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Ligeng Zhu

Education

Massachusetts Institute of Technology, *Cambrdige*, MA, USA.
Department of EECS. Visiting student at Prof. Song Han's group.

Simon Fraser University, *Vancouver*, BC, Canada.
B.Sc in Computing Science. Dual Degree Program exchange. GPA: 3.68/4.3 Major: 3.81/4.3

Zhejiang University, *Hangzhou*, Zhejiang, China.
B.Eng in Computer Science & Technology. GPA: 3.53/4.0 Major: 3.88/4.0

Publications

Neural Network Architectures

Preprint **ProxylessNAS: Direct Neural Architecture Search on Target Task and Hardware**.
Cai Han, Ligeng Zhu, Song Han
Under review at ICLR 2019.

Sept 2018 **Sparsely Aggregated Convolutional Networks**.
Ligeng Zhu, Ruizhi Deng, Michael Maire, Zhiwei Deng, Greg Mori and Ping Tan
In 15th European Conference on Computer Vision (ECCV 2018).

Colour Vision

Nov 2018 **Does Colour Really Matter? Evaluation via Object Classification**.
Brian Funt, Ligeng Zhu
In Proc. CIC 26th Color Imaging Conference (CIC 2018).

Sept 2018 **Colorization of Dichromatic Images**.
Brian Funt, Ligeng Zhu
In Proc. AIC 2018 International Colour Association Conference (AIC 2018).

Jan 2018 **Colorizing Color Images**.
Ligeng Zhu and Brian Funt
In 30th Human Vision and Electronic Imaging Conference (HVEI 2018).

Segmentation / Detection / Recognition

Preprint **Learning to Forecast Videos of Human Activity with Multi-granularity Models and Adaptive Rendering**.
Mengyao Zhai, Jiacheng Chen, Ruizhi Deng, Ligeng Zhu, Lei Chen and Greg Mori
arXiv preprint.

Mar 2019 **Small Object Sensitive Segmentation of Urban Street Scene with Consistent Spatial Adjacency Between Object Classes**.
Ligeng Zhu*, Dazhou Guo*, Yuhang Lu and Song Wang (* denotes equal contribution)
To appear in IEEE Transactions on Image Processing (TIP 2019).

Oct 2016 **Attribute Recognition from Adaptive Parts**.
Luwei Yang, Ligeng Zhu, Yichen Wei, Shuang Liang and Ping Tan
In 27th British Machine Vision Conference (BMVC 2016).

Research Experience

Aug 2018 – Now **Research Assistant**, *HanLab*, MIT, Advisor: Prof. Song Han.
Efficient neural architecture search for hardware specialization
- Reduced the cost of Neural Architecture Search to the same level as regular training.
- Directly specialized neural network architectures for target task / hardware.

Jan 2018 – Aug 2018 **Research Intern**, *Video Segmentation Group*, Sensetime, Advisor: Dr. Jianping Shi.
Research on color stability through videos, and fix point inference
- (Pending Patent) Propose an algorithm to reduce color variance under difference scenes.
- Design a quantization-aware loss that improves the accuracy under low-bit inference.

May 2017 – May 2018 **Research Assistant**, *CVL Lab*, Simon Fraser University, Advisor: Prof. Brian Funt.
Study color vision problems using deep learning technique.
- Proposed an algorithm to improve color quality using deep neural network.
- Evaluated the importance of color via CNN based classification.

May 2017 – Aug 2017 **Deep Learning Engineer**, *Self-driving Group*, TuSimple @ USA, Mentor: Dr. Panqu Wang.
- (Patent) Designed an algorithm that generates the road area from lidar cloud points.
- (Patent) Designed vehicle tail-light understanding system.
- Improved deep semantic segmentation model for real time scene parsing.

TuSimple Inc. is an unicorn startup aiming to achieve the first commercially viable autonomous truck driving platform with L4 (SAE) levels of safety.

Sept 2015 – May 2017 **Research Assistant**, *GruVi Lab*, Simon Fraser University, Advisor: Prof. Ping Tan.
Research in attribute recognition and 3D vision
- Designed an algorithm that optimizes localization for object detection.
- Contributed to *Garment Clothes*, a dataset with both cloth attribute and human pose.

Sept 2014 – Jan 2015 **Research Assistant**, *CAD & CG Lab*, Zhejiang University.
Research in computer graphics
- Implemented an image depth-detection algorithm
- Participated in the development of a material simulation system.

Honors and Awards

2017 **Open Source Scholarship**, Issued by Simon Fraser University.
To reward students who made a major contribution in an open source project.

2017 **Academic Scholarship**, Issued by Simon Fraser University.
Offered to students who are in excellent academic standing.

2015 **ACM-ICPC Contest**, Issued by Zhejiang University.
Silver Medal

2015 **The Mathematical Contest In Modeling**, Issued by Zhejiang University.
First prize, ranking 3/188

Projects

2018 **THOP: a flops counter of PyTorch framework**, *GitHub*.
A toolbox that calculates the multipy-adds operation of PyTorch models.
PS: if you search with keywoards (pytorch, flops, counter), THOP now ranks first on Google,

2017 **MXBox: a toolbox for MXNet framework**, *GitHub*.
- Data preprocess as a transformation flow.
- Efficient and flexible DataLoader.
- Out-of-box state-of-the-art models.

PS: MXBox is now available on PyPi. You can install through 'pip install mxbox'.

2016 **Colorize gray-scale image using deep neural networks**, *Project Page*.
- Implemented the state-of-the-art model, and accelerated training time from 3 weeks to 3 days.
- Introduced a simple feed-forward network for colorization task, which only requires 1/10 parameters while keeping competitive results to the state-of-the-art model.

2016 **Fast Artistic Stylization for Videos**, *Project page*.
Propose a fast and coherent video style transfer.
- Stable: unlike frame-by-frame transform, there is no artifact between frames.
- Fast: transformation with arbitrary styles can be achieved with 7 - 12 fps.

2016 **Chinese-English Translation System**, *Project page*.
- Implemented common basic utilities in NLP : segmentation, chunking, alignment and beam search.
- Implemented a traditional Phrase-Based translation with BLEU score 0.091.
- Implemented a seq2seq Neural Machine Translation approach with BLEU score 0.21.

2016 **Play with Multimedia**.
- Implemented RAW-to-JPEG converter with standard JPEG 2000.
- Implemented a simple video-gif converter based on GIF89 standardization.
- Built an image retrieval system with CNNs and reaches mAP 0.62 on Caltech 256 dataset.