun Fu, "Generatively Inferential Co-Training for Unsupervised Domain Adaptation," *International Conference on Computer Vision (ICCV) Workshop (Best paper award)*, 2019 [\[PDF\]](#)
- > Gan Sun, Yang Cong, **Lichen Wang**, Zhengming Ding, Yun Fu, "Online Multi-task Clustering for Human Motion Segmentation," *International Conference on Computer Vision (ICCV) Workshop*, 2019 [\[PDF\]](#)
- > **Lichen Wang**, Zhengming Ding, Yun Fu, "Low-Rank Transfer Human Motion Segmentation," *IEEE Transactions on Image Processing (TIP)* [\[PDF\]](#)
- > Yulun Zhang, Kunpeng Li, Kai Li, **Lichen Wang**, Bineng Zhong, Yun Fu, "Image Super-Resolution Using Very Deep Residual Channel Attention Networks," *European Conference on Computer Vision (ECCV)*, 2019 [\[PDF\]](#)
- > **Lichen Wang**, Zhengming Ding, Yun Fu, "Adaptive Graph Guided Embedding for Multi-label Annotation," *International Joint Conference on Artificial Intelligence (IJCAI)*, 2018 [\[PDF\]](#)
- > **Lichen Wang**, Zhengming Ding, Yun Fu, "Learning Transferable Subspace for Human Motion Segmentation," *AAAI Conference on Artificial Intelligence (AAAI)*, 2018 [\[PDF\]](#)
- > **Lichen Wang**, Aimin Zhang, Chujia Guo, Pervez Bhan, Tian Yan, "Modified Multi-target Recognition Based on CamCom," *Chinese Control Conference (CCC)*, 2015 [\[PDF\]](#)
- > **Lichen Wang**, Aimin Zhang, Chujia Guo, Songyun Zhao, Pervez Bhan, "3-D Reconstruction for SMT Solder Joint Based on Joint Shadow," *Chinese Control and Decision Conference (CCDC)*, 2015 [\[PDF\]](#)

## • Patents

- > Bo Zong, Haifeng Chen, **Lichen Wang**, "Reinforced Text Representation Learning," *granted U.S. Invention Patent No. 20210248425* [\[PDF\]](#)[\[Google Patent\]](#)[\[Research Paper\]](#)
- > Bo Zong, Haifeng Chen, **Lichen Wang**, "Unsupervised Graph Similarity Learning Based on Stochastic Subgraph Learning," *granted U.S. Invention Patent No. 20210089652* [\[PDF\]](#)[\[Google Patent\]](#)[\[Research Paper\]](#)
- > **Lichen Wang**, Yan Zhang, Kevin O'Connell, "Three-Dimensional (3D) Depth Imaging Systems and Methods for Dynamic Container Auto-Configuration," *granted U.S. and International Invention Patent No. 11010915* [\[PDF\\_US\]](#)[\[PDF\\_CN\]](#)[\[Google Patent\]](#)
- > Yan Zhang, Kevin O'Connell, Jay Williams, **Lichen Wang**, "Systems and methods for automatic camera installation guidance (CIG)," *granted U.S. and International Invention Patent No. 10820307* [\[PDF\\_US\]](#)[\[PDF\\_CN\]](#)[\[Google Patent\]](#)
- > **Lichen Wang**, Min Wu, Qinglin Liu, "Novel Methods and System for Evaporator Frosting Inspection," *granted China Invention Patent No. CN201511025257.3* [\[PDF\\_CN\]](#)
- > Zhenshen Qu, **Lichen Wang**, Wenhua Jiao, Changlun Gao, Pengshan Ren, Haisheng Wang, "Novel Methods and System of Foreign Matter Inspection in Infusion Bottle," *granted China Invention Patent No. CN2013102084539* [\[PDF\\_CN\]](#)