

# YUE XIN

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## SUMMARY

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**Research Interests:** My research primarily lies in machine learning, interpretable AI, and computer vision. My goal is to identify the fundamental optimization goal of deep learning and construct interpretable machine learning systems through mathematical derivations. Specifically, I aim to establish objective metrics to measure model performance and mathematically deduce the factors that contribute to model performance, guiding the design of neural network architectures.

**Highlight:** 5 years of programming experience; 3 years of research experience with solid mathematical and theoretical background.

**Relevant Courses:** A(90+) for all math/physics related courses(Calculus, Physics, Probability and Statistics, etc) and most major related courses(Signals and Systems, Programming, Digital Image Processing, etc). A+(95+) for most major related experimental courses(Engineering Problem Modeling and Simulation, Engineering Practice and Technological Innovation).

## EDUCATION

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**Shanghai Jiao Tong University (SJTU)** **June 2023 – Present**  
*M.S. in Information and Communication Engineering* *Shanghai, China*

- Advisor: Prof. Hongkai Xiong and Prof. Wenrui Dai

**Shanghai Jiao Tong University (SJTU)** **Sep 2019 – June 2023**  
*B.S. in Electronic Science and Technology (major) and Computer Science and Technology (minor)* *Shanghai, China*

- Grades for All Courses: 89.66/100      GPA for All Courses: 3.85/4.3

## PUBLICATIONS

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- **ICPNet: A Network of Network with Implicit Layers and Chebyshev Polynomial Activation Function**  
Yue Xin, Jiarui Zhang, Wen Fei, Wenrui Dai, Chenglin Li, Junni Zou, Hongkai Xiong.  
ECCV 2024 on submission
- **Why Adversarial Training of ReLU Networks Is Difficult?**  
Xu Cheng\*, Hao Zhang\*, Yue Xin, Wen Shen, Jie Ren, Quanshi Zhang.  
AAAI, 2024. [\[paper\]](#)

## ACADEMIC RESEARCH EXPERIENCE

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**Institute of Media, Information and Network(min), SJTU** **Nov 2022 – Present**  
*Machine Learning and Computer Vision Intern and Master's Student* *Advisor: Hongkai Xiong, Wenrui Dai*

- Proposed ICPNet, a unified model capable of representing networks with arbitrary depths with fixed-point iteration layers and any activation function with Chebyshev polynomials, and verified its great properties. (ECCV 2024 on submission)
- Validated the high similarity properties of parameter matrices in LoRa, thereby constructed low-rank decomposition which reduced the required parameter quantity for fine-tuning as well as enhanced performance.

**Interpretable ML lab, SJTU** **Feb 2022 – Nov 2022**  
*Interpretable Machine Learning Intern* *Advisor: Quanshi Zhang*

- Used high-dimensional matrix analysis to clarify the challenges in adversarial training. (Accepted by AAAI 2024)
- Derived the dynamics characteristics in interactive learning. (Preparing for submission)
- Designed experimental methods to analyze the robustness of various complexity concepts.

**SunnyLab, SJTU** **Mar 2021 – May 2022**  
*Machine Learning and Computer Vision Intern* *Advisor: Chongyang Zhang*

- Developed Swin Transformer based model to implement instance segmentation of workpiece welding area.
- Designed a space-time filter to remove false positive samples in pedestrian detection.
- Developed YOLOv5-based model to detect tower crane, recognize dangerous tower crane, and label electronic fence.

## ACADEMIC COMPETITION (Selected)

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The 20th Chinese Graduate Mathematical Modeling Competition:	<i>Nation level, Second Prize</i>	2023
The Mathematical Contest in Modeling:	<i>World level, Meritorious Winner (First Prize)</i>	2021
The Huawei Cloud ‘Cloud Pioneers’ Few-Shot Detection Competition:	<i>Nation level, Third Place</i>	2021
The 12th National College Student Mathematical Competition:	<i>City level, First Prize</i>	2020
The 2nd National ‘August 1st Cup’ Online Mathematics Competition:	<i>Nation level, Tenth Place</i>	2020

## PROJECT (Selected)

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**CS368: Digital Image Processing Course Final Project** | *Python, Pytorch* **Oct 2021 – Feb 2022**

Implemented multi-object tracking and behavior recognition for soccer players using algorithms like ByteTrack, YOLOv5, and Kalman filtering, with file Transfer and visualized recognition results using Qt.

**AI005: Deep Learning Practical on Huawei AI Platform Competition** | *Python, Pytorch* **Oct 2021 – Feb 2022**

Secured the third place nationwide in the ‘Cloud Pioneers’ competition on Huawei Cloud by successfully completing the few-shot detection task.

**EE458: Software Engineering Course Final Project** | *Python, Pytorch, Java* **Sep 2021 – Jan 2022**

Trained a YOLOv5 model on a face mask dataset and deployed it on mobile devices for real-time mask detection.

## TECHNICAL SKILLS

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**Programming Languages:** Proficient in Python, C++, Matlab, L<sup>A</sup>T<sub>E</sub>X, Linux, etc.

**Frameworks:** Proficient in PyTorch, NumPy, Anaconda, Git, OpenCV.

**Mathematics:** Proficient in calculus, linear algebra, probability statistics, etc.

**Language:** mandarin (native), English (fluent)

## HONORS & AWARDS (Selected)

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Outstanding Undergraduate Graduate of Shanghai Jiao Tong University	<i>University level, 5%</i>	2023
National Scholarship	<i>Nation level, 2%</i>	2021
Shanghai Jiao Tong University A-Class Excellent Scholarship for Undergraduate	<i>University level, 2%</i>	2021
Shenzhen Stock Exchange Scholarship	<i>University level, 2%</i>	2020
Shanghai Jiao Tong University B-Class Excellent Scholarship for Undergraduate	<i>University level, 5%</i>	2020