Jianzhu Yao

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Research Interest

My primary research interests are in the fields of Natural Language Processing and Machine Learning, including conversational systems, consistent and faithful generation, and biomedical application. I am also very excited about the research field of ***Language + {Multimocal Information, Knowledge, Memory, Mixture of Experts...}***.

Education

Tsinghua University **Sep 2019 – Present**

Bachelor of Computer Science and Technology; GPA: 3.86/4.00 *Beijing, China*

Courses: Introduction to Machine Learning, Probability and Statistics, Introduction to Artificial Intelligence, Data Structures, Linear Algebra, Object-Oriented Programming, Operating Systems, Compiler, Computer Architecture, Software Engineering, Network

Publications

- **A Benchmark for Understanding and Generating Dialogue between Characters in Stories**
  Jianzhu Yao, Ziqi Liu, Jian Guan, Minlie Huang
  EMNLP 2022, under review

- **EVA2.0: Investigating Open-Domain Chinese Dialogue Systems with Large-Scale Pre-Training**
  Yuxian Gu, Jiaxin Wen, Hao Sun, Yi Song, Pei Ke, Chujie Zheng, Zheng Zhang, ***Jianzhu Yao***, Xiaoyan Zhu, Jie Tang, Minlie Huang
  arXiv:2203.09313

Research Experience

Wang Lab, University of Washington, Seattle **Jul 2022 – Present**

Research Assistant *Remote*

- Utilized biomedical knowledge base to retrieve extra information, and implemented Graph Convolutional Network on the relation graph in order to generate more faithful and accurate terminology definition.
- Designed terminology definition generation evaluation metrics focused on the faithfullness and factuality, considering existing automatic evaluation metrics' bad performance.

Natural Language Computing Group, Microsoft Research Asia **Mar 2022 – Jun 2022**

Research Intern *Beijing, China*

- Conducted profiling experiments of Mixture of Experts models with different numbers of experts and devices to observe the computing cost trend of all2all communication.
- Explored expert pruning algorithms on the Mixture of Experts language models in order to speed up computation, lower computation latency, and reduce GPU memory usage.

Conversational AI Group, Tsinghua University **Jul 2021 – Mar 2022**

Research Assistant *Beijing, China*

- Independently designed a benchmark for dialogue understanding and generation between characters in stories, and a character-modeling approach for those tasks.
- Collaborated with team members on the development of the Open-Domain Chinese Dialogue System EVA1.0 and EVA2.0, and responsible for decoding strategies.
- Trained and implemented a contradiction detection classifier (RoBERTa) for Chinese Dialogue Systems, and designed the regeneration pipeline in order to avoid the inconsistent generation.

Graphics & Geometric Computing Group, Tsinghua University **2021**

Research Assistant *Beijing China*

- Researched on rotation invariance of image local features in object reconstruction based on deep learning methods and traditional algorithms.
- Observed the effect of image transformation (like rotation, style transformation, affine transformation, streching) on feature extraction and matching in SuperPoint, D2-Net, SuperGlue, and SIFT.

Selected Projects

- **Gym Reservation Script(Python, Selenium, PhantomJS, Shell, Wireshark)**: Developed a script using Python and PhantomJS to register for a timeslot at gym with captured cookie by Wireshark. (May 2021)
- **K-Means Clustering on MNIST(Python, K-Means, NumPy, Matplotlib, sklearn)**: Implemented K-Means Clustering Algorithm on MNIST dataset. (Apr 2022)
- **Ensemble Learning Experiment on Spam Classification(Python, SVM, Decision-Tree, Bagging, AdaBoost)**: Incorporated SVM and Decision-Tree with ensemble learning method Bagging and AdaBoost for spam classification. (May 2022)
- **Four-in-a-row AI Bot(C++, Monte Carlo Tree Search, Upper Confidence Bound Apply to Tree)**: Designed an AI bot with MCTS and UCB algorithm to compete with other AI bots of Four-in-a-row game. (Apr 2021)
- **Enterprise personnel permissions Management System(Vue, JavaScript, Front-end)**: Developed a front-end service for the management of personnel permissions in an enterprise(Kuaishou). (Nov 2021)
- **Education platform app based on knowledge graph(Java, SpringBoot, Android Studio, Full-stack)**: Developed the Front-end and Back-end educational application IntelEdu based on knowledge graph with a semantic similarity classifier(BERT). (Aug 2021)
- **KD-Tree based Stochastic Progressive Photon Mapping image rendering framework(C++)**: Implemented the SPPM algorithm, KD-Tree based Bounding Box for intersection acceleration, 3-d scene construction, anti-aliasing, motion blur, etc. (May 2021)

Services and Membership

- EMNLP 2022 Review Committee for the track Dialogue and Interactive Systems, Jul. 2022
- Member of the Bodybuilding Team of Tsinghua University, 2022 – Present
- Member of the Winter Swimming Association of Tsinghua University, 2021 – Present
- Member of Tsinghua University Admission Group in Heilongjiang Province, Jun. 2020
- Member of Student Association for Science and Technology, Dept. CST of Tsinghua University, 2020 – Present
- Member of Swimming Team of CST in Tsinghua University, 2019 – 2019

Workshops

Mutlimodal Machine Learning + Mixture of Experts **June 2022**

Participant *Beijing, China*

- Did a literature survey, and gave a presentation on the multimodal machine learning: Hierarchical Overview of Multimodal Machine Learning — And potential ideas with personal insights. [slides]
- Inspired by multimodal + MoE, designed experiments for Multitask Multimodal MoE, and wrote a research proposal: MMMoE: Advancing Multimodal Mixture-of-Experts Architecture to Power Next-Generation Multimodal Paradigm. [pdf][slides]

Technical Skills

Programming Languages: Python, Latex, Java, C, C++, C#, Shell, HTML/CSS, MATLAB, Assembly(RISC-V, x86)
Developer Tools: VS Code, PyCharm, Git, Docker, Linux, Xcode, Unity Hub, Vim, Android Studio, Vivado, Quartus
Libraries/Frameworks: PyTorch, Transformers, Fairseq, spaCy, CoreNLP, NumPy, Matplotlib, Jupyter Notebook, Scikit, Keras, Django, SpringBoot, Vue
Soft Skills: Critical Thinking, Event Management, Presentation, Paper Writing, Time Management, Teamwork

Honors / Awards

- Academic Excellence Award, Tsinghua University, 2020
- 37th National Physics Competition for College Students in Beijing, China, First Prize, 2021
- The first prize of Engineering Technology Challenge, Tsinghua University, 2019
- The first prize of the Province Degree in the national Physic competition (senior group), 2018

Volunteer Service

- **Program Buddy:** Providing programming guidance for students not from institute of information. (2020, 2021)
- **The 110th anniversary of Tsinghua University:** Providing reception services. (2021)
- **International Collegiate Competition for Brain-inspired Computing:** Tournament service staff. (2019)