

# YANG LI

Google Scholar  $\diamond$  Github  $\diamond$  LinkedIn

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## PERSONAL SUMMARY

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- Ph.D. in Computer Science. Former intern at Oracle and NEC Labs.
- Extensive hands-on experience with LLMs such as BERT, GPT, Llama, Mistral, Gemma, and more. Worked on a variety of NLP tasks including natural language understanding (NLU), natural language generation (NLG), instruction tuning, and mathematical reasoning.
- Specializations include parameter-efficient fine-tuning, neural network compression, and data mining and modeling. Authored 7 research papers published in prestigious conferences and journals such as ECML, IEEE IJCNN, OFC, and Human Brain Mapping. Authored 1 US Patent.
- Strong coding skills with proficiency in Python, C++, Java, SQL, PyTorch, and TensorFlow. Contributed code under the HuggingFace PEFT framework.

## EDUCATION

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### Georgia State University

Ph.D of Computer Science

GPA: 3.75/4.3

Aug. 2018 — Jul. 2024

### University of Science and Technology of China (USTC)

Master of Nuclear Science and Technology

GPA: 3.61/4.0

Sept. 2015 — Jun. 2018

### Anhui Normal University

Bachelor of Computer Science and Technology

GPA: 3.93/5.0, Rank: 1/97

Sept. 2011 — Jul. 2015

## PROJECTS

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### Research on LLMs Finetuning (Parameter Efficient Finetuning) [1]

Released in May 2024. Received 3 citations within the first 2 months. [Paper], [Code]

- Proposed VB-LoRA which aims at reducing the trainable/storage parameters required for fine-tuning large language models (LLMs). Introduced a novel divide-and-share strategy, where parameters from different layers and modules are decomposed and shared in a global *vector bank*.
- Performed instruction tuning on Llama2-13B, Mistral-7B, and Gemma-7B: VB-LoRA uses approximately 0.4% of the parameters compared to LoRA, while achieving better performance.

### Neural Network Pruning [2]–[4]

- Proposed L0-ARM and Dep-L0, learning binary gates with  $L_0$ -based regularization in an end-to-end manner. Pruned 43.9% of the parameters and reduced 38.1% FLOPs of ResNet-50 on the ImageNet task while maintaining comparable performance.
- Proposed NPNs, a unified framework for network pruning and expansion.

### Human Intelligence Prediction and Brain Structure Exploration [5]

Collaborated with Columbia University and MD Anderson Cancer Center. [Paper]

- Designed an LSTM-based network to extract spatiotemporal information from fMRI data and predict human intelligence, achieving state-of-the-art results.
- Learned the importance scores of brain regions in an end-to-end manner. Our findings aligned with results from neuroscience research.

## Network Device Classification and Anomaly Detection

*A project with VMWare*

- Designed and curated a dataset of network traffic by analyzing TCP and UDP packet headers; performed feature engineering to select the top 10 most informative features for device classification tasks.
- Designed and implemented LSTM and CNN models for device classification (iOS, Android, Linux, Windows, MacOS, webcams, and routers), achieving an accuracy rate of approximately 95%.
- Identified unique traffic patterns for each device type and developed language models to detect anomalous behavior in real-time.

## INTERN EXPERIENCE

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### Data Science Intern @ Oracle

May 2023 - Aug 2023

- Designed and implemented an LSTM model to disaggregate energy usage from monthly electric bills.
- Proposed a new feature representation to improve model performance by 10%.
- Contributed code and unit tests to the deep learning library used internally at Oracle.

### Research Intern @ NEC Laboratories America

May 2022 - Aug 2022

- Proposed an eigenvalue-based algorithm for locating ocean earthquakes at span-level (60-90 kilometers) using existing submarine fibers, achieving nearly 100% accuracy.
- Published the results in the top conference Optical Fiber Communication [6] and filed a patent [7].

## PUBLICATIONS

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- [1] Y. Li, S. Han, and S. Ji, "Vb-lora: Extreme parameter efficient fine-tuning with vector banks," *arXiv preprint arXiv:2405.15179*, 2024.
- [2] Y. Li and S. Ji, "Dep-l0: Improving l0-based network sparsification via dependency modeling," in *Joint European Conference on Machine Learning and Knowledge Discovery in Databases*, Springer, 2021, pp. 167–183.
- [3] Y. Li and S. Ji, "L0-ARM: Network sparsification via stochastic binary optimization," in *The European Conference on Machine Learning (ECML)*, 2019.
- [4] Y. Li and S. Ji, "Neural plasticity networks," in *2021 International Joint Conference on Neural Networks (IJCNN)*, IEEE, 2021, pp. 1–9.
- [5] Y. Li, X. Ma, R. Sunderraman, S. Ji, and S. Kundu, "Accounting for temporal variability in functional magnetic resonance imaging improves prediction of intelligence," *Human Brain Mapping*, vol. 44, no. 13, pp. 4772–4791, 2023.
- [6] F. Yaman, Y. Li, S. Han, T. Inoue, E. Mateo, and Y. Inada, "Polarization sensing using polarization rotation matrix eigenvalue method," in *Optical Fiber Communication Conference*, Optica Publishing Group, 2023, W1J–7.
- [7] F. Yaman, H. Shaobo, E. F. M. RODRIGUEZ, Y. Li, Y. Inada, and T. Inoue, *Fiber sensing by monitoring polarization function of light on supervisory path of cables*, US Patent App. 18/369,041, Mar. 2024.

## ACHIEVEMENTS

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**Graduate Teaching Award**, awarded by Georgia State University

*Mar. 2022*

**Best Graduate Presentation**, awarded by Georgia State University

*May 2019*

**Outstanding Dissertation**, awarded by Anhui Normal University

*Jun. 2015*

**National Scholarship**, awarded by Ministry of Education, PRC

*Nov. 2013*

## SKILLS

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**Programming Languages**

Python, C++, Java, Swift, Matlab, Bash Script, Javascript, SQL

**Machine Learning Tools**

Pytorch, Tensorflow, HuggingFace Transformers / PEFT