Zhuo Su

Ph.D Candidate in Computer Vision (about to graduate), University of Oulu, Finland

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I am a final-year PhD candidate at Center for Machine Vision and Signal Analysis (CMVS) in University of Oulu, Finland. I have visited the AMLab, University of Amsterdam for six months in 2021 and 2022. By April, 2023, I accomplished my 7-month internship at Intel Lab, Germany. My thesis topic is Efficient Representation Learning for Computer Vision, towards building real-time and compact computer vision models with deep learning. I have a great interest in computer vision and machine learning and hope I can proceed in my future career.

Interests : Deep Learning, Computer vision, Machine Learning

Programming

Python ●●●●●
Matlab ●●●●●
C/C++ ●●●○○

Tools/Frameworks

Pytorch ●●●●●
Tensorflow ●●●●○
Caffe ●●●○○

Languages

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

Experience

Computer vision 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. The involved tasks are real-time salient object detection and depth estimation.

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

Present – 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 : Prof. Li Liu, 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 – September 2011 — **B.Sc, Automation Science and Electrical Engineering, Beihang University, China**
Topic : Pattern Recognition
GPA : 3.68/4.0
Pattern recognition | Machine learning

Papers (first author)

1. **Zhuo Su**, Jiehua Zhang, Longguang Wang, Hua Zhang, Zhen Liu, Matti Pietikäinen, Li Liu, "Lightweight Pixel Difference Networks for Efficient Visual Representation Learning", **IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI)**, 2023

2. **Zhuo Su**, Wenzhe Liu, Zitong Yu, Dewen Hu, Qing Liao, Qi Tian, Matti Pietikäinen, Li Liu, "Pixel Difference Networks for Efficient Edge Detection", **IEEE/CVF International Conference on Computer Vision (ICCV)**, 2021 (**oral presentation**)
   pdf github.com/zhuoinoulu/pidinet
3. **Zhuo Su**, Linpu Fang, Wenxiong Kang, Dewen Hu, Matti Pietikäinen, Li Liu, "Dynamic Group Convolution for Accelerating Convolutional Neural Networks", **European Conference on Computer Vision (ECCV)**, 2020 (**spotlight presentation**)
   pdf github.com/zhuogege1943/dgc
4. **Zhuo Su**, Matti Pietikäinen, Li Liu, "BIRD : Learning Binary and Illumination Robust Descriptor for Face Recognition", **British Machine Vision Conference (BMVC)**, 2019
   pdf github.com/zhuogege1943/bird-descriptor
5. **Zhuo Su**, Max Welling, Matti Pietikäinen, Li Liu, "SVNet : Where SO(3) Equivariance Meets Binarization on Point Cloud Representation", **IEEE International Conference on 3D Vision (3DV)**, 2022
   pdf github.com/zhuoinoulu/svnet
6. **Zhuo Su**, Matti Pietikäinen, Li Liu, "From Local Binary Patterns to Pixel Difference Networks for Efficient Visual Representation Learning", **Scandinavian Conference on Image Analysis (SCIA)**, 2023
   pdf
7. **Zhuo Su**, Matthias Müller, Diana Wofk, Matti Pietikäinen, Li Liu, "Spatial and Temporal Difference Network for Real-time Salient Object Detection" (in submission to *TPAMI*, 2023)
8. **Zhuo Su**, Jiehua Zhang, Tianpeng Liu, Zhen Liu, Shuanghui Zhang, Matti Pietikäinen, Li Liu, "Boosting Convolutional Neural Networks with Middle Spectrum Grouped Convolution", under review in *TNNLS* (submitted in April, 2023)

Papers (co-author)

1. Zitong Yu, Chenxu Zhao, Zezheng Wang, Yunxiao Qin, **Zhuo Su**, Xiaobai Li, Feng Zhou, Guoying Zhao, "Searching central difference convolutional networks for face anti-spoofing", **IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)**, 2020
2. Wanxia Deng, **Zhuo Su**, Qiang Qiu, Lingjun Zhao, Gangyao Kuang, Matti Pietikäinen, Huaxin Xiao, Li Liu, "Deep ladder reconstruction classification network for unsupervised domain adaptation", **Pattern Recognition Letters (PRL)**, 2021
3. Jiehua Zhang, **Zhuo Su**, Li Liu, "Median Pixel Difference Convolutional Network for Robust Face Recognition", **British Machine Vision Conference (BMVC)**, 2021
4. Jiehua Zhang, **Zhuo Su**, Yanghe Feng, Xin Lu, Matti Pietikäinen, Li Liu, "Dynamic Binary Neural Network by learning channel-wise thresholds", **The International Conference on Acoustics, Speech, & Signal Processing (ICASSP)**, 2021

Scientific Contributions

Teaching Assistant, University of Oulu (Prof. Li Liu) 2018 - 2022

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 - 2023

Journals

IEEE Transactions on Pattern Analysis and Machine Intelligence
IEEE Transactions on Image Processing
IEEE Transactions on Multimedia
IEEE Transactions on Circuits and Systems for Video Technology
Neurocomputing, Pattern Recognition Letters

Conferences

IEEE/CVF Conference on Computer Vision and Pattern Recognition	2021-2023
IEEE/CVF International Conference on Computer Vision	2021-2023
IEEE International Conference on Multimedia and Expo	2021-2023
IEEE International Conference on Acoustics, Speech, and Signal Processing	2023
ACM International Conference on Multimedia	2023
European Conference on Computer Vision	2022
AAAI Conference on Artificial Intelligence	2022
Asian Conference on Computer Vision	2020