Ce Zhang

https://zhangce.netlify.app/ @ zhangce.sustech@gmail.com (+86) 150-7127-4102

Education

- **Southern University of Science and Technology (SUSTech), Shenzhen, China** *Sep 2019 - Jun 2023*
  B.Eng. in Communication Engineering GPA: 3.91/4.00 Percentage Grade: 94.27/100 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).
- **Imperial College London, London, United Kingdom** *Jul 2021 - Aug 2021*
  Data Science Online Summer School Percentage Grade: 78/100 - Distinction

Research Experience

#1. Multi-Scale Self-Referential Correction Networks for Time Series Forecasting *July 2022 - Present*
- Characterized the prediction error by a self-referential error evaluated on a forward-backward prediction loop and adaptively adjusted the prediction. Extended self-referential correction to multiple time scales.
- Fused the error vectors and the differential vector information for joint error correction.
- Outperformed the previous state-of-the-art by 15% on public ETT and PeMS datasets.

#2. Neuro-Modulated Hebbian Learning for Fully Test-Time Adaptation *May 2022 - Nov 2022*
- Combined unsupervised Hebbian learning and neuro-modulator to update the source model during inference stage.
- Incorporated a soft decision rule into the feed-forward Hebbian learning to improve its competitive learning.
- 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 - Sep 2022*
- 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.
- Designed a adaptive sampling scheme guided by self-supervised multi-step reciprocal prediction error.
- 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 *Nov 2021 - Jul 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.
- Partitioned the body keypoints into 6 structural groups, utilized mutual information in groups to refine pose prediction.
- Achieved state-of-the-art performance on public MS COCO test-dev dataset, with average precision gain of 1.4%.

Project Experience

#1. Calculator and Music Player Applications Design | Kotlin, Android Studio | [Report] [Video] *Feb 2022 - Jun 2022*
- Designed numerical and operational buttons and supported advanced mathematical operations (e.g. factorial, square root). Designed seek bar, song list, functional buttons, and supported page jumping for the music player application.
- Developed light and dark mode user interfaces for both applications. Adapted to different real devices.

#2. P2P File Transfer System Protocol Design | Python | [Codes] [Slides] *Sep 2021 - Dec 2021*
- Prioritized nodes with high uplink bandwidth and actively choked nodes with sudden drops in uplink bandwidth.
- Designed the specific information stored on the tracker, the API provided by the tracker to the clients.
- The file transfer efficiency of the designed protocol outperforms the Server-Client by 176% in benchmarking scenarios.

#3. Halma Game Development | Java | [Codes] [Slides] *Mar 2020 - Jun 2020*
- Supported all basic rules of Halma (e.g. valid move judgement, game initializing and winning status detection).
- Supported match saving on JSON files and developed online mode in Local Area Network (LAN).
- Designed Human vs. Machine mode and implemented alpha-beta pruning algorithm for intelligent decision-making.

Publications

- **Ce Zhang**, Siqi Wu, Kailiang Wu, Zhihai He. Critical Sampling for Robust Evolution Behavior Learning of Unknown Dynamical Systems. Under peer review in *International Conference on Learning Representations* (*ICLR*), 2023.
- Yushun Tang, **Ce Zhang**, Heng Xu, Shuoshuo Chen, et al. Neuro-Modulated Hebbian Learning for Fully Test-Time Adaptation. Submitted to *IEEE/CVF Conference on Computer Vision and Pattern Recognition* (*CVPR*), 2023.
- Zhehan Kan, Shuoshuo Chen, **Ce Zhang**, Yushun Tang, et al. Self-Correctable and Adaptable Inference for Generalizable Human Pose Estimation. Submitted to *IEEE/CVF Conference on Computer Vision and Pattern Recognition* (*CVPR*), 2023.
- Zhehan Kan, Shuoshuo Chen, **Ce Zhang**, Yi Zhang, Zhihai He. Multi-Scale Self-Referential Correction Networks for Time Series Forecasting. Manuscript in preparation.

Honors and Awards

- *National Scholarship* (top 0.2%), Ministry of Education of the People's Republic of China *Nov 2022*
- *School Motto Scholarship Special Award* (top 0.4%), SUSTech *Nov 2022*
- *Academic Star* (top 2%), Shuli College of SUSTech *Jun 2021 & Jun 2022*
- *Outstanding Tutor*, SUSTech 8th & 9th Peer-Supporting Class Project *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

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