



ZHANG Yusen

PhD Candidate at National University of Defense Technology

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PhD candidate in Computer Science and Technology, conducting research in the fields of Edge Intelligence, Artificial Intelligence, and GNNs.

Professional Experience

PhD Candidate National University of Defense Technology, Changsha, Hunan | Sep 2020 – Present

- Proposed a NAS framework for Edge Intelligence to automate the design and optimization of neural architectures on resource-constrained edge devices.
- Developed a technique for compressing neural architectures, reducing the size and complexity of neural network models while maintaining their inference accuracies.
- Designed a directed graph representation learning model that utilizes the incidence matrix to effectively capture orientation information, enhancing downstream tasks efficiently.

Lecturer Xi'an International Studies University, Xi'an, Shaanxi | Jan 2019 – Aug 2020

- Taught higher mathematics (calculus) at School of Economics and Finance as mandatory foundation courses for undergraduate students.
- Designed and delivered engaging and student-centered lectures, tutorials, and assessments for undergraduate and graduate students.

Commercial space technic and strategic manager Xi'an Satellite Control Center, Xi'an, Shaanxi | Jan 2011 – Dec 2018

- Tracked developments in satellite applications, focusing on communication, navigation, and remote sensing.
- Studied the application models and service approaches of big data, cloud computing, AI, and IoT in ground control centers and satellite ground stations.
- Managed ground equipment for space tracking, measurement control, and telemetry reception.
- Entire lifecycle of aerospace control network equipment management.
- Conducted requirement analysis and target decomposition. Focused on controlling the design, implementation, and verification of software and hardware functional architectures.

Education

PhD in Computer Science and Technology

National University of Defense Technology, Changsha, Hunan
Sep 2020 – Present

Masters in Computer Science and Technology

National University of Defense Technology, Changsha, Hunan
Sep 2008 – Dec 2010

Bachelor in Mechanical Engineering and Automation

Tsinghua University, Beijing
Sep 2004 – Aug 2008

Key Skills

- Remarkable learning ability with a keen interest in exploring new technologies and domains.
- Proficient in planning and designing for complex systems and applications.
- Strong ability to solve practical engineering problems and deliver high-quality solutions.
- Excellent written and oral communication skills, detailed oriented, and developing positive workplace relationships.

Languages



English

Japanese



French

Russian

Publications

- Y. Zhang, et al, "Evaluation Ranking is More Important for NAS," 2022 International Joint Conference on Neural Networks (IJCNN), Padua, Italy, 2022, pp. 1-8.

- Y. Zhang, et al, "DGLP: Incorporating Orientation Information for Enhanced Link Prediction in Directed Graphs", submitting to IEEE ICASSP 2024 (Accepted).
- Y. Zhang, et al, "OnceNAS: Discovering Efficient On-device Inference Neural Networks for Edge Devices", submitting to Information Sciences (Major Revision).
- Y. Zhang, et al, "NARL: Capturing the Asymmetry and Inequality in Neural Architecture Representation Learning", submitted to IEEE Transaction of Knowledge and Data Engineering (under revision).
- Y. Zhang, et al, "Elite: Effective Lightweight Neural Architecture Search for Resource-Limited Edge Devices", submitting to Advanced Engineering Informatics (under revision).
- Y. Zhang, et al, "Neural Architecture Condensation via Gradient Matching", in preparation.

Patent

- Y. Zhang, et al. 2022. An End-to-End Lightweight Model Search Method and System Based on Latent Space Mapping for Edge Intelligence. CN(Patent)202111334686.4
- Y. Zhang, et al. 2022. A Multi-Search Space Adaptive Neural Network Architecture Representation Learning Method and System. CN(Patent)202111334705.3
- Y. Zhang, et al. 2022. A Method and System for Extracting and Representing Features of Directed Graph Data Based on Incidence Matrices. CN(Patent)202211066764.1
- Y. Zhang, et al. 2023. A Unified Identity Authentication Approach, Device, and Medium for Operating System Platforms. CN(Patent)202311042621.1
- Y. Zhang, et al. 2023. A Graph-Based System User Management Method, System, and Medium for Operating System. CN(Patent)202310720279.X

Projects

- **Research on Multimodal Data Representation Learning and Its Applications, 2021 – Present**

Supported by National Natural Science Foundation of China, Grant No. 62002371

Participant

Introduction: The fault information of operation system is typically recorded in system logs, while trace data captures various event information during the operation of the OS. To enhance the fault diagnosis capability for OS, I first design a multimodal representation learning model to extract fault features from log data and trace data. Based on this, I implement an anomaly detection application using an autoencoder, enabling efficient fault detection for OS.

- **Research on Key Technologies of Domestic Basic Software for Edge Intelligence, 2022 – Present**

Supported by Talent Program of National University of Defense University

Participant

Introduction: I contribute to the research on the design and optimization of lightweight neural architectures. Specifically, my focus is on developing methods for neural architecture feature extraction and representation learning. Following this, I develop an effective performance evaluation method for assessing candidate architectures. Subsequently, I implement a lightweight neural architecture search approach tailored for edge intelligence scenarios. Through these efforts, we can efficiently generate on-device inference neural network models suitable for various edge devices.

- **Research on Intelligent Intrusion Detection System for Complex Data Scenarios, 2022 – Present**

Support by Foundation of National University of Defense Technology, Grant No. ZK21-17

Participant

Introduction: I participant in the research on graph construction for intrusion data and develop representation learning approach for them. Initially, I design a graph construction method that leverages both the local and global association within intrusion data. Following this, I design and implement an effective Graph Neural Network (GNN) model based on incidence matrix. This model facilitates the extraction of intrinsic features and enables representative representation learning. Finally, based on these approaches, I implement an effective intrusion detection method that can be applied to various intrusion datasets.