Xiaoguang Zhu

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Education

Shanghai Jiao Tong University, Shanghai — Apr. 2017 – Jun. 2022
PhD Information and Communication Engineering

Shanghai Jiao Tong University, Shanghai — Sep. 2014 – Mar. 2017
Master Electronics and Communication Engineering

Shanghai Jiao Tong University, Shanghai — Sep. 2010 – Jun. 2014
Bachelor Electronic Science and Technology

Research Interest

Representation Learning, Deep Generative Models, Model Generalization, Neural Stochastic Differential Equations, Action Recognition, EEG Signal Recognition

Research Experience

Domain generalization for visual perception in autonomous driving — Dec. 2022 – Mar. 2023

To tackle the visual corner cases in autonomous driving, casual generative models are proposed to learn disentangled representation of images. Moreover, incentive-aware federated learning are designed to optimize the model across various agents while preserving data privacy.

- Casual generative models for disentangled representation of visual autonomous images
- Incentive-aware federated learning for open generalization

Representation Learning — Dec. 2017 – Mar. 2023

To address the generalization performance degradation problem in open-world image retrieval, graph-based network and uncertainty-aware metric learning method are proposed for representation learning of image retrieval.

- Content-based image retrieval
- Cross-modal image retrieval
- Metric learning for image retrieval

Human Action Analysis — Jul. 2018 – Jun. 2022

A novel multi-modal fusion network is proposed to exploit the complementarity of skeleton and RGB modalities, which achieves competitive accuracy to SOTA but with lower computation. Deep generative models and domain adaptation method are proposed to enhance the generalization capability of action recognition models.

- Multi-modal video action recognition
- Anomaly detection for action recognition
- Domain adaptation for action recognition

EEG Signal Recognition — Sep. 2021 – Sep. 2022

Deep learning models of graph neural networks and neural stochastic differential equations are proposed for EEG signal recognition and SOTA performance is achieved on public benchmarks. Causal Models is used to analyze the casual relations through channels of EEG signals to enhance the generalization ability via individual persons.

• Deep models for EEG signal recognition
• Casual inference based domain generalization for EEG models

GNSS Receiver Test and Evaluation Jul. 2015 – Dec. 2016

Implemented an algorithm to replay high-fidelity GNSS signals by modeling the error between real signal and recorded signals. Introduced a test method for GNSS receiver evaluation on various scenarios.

• GNSS test and evaluation method with high fidelity playback
• Machine learning method for scenarios classification with GNSS signals

ARTICLES

• **Xiaoguang Zhu**, Jiuchao Qian, Haoyu Wang, Peilin Liu. Curriculum enhanced supervised attention network for person re-identification. ***IEEE Signal Processing Letters***, Volume 27, September 2020, Pages 1665-1669.

• **Xiaoguang Zhu**, Haoyu Wang, Peilin Liu, Zhantao Yang, Jiuchao Qian. Graph-based reasoning attention pooling with curriculum design for content-based image retrieval. ***Image and Vision Computing***, Volume 115, November 2021, Pages 104289.

• **Xiaoguan Zhu**, Ye Zhu, Haoyu Wang, Honglin Wen, Yan Yan, Peilin Liu. Skeleton sequence and RGB frame based multi-modality feature fusion network for action recognition. ***ACM Transactions on Multimedia Computing, Communications, and Applications***, Volume 18, Issue 3, October 2021, Pages 1-24.

• **Xiaoguan Zhu**, Lianghong Chen, Peilin Liu. Uncertainty-aware asymmetric cycle consistency network for zero-shot sketch-based image retrieval. Submitted to ***IEEE Transactions on Image Processing***, under review.

• **Xiaoguang Zhu**, You Wu, Zhantao Yang, Peilin Liu. Uncertainty-aware domain adaptation for action Rrecognition. ***2021 28th International Conference on Neural Information Processing (ICONIP)***, December 2021, Pages 494-506.

• **Xiaoguang Zhu**, Siran Huang, Wenjing Fan, Yuhao Cheng, Huaqing Shao, Peilin Liu. SDAN: Stacked diverse attention network for video action recognition. ***2021 IEEE International Symposium on Circuits and Systems (ISCAS)***, May 2021, Pages 1-5.

• **Xiaoguang Zhu**, Haoyu Wang, Ye Zhu, Peilin Liu. Graph-based aggregation for content-based image retrieval. Submitted to ***2023 IEEE Conference on Computer Vision and Pattern Recognition (ICCV)***.

• **Xiaoguang Zhu**, Xin Chen, Rendong Ying, Shanshan Zhan, Yuze Wang, Xiaoran Fang, Fei Su, Di He, Peilin Liu, Wenxian Yu. An innovative remote testing system for GNSS receiver based on IF sampled signal library of various scenarios. ***2015 International Technical Meeting of the Satellite Division of The Institute of Navigation (ION GNSS+ 2015)***, September 2015, Page 250-257.

• Zhantao Yang, **Xiaoguang Zhu**, Jiuchao Qian, Peilin Liu. Dark-aware network for fine-grained sketch-based image retrieval. ***IEEE Signal Processing Letters***, Volume 28, December 2020, Pages 264-268.

• Yuhao Cheng, **Xiaoguang Zhu**, Jiuchao Qian, Fei Wen, Peilin Liu. Cross-modal graph matching network for image-text retrieval. ***ACM Transactions on Multimedia Computing, Communications, and Applications***, Volume 18, Issue 4, November 2021, Pages 1-24.

• Di Li, **Xiaoguang Zhu**, Liang Song. Mutual match for semi-supervised online evolutive learning. ***Applied Intelligence***, May 2022, Pages 1-15.

• Minting Pan, **Xiaoguang Zhu**, Yongfu Li, Jiuchao Qian, Peilin Liu. MRNet: A keypoint guided multi-scale reasoning network for vehicle re-identification. ***2020 27th International Conference on Neural Information Processing (ICONIP)***, November 2020, Pages 469-478.

• Jiameng Pan, **Xiaoguang Zhu**, Peilin Liu. Generating Adaptive Targeted Adversarial Examples for Content-Based Image Retrieval. ***2022 International Joint Conference on Neural Networks (IJCNN)***, July 2022, Pages 1-9.

• Donglai Wei, Chengeng Liu, Yang Liu, Jing Liu, **Xiaoguang Zhu**, Xinhua Zeng. Look, listen and pay more attention: fusing multi-modal information for video violence detection. ***2022 IEEE International Conference on Acoustics, Speech, & Signal Processing (ICASSP)***, May 2022, Pages 1980-1984.

• Yang Liu, Jing Liu, **Xiaoguang Zhu**, Donglai Wei, Xiaohong Huang, Liang Song. Learning task-specific representation for video anomaly detection with spatial-temporal attention. ***2022 IEEE International Conference on Acoustics, Speech, & Signal Processing (ICASSP)***, May 2022, Pages 2190-2194.

• Yang Liu, Jing Liu, Mengyang Zhao, Dingkang Yang, **Xiaoguang Zhu**, Liang Song. Learning appearance-motion normality for video anomaly detection. ***2022 IEEE International Conference on Multimedia & Expo (ICME)***, July 2022, Pages 1-6.

• Ye Zhu, **Xiaoguang Zhu**, Yuzhang Shang, Zhenghao Zhao, Yan Yan. Supplementing Missing Visions via Dialog for Scene Graph Generations. Accepted by ***IEEE Transactions on Image Processing***.

• Donglai Wei, **Xiaoguang Zhu**, Yang Liu, Jing Liu, Xinhua Zeng. MSAF: Multimodal Supervise-Attention enhanced Fusion for Video Anomaly Detection. ***IEEE Signal Processing Letters***, accepted on September 2022.

• Guiyu Liu, Jiuchao Qian, Fei Wen, **Xiaoguang Zhu**, Rendong Ying, Peilin Liu. Action recognition based on 3d skeleton and rgb frame fusion. ***2019 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)***, November 2019, Pages 258-264.

• Jing Liu, **Xiaoguang Zhu**, Yang Liu, Wei Zhu, Liang Song. Distributional and spatial-temporal robust representation learning based on multimodal sensing. Accepted by ***Pattern Recognition***.

• Junyu Dai, Jiuchao Qian, Zheng Tao, Junhong Chen, **Xiaoguang Zhu**, Huaqing Shao, Zheng Gong, Peilin Liu. A system integrating speech interaction and vision sensing applying in smart home scenario. ***2019 IEEE International Symposium on Circuits and Systems (ISCAS)***, May 2019, Pages 1-5.

• Hanqi Wang, **Xiaoguang Zhu**, Tao Chen, Chengfang Li, Liang Song. Rethinking saliency map: An context-aware perturbation method to explain EEG-based deep learning model. Submitted to ***IEEE Transactions on Biomedical Engineering***, under review.

• Chengfang Li, **Xiaoguang Zhu**, Xinhua Zeng, Liang Song. Graph-based networks with channel selection for EEG signal learning. Submitted to ***IEEE Transactions on Biomedical Engineering***, under review.

⚙ Other Experiences

Invited Reviewer: CVPR 2021, CVPR 2022, CVPR 2023, ICCV 2021, ICCV 2023, ECCV 2022, BMVC 2020, BMVC 2021, IEEE Signal Processing Letters
Technical Program Committee: 2021 & 2022 International Conference on Networking System of AI (INSAI)
Visiting Fellowship: Shanghai key lab of networking system of AI， Fudan University, 2021-2022
Teaching Assistant: Digital Circuits， Shanghai Jiao Tong University, 2015
Counselor for Undergraduates: Leader of Academic Science and Technology Department

♡ Awards

Graduate National Scholarship	2015
RongChang Scholarship, Shanghai Jiao Tong University (10/year)	2017-2019
Shanghai Outstanding Communist Youth League Member	2018
Shanghai Jiao Tong University Outstanding Student (5%)	2013, 2016, 2020
Outstanding Graduates of Shanghai	2022