Xiaohan Zou

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Education

Pennsylvania State University — State College, PA
Ph.D. in Computer Science and Engineering — 08/2023 - Present

Boston University — Boston, MA
M.S. in Computer Science, GPA: 3.79/4.0 — 09/2021 - 01/2023

Tongiji University — Shanghai, China
B.Eng. in Software Engineering, GPA: 84.35/100 — 09/2016 - 07/2020

Publications and Preprints (also see Google Scholar)

P1 **Reconstruct before Query: Continual Missing Modality Learning with Decomposed Prompt Collaboration** [Paper]
Shu Zhao, Xiaohan Zou, Tan Yu, Huijuan Xu
Under review

P2 **TokenFlow: Rethinking Fine-grained Cross-modal Alignment in Vision-Language Retrieval** [Paper]
Xiaohan Zou, Changqiao Wu, Lele Cheng, Zhongyuan Wang
Preprint, 2022

P3 **Efficient Meta-Learning for Continual Learning with Taylor Expansion Approximation** [Paper]
Xiaohan Zou, Tong Lin
International Joint Conference on Neural Networks (IJCNN), 2022, ***Oral***

P4 **To be an Artist: Automatic Generation on Food Image Aesthetic Captioning** [Paper]
Xiaohan Zou, Cheng Lin, Yinjia Zhang, Qinpei Zhao
International Conference on Tools with Artificial Intelligence (ICTAI), 2020, ***Oral***

P5 **A Survey on Application of Knowledge Graph** [Paper]
Xiaohan Zou
International Conference on Control Engineering and Artificial Intelligence (CCEAI), 2020

Industry Experience

Kuaishou Technology · Intelligent Creation Team — Beijing, China
Machine Learning Engineer Intern — 2021 - 2022
Worked on fine-grained vision-language learning (see P2). Built a PyTorch codebase for video-text retrieval.

China Electronics Technology Group Corporation — Chongqing, China
Software Engineer Intern — 2020 - 2021
Participated in developing a security visualization system for an archaeological site, utilizing Vue and Cesium.

Banana Interactive — Shanghai, China
Game Engineer Intern — 2019 - 2020
Developed and maintained three HTML5 games using JavaScript and Affinity Designer.

Academia Experience

Boston University — Boston, MA
Graduate Student Researcher (Advisor: Prof. Bryan Plummer) — 2022 - 2023
Worked on rehearsal-free continual learning with an arbitrary, fixed parameter budget.

Peking University Remote
Research Intern (Advisor: Prof. Tong Lin) 2020 - 2022
Designed a fast meta-learning algorithm for continual learning problems (see P3).

Tongji University Shanghai, China
Undergraduate Student Researcher (Advisor: Prof. Qinpei Zhao) 2020
Proposed a method for food image aesthetic captioning and created a dataset for this novel task (see P4).

Tongji University · Xlab Shanghai, China
Undergraduate Student Researcher (Advisor: Prof. Qingfeng Du) 2018 - 2019
Worked on 1) speech emotion recognition and 2) fault diagnosis for microservice architectures without knowledge of the calling graph using Bayesian networks.

Peking University Beijing, China
Research Intern (Advisor: Prof. Tong Lin) 2018
Worked on semi-supervised machine translation utilizing the structure duality.

Selected Projects

Scalable Parameter-Efficient Continual Learning 2022 - 2023
Boston University (Advisor: Prof. Bryan Plummer) Boston, MA

- Achieved zero forgetting with an arbitrary, fixed parameter budget and without episodic memory
- Proposed learning task-specific networks through shared weight templates, where each network layer is defined as a linear combination of these templates
- Surpassed the majority of recent methods while using less than one-fifth of the parameters

Fine-grained Vision-Language Learning (See P2) 2021 - 2022
Kuaishou Technology (Mentor: Changqiao Wu) Beijing, China

- Devised a novel model-agnostic framework for fine-grained cross-modal semantic alignment, subsuming recent popular works into the proposed scheme
- Proposed a fine-grained video-text retrieval method that achieves better or on-par performance against the SoTA approaches with heavy model designs, by merely altering the similarity function

Efficient Meta-Learning for Continual Learning (Published in *IJCNN 2022*, see P3) 2021 - 2022
Peking University (Advisor: Prof. Tong Lin) Remote

- Designed an efficient method for estimating parameter importance using Taylor expansion
- Proposed a fast meta-learning algorithm for continual learning that calculates the gradient of meta-updates in closed-form, bypassing the need for Hessian information
- Outperformed strong baselines while optimizing much more efficient on popular benchmarks

Selected Software

Flint: A toy deep learning framework built from scratch using Numpy (see code)

- Implemented an autograd engine, layers (Linear, Convolution, MaxPooling, Unfold, Dropout, Flatten), 6 optimizers, 4 loss functions, 3 activation functions, 5 initializers, and a data loader in pure Numpy
- Wrote complete documentation and comprehensive unit tests

Awards and Honors

Bronze, China Collegiate Programming Contest (CCPC) 2018
Finalist, ACM International Collegiate Programming Contest (ICPC) Asia Regional 2018
Second Prize, China Mathematical Contest in Modeling (CUMCM) 2017, 2018
Second Prize, Tongji University Programming Contest 2017, 2018
Second Prize, East China Normal University Programming Contest 2017

Services and Activities

Reviewer for NeurIPS 2023

Vice Chief Technology Officer & Chief Experience Officer at Tongji Microsoft Student Club 2018 - 2019

Core Courses

Machine Learning: Vison and Language, Natural Language Processing, Machine Learning, Image and Video Computing, Computational Tools for Data Science

Mathematics: Probability and Mathematical Statistics, Calculus, Linear Algebra, Discrete Mathematics

Skills

Programming Languages: Python, JavaScript/TypeScript, HTML/CSS, Java

Tools and Frameworks: PyTorch, Vue, React, Flask, Django, Linux, Git, LaTeX

Languages: Chinese (native), English (proficient)