# Xiaohan Zou

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## Education

**Boston University** Boston, MA
M.S. in Computer Science 09/2021 - 01/2023

**Tongiji University** Shanghai, China
B.Eng. in Software Engineering 09/2016 - 07/2020

## Publications and Preprints

P1 **TokenFlow: Rethinking Fine-grained Cross-modal Alignment in Vision-Language Retrieval**
Xiaohan Zou, Changqiao Wu, Lele Cheng, Zhongyuan Wang
*Preprint, 2022*

P2 **Efficient Meta-Learning for Continual Learning with Taylor Expansion Approximation**
Xiaohan Zou, Tong Lin
*International Joint Conference on Neural Networks (IJCNN), 2022* ***(Oral)***

P3 **To be an Artist: Automatic Generation on Food Image Aesthetic Captioning**
Xiaohan Zou, Cheng Lin, Yinjia Zhang, Qinpei Zhao
*International Conference on Tools with Artificial Intelligence (ICTAI), 2020* ***(Oral)***

P4 **A Survey on Application of Knowledge Graph**
Xiaohan Zou
*International Conference on Control Engineering and Artificial Intelligence (CCEAI), 2020*

## Industry Experience

**Machine Learning Engineer Intern** 07/2021 - 07/2022
Kuaishou Technology Beijing, China

- Devised a new model-agnostic formulation for fine-grained cross-modal semantic alignment and subsumed the 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 design by only altering the similarity function (see P1)
- Built a highly flexible PyTorch codebase for video-text retrieval to benefit the group members' research work

**Software Engineer Intern** 10/2020 - 06/2021
China Electronics Technology Group Corporation Chongqing, China

- Involved in building a security visualization system for an archaeological site using Vue and Cesium

**Game Engineer Intern** 10/2019 - 05/2020
Banana Interactive Shanghai, China

- Developed and maintained 3 H5 games using JavaScript and Affinity Designer

## Research Experience

**Scalable Parameter-Efficient Continual Learning** 09/2022 - Present
Boston University (Advisor: Prof. Bryan Plummer) Boston, MA

- Achieved zero forgetting using an arbitrary, fixed parameter budget and no episodic memory
- Proposed to learn task-specific networks with shared weight templates, where each network layer is defined as the linear combination of the templates
- Surpassed most of the recent methods even when using less than one-fifth of the number of parameters

**Efficient Meta-Learning for Continual Learning** 09/2021 - 01/2022
Peking University (Advisor: Prof. Tong Lin) Remote

- Designed an efficient method for parameter importance estimation via Taylor expansion
- Proposed a fast meta-learning algorithm for continual learning problems, which expresses the gradient of meta-update in closed-form instead of using Hessian information, **published in IJCNN 2022** (see P2)
- Outperformed strong baselines while optimizing much more efficient on popular benchmarks

**Personalized Product Description Generation** 06/2021 - 08/2021
Deecamp 2021 (Champion of the Language Track)

- Incorporated user information to T5 pre-trained language model using bidirectional attention to generate personalized descriptions for target users
- Designed a transformer to make use of the external knowledge extracted from a structural knowledge graph for providing informative product descriptions

**Food Image Aesthetic Captioning** 03/2020 - 06/2020
Tongji University (Advisor: Prof. Qinpei Zhao) Shanghai, China

- Proposed a novel framework consisting of a single-attribute captioning module and an unsupervised text summarization module to generate aesthetic captions for food images, **published in ICTAI 2020** (see P3)
- Designed a data filtering strategy inspired by TF-IDF method for building a dataset for this new task
- Introduced two new evaluation criteria to assess the novelty and diversity of the generated captions
- Outperformed baselines and existing methods substantially in terms of diversity, novelty, and coherence

**Semi-Supervised Machine Translation** 07/2018 - 08/2018
Peking University (Advisor: Prof. Tong Lin) Beijing, China

- Proposed a dual learning framework based on shared hidden space to utilize the structure duality to boost the learning of two dual tasks and better regularize the model
- Designed two denoising auto-encoders consisting of encoders and decoders of two traditional Seq2Seq neural machine translators to make use of unpaired data
- Outperformed strong baselines by 1.0-2.9 BLEU on IWSLT'15 (English-Vietnamese) and WMT'14 (English-German), the improvement is more obvious when labeled data is little

## 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

## Core Courses

**Machine Learning:** Machine Learning, Image and Video Computing, Computational Tools for Data Science
**Mathematics**: Probability and Mathematical Statistics, Calculus, Linear Algebra, Discrete Mathematics

## Other Activities

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

## Skills

**Programming Languages:** Python, JavaScript/TypeScript, HTML/CSS, Java, C/C++
**Tools and Frameworks:** Git, PyTorch, Keras, scikit-learn, Linux, Vue, React, Django, LaTeX
**Languages:** Chinese (native), English (proficient)