Xianfeng Wu

School of Artificial Intelligence (AI)
Jianghan University

wxf20011228@gmail.com
+86 177 8642 6997
maradona10wxf.github.io
orcid: 0000-0002-5113-5314

EDUCATION

B.E. Artificial Intelligence, Jianghan University, Wuhan, China, 2020-present
       advisor: Associate Researcher Zhongyuan Lai

RESEARCH EXPERIENCE

Institute for Interdisciplinary Research, Jianghan University   Wuhan, China
Undergraduate Researcher   Sep 2020 – present
Under the supervision of Associate Researcher Zhongyuan Lai, I proposed a point cloud classification framework that can extract more effective global features with better robustness than existing point cloud classification models. The work was submitted to Computers Electrical Engineering (CAEE) and accepted, and I am the first author of the publication. Now I am combining GAN and Transformer together to propose a stable point cloud completion model, which is still able to complete the point cloud well in the extreme case of there are only 16 points of partial point clouds. This work collaborate with University at Buffalo, State University of New York Professor Junsong Yuan is submit to ICCV23'. A Chinese national invention patent is being accepted. Seven software copyright applications have been registered by the National Copyright Administration. six of them have been transformed with a total of RMB 90,000.

School of Cyber Science and Engineering, Wuhan University   Wuhan, China
Intern   Jun 2022 – Dec 2022
Learn reinforcement learning, Federated Learning, adversarial learning and other ai safety knowledge under the guidance of Professor Libing Wu. Based on the current high communication overhead and vulnerability of edge devices with servers, a federation learning algorithm was designed to address the communication efficiency while ensuring robustness against Byzantine attacks, and the work has been submitted to IEEE Network, and I have also co-authored with Libing Wu's team Security and Communication Networks, BESC'22, and Information.

Institute of Data Science, The University of Hong Kong   Pokfulam, Hong Kong
Remote Intern   Nov 2022 – May 2023
Learn about the application of Federated Learning in AI in healthcare and participate in several projects exploring privacy leakage attack in Federated Learning under the guidance of Assistant Professor Liangqiong Qu. I studied the privacy leakage problem under different federated learning algorithms in the framework of federated learning for AI in healthcare under different attacks, and found that the privacy leakage attack method designed based on GAN or diffusion model can still reconstruct the input image while the federated learning shared information is protected, but there is a problem with the discrepancy under the same class due to the problem of a prior knowledge of the reconstructed class, resulting in the reconstructed However, due to the problem of discrepancy under the same class with the help of the prior knowledge of the reconstructed class, the reconstructed input image is not the same as the recovered one. Federal learning communication is also being investigated to reduce the overhead by means of model compression.

School of Information Sciences, University of Illinois Urbana-Champaign IL, USA
Remote Intern Dec 2022 – May 2023
Under the guidance of Assistant Professor Haohan Wang, I am working on Trustworthy Machine Learning and I am currently investigating whether adding data-free knowledge distillation to federal learning can protect customer privacy better than existing methods.

School of Engineering, Westlake University Hangzhou, China
Summer Research Intern June 2023 – present
Under the guidance of Assistant Professor Tailin Wu, I am working on AI4Science and I will be developed a machine learning algorithms based on diffusion model for the scientific design of large systems.

RESEARCH AREAS

Computer Vision: 3D reconstruction, point cloud recognition, completion

Trustworthy Machine Learning

AI4Science

PUBLICATIONS

Under review

2023 **Xianfeng Wu**, Xianzu Wu, Tianyu Luan, Zhongyuan Lai*, Junsong Yuan*, FSC: Few-point Shape Completion, International Conference on Computer Vision (ICCV23').

2023 Xianzu Wu, yangyang zheng, **Xianfeng Wu**, Weifeng Shang, Cheng Meng, Zhou Xie, Yajing Bai, Guozhong Gao*, Neural Information Processing Systems (NeurIPS23').

Journal Articles

2023 Zhuangzhuang Zhang*, Libing Wu*, Debiao He, Jianxin Li, Shuqin Cao, **Xianfeng Wu**, Communication-Efficient and Byzantine-robust Federated Learning for Mobile Edge Computing Networks, IEEE Network, Accepted.

2023 Fudong Ding, Libing Wu, Zhuangzhuang Zhang, Xianfeng Wu, Chao Ma, and Qin Liu. "A Low-Overhead Auditing Protocol for Dynamic Cloud Storage Based on Algebra." In: *Security and Communication Networks* 2023 (2023). DOI: `https://doi.org/10.1155/2023/5477738`. URL: `https://www.hindawi.com/journals/scn/2023/5477738/`

2023 Jiyan Cai, Libing Wu, Dan Wu, Jianxin Li, and Xianfeng Wu. "Multi-Dimensional Information Alignment in Different Modalities for Generalized Zero-Shot and Few-Shot Learning." In: *Information* 14.3 (2023). ISSN: 2078-2489. DOI: `10.3390/info14030148`. URL: `https://www.mdpi.com/2078-2489/14/3/148`

2022 Xianfeng Wu, Xinyi Liu, Junfei Wang, Zhongyuan Lai, Jing Zhou, and Xia Liu. "Point cloud classification based on transformer." In: *Computers and Electrical Engineering* 104 (2022), p. 108413. ISSN: 0045-7906. DOI: `https://doi.org/10.1016/j.compeleceng.2022.108413`. URL: `https://www.sciencedirect.com/science/article/pii/S0045790622006309`

Conference Proceedings

2022 Xianfeng Wu, Xinyi Liu, Junfei Wang, et al. "Transformer-Based Point Cloud Classification." In: *Artificial Intelligence and Robotics*. Ed. by Shuo Yang and Huimin Lu. Singapore: Springer Nature Singapore, 2022, pp. 218–225. ISBN: 978-981-19-7946-0

2022 Jiyan Cai, Libing Wu, Dan Wu, Jianxin Li, and Xianfeng Wu. "Multi-dimensional alignment via Variational Autoencoders for Generalized Zero-Shot and Few-Shot Learning." In: *2022 9th International Conference on Behavioural and Social Computing (BESC)*. 2022, pp. 1–4. DOI: 10.1109/BESC57393.2022.9995148

2022 Junfei Wang, Luxin Hu, Xianfeng Wu, Zhongyuan Lai, and Qian Jia. "Point Cloud Driven Object Classification: A Review." In: *Artificial Intelligence and Robotics*. Ed. by Shuo Yang and Huimin Lu. Singapore: Springer Nature Singapore, 2022, pp. 260–270. ISBN: 978-981-19-7946-0

2022 Junfei Wang, Hui Xiong, Yanli Gong, et al. "Attention-Based Dynamic Graph CNN for Point Cloud Classification." In: *Artificial Intelligence and Robotics*. Ed. by Shuo Yang and Huimin Lu. Singapore: Springer Nature Singapore, 2022, pp. 357–365. ISBN: 978-981-19-7946-0

PATENT

2022 Object classification method based on point cloud and related equipment. China Invention Patent. 202211076689.7, Under review.

SOFTWARE COPYRIGHT

2022 Software Copyright of Polygon approximation-based rate distortion optimal shape codec software V3.0. 2022SR0373977. March 22, 2022.

2022 Software Copyright of 2D shape skeleton extraction software V1.1. 2022SR0347060. March 15, 2022.

2022 Software Copyright of Polygon approximation-based rate distortion optimal shape codec software V2.1. 2022SR0102715. January 17, 2022.

2021 Software Copyright of Polygon Evolution Software for Planar Digital Contours V1.0. 2021SR1647057. November 5th, 2021.

2021 Software Copyright of Curve approximation-based rate distortion optimal shape codec software V1.0. 2021SR1536129. October 20th, 2021.

2021 Software Copyright of Polygon approximation-based rate distortion optimal shape codec software V2.0. 2021SR1536127. October 20th, 2021.

2021 Software Copyright of Polygon approximation-based rate distortion optimal shape codec software V1.0. 2021SR0785371. May 28th, 2021.

AWARDS

Awards and Honors

2022 Second Prize in Hubei Contest District in China Undergraduate Mathematical Contest in Modeling

2022 ASC World Student Supercomputer Competition Second Prize

EXTERNAL AND INTERNAL FUNDING

A. MODERATOR

1 Sparse Point Cloud 3D Reconstruction Based on Point-Nerf and Diffusion Model
National College Students' innovation and entrepreneurship training program (No.2023zd111)
2023/05-2024/05 RMB 10000

2 An Encoder-Decoder network-based point cloud completion method
The second batch of student research sub-focus projects of Jianghan University 2021 (No. 2021Bczd006)
2021/10-2022/10 RMB 5000

B. Participation

1 Privacy and security research of point cloud information processing for autonomous vehicles based on federated learning
National College Students' innovation and entrepreneurship training program (No.2023zd111)
2023/05-2024/10 RMB 10000

2 Machine vision-based assessment of infant motor development
Jianghan University School-level Research Project (No. 2022SXZX16)
2022/11-2024/11: RMB 70,000

3 Machine vision-based blast rock detection and trajectory prediction
State Key Laboratory of Precision Blasting 2022 Exploratory Project of Independent Subjects (No. PBSKL2022201)
2022/05-2024/05: RMB 200,000

4 Research on the Detection Method of Weakly Perceived Point Cloud Targets in Complex Scenes
National Natural Science Foundation of China (No. 62106086)
RMB 300,000

5 Research on weak perceptual target detection method based on deep attention-guided completion
Nature Science Foundation of Hubei Province (No. 2021CFB564)
RMB 80,000

6 Machine vision-based recognition of abnormal human postures and rehabilitation movements
Key Research and Development program projects of Hubei Province (No. 2020BCB054)
2020/09-2022/12: RMB 300,000

TEACHING

2023 Teaching Assistant: Digital Image Processing

2021 Teaching Assistant: Object Oriented Programming (C++)

SERVICE

Academic Journal and Conference Reviewer

Computers and Electrical Engineering (CAEE)

International Symposium on Artificial Intelligence and Robotics (ISAIR)

Membership in Professional Societies

China Society of Image and Graphics (CSIG) Student Member

SKILLS

Programming   Python, Matlab, C/C++, Java, LaTex, R

Deep Learning   PyTorch, TensorFlow