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**
<u>Xiaohan Zou</u>, Changqiao Wu, Lele Cheng, Zhongyuan Wang
Preprint, 2022

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

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

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

Industry Experience

Machine Learning Engineer Intern   07/2021 - 04/2022
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)
- Developed a PyTorch library for video-text retrieval which is benefiting 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

Parameter Sharing for Task-Incremental Learning   09/2022 - Present
Boston University (Advisor: Prof. Bryan Plummer)   Boston, MA

- Enabled cross-layer parameter sharing to reduce memory cost while growing the model architecture to avoid catastrophic forgetting when given a new task
- Represented each layer with a linear combination of the template weights to allow parameter sharing
- Achieved SoTA performance even when using fewer 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 SoTA methods while optimizing much more efficient in experiments on popular benchmarks

Personalized Product Description Generation   06/2021 - 08/2021

- 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 of Tongji Microsoft Student Club   2018 - 2019
Member of Tongji Softball Team   2016 - 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, TOEFL: 106, GRE: 322)