

Ce Zhang

<https://zhangce01.github.io/> @ cezhang@cs.cmu.edu (412) 844-1074

Education

- **Carnegie Mellon University, Pittsburgh, United States** Aug 2023 - Present
M.Sc. in Machine Learning, Machine Learning Department, School of Computer Science
- **Southern University of Science and Technology (SUSTech), Shenzhen, China** Aug 2019 - Jun 2023
B.Eng. in Communication Engineering, Department of EEE, College of Engineering GPA: 3.91/4.00 Rank: 1/30
Core Courses: Data Structures and Algorithm Analysis (100), Linear Algebra (100), Introduction to Computer Programming (98), Artificial Intelligence (96), Probability and Statistics (96), C/C++ Program Design (93).

Research Experience

- #1. **BDC-Adapter: Brownian Distance Covariance for Better Vision-Language Reasoning** Feb 2023 - Jun 2023
 - Introduced BDC to vision-language reasoning to provide a more robust metric for measuring feature dependence.
 - Integrated BDC prototype similarity reasoning and multi-modal reasoning network prediction to adapt CLIP efficiently.
 - Achieved SOTA performance on CLIP-based few-shot learning, domain generalization, and visual reasoning tasks.
- #2. **Neuro-Modulated Hebbian Learning for Fully Test-Time Adaptation** May 2022 - Nov 2022
 - Explored neurobiology-inspired Hebbian learning for effective early-layer representations for test-time adaptation.
 - Combined unsupervised Hebbian learning with a learned neuro-modulator to capture feedback from external responses.
 - Outperformed the previous state-of-the-art by 1.4%, 2.4%, 2.3% on CIFAR10-C, CIFAR100-C and ImageNet-C datasets.
- #3. **Critical Sampling for Robust Evolution Behavior Learning of Unknown Dynamical Systems** Jan 2022 - Oct 2022
 - Designed an adaptive sampling scheme guided by self-supervised multi-step reciprocal prediction error.
 - Introduced a joint spatial-temporal evolution network which incorporates spatial dynamics modeling into the temporal evolution prediction for robust learning the evolution operator with very few samples.
 - Reduced the numbers of samples needed for robust learning of evolution behaviors of PDE systems by up to 100 times.
- #4. **Self-Correctable and Adaptive Inference for Generalizable Human Pose Estimation** Feb 2022 - Aug 2022
 - Designed a self-supervised prediction-feedback-correction scheme by incorporating fitness feedback network and prediction error correction network to adjust the prediction results given unseen test samples.
 - Introduced a new loss function to perform quick adaptation of the correction network during the inference stage.
 - Achieved state-of-the-art performance on public MS COCO test-dev dataset, with average precision gain of 1.4%.

Publications

- **Ce Zhang**, Kailiang Wu, and Zhihai He. Critical Sampling for Robust Evolution Operator Learning of Unknown Dynamical Systems. [Under revision](#) in *IEEE Transactions on Artificial Intelligence (IEEE TAI)*, 2023.
- Yi Zhang*, **Ce Zhang***, Zihan Liao, Yushun Tang, and Zhihai He. BDC-Adapter: Brownian Distance Covariance for Better Vision-Language Reasoning. In *British Machine Vision Conference (BMVC)*, 2023.
- Xueting Hu, **Ce Zhang**, Yi Zhang, Bowen Hai, Ke Yu, and Zhihai He. Learning to Adapt CLIP for Few-Shot Monocular Depth Estimation. [Under review](#) in *IEEE/CVF Winter Conference on Applications of Computer Vision (WACV)*, 2023.
- Yushun Tang, **Ce Zhang**, Heng Xu, Shuoshuo Chen, Jie Cheng, Luziwei Leng, *et al.* Neuro-Modulated Hebbian Learning for Fully Test-Time Adaptation. In *IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, 2023.
- Zhehan Kan, Shuoshuo Chen, **Ce Zhang**, Yushun Tang, and Zhihai He. Self-Correctable and Adaptable Inference for Generalizable Human Pose Estimation. In *IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, 2023.

Honors and Awards

- *Top 10 Summa Cum Laude Graduates* (top 1%), SUSTech Jun 2023
- *Top 10 Undergraduate Graduates* (top 2%), College of Engineering, SUSTech May 2023
- *National Scholarship* (top 0.2%), Ministry of Education of the People's Republic of China Nov 2022
- *School Motto Scholarship Special Award* (top 1%), SUSTech Nov 2022
- *Academic Star* (top 2%), Shuli College, SUSTech Jun 2021 & Jun 2022
- *Outstanding Tutor*, SUSTech 8th & 9th Peer-Supporting Class on Linear Algebra Jan 2022 & Jun 2022
- *Meritorious Winner* (top 9.5%), Mathematical Contest in Modeling May 2022
- *The First Prize of Outstanding Student Scholarship* (top 5%), SUSTech Nov 2020 & Nov 2021
- *National Second Prize* (top 2%), Chinese Undergraduate Mathematical Contest in Modeling Oct 2021
- *Freshman Scholarship Merit Award*, SUSTech Sep 2019

Computer Skills

- *Programming Languages* Python, Java, C/C++, MATLAB, Kotlin, Markdown, LaTeX
- *Data Analysis Tools* PyTorch, Keras, Numpy, Scipy, Scikit-learn, Pandas, Matplotlib, Seaborn