Jiacheng Guo

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Research Interests

Deep Learning, Multi-task Learning, Model Compression, Data Science, Computer Vision, Geographic Information Science (GIScience), Smart Cities, Intelligent Transportation Systems (ITS)

Education

Cleveland State University   Cleveland, OH, USA
PhD Candidate in Computer Science   *Jan 2023 - Present*
Advisors: Dr. Tianyun Zhang, Dr. Hongkai Yu

The Hong Kong Polytechnic University   Hong Kong SAR, China
M.S. in Geographical Information Systems   *Aug 2021 - Dec 2022*
Advisor: Dr. Yang Xu

Shandong University of Science and Technology   Qingdao, China
B.S. in Geomatics   *Sep 2017 - Jun 2021*

Working Experiences

Research Assistant   *Cleveland, OH*
Cleveland State University   *Jan 2023 - Present*

- Model compression; Image classification and prediction; Adversarial attack and defense; Object detection.
- Coordinate with diverse to accomplish projects among model accelaration, computer vision, autonomous driving, etc.

Database Manager   *Xiamen, China*
Sougu Technology Co., Ltd   *Feb 2021 - Dec 2022*

- Spatiotemporal dynamic data acquisition, storage, management and updating for real-time operation of 700+ bus routes in Qingdao.
- Coordinate cooperation between superiors and subordinates to accomplish data management tasks.

Research Projects

Model Compression Using Min-max Optimization in Sparse Multi-task   *Jan 2023 - May 2024*
Deep Neural Networks

- Developed a novel optimization framework to improve model performance by minimizing the worst-case performance. The pruned multi-task model with min-max framework was more robust while the model was highly compressed ($40\times$, $60\times$).
- Combining dynamic sparse training to further improve the sparsed model performance. The proposed framework showed to be more robust while the model was highly compressed ($40\times$, $60\times$, $100\times$).

Stealthy Multi-task Adversarial Attacks   *Mar 2024 - Nov 2024*

- Proposed a novel concept "Stealthy Multi-task Attack" where the targeted task was significantly attacked while strictly preserved other tasks' performance in multi-task adversarial attack scenarios.
- Developed an automatic method to search for the optimal weighting factors for each task. Also developed the baseline of stealthy multi-task attack.
- Introduced a novel optimization framework to further enhance adversarial model robustness as well as improve attack effectiveness in multi-task adversarial attacks.

Multi-task Adversarial Training Model Optimization   *Oct 2024 - Present*

- Enhancing the robustness of multi-task learning models against adversarial attacks, which exploit vulnerabilities in neural networks to disrupt their performance by using optimization strategies. This project explores strategies to protect all tasks from potential attacks while mitigating stealthy attacks targeting specific tasks in multi-task scenarios.

Publications

A. Journal Articles

- **Jiacheng Guo**, Lei Li, Huiming Sun, Minghai Qin, Hongkai Yu, Tianyun Zhang†. A Min-Max Optimization Framework for Sparse Multi-task Deep Neural Networks. *Submitted to Neurocomputing (Under Review, Minor Revision).*
- **Jiacheng Guo***, Tianyun Zhang*†, Lei Li, Haochen Yang, Hongkai Yu, Minghai Qin†. Stealthy Multi-task Adversarial Attacks. *Submitted to Complex and Intelligent Systems (Under Review).*
- Mengchen Fan*, Tianyun Zhang*, Xiaolong Ma, **Jiacheng Guo**, Zheng Zhan, Shanglin Zhou, Minghai Qin, Caiwen Ding, Baocheng Geng†. A Unified DNN Weight Compression Framework Using Reweighted Optimization Methods (2024). *Submitted to Intelligent Systems with Applications (Under Review).*

B. Conference Proceedings

- **Jiacheng Guo**, Huiming Sun, Minghai Qin, Hongkai Yu, Tianyun Zhang†. A Min-Max Optimization Framework for Multi-task Deep Neural Network Compression. *In proceedings of 2024 IEEE Conference of International Symposium on Circuits and Systems (ISCAS 2024).*
- **Jiacheng Guo**, Lei Li, Haochen Yang, Baocheng Geng, Hongkai Yu, Minghai Qin, Tianyun Zhang†. Robust Multi-task Adversarial Attacks Using Min-max Optimization. *In Proceedings of 2025 IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP 2025).*
- Huiming Sun, **Jiacheng Guo**, Zibo Meng, Tianyun Zhang, Jianwu Fang, Yuewei Lin, Hongkai Yu†. EVD4UAV: An Altitude-Sensitive Benchmark to Evade Vehicle Detection in UAV. *In proceedings of 2024 IEEE Foundation Intelligence of Intelligent Vehicle Symposium (IV 2024).*
- Lei Li*, Haochen Yang*, **Jiacheng Guo**, Hongkai Yu, Minghai Qin, Tianyun Zhang†. An Efficient and Accurate Dynamic Sparse Training Framework Based on Parameter Freezing. *In Proceedings of the 39th AAAI Conference of Association for the Advancement of Artificial Intelligence (AAAI 2025).*
- Lei Li*, Haochen Yang*, **Jiacheng Guo**, Hongkai Yu, Minghai Qin, Tianyun Zhang†. Task-Aware Federated Multi-task Learning. *Submitted to The 33rd ACM International Conference on Multimedia (ACMMM 2025) (Under Review).*
- Haochen Yang*, Lei Li*, **Jiacheng Guo**, Baolu Li, Minghai Qin, Hongkai Yu, Tianyun Zhang†. DA3D: Domain-Aware Dynamic Adaptation for All-Weather Multimodal 3D Detection. *Submitted to The 33rd ACM International Conference on Multimedia (ACMMM 2025) (Under Review).*
- Baolu Li*, Jinlong Li*, Xinyu Liu, Runsheng Xu, Zhengzhong Tu, **Jiacheng Guo**, Xiaopeng Li, Hongkai Yu†. V2X-DGW: Domain Generalization for Multi-agent Perception under Adverse Weather Conditions. *In proceedings of 2025 IEEE Conference on Robotics and Automation (ICRA 2025).*
- Xinyu Liu, **Jiacheng Guo**, Ran Chang, Tianyun Zhang, Yuewei Lin†, Hongkai Yu†. TrafficFD: A Real-world Dataset for Traffic Surveillance Forgery Detection. *In proceedings of 2025 IEEE 8th International Conference on Multimedia Information Processing and Retrieval (MIPR 2025).*

Honors And Awards

Outstanding Student Model, Shandong University of Science and Technology, China, 2021

National Second Prize, National English Competition for College Students (NECCS), China, 2021

National Third Prize, National English Competition for College Students (NECCS), China, 2019

Outstanding League Cadres, Shandong University of Science and Technology, China, 2018

Services

Reviewer of the Journals
- IEEE Transactions on Intelligent Vehicles
- IEEE Open Journal of Intelligent Transportation Systems

Service to the Professional Society
- A Member of Qingdao Municipal Public Transportation Passenger Committee, 12/01/2020-11/30/2023

Technical Skills

Languages: Python (Skillful), R (Skillful), Matlab (Skillful), C++ (Familiar)

Technology tools: Pytorch (Skillful), Sklearn (Skillful), QT5 (Familiar), Linux Operation (Proficient)