Shaopeng Guo

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Education

- **The Hong Kong University of Science and Technology** — Hong Kong
  Bachelor of Engineering - Computer Science — *Aug. 2018*

Research Experience

- **The Hong Kong University of Science and Technology** — Hong Kong
  Supervisor: Prof. Chi-Keung Tang & Dr. Yu-Wing Tai — *Aug. 2021 - Present*
  - **Conditional Human Motion Prediction.** We propose a semi-supervised human motion prediction method. Based on single-frame SMPL input, our model can predict N frames forward and backward, conditioned on the human action input. (In Progress)
  - **Learning Transferable Part-Level Representations by Language Supervation.** We propose a multi-modal training method that instead of training with one-hot labels, we utilize the pre-trained language model to map labels into continuous feature space; with our novel human-part level training pipeline, the model can be trained on multiple fully-labeled dataset simultaneously by supervised learning and partially-labeled datasets by semi-supervised learning. Our method outperforms SOTA by a large margin. (CVPR2022 submission, First Author)
- **S-Lab, Nanyang Technological University.** — Remote
  Supervisor: Prof. Ziwei Liu — *Jan.2021 - Mar. 2021(Part-time)*
  - **Vision transformer** Considering the drawback of visual transformer (ViT) that requires a large amount of pretraining data and high computation cost, we designed an image-to-token module and a locally-enhanced layer. The models achieved similar or better performance with less than 1/3 of training iteration compare to original ViT. (ICCV 2021)
  - **Differentiable dynamic wiring network** We find that a fixed architecture may not be suitable for different data with high diversity. We address this issue by proposing Differentiable Dynamic Wirings, which learns the instance-aware connectivity that creates different wiring patterns for different instances. (ICCV 2021)
- **SenseTime Group Ltd.** — Hong Kong
  Supervisor: Dr. Junjie Yan — *Sept 2018 - Sept. 2019*
  - **Network Pruning via Differentiable Markov Process.** We model the channel pruning of neural networks as a Markov Process, with transition probabilities computed by a set of learnable parameters. The marginal probability of each network channel can be computed and fused into the network; thus, the Markov process could be optimized together with model parameters by gradient descent. Our method achieved SOTA results in various models on ImageNet dataset. (CVPR2020 Oral, First author)

Publications

- Kun Yuan, **Shaopeng Guo**, Ziwei Liu, Xinyu Xu, Aojun Zhou, Fengwei Yu, Wei Wu, "Incorporating Convolution Designs into Visual Transformers", IEEE International Conference on Computer Vision (ICCV) 2021
- Kun Yuan, Quanquan Li, **Shaopeng Guo**, Dapeng Chen, Aojun Zhou, Fengwei Yu, Ziwei Liu, "Differentiable Dynamic Wirings for Neural Networks", IEEE International Conference on Computer Vision (ICCV) 2021
- **Shaopeng Guo**, Yujie Wang, Quanquan Li, Junjie Yan, "DMCP: Differentiable Markov Channel Pruning for Neural Networks", IEEE Conference on Computer Vision and Patten Recognition (CVPR) 2021, **(Oral, 5.03% acceptance rate)**

Employment

- **The Hong Kong University of Science and Technology** — Hong Kong
  Research Assistant — *Aug.2021 - Present*
- **SenseTime Group Ltd.** — Hong Kong
  Research and Development — *May. 2019 - Jul. 2021*
  - **Large Model Pre-training.** Lead a small group with 4 members, work on transferring the knowledge from a large pre-trained model (trained on 400M web images) to variety of small models with few-shot learning and meta-learning.
  - **Deep Vision Model Training Framework.** One of two members that implement and maintain an efficient training framework including all widely used models, SOTA supervised, semi-supervised, and unsupervised training methods.
  - **Model production Tool Chain.** Participate in developing the internal tool chain for "production-ready" model, establish a complete pipeline from model pre-training to hardware deployment.
- *R&D Intern* — *Sept. 2018 - May 2019*
  - **Network Quantization for Efficient Inference.** Define network quantization as a convex optimization problem, the information loss from 32bit floating point to 4bit integer was represented by our proposed reconstruction loss, which was convex and could be optimized iteratively by gradient-based method. The quantized models had negligible accuracy loss and 2x faster inference speed on both GPUs and mobile processors.
- **Tencent YouTu Lab.** — Shen Zhen, China
  R&D Intern — *Sept. 2017 - Jan. 2018*
  - **Detection Driven Reinforcement Learning for 3D Game Playing.** Formulate the navigation in 3D immersive environment as reinforcement learning problem, and introduced an auxiliary task that learning to distinguish the foreground objects and background. A region proposal network was proposed to be the encoder of auxiliary task.