# 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 Submitted Manuscripts

- **Xiaohan Zou**, Changqiao Wu, Lele Cheng, and Zhongyuan Wang. "TokenFlow: Rethinking Fine-grained Cross-modal Alignment in Vision-Language Retrieval", **submitted to** ACM International Conference on Multimedia (**ACM MM**), 2022.
- **Xiaohan Zou**, and Tong Lin. "Efficient Meta-Learning for Continual Learning with Taylor Expansion Approximation", **submitted to** International Joint Conference on Neural Networks (**IJCNN**), 2022.
- **Xiaohan Zou**, Cheng Lin, Yinjia Zhang, and Qinpei Zhao. "To be an Artist: Automatic Generation on Food Image Aesthetic Captioning", International Conference on Tools with Artificial Intelligence (**ICTAI**), 2020. (Acceptance Rate: 25%, **Oral Presentation**) [Paper] [Code] [Slide]
- **Xiaohan Zou**. "A Survey on Application of Knowledge Graph", International Conference on Control Engineering and Artificial Intelligence (**CCEAI**), 2020. [Paper]

## Professional Experience

**Machine Learning Engineer Intern**, Kuaishou Technology, Beijing                        07/2021 – 04/2022
- 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 video-text retrieval method which is competitive when compared with the SoTA approaches with heavy model design by only altering the similarity function, **submitted to ACM Multimedia 2022**
- Developed a PyTorch library for video-text retrieval which is benefiting the group members' research work

**Software Engineer Intern**, China Electronics Technology Group Corporation            10/2020 – 06/2021
- Involved in building a security visualization system for Sanxingdui using Cesium and Vue, responsible for displaying 3D models and visualizing sensor data
- Labeled ancient handwritten Chinese characters and generated OCR training files automatically using Python and Shell
- Developed a demo for a real time person pose estimation model

**Game Engineer Intern**, Banana Interactive, Shanghai, China                              10/2019 – 05/2020
- Participated in the development and maintenance of 3 H5 games using JavaScript and Affinity Designer
- Completed the first release version of a H5 game independently
- Improved the readablity of code through code refactoring and developed a skin system, shop system and item system for the other two games
- Ported a game packaging and deployment tool from Windows to Linux and macOS

## Research Experience

**Personalized Product Description Generation**, Deecamp 2021                              06/2021 – 08/2021
- Incorporated product attributes, personalized information and external knowledge to T5 pre-trained model using transformer and bidirectional attention to generate interesting and informative product descriptions
- Built the frontend of a fancy cross-platform website for interacting with our model using Vue and uni-app
- Won the **champion of the language track** in Deecamp 2021

**Meta-Learning for Continual Learning**, Peking University, Beijing                    08/2020 − 01/2022
Advisor: Prof. Tong Lin

- 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, **submitted to IJCNN 2022**
- Outperformed SoTA methods while optimizing much more efficient in experiments on popular benchmarks

**Food Image Aesthetic Captioning**, Tongji University, Shanghai [Project Page]                    03/2020 − 06/2020
Advisor: Prof. Qinpei Zhao

- Proposed a novel framework consisting of a single-attribute captioning module and an unsupervised text summarization module for generating aesthetic captions for food images, **published in ICTAI 2020**
- 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 existed methods substantially in terms of diversity, novelty and coherence

**Fault Diagnosis for Microservice Architectures**, Tongji University, Shanghai                    09/2018 − 01/2019

- Represented the microservices of a cloud platform and the causal relationships between them by a Baye-sion network against the observed performance metrics dynamically using PC algorithm
- Identified the culprit microservices when an anomaly occured using random walk
- Outperformed traditional approaches with 6.56% accuracy improvement, without knowing the calling graph

**Chatbot**                    10/2018 - 11/2018
Advisor: Dr. Fan Zhang

- Built a chatbot which can identify and analyze the intentions of users and provide stock and weather in-formation using RasaNLU
- Achieved intention classification and named entity recognition based on SVM using spaCy and scikit-learn
- Allowed multi-turn dialogue and handling pending actions using finite state automaton
- Integrated the chatbot to WeChat and QQ for a better user interface

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

- 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 (Eng-lish-German), the improvement is more obvious when labeled data is little

## Open-Source Projects

**Flint**: A toy deep learning framework implemented in Numpy from scratch [Github]                    01/2021 − Present

- Implement an autograd engine, Linear, Convolution, Pooling, Flatten, RNN, Dropout and BatchNorm lay-ers, 6 optimizers, 4 loss functions, 3 activation functions, 5 initializers and a data loader in pure Numpy
- Wrote complete documentation and comprehensive unit tests

**Speech Emotion Recognition** [Github]                    04/2019 − 06/2019

- Implemented several models and features extracting methods for speech emotion recognition
- Achieved 7.2 - 12.2 accuracy improvement over baseline on four benchmark datasets: CASIA (Chinese), EMODB (German), SAVEE (English), and RAVDESS (English), got over 300 Github stars

## Awards and Honors

**Champion of Language Track**, Deecamp                    2021
**Bronze**, China Collegiate Programming Contest (CCPC)                    2018

**Honorable Mention**, ACM International Collegiate Programming Contest (ICPC) Asia Regional    2018
**Second Prize**, Programming Contest of Tongji University    2017, 2018
**Second Prize**, China Mathematical Contest in Modeling (CUMCM)    2017, 2018
**Second Prize**, Programming Contest of East China Normal University    2017

## Leadership and Activities

**Vice Chief Technology Officer & Chief Experience Officer**, Tongji Microsoft Student Club    2017 - 2019
- Participated in seminars and meetings
- Gave lectures about data structure and algorithms as well as their applications in machine learning

**Vice President**, Baseball and Softball Association of Tongji University (Jiading campus)    2018 - 2019
**Member**, Softball Team of Tongji University    2016 - 2019

## Core Courses

- **Boston University:** Machine Learning, Image and Video Computing, Cryptography, Computational Tools for Data Science
- **Tongji University**: Probability and Mathematical Statistics, Discrete Mathematics, Calculus, Linear Algebra, Object-Oriented Programming, Data Structure, Algorithm, Operating Systems, Principles of Compilers, Database, SOA and Web Services, Distributed System, Web System and Technology, Design Patterns

## Skills

**Programming Languages:** Python, JavaScript/TypeScript, HTML/CSS, Java, C/C++, MATLAB
**Tools and Frameworks:** Git, PyTorch, Keras, scikit-learn, Linux, Vue, React, Django, LaTeX
**Languages:** Chinese (native), English (proficient, TOEFL: 106, GRE: 322)