Zhuo Su

AI Research Scientist at Huawei Suomi Finland

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I am a Research Scientist at Huawei Helsinki R&D Center in Finland, working on computer vision on security engineering. I am also a PostDoc (part-time) at the University of Oulu in Generative AI and LBP-based binary network optimization. Before that, I defended my thesis in October 2023. My thesis topic is Efficient Representation Learning for Computer Vision, towards building real-time and compact deep learning models.

Interests : Machine Learning, Deep Learning, Computer vision, Optimization, Math, Coding

Programming

Python
C/C++
Matlab

Tools/Frameworks

Pytorch
Linux
Git
vim

Languages

- English (fluent)
- Chinese (native)
- Finnish (survival)

Experience

Research Scientist (Huawei Suomi, Finland) — September 2024 - Present

In a team with experts in LLM, computer vision, generative AI, and multimodal learning. My duties include 1. Developing multimodal AI models for building global abuse detection and prevention systems. 2. Profiling and optimizing the latency consumptions of models for on-device inference, ensuring real-time performance while maintaining industry-level accuracy. 2. R&D though dataset and architecture iterations for the on-device models.

On-device Model | Computer Vision | Multimodal Learning

Postdoc in GenAI and LBP-based Binary Networks (Oulu University, Finland) — November 2023 - Present (part-time now)

I worked on Generative AI based on diffusion models and GAN. I am developing LBP-based binary kernels using C++ and cuda. In addition, I am also supervising PhD and Master students, as well as giving lectures on deep learning basics.

Diffusion Models | Binary Networks | Multimodal Learning

Machine Learning Intern (Intel Lab, Germany. 7 months) — September 2022 - March 2023

I worked with Matthias Müller at Intel Lab, Germany, on building efficient computer vision networks. We achieved a good performance in terms of speed and accuracy on light hardware for real-time salient object detection.

Computer Vision | Efficient Neural Networks | Real-time Salient Object Detection

Visiting Researcher (University of Amsterdam. 6 months) — October 2021 - March 2022

ELLIS PhD & Postdoc Program | AMLab

I visited AMLab under the ELLIS PhD & Postdoc Program. There, I worked with Prof. **Max Welling**, on the topic of "Binary SO(3) Equivariant Graph Neural Networks". A paper was published at the International conference on 3D vision 2022.

Graph Neural Networks | Rotation Equivariant | Network Binarization

Software Engineer (Samsung R&D Institute China-Beijing. 3 months) — May 2018 - July 2018

I worked in the Machine learning group, on Optical Character Recognition.

Computer Vision | Optical Character Recognition

Software Engineer Intern (Aihujing.com, China. 4 months) — January 2018 - April 2018

I worked as a computer vision intern, on Optical Character Recognition.

Computer Vision | Optical Character Recognition

Education

October 2023 / October 2018 — **Ph.D, Computer Science and Engineering, University of Oulu, Finland**
Thesis : LBP Inspired Efficient Deep Convolutional Neural Networks for Visual Representation Learning
Supervisor : Dr. Li Liu ; Opponent : Prof. Karen Eguiazarian ; Custos : Prof. Matti Pietikäinen
Computer Vision | Network compression | Binary neural networks | Efficient | Graph neural networks

March 2018 / September 2015 — **M.Sc, Automation Science and Electrical Engineering, Beihang University, China**
Thesis : Salient Object Detection for Single Images
Supervisors : Prof. Hong Zheng, Prof. Baochang Zhang
GPA : 3.24/4.0
Image processing | Salient object detection | Machine learning

June 2015 | **B.Sc, Automation Science and Electrical Engineering, Beihang University, China**
September 2011 | Topic : Pattern Recognition
GPA : 3.68/4.0
Pattern recognition | Machine learning

Papers (first author)

1. **Zhuo Su** et al. "Boosting Convolutional Neural Networks with Middle Spectrum Grouped Convolution", **IEEE Transactions on Neural Networks and Learning Systems (TNNLS)**, 2024
   pdf github.com/hellozhuo/msgc
2. **Zhuo Su** et al. "Lightweight Pixel Difference Networks for Efficient Visual Representation Learning", **IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI)**, 2023
3. **Zhuo Su** et al. "Pixel Difference Networks for Efficient Edge Detection", **IEEE/CVF International Conference on Computer Vision (ICCV)**, 2021 (**oral presentation**)
   pdf github.com/hellozhuo/pidinet
4. **Zhuo Su** et al. "Dynamic Group Convolution for Accelerating Convolutional Neural Networks", **European Conference on Computer Vision (ECCV)**, 2020 (**spotlight presentation**)
   pdf github.com/hellozhuo/dgc
5. **Zhuo Su** et al. "BIRD : Learning Binary and Illumination Robust Descriptor for Face Recognition", **British Machine Vision Conference (BMVC)**, 2019
   pdf github.com/hellozhuo/bird-descriptor
6. **Zhuo Su** et al. "SVNet : Where SO(3) Equivariance Meets Binarization on Point Cloud Representation", **IEEE International Conference on 3D Vision (3DV)**, 2022
   pdf github.com/hellozhuo/svnet
7. **Zhuo Su** et al. "From Local Binary Patterns to Pixel Difference Networks for Efficient Visual Representation Learning", **Scandinavian Conference on Image Analysis (SCIA)**, 2023
   pdf
8. **Zhuo Su** et al. "Rapid Salient Object Detection with Difference Convolutional Neural Networks" (*TPAMI*, in Major revision)

Papers (co-author)

1. Chao Xiao et al. **Zhuo Su** et al. "Highly Efficient and Unsupervised Framework for Moving Object Detection in Satellite Videos", **IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI)**, 2024
2. Huali Xu et al. **Zhuo Su** et al. "Enhancing Information Maximization with Distance-Aware Contrastive Learning for Source-Free Cross-Domain Few-Shot Learning", **IEEE Transactions on Image Processing (TIP)**, 2024
3. Zitong Yu et al. **Zhuo Su** et al. "Searching central difference convolutional networks for face anti-spoofing", **IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)**, 2020
4. Wanxia Deng, **Zhuo Su** et al. "Deep ladder reconstruction classification network for unsupervised domain adaptation", **Pattern Recognition Letters (PRL)**, 2021
5. Jiehua Zhang, **Zhuo Su**, Li Liu, "Median Pixel Difference Convolutional Network for Robust Face Recognition", **British Machine Vision Conference (BMVC)**, 2021
6. Jiehua Zhang, **Zhuo Su** et al. "Dynamic Binary Neural Network by learning channel-wise thresholds", **The International Conference on Acoustics, Speech, & Signal Processing (ICASSP)**, 2022

Scientific Contributions

Teaching Assistant, University of Oulu 2018 - Present

I have been working as the teaching assistant of the course "Deep Learning" in University of Oulu in the past years.

Deep Learning | Network Compression | Pytorch

Invited Reviewer 2019 - Present

Journals
TPAMI, TIP, TMM, TCSVT, Neurocomputing, PRL, CVIU, TOMM

Conferences
CVPR, ICCV, ECCV, ICME, ICASSP, ACMMM, AAAI, ACCV, ICPR, PRCV