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

Teaching Assistant
09/2016-04/2021

Data Visualization (EECE5642), Python Tableau MATLAB
Introduced diverse visualization strategies in various scenarios, including presentations, reports, and research papers. Tools such as MATLAB and Tableau are introduced in assignments.

Unsupervised Machine Learning (DS5230), Python MATLAB
Introduced various traditional and SOTA unsupervised learning strategies such as clustering, dimension reduction, auto-encoder, deep learning, self-supervised learning, etc.

Computer Vision (EECE 5639), Python MATLAB C/C++
Introduced conventional and advanced computer vision algorithms including image processing, 3D reconstruction, deep learning, classification, detection, segmentation, etc.

- **Samsung Research America, Mountain View, CA** Group of Artificial Intelligence.

Research Intern
05/2020-09/2021

Multi-modal (RGB-D) visual saliency detection, Python
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.
Multi-Modal Learning | RGB-D | Saliency Detection | Model Compression

- **NEC Labs America, Princeton, NY** Department of Data Science and System Security.

Research Intern
05/2019-01/2020

Reinforced Sentiment Classification, Python
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.
Sentiment Classification | NLP | Reinforcement Learning

Graph Data Representation Learning, Python
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.
Graph Isomorphism | Graph Similarity | Representation Learning | Auto-encoder | Random Walk

- **Zebra Technology, Lincolnshire, IL** Chief Technology Office, Computer Vision Algorithm.

CV Engineer Intern
05/2018-09/2018

Robust 3D Objects Detection & Localization, C/C++ Python
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)
RGB-D | Point Cloud | 3D Deep Learning | Object Detection

05/2017-09/2017

Vision-based Human & Pose Detection, C/C++ Python
Deployed human/face detection and pose estimation algorithms in a warehouse environment. It effectively tackles challenges such as low illumination, occlusion, and various interruptions.
Computer Vision | Pose detection | Faster-RCNN | YOLO | QR Code

Publications

- **Conferences & Journals**
  - 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 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]