CHAO WANG

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EDUCATION

Northeastern University, School of Computer Science (985 Project University) **Shenyang, China**
Master of Engineering in Computer Application Technology 2008 - 2010

Relevant Courses: Machine Learning, Advanced Artificial Intelligence, Knowledge Discovering and Database Mining

Jiangnan University, School of Mechanical Engineering (211 Project University) **Wuxi, China**
Bachelor of Engineering in Process Equipment and Control Engineering 2003 - 2007

WORK EXPERIENCE

Research intern, China Academy of Railway Sciences Corporation Limited 2010 – 2012

Assistant Researcher, China Academy of Railway Sciences Corporation Limited 2012 – PRESENT

STANDARD TEST

IELTS(Academic**):** Overall Band 7 07/2024

FELLOWSHIPS & AWARDS

- The Second Prize of Science and Technology Progress of Beijing Rail Transit Society Award (top1%) 2021
- The First Prize of China Academy of Railway Sciences Award 2020
- Innovation Award of Communication Signal Research Institute (top1%) 2018
- China Patent Excellence Award **(highest intellectual property award in China)** 2017
- Third Prize in the Mathematics Competition at Jiangnan University 2005
- Second Prize Scholarship at Jiangnan University 2004
- First Prize Scholarship at Jiangnan University (top 5%) 2003
- Outstanding Student at Jiangnan University (top 5%) 2003

RESEARCH INTERESTS

Deep Learning (Computer Vision, Graph Neural Network); Machine learning; Data analysis (Big Data)

PUBLICATIONS

[1] WSSGCN: Wide Sub-stage Graph Convolutional Networks
Chao Wang*, Zheng Tang, Hailu Xu
Neurocomputing **(Top-tier SCI, IF 5.5)**. 07/2024
Paper link: Link

[2] Fast Meta Failure Recovery for Federated Meta-Learning
Brandon Delliquadri, **Chao Wang**, Shuo Chen, Zhengxiong Li, Hui Luo, Hailu Xu*
First International Workshop on Machine Learning for securing IoT systems using BigData. 12/2023
Paper link: Link

[3] The Staged Knowledge Distillation in Video Classification: Harmonizing Student Progress by a Complementary Weakly Supervised Framework
Chao Wang*, Zheng Tang
IEEE Transactions on Circuits and Systems for Video Technology (Top-tier SCI, IF 8.3). 07/2023
Paper link: Link

[4] Research on Micro-service Architecture Scheme of ATS System Based on Cloud Platform
Xin Song*, Deming Zhang, Wei Xu, **Chao Wang**,
Railway Signalling & Communication. 06/2022
Paper link: Link

[5] CBTC software intelligent test system technology based on big data computing model
Chao Wang*, Deming Zhang, Wei Xu, Xin Song
RAILWAY COMPUTER APPLICATION. 07/2020
Paper link: Link

[6] Train intelligent testing system based on convolution neural network optimization algorithm
Chao Wang*
RAILWAY COMPUTER APPLICATION. 05/2019
Paper link: Link

[7] Application of Decision Tree Optimization Algorithm in Train Simulation Technology
Chao Wang*
Urban Mass Transit (Chinese Science and Technology Core Journals). 12/2017
Paper link: Link

[8] Software Design and Implementation of Intelligent Data Maintenance Terminal for Urban Rail Vehicle
Shuo Xu*, **Chao Wang**, Wang Sun
Railway Signalling & Communication. 07/2016
Paper link: Link

[9] Research and Implementation of Train Control Simulation System
Chao Wang*
Railway Signalling & Communication. 04/2016
Paper link: Link

[10] Design and Realization of Vehicle Human-machine Interface of CBTC System
Wei Zheng*, **Chao Wang**, Ningning Chen
Railway Signalling & Communication. 01/2016
Paper link: Link

[11] Research on frequent episode mining methods on interval event streams
Chao Wang, ShuKuan Lin*
Northeastern University (Master's thesis). 07/2010

** Represents the corresponding author*

SELECTED RESEARCH EXPERIENCE

China Academy of Railway Sciences Corporation Limited, Communication signal research institute

Research on target classification technology of rail transit based on computer vision 2021 - 2023
Lead Researcher
- Researched fine-tuning methods for custom and pre-trained models, enabling effective classification and recognition of pedestrians, vehicles, and traffic signals.
- Explored GCN techniques to improve the training speed of the network and reduce the number of parameters.
- Extended the structure of our phased learning frameworks from CNN to GCN and designed a width-based graph convolutional network in PyTorch, achieving the state-of-the-art (SOTA) performance on various benchmark of GCN.
- Paper link: Link

Human body detection and alarm system based on cloud platform 2020 - 2022
Senior Researcher
- Applied lightweight object detection model and integrate it with a small-scale industrial computer like Nvidia Jetson to automate human detection and alarm triggering.
- Explored knowledge distillation techniques to efficiently construct lightweight deep learning models.
- Proposed a new loss algorithm, which was based on the feature distribution and was able to uncover knowledge hidden in the distribution of features.
- Proposed two new weakly supervised distillation frameworks that simulated the human-stage learning process to improve efficiency and accuracy of models.
- Paper link: Link

Intelligent Platform for Urban Rail Train Control System based on private Cloud 2020 - 2022
Senior Researcher
- Trained Inception and MobileNet in TensorFlow and Keras on a Linux system to handle object classification and object detection tasks for rail transit equipment, respectively.
- Construct load-balancing Nginx servers and performance-monitoring Ganglia servers to optimize resource allocation and scheduling.
- Built an automatic data monitoring and analysis system within a private cloud architecture in VMware.
- Paper link: Link
- Award Link: Link

Data service analysis platform of the CBTC system based on the big data framework 2018 - 2020
Lead Researcher
- Built an automated, modular, highly scalable, and efficient data processing platform for comprehensive intelligent railway train control systems.
- Conducted research and integrate various technologies within the big data ecosystem, including but not limited to Hadoop and Spark, to enable real-time and offline functionalities as well as parallelized task scheduling on the platform.

- Achieved automated visualization of analyzed data, using JavaScript and Spring Boot.
- Received one patent: Real-time Monitoring Platform of Urban Rail Vehicle Signal System.
- Paper link: Link

Foundation of Intelligent Software Test System for Urban Rail Transit 2018 - 2020

Senior Researcher

- Proposed a CNN-based algorithm to achieve automated testing of repetitive scenarios.
- Improved testing efficiency by over 50% in subsequent tests of metro projects.
- One patent was obtained: Intelligent Automatic Test System Based on CBTC.
- A reward was obtained: Innovation Award of Communication Signal Research Institute.
- Paper link: Link

Development of Maglev Train on-board Signal Equipment Monitoring System 2015 - 2017

Senior Researcher

- Implemented an automated fault analysis feature for log data from maglev train signaling equipment.
- Proposed an algorithm based on decision trees to handle large datasets.
- Conducted experiments and demonstrated that our algorithm accurately classified and categorized fault issues, providing a reliable foundation for fault prediction.
- Received one patent: An intelligent fault analysis method based on CBTC system network data.
- Paper link: Link

TRAINER

Digital Transformation of Railway Signaling Systems 2019 - 2021

- Class: 50 employees

SELECTED PATENTS

- Train arrival warning method based on distributed structure No.ZL202011516650.3, 2023
- Automatic control method of train reentry route No.ZL202011518244.0, 2023
- An intelligent fault analysis method based on CBTC system network data No.ZL201910208479.0, 2022
- Intelligent Automatic Test System Based on CBTC No.ZL201811504086.6, 2022
- Real-time Monitoring Platform of Urban Rail Vehicle Signal System No.ZL201822216346.1, 2019
- Train protection system based on two channel redundant vehicle communication No.ZL201510977159.3, 2017
- An Automatic Test Method and System for Subway Train Signal System No.ZL201310652894.8, 2016
- An On-line Monitoring and Early Warning Device for Subway Train Signal System No.ZL201310654233.9, 2016
- A Method and System for Real-time Adjustment of Automatic Train Running Grade No.ZL201410515708.0, 2016
- An ATO Speed Measuring and Ranging System No.ZL201410563349.6, 2016

SERVICES

Invited Conference Speaker

The 2nd International Conference on Neurology & Alzheimer's Disease Paris, France 06/2025

The 6th International Conference on Computer Systems and Communication Technology Hong Kong 11/2024

Poster Presenter

The 31th International Conference on Neural Information Processing Auckland,New Zealand 12/2024

Reviewer

IEEE Transactions on Circuits and Systems for Video Technology (Reviewed 4 times)

IEEE Transactions on Neural Networks and Learning Systems (Reviewed 2 times)

International Conference on Neural Information Processing (Reviewed 4 times)

British Machine Vision Conference (Reviewed 4 times)

SKILLS

Programming Languages: Python, JAVA, C, Scala, JavaScript, SQL, LaTeX

Frameworks: PyTorch, TensorFlow, Keras, Numpy, Pandas, Scikit-learn, Hadoop, Spark, Spring Boot, E-Charts

Tools: IntelliJ IDEA, JupyterLab, PyCharm, Git, MySQL, Hive, Kafka, Flume, Zookeeper, Nginx, Ganglia

Environments: Linux, Windows, Web, Nvidia Jetson, VMware

Competitions: Kaggle